Northern Ireland Water Ltd
Annual Information Return 2012

Part 3 of 10 containing:
Non-financial Measures - commentaries for tables 7 to 16b
(excluding table 10b)

Public Domain Submission
3 December 2012

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Table 7 – Non financial measures – Water properties and population

Commentary by REPORTER

1. Background

This table reports on the properties connected during the year, billing information and average report year population estimates.

2. Key Findings

- We were able to reconcile the property numbers reported to the Rapid extract presented by NI Water.
- However, there are some minor anomalies in NI Water's new connections data.
- Methodologies for Block B have changed from AIR11 which made small (within the confidence grade) differences to the reported numbers.
- We believe that the confidence grades for property numbers should remain consistent with those agreed in Undertaking A.
- Methodology Statements require further improvements.
- The methodology for Block C is consistent with that used in AIR11.
- NI Water has assigned confidence grades to the population data reported in Table 7 of AIR12. Whilst we feel NI Water has made a reasonable estimate of the confidence grades, based on an understanding of the NISRA methodology, we do not consider this provides any discernable value to the Utility Regulator, as the data has been primarily sourced from the NISRA website.

3. Audit Approach

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.

4. Audit Findings

4.1 General

The key source of information for the new connections and property data is the customer billing database, RapidXtra. This is an automated system where customer information is updated through various means, including customer contact. The Company outlined that data on property counts and classifications are reported monthly and reconciled with other data collection activities, such as the test metering project. During the audit we sought an update on various issues which had been raised in previous AIRs and PC10 reviews. The following provides an overview of the discussions held with NI Water:

Whilst we acknowledge that the information needed to populate this table generally requires the extraction of the relevant information from the Company's Rapid system, we believe that the methodology statements need improvement to better explain the data sources and assumptions used.

Test meters

NI Water outlined that their test meter project is ongoing with accounts being assessed and reclassified as appropriate. The Company advised that the survey of all 10,898 test meter accounts was completed in 2011/12, 43 of these still need to be confirmed and uploaded to Rapid.

NI Water advised that a different approach has been adopted in reporting household and non-household property numbers, by 'Test' meter numbers have been included in household property numbers but excluded from non-household numbers. This methodology is consistent with the Company approach in previous AIR submissions.

Site meters

The Company explained that as part of their ongoing data checks the number of site metered properties (multiple properties being charged through a single meter) is currently being investigated and verified. To ensure these are not double counted the Company has excluded these meters from their Table 7 property counts. We understand this approach is consistent to that adopted in previous AIR submissions.

4.2 Properties

Line 1 – Household properties connected during the year

This line reports the number of new household properties added within the Company's area of supply. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water.

We note a decrease of 910 (or 19%) new connections when compared to the 10/11 Report Year. We believe this conflicts with the assumptions on growth forecasted in the recent PC13 submission. The Company explained that they maintained the Business Plan submission assumption of 5,550 new connections for the reason of consistency.

We have checked the Company's list of new connections for 11/12 and raised several queries. These apply to both household and non-household properties and are detailed together below with NI Water's responses.

1. The methodology for new connections states that '*Properties with a reference number of 0 were excluded*'. NI Water explained that these were omitted as there was a potential to double count. The volume and reason for exclusion will be reviewed during this reporting year.

2. NI Water includes properties where the status is '***Demolished***'. NI Water explained that this will be reviewed during this reporting year. These properties have been included as they are properties which have been newly connected this year, albeit may also have been demolished in the same year, or water status has not been updated to reflect the current position.

3. When the 'Original Transaction Description' states that properties are classed as '***Water Connx Only*** (presumably water connection only)', these properties also have various sewerage services assigned.

   The Company explained that there are 3 categories used in the new connection list: The 'Water Connx Only <32mm (W/o Exc)' refers solely to the connection of the pipework and it is not related on the sewerage status. There is no concern in water, however sewerage numbers remain concerned.

4. When 'Water status' and its 'Description' are ***well water***, these properties are assumed to be connected to water services. NI Water explained that this will be reviewed during this reporting year.

5. When 'water status' and its 'Description' are ***Unm Water not supplied***, they are also assumed to be connected to water services. NI Water explained that this will be reviewed during this reporting year.

Line 2 – Non-household properties connected during the year

This line contains the number of new non-household properties added within the Company's area of supply during the Report Year. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water. However we have raised queries on the data and population of Table 7 (please see the section above).

We note a slight increase of 45 new connections when compared to the 10/11 Report Year. NI Water outlines that they believe this increase is associated with a slow economic recovery and state that this will continue for the next few years.

4.3 Billing

Line 3 – Households billed unmeasured water

We note an increase of 9,463 properties reported in this line since 10/11. The Company was able to demonstrate the consistency of the number reported in this line to extracts from records on Rapid.

This line is calculated as the average of occupied domestic unmeasured plus the properties where a test meters has been identified. NIAUR has asked the Reporter to check the numbers and comment if there are difference between PC13 and AIR submissions.

	AIR12 (000's)	PC13 2011/12 (000's)	PS 2012-13 (000's)
Unmeasured Household	672.816	673.406	
Measured Household	0	0	
Unmeasured non-Household	11.943	11.629	11.629
Measured non-household	68.674	68.523	68.952
Void Properties	52.981		

Note that the figure for AIR is April-March average, and PC13 is November-October average while PS is 1st of December figure. The divergences in each of the 3 submissions are largely a result of the dates of each submission. Nevertheless, the three submissions are reasonably well aligned with relatively small percentage differences.

Line 4 – Households billed measured water (external meter)

Whilst NI Water has been installing meters on all new household connections since April 2007, customers are not being charged on a measured basis. As such, all household properties are reported as unmeasured. We believe this is appropriate.

Line 5 – Households billed measured water (not external meter)

The number of billed measured households is again reported as zero. This remains unchanged from AIR08. The Company does install internal meters on household properties but these are not charged upon.

Line 6 – Households billed water

This is a calculated line, the sum of lines 3, 4 and 5. The figure reported represents the number of domestic properties that would have been billed had charges been introduced.

The increase observed is consistent with the rise in unmeasured household properties reported in line 3.

Line 7 – Household properties (water supply area)

We note that the number of household properties connected in the Company's water supply area has increased by circa 10,516 since 2010/11. We have checked that the Company calculated this number as the total number of domestic connections (including voids) less those customers who are connected for sewerage only or receive water from well supplies.

Line 8 – Non-households billed unmeasured water

As expected we note that the number of non-households billed for unmeasured water within the supply area has decreased by circa 1,705 (13%) during the year.

The decrease observed is also a result of the Company's non-household metering programme. We reviewed the Company's progress in delivering this programme and our commentary on delivery of the programme this is provided in Table 8.

Line 9 – Non-households billed measured water

Our audit indicates that the Company has followed their stated methodology in preparing this line.

We note that the number of non-households billed for measured water within the supply area has slightly decreased by 39 properties since 2010/11. According to PC10 business plan agreement the Company has targeted 1,000 higher consumption NHH properties for meter installation, and they have achieved at 747 (please see Table 8 commentary for the detail), thus we would have expected to observe a corresponding increase in the number of measured properties reported in this line. We assume that more properties than envisaged have been categorised as voids or demolished. NI Water also added to that this reduction could also be due to occupied properties moving to voids or occupied properties moving to the domestic unmeasured category. However, this decrease was not fully evident in this line.

Line 10 – Non-households billed water

This is a calculated line and is the sum of lines 8 and 9.

Line 11 – Non-household properties (water supply area)

We note that the average number of connected non-household properties within the water supply area, including void properties, has decreased by 6,602 from 10/11. Similarly to line 7, this number is calculated as the average of gross non-domestic, less those customers who do not receive a water supply or are connected for sewerage only. As reporting methodologies become embedded over time we would expect the number of properties reported within this line to remain relatively consistent over time.

Line 12 – Void properties

The number reported in this line has remained relatively consistent from that reported previously in AIR11. NI Water defines properties within this line as those which are connected to the distribution system but do not receive a charge as there are no occupants.

4.4 Reconciliation of the property numbers

Whilst the Reporting Requirements ask the Company to provide a reconciliation of the property numbers in Table 7 to the figures reported in Table 2, the Company has not commented. We provide our understanding of the reconciliation here.

Each line in Table 7 is calculated as follow.

4.4.1 Line 3 Household billed unmeasured water

	31/03/2011	31/03/2012
uHH	649,249	654,863
mHH (Test meter)	1,529	934
mHH	17,491	20,714
HH (Site meter)	392	459
Total	**668,661**	**676,970**
Average	**672,816**	

The methodology has changed to include site meters in the AIR12 submission, which made a small difference of 0.06% and immaterial.

4.4.2 Line 7 Household properties (water supply area)

	31/03/2011	31/03/2012
uHH	687,054	692,222
mHH (Test meter)	1,546	944
mHH	19,652	24,240
HH (Site meter)	475	548
Total	**708,727**	**717,954**
Average	**713,341**	

4.4.3 Line 8 Non household billed unmeasured water

	31/03/2011	31/03/2012
uNHH	12,618	11,267
Average	**11,943**	

4.4.4 Line 9 Non household billed measured water

	31/03/2011	31/03/2012
mNHH	68,487	68,860
Average	**68,674**	

4.4.5 Line 11 Non household properties (water supply area)

	31/03/2011	31/03/2012
uNHH	20,813	19,171
mNHH	72,917	73,242
Total	**93,730**	**92,413**
Average	**93,072**	

The methodology has changed to include measured non household (Test meter) and unmeasured non household (not charged) in AIR12 submission. The difference between AIR11 reported figure (97,621) and the calculated figure (93,730) using AIR12 methodology is 4%.

4.4.6 Line 12 Void properties

	31/03/2011	31/03/2012
uNHH	8,195	7,904
mNHH	40430	4,382
uHH	37,805	37,359
mHH	2,161	3,526
mHH (Test meter)	17	10
HH (Site meter)	83	89
Total	**52,691**	**53,270**
Average	**52,981**	

The methodology has changed to include the number of unmeasured (not charged) in AIR12 submission. The difference between AIR11 reported figure (52,695) and the calculated figure (52,691) using AIR12 methodology is 0.01% and this is immaterial.

4.4.7 Reconciliation between Table 2 and Table 7

As noted, NI Water has amended their methodologies for Tables 2 and 7. In the table below, we summarise the differences that this change has had on the numbers reported in AIR11. In our view, the total number of connected properties should include measured non household Test Meters (if not double-counted) and unmeasured non household not charged. Nonetheless, the difference this methodology change has had on AIR11 numbers is immaterial.

We have checked the 10/11 Rapid report and 11/12 Rapid report. Although the different methodologies were adopted to calculate figures for Tables 2 and 7 from AIR11 to AIR12, these figures are consistent with the figures reported in each AIR11 and AIR12 Table 7.

	T2L1 as at 31/03/11			T2L1 as at 31/03/12	
	AIR11 Reported	AIR11 Correction		AIR12 Reported	
	Connected			Connected	
uNHH	20,813	20,813	T7L11	19,171	T7L11
mNHH	72,917	72,917		73,242	
uHH	687,054	687,054	T7L7	692,222	T7L7
mHH	19,652	19,652		24,240	
Test meter	1,546	1,546		944	
Site meter	475	475		548	
mNHH Test meter	3,269				
Trade effluent	96				
uNHH Not charged	622				
Total	**806,444**	**802,457**	T2L1	**810,367**	T2L1

Although different methodologies were adopted in AIR11 and AIR12, the differences are small (please refer to the above sections for each line). We believe that these differences should therefore make an immaterial difference to the reported numbers but urge NI Water to adopt a consistent approach between years.

4.5 Population

Total population is derived from 2010 based population projections obtained from the Northern Ireland Statistics and Research Agency (NISRA), which are provided for the year ending 30th June. In order to comply with the Utility Regulator's guidelines, NI Water reports a mid year average population for Table 7. For AIR11, NI Water has extrapolated between the June 2011 and June 2012 estimate, in order to derive a September 2011 (mid year) estimate of 1,808,820. This population is then assigned

to the various categories required for Table 10 using the approach outline below and summarised in Figure 7.1.

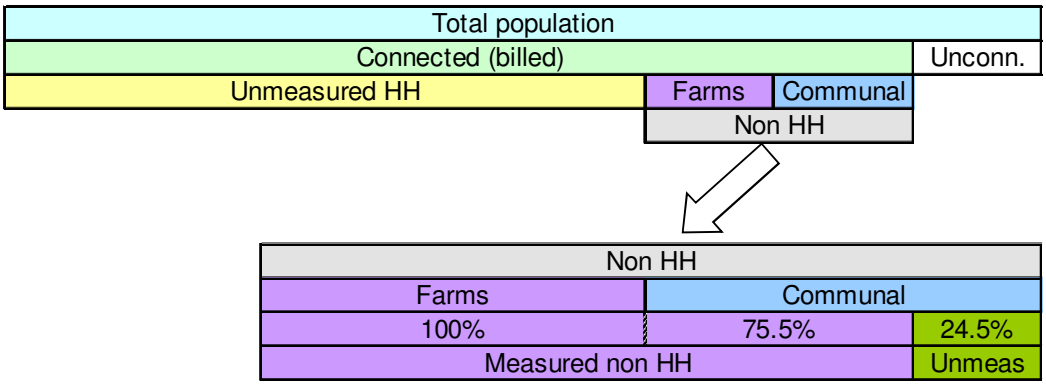


Figure 7.1: Population Estimates

The Company advised that the total population (Line 17) is adjusted to account for the number of properties within the province without a water connection. This line is derived from the RAPID database number of unconnected properties of 6,080 (7,994 in AIR11) and an occupancy estimate of 0.866 (the same as AIR11). The occupancy estimate is taken from the NIHE Housing Condition Survey (completed in 2009, but not updated by NIHE in time for AIR12).

The non-household population is based on the population associated with measured farms and the population in communal residence. The communal population (31,129) is based on the latest NISRA 2010 based Census estimate, which shows a small (1%) increase from the estimate used in AIR11. The communal population is split between unmeasured and measured on a pro-rata basis consistent with the measured non-household split reported in lines 8 and 9, after excluding farms. The split is 76.5%:24.5%, which results in 7,610 being assigned to unmeasured non households (Line 15) and balance of 23,519 being added to the measured non-household. The unmeasured non-household population has decreased by 676 (8%) from AIR11.

The farm population is derived from the number of metered farms (31,786) from RAPID and the average NI occupancy rate (2.49), giving a total 79,147. The total measured non-household population is the sum of communal measured population and the farm population giving at total of 102,660 (line 16). This value shows a decrease of 1,000 (1%) over the value reported in AIR11

Unmeasured household population is reported as the balance when the non-household population (farms and communal properties) is deducted from the total connected population, giving a value of 1,698,550 (Line 13). This is a 10,410 (0.6%) increase from the AIR11 value.

5. Confidence Grades

5.1 Properties

As we described in Section 4.2, we challenged a number of aspects relating to new connections data and the system to derive the Table 7 figures. Whilst we believe that total (household plus non household) numbers of new connections are accurate, we do not consider the breakdown to be correct. Therefore we are not confident that the system is capturing the correct details necessary to report the data required accurately. The Company's billing system, Rapid, has been used to extract the figures for Table 7 since AIR07, and the new connections data has been embedded into total number of households/non household numbers (Table 7 Block B) since. We therefore believe that as the latest new connection figures contain material categorisation errors, this will be reflected in the historic data and will impact on the accuracy of Block B.

We also noticed during our DG8 audit that although there was no leakage reported, some measured properties see high consumptions while void inspectors report the properties as void. In such instances there is a risk that a number of voids could be overlooked. There is no follow-up system in place to scrutinise the allocation of such properties.

NI Water explains that as they have introduced an automated tool to populate the Table 7 figures, the confidence grades should be A. This improvement will have made the process more robust. Nonetheless, the concerns expressed in our Undertaking A report on NI Water's lack of direct access to their unmeasured customers base (which would help ratify the numbers) remain.

5.2 Population

As we reported in previous years we do not consider it reasonable for NI Water to be required to provide confidence grades against population estimates as we do not feel this provides any discernable value to the Utility Regulator, as the data has been primarily sourced from the NISRA website. With the exception of a number of minor adjustments/assumptions made by NI Water the reported data is public domain information and NI Water has no influence on the methodology adopted by NISRA.

However, the Company has made a reasonable attempt at assigning confidence grades to this data. Based on their understanding of the NISRA methodology and the degree to which NI Water has allocated the total population between customer types, we consider the confidence grades are probably appropriate.

We recommend that NIAUR reconsider their requirement for NI Water to report confidence grades against population data. NI Water has no real influence over the derivation of this information, and unless they commission their own annual population survey it will be difficult for NI Water to improve this methodology and thus confidence grades in the future.

6. Consistency Checks

The number of void properties should be consistent with the following calculation:
(Line 11 – Line 10) + (Line 7 – Line 6) = Line 12

When we carry out the same calculation, this will be as follow:
(93.072 – 80.617) + (713.341 – 672.816) = 52.980

As the line 12 is 52.981, these are consistent.

The total population (Line 17) is identical to the total population reported in Table 10A (column 11).

Date: 25 July 2012
Prepared by: HMS

Table 8 – Non financial measures – Water Metering

Commentary by REPORTER

1. Background

Table 8 is designed to track activity installing meters against planned activity. It also typically provides summary information on the demand of household customers after having a meter installed. This table should only include reporting of meter installation on existing household properties.

2. Key Findings

- NI Water reports that meters have been installed on all new properties and that it has made good progress with metering of non-household customers.
- The Company has not met the targets set out within Appendix 19 of their response to the draft determination; a total of 747 installations have been reported against a target of 1,000. The Company explained that it had encountered data quality problems in identifying high consumption properties suitable for metering. A number of installations were not undertaken due to the identified property being demolished, ceased trading, changed to domestic or already metered.
- The Company has improved its process for completing Line 12, the *number of meter installation requests outstanding for greater than three months*, we therefore support the improvement in the confidence grade from B3 to B2, which is now consistent with the other lines in this table.
- Methodology to calculate consumption at recently metered properties has changed from AIR11. Data for this calculation are from meters installed in 2010/11 rather than 2011/12.

3. Audit Approach

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.

4. Audit Findings

The Company confirmed its metering policy:

- Household: includes installing meters on all new connections as per the obligation associated with Article 81 of the Water and Sewerage Services (Northern Ireland) Order 2006.
- Non-household: metering of all non-household customers where possible.

NI Water has been increasing its meter penetration across its non-domestic

customer base through selective metering or customer optants. The Company also reports that it has metered 747 against the target of 1,000 large volume non-domestic customers as outlined for 2011/12 in Appendix 19 of their response to the draft PC10 Determination. Further commentary on these installations is provided below.

4.1 Block A – Household Installations (Lines 1 to 6)

Within line 1 of the table the Company have reported the number of meter installation at new domestic properties. The number of installations reported (3,458) is circa 10% less than the number of new domestic properties reported in Table 7. We believe this is potentially due to the significant time lags between carrying out metering activity and recording. The Company confirmed that all domestic meter installations are made within an existing boundary box. Table 8 refers to meters fitted (from the works management system) whereas Table 7 refers to properties added to the billing system.

4.2 Block B – Non-household installations (Lines 7 to 12)

4.2.1 Line 7 – Selective Meters Installed

NI Water has a number of targets to achieve with respect to this customer base, most particularly to achieve an average consumption for the post PC10 unmeasured NHH customer base of around 170m3/property/annum. NI Water has confirmed that they are on target to meet this.

The Company reports that 747 meters were installed under this category. The Company provided a spreadsheet and report from its metering contractor that supported the calculation of this number. We found that the majority (611) of the meters installed relate to the properties identified with the Company's Appendix 19 response to the PC10 Draft Determination. Within this submission NI Water committed to metering an additional 1,000 large non-domestic properties per year.

The remaining meters (136) were installed as a result of the metering of new large diameter connections and other installations performed by the metering section staff.

The Company explained that they had been working hard with its metering contractor to reach the target, but had encountered data quality issues when attempting to identify large consumption properties suitable for metering. When suitable properties were identified these were then sent to the metering contactor. A total of 3,400 properties were sent to the metering contractor, however a large number were not suitable for metering due to a number of reasons including, but not limited to, having been demolished (129), shared supplies (250), changed to domestic (303), vacant (652), engineering difficulties (24) or already metered (457). The Company provided a spreadsheet that identified the number of failed metering attempts, and we are satisfied the Company made a realistic attempt to reach the target number of 1,000 meter installations.

The Company proposes a much lower level of meter installation for PC13 period.

4.2.2 Line 7a – Number of non-household meters renewed

NI Water reports that 8,722 meters were renewed during the Report Year and provided a copy of their audit trail to support this figure. We reviewed this spreadsheet and confirm the data and calculations are robust.

We found that the Company currently assumes the lifespan of a meter to be circa 17 years and where a meter is removed for testing (and replaced with a new meter) then this would count as a renewal and reported within this line.

4.2.3 Line 8 – Meter Optants installed

NI Water reports that 67 non-household customers opted to have a meter installed.

During the audit we queried how the Company promotes the optant scheme to customers and NI Water advised that whilst there is no formal promotion campaign, agents should be aware of the scheme and be able to process applications if requested by the customer. We consider this approach appropriate as an optional metering scheme is unlikely to encourage large users to opt for a meter.

4.2.4 Line 9, 10 and 11 – Meter Location

Within these lines the Company reports the location of the meters they have fitted. NI Water's preference is to fit meters externally where possible but a number of installations have been reported as internal fits.

We confirm that total number of meter installations reported in Line 7 and Line 8 equals the number of meters reported in Lines 9, 10 and 11.

4.2.5 Line 12 – Meter installations requests outstanding greater than three months

In total the Company reports that 23 installation requests were outstanding for greater than 3 months. NI Water advised that a small number of requests may take an extended period of time due to the complexity or type of installation required.

4.3 Water demand at recently metered properties

We met with NI Water to discuss their methodology to report this volume and they were able to demonstrate how the figure reported had been derived. We found that using a report generated from Rapid the Company had extracted all recently metered property data where readings had been taken. Using data from 495 records the Company has taken the total consumption and calculated the volume reported. We have checked NI Water's calculation of this volume and confirm it appears reasonable and is consistent with the audit trail supplied.

We also reviewed the Company's methodology and note that they have included existing (not new) meters which have less than 10 cubic meters consumption. The figures excluded the meters which have no meter reference number against the property record, and the meters which the consumption was zero. We believe this is reasonable as the inclusion of any of the components would skew the estimate

made.

5. Methodology

5.1 Meter Installations

We found that the number of meters installed, and reported in Table 8, is derived from the Company's contractor's records. During the audit we discussed the process by which meter installations are requested and raised and the interaction between the Company's various systems and Directorates. The following provides an overview of these discussions:

- Customer driven new connections are processed through the Customer Services Directorate and a job request is raised on the Company's Work Management System and closed once the connection is complete.
- New connections meter installations are automatically scheduled by the metering contractor as a result of the new connection instruction.
- For selective metering the Company raises an order with their metering contractor who surveys and installs the meter at the requested property.

NI Water provided sample copies of the contractor's spreadsheets which contain a list of meters installed between from April 2011 to March 2012 and were used to audit specific calculations within this table.

5.2 Water Demand at recently metered properties

NI Water explains that as the uploading to Rapid does not always complete on the day of installation, properties may not have completed their first year of charging in 2011/12. Therefore they used properties where meters were installed in 2010/11. The consumption is based on the properties which had first two meter readings during the 2011/12 year.

The Company bases their estimate on billing data held in Rapid. We reviewed the Company's audit trail and believe the methodology adopted is appropriate to meet the Reporting Requirements.

6. Assumptions

Except where noted above we do not believe there are any material assumptions to report.

7. Confidence Grades

During the audit we discussed the confidence grades assigned and the Company's rationale and in the majority of cases we concur with the grades assigned to each line. Lines 7, 7a and 8 have seen a continual improvement since AIR10 and through to AIR11, but we do not, however, feel that this improvement is sufficient to merit moving from B2 to A2 at this stage.

Due to the improvements in the data supporting Line 12 we agree with the Company's view that B2 is now appropriate, an improvement from the B3 at AIR11, as the methodology is consistent with other entries in this table which are already reported as B3.

8. Consistency Checks

The numbers reported in this table are used to complete Lines 24a, 25, 25a, 26 and 26a in Table D; we confirm the numbers in Table 8 and Table D are consistent.

Date: 25 July 2012
Prepared by: HMS

Table 9 – Non financial measures: Water quality

Commentary by REPORTER

1. Background

This information (along with DWI reports) will be used examine performance with quality standards, the outputs funded in Price Controls 2010 and the quality of the water received by customers.

2. Key Findings

- Slightly decrease in water quality and OPI, largely due to the change in the methodologies.
- No existing or new 'Legal Instruments of Work' or Authorised Departures for distribution input in affect at the end of the Report Year.
- Further improvements to plumbosolvency with 99.6% zonal compliance with the current 25 µg/l target limit for lead.
- Declaration of 1 CPEO covering taste and odour parameters.

3. Audit Approach

The audit consisted of an interview with the NI Water system holder and a review of relevant documentation, system methodology and data used to compile Table 9. Spreadsheets behind the table numbers were also examined to verify calculations. The audit also included a review and comparison of the Company's commentary and table data with previous year submissions.

4. Audit Findings

4.1 General

As the DWI requires calendar year reporting, the Company also continues to report Table 9 based on calendar year. For calculation purposes, the total average daily input applied to 2011 calendar year was 601.80 Ml/d, only a slight decrease from 2010 figure of 628.36Ml/d. We verified this and individual inputs against the source flow data.

Mean zonal compliance
This year, NI Water reports a steady level of overall Mean Zonal Compliance to 99.80%. The slight decrease in water quality was observed due to the changes in methodologies regarding sample analysis and its temperature. This led the increase in odour exceedances. The change also led the issue of Consideration of Provisional Enforcement Order at Killyhevlin.

Operational performance index
Following an improvement in performance last year, the Operational Performance Index has again increased to 99.31%, achieving a target of 99.10%. The Company explained that the freeze thaw incident experienced across Northern Ireland at the

start of 2011 had the effect of scouring much of our distribution system. It is felt that this has contributed to the lower level of exceedance for iron and manganese in 2011 as opposed to 2010. In 2012 however, the iron exceedance numbers so far are higher than 2011, so the OPI assessment for 2012 is likely to drop.

Number of WSZs

As in previous years, NI Water has continued to conglomerate some Water Supply Zones (WSZs) with the resulting decrease in number of WSZs this year to 53 from 55 in 2010. When challenged, NI Water advised that these changes were largely as a direct result of the closure of two boreholes and the need to align the zones to suit the new supply arrangements. In addition, we note that a further re-zoning has been carried out as noted in their commentary to provide a more logical breakdown of zones based on the current operational WTWs and the definition of more zones in the more densely populated areas.

Sites decommissioned during the year (Altmore, Gortlenaghan, Shanmoy) are not included, although we note that this has had no impact on the line totals this year.

4.2 New Legal Instruments of Work and Work Programmes

The Company confirmed that they have not agreed to fulfil any new Legal Instruments of Work or Authorised Departures for distribution input this year. All Authorised Departures in place were issued prior to 2011.

No new legal instruments relating to turbidity, *Cryptosporidium* or plumsolvency have been agreed this year.

We queried NI Water why they believe they have not needed any new legal undertakings for the last few years. They believe that this has been achieved through good communication and an open and honest relationship with DWI. Specifically, NI Water advised that they hold monthly meetings with DWI and provided quarterly progress reports to them to discuss potential issues. They also inform DWI for any changes, incidents and near misses whenever it occurs.

We therefore remain satisfied that the Company appears to be taking timely and appropriate action to identifying and resolving problems and that they are working in full co-operation with the DWI.

4.3 Water Treatment and Distribution Inputs (Lines 1 – 3)

There is no outstanding Authorised Departures from previous years, therefore the reported Line 1 total of zero is confirmed as the correct summation of the volumes of distributed water affected for all legal instruments still in place on 31st December 2011. NI Water confirms that there are no other legally binding instruments in place.

NI Water confirmed that no new Authorised Departures, Article 31s or other legal instruments have been agreed this year and hence there are no contributory sites to Line 2. The total number is therefore correctly reported as zero.

The percentage total in Line 3 is based on comparison with actual flow data recorded at each WTW. As there are no Authorised Departures in place at the end of the year, the figure is 100%.

We reviewed the data behind the line totals and can confirm that the calculations appear correct and accurate.

4.4 Distribution Systems (Lines 4 – 5)

The totals in Lines 4 and 5 are made up from the properties within WSZs affected by the any Authorised Departures applied to the distribution system and still in effect at year end. The Line 4 percentage is therefore correctly reported as zero.

There were no new legal instruments received this year and hence there are no contributory zones to Line 5. The percentage is therefore correctly reported as zero.

We reviewed the spreadsheet behind the Line figures and can confirm that the percentages for Lines 4 and 5 have been correctly calculated from the number of properties within the affected WSZs.

4.5 Raw Water Deterioration (Line 6)

As detailed in the Company's commentary, the Authorised Departures at Altmore WTW and Lough Braden WTW relating to pesticides expired prior to 2011. During 2011 Altmore WTW became out of service, therefore this site is not included in the calculation. Lough Braden still has a former legal instrument. Hence the line total is correctly reported as zero.

Dorisland and Camlough WTWs are under enhanced monitoring programmes since 2006/07. During 2011, further 4 sites; Ballinrees PPP, Derg, Killyhevlin and Belleek WTWs, are under enhanced sampling programmes but no Authorised Departures are in place. Hence these are not included in the calculation.

Line 6 is confirmed as being reported on the situation at calendar year end.

4.6 Plumbsolvency (Line 7)

As stated in their commentary, NI Water currently has a policy of orthophosphoric acid dosing at their treatment works to control plumbsolvency in the distribution system. This affects almost all water entering supply with the exception of the small number of remaining boreholes which are largely programmed for abandonment. In total 99.6% of water entering supply is currently dosed. Dosing levels are based on compliance with the lead target of 10µg/l, although regulation is currently based on a 25 µg/l limit. The dosing programme is optimised annually. Altmore, Gortlenaghan and Shanmoy which became out of service during the year, were not dosed in 11/12.

	AIR11	AIR12	Difference
T9 L7	623.693 Ml/d	601.801 Ml/d	-3.5%
Average DI	626.64	604.08	-3.6%
T10 L26	625.15	583.93	-6.6%
% of dose base on average DI	99.5%	99.6%	

In 2012, NI Water has agreed with DWI the reduction of the dosing rates at 2 sites where the Company believed some rationalisation could be applied. There is also a site which has not met the criteria in 2011 but the phosphate does rate remains at 2011 level. NI Water confirmed that these sites are monitored and that they remain committed to working with the DWI towards achieving the future lead target of <10µg/l in all zones by the end of 2013.

We reviewed the overall performance of the dosing with NI Water who informed us that total number of sample failures above the lead target of 10µg/l has continued to decline from 69 in 2010 to 52 in 2012 and with only 1 failure above 25µg/l limit. This represents an overall zonal compliance of 99.80% (base on a total sample base of 408).

The Company has no reported changes to existing measures at any site. Although the closure of sites such as Altmore during 2011 will have affected the figures, the change in the Line 7 totals primarily due to fluctuations in average daily flow volumes rather than any direct change. We reviewed the spreadsheet behind the line total and can confirm that the total is the correct summation of annual flow output volume from all WTWs the exception of the Company's borehole sites where orthophosphate dosing is not applied.

NI Water currently does not have a targeted lead replacement programme in place and replacements of lead communication pipes are done opportunity basis through capital works and maintenance projects.

Line 7 is confirmed as being reported on the situation at calendar year end.

4.7 *Cryptosporidium* (Line 8)

There were no legal instruments in place at the end year for *Cryptosporidium* and hence there are no contributory zones to Line 8. The total numbers is therefore correctly reported as zero.

As pointed out in the Company's commentary, *Cryptosporidium* risk assessments are now captured under other areas and are currently being separately assessed by the DWI.

4.8 Other Parameters (Line 9)

Following clarification with NIAUR, NI Water has declared one Consideration of Provisional Enforcement Order (CPEO) within this line. Checks confirmed that the CPEO was in place during the year at Killyhevlin WTW. NI Water has included site

specific details in an appendix to their commentary which clearly illustrates the requirements and progress at the site. Having reviewed and discussed the details with the Company, we are satisfied that they have undertaken appropriate actions rectify the issues, primarily through the closure of Altmore WTW. We therefore understand that Killyhevlin is the only CPEO not expected to be shortly closed and that progress remains to the satisfaction of the DWI such that NI Water does not foresee any requirement for escalation of the issue.

5. Company Methodology

The Company explained that there was a small change in assessing taste and odour in December 2010. This causes a small decrease in overall Mean Zonal Compliance performance. There are no significant changes to their methodology this year.

The Company uses actual flow data records taken over the year to produce an average daily flow volume for each WTW for the calendar year. These totals are used to calculate the figures in lines 1, 2 and 3.

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 NIAUR, the Company does not include sites which have been taken offline par-way through a year although they provide full details in their commentary to ensure transparency. We have previously questioned this approach and recommend consideration of an annually averaged value for any site with active legal instruments still in place at year end. We note that due to the number of legal instruments still in place, this has no impact on the figures for this year.

We asked the Company whether they would be informed if and when the data have been changed. They explained that the year end of Table 9 is the end of December and so IT and other teams should have enough time to prepare and make any necessarily changes by April. Therefore they feel that they do not need to chase the others up for any classifications.

The data spreadsheet can be accessed by the LIMS, Regulation and Internal Audit teams. No one can change the original spreadsheets and the original is downloaded to the LIMS team server and the team can change it. If something looks odd then they can see who saved the sheet last.

6. Company assumptions

The Company makes the following assumptions:

- For Lines 1-5 and 6-9, the average daily flow volumes from WTWs are reliant on the accuracy of flow measurement devices at each site.
- For Lines 4 and 5, the volume of water input to a zone is proportioned to the number of properties in the zone. It is possible that large non-household users could affect this. The Company also utilise a factor to estimate population from the property count based on external statistical data. As the calculation fro the

line total is based on proportions, this factor is largely irrelevant, although it can impact the zonal size limits and required sampling rate.

- A problem affecting part of a WSZ is deemed to affect it all.

7. Confidence Grades

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 and numbers of properties.

8. Consistency checks

Following the initial audit, the Company provided additional data and clarification to confirm all issues raised within the audit. Cross checks were carried out against comparable data in Table 11 and 11a to confirm consistency.

Date: 25 July 2012
Prepared by: HMS

Table 10 – Water Delivered

Commentary by REPORTER

1. Background

The information in this table records the total volume of water delivered to measured and unmeasured households and non-households and the assumptions which companies have made in determining their overall water balance, including; per capita consumption, meter under-registration and unmeasured non-household use.

2. Key Findings

- We confirm that the Company has adopted the principles of NERA/UKWIR Demand Forecasting Methodology for estimating the components of the water balance.
- The Company has reported a fall in leakage from 177 Ml/d to 168 Ml/d despite a revised property count which led to a reduction in night use allowances.
- The Company is part-way through a process to transfer to a new leakage management software package; this will increase the robustness of leakage data for operational management and annual reporting. The Company estimates the revised method of calculation will lead to an increase in leakage of between 10 and 30 Ml/d. We challenged the Company to explain why this estimate has not narrowed since the previous estimate; the company explained it is a "top down" assessment and is based on an assessment of the likely change in reported leakage within the water balance. We consider this a reasonable estimate.
- The Company has provided a detailed commentary on the water balance for AIR12.
- For AIR12, the pre-MLE estimate of distribution input (585.09 Ml/d) exceeded the sum of the components of the water balance by 13.56 Ml/d (2.32%), which is well within the 5% threshold set by the Utility Regulator and a significant improvement from AIR11 (4.15%).
- The Company has achieved a SOSI score of 100, which has largely been driven by lower distribution input. We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, has resulted in a significant year-on-year improvements from -26 (AIR08) to 45 (AIR09) to 88 (AIR10) to 97 (AIR11) to 100 for AIR12 for the dry year average planned Levels of Service (LoS) conditions.
- The SOSI has been calculated by reference to figures contained within the Water Resources Management Plan. Full details on the changes in the SOSI base data from previous years, and the consistency with the WRMP is presented in our Commentary on Table 10a.

3. Audit Approach

The audit consisted of an interview with the system holders and a review of documentation, systems and data used to generate the water balance for AIR12.

4. Audit Findings

We confirm that the Company has adopted the principles of NERA/UKWIR Demand Forecasting Methodology for estimating the components of the water balance.

There was an extreme weather event during AIR11; this resulted in an increase in leakage and led to the Company missing its leakage target. The Company has recovered from this event and reduced leakage from 177 Ml/d to 168 M/d in the Reporting Year.

During the year the Company revised its property numbers as a result of the use of more robust datasets. The resulting (lower) estimate has resulted in lower night-use allowances within the leakage calculation which had led to an increase in reported leakage of approximately 9 Ml/d.

The Company is part-way through a process to transfer to a new leakage management software package; this will increase the robustness of leakage data for operational management and annual reporting. The Company estimate the revised method of calculation will lead to an increase in leakage of between 10 and 30 Ml/d. We challenged the Company to explain why this estimate has not narrowed since the previous estimate; the company explained it is a “top down” assessment and is based on an assessment of the likely change in reported leakage within the water balance. We consider this a reasonable estimate.

4.1 Overview of Water Balance

NI Water has reported an annual average leakage of 168.23 Ml/d at year-end, a decrease of 8.74 Ml/d from that reported for AIR11. The Company has therefore met its leakage target for AIR12.

The imbalance in the water balance has fallen from 4.15% at AIR11 to 2.32% at AIR12; we consider this is likely to be due to both better/more robust data and the lack of the significant uncertainty that resulted from the freeze-thaw incident in AIR11.

The following table compares the water balance for AIR12 with that for the previous year.

Component	AIR11			AIR12			Variance for the year (Ml/d)
	Initial Estimate (Ml/d)	Accuracy (%)	Final Estimate (Ml/d)	Initial Estimate (Ml/d)	Accuracy (%)	Final Estimate (Ml/d)	
Measured Household Consumption	0.00	10	0.00	0.00	10	0.00	0.00
Measured Non-h'hold Consumption	132.41	10	134.71	128.41	10	129.64	-5.07
Unmeasured Household Consumption	305.72	10	318.04	294.84	10	301.31	-16.73
Unmeasured Non-h'hold Consumption	9.02	15	9.04	7.55	15	7.56	-1.48
SPL	46.31		46.31	46.31		46.31	0.00
DSOU	4.64	25	4.66	2.97	25	2.97	-1.69
Water taken unbilled	27.42	25	28.04	20.33	25	20.52	-7.52
Top Down Leakage	194.60			177.30			
Distribution Input	**627.50**	**2**	**625.15**	**585.09**	**2**	**583.93**	-41.22
Bottom Up Leakage	168.54	15	176.97	163.74	15	168.23	-8.74
Water Balance Variance	26.06 (4.15%)			23.56 (2.32%)			

We provide additional comment on the various components of the water balance and explanation for the above variances in Section 4.2 of our commentary below.

4.2 Water Delivered – Volumes

4.2.1 Measured Volumes (lines 1 to 3)

Line 1 represents the average volume of water delivered to households which is measured. Legislative changes and deferral of charging by the Northern Ireland Assembly in March 2007 means that household customers are not issued with bills for water usage. Therefore no value is reported for billed measured households, which is consistent with previous years.

Line 2 – Billed measured non-household, corresponds to the average volume of water delivered to non-households which is measured. These volumes are determined from the Company's Customer Billing System Rapid and do not include test meter volumes, trade effluent volumes, free supplies or NI Water supplies.

We note that the reported value for water delivered to measured non-households has decreased from 134.71 Ml/d to 129.64 Ml/d. The number of measured non-households has decreased by 39 properties (as reported in Table 7).

In terms of supply pipe leakage, the Company has not added an allowance for this as all measured non-households are externally metered and the billed consumption would already include it. In terms of meter under-registration, following a NI Water project undertaken during AIR10, a Company specific value of 8.33% has been added.

The confidence limit of 10% on this component has not been changed and is considered to be appropriate.

4.2.2 Unmeasured Volumes (lines 4 to 6)

Line 4 - NI Water has calculated the volume of water delivered to unmeasured household properties by applying its estimates of unmeasured population, the regional average per capita consumption (adjusted for MUR) and supply pipe leakage for unmeasured households.

Line 5 - NI Water has based the water delivered to unmeasured non-household properties on the actual consumption of comparable measured non-households, the number of connected unmeasured non-households (excluding voids) and MUR. To assess the consumption of unmeasured non-households, NI Water undertook an analysis of consumption at measured non-household properties and derived a weighted average consumption for property types matching unmeasured categories. Average consumption in each property category was then assessed, excluding the highest 10% and lowest 10% in each category (which excludes outliers from the analysis), and an average total consumption of 191.21 m^3/yr was derived (211.65 m^3/yr in AIR11).

This estimate of PPC is then multiplied by the total number of connected unmeasured non-households (excluding voids) and adjusted for MUR (8.33%) to derive a total volume of 7.56 Ml/d (a reduction of 16%). We consider this to be an appropriate means of deriving unmeasured non-household consumption.

The per-property consumption has decreased (10%) from the value reported in AIR11 and consistent with the values reported by water companies in England & Wales.

4.3 Water Delivered Components

4.3.1 Unmeasured Water Delivered per Property (lines 7 & 7a)

These are calculated lines.

The estimated volume of water per unmeasured household (UHH) was based on estimates of unmeasured PCC, occupancy rate, SPL and the number of UHHs. We checked the basis of the calculations and for consistency between water delivered (line 5), the water delivered per unmeasured household (line 7) and the number of unmeasured non-households (Table 7, line 8) and found the results to be consistent.

4.3.2 Unmeasured per capita consumption (lines 8 & 9)

In order to derive a Company specific estimate of the per capita consumption for unmeasured household properties, NI Water maintains a domestic consumption monitor, comprising 105 discrete areas (predominantly cul-de-sacs of similar property types). The areas were designed to predominantly contain a different property type, such that a representative sample of detached, semi-detached, terraced and apartment style housing is included. This approach is in line with the UKWIR report '*Best Practice for Unmeasured Per Capita Consumption Monitors' (1999)* and is consistent with NIAUR's definitions for a B reliability grade.

Over the previous three years NI Water has undertaken significant investigation into the properties within the monitor sites, with 100% of the properties having been surveyed during 2008/09, with a further 30% during 2009/10, 20% during 2010/11 and 17% during 2011/12 as part of an on-going programme to ensure the monitor remains up to date. We examined details of the surveys in three sites and confirm that the results have been recorded correctly. Most customers within these areas are therefore acutely aware that their consumption is being monitored. The Company has therefore added 1.5% to the recorded consumption (Hawthorne Effect). We consider this small adjustment appropriate.

The occupancy rate for the PCC monitor of 2.26 is consistent with that quoted by NISRA in its latest population update, which further confirms the validity and value of the work undertaken.

NI Water has sought to continue to improve the mix of property types within its PCC monitor, to ensure the mix is representative of the overall property mix in Northern Ireland.

We checked for consistency between the billed unmeasured HH water delivered (line 4) and the PCC (line 8) and found the calculations to be consistent.

In order to determine an overall average PCC value for the Region, NI Water has employed a multi-regression analysis. We believe this to be an effective technique that reduces the need to separate out property types within each area, and should simplify the process of adjusting the size of their domestic consumption monitor in the future, as areas will no longer need to be limited to containing just one property type. For AIR12, a pre-MLE unmeasured household PCC of 137.38 l/h/d (144.74 l/h/d for AIR11) was calculated.

For AIR12, NI Water has reported a post-MLE estimate for unmeasured PCC of 152.82 l/h/d, which includes an adjustment for meter under-registration. This represents a 6.9% decrease on that reported for AIR11 (164.19 l/h/d) and is also 3.5% below the value for AIR10 (158.41/h/d).

4.3.3 Supply Pipe Leakage (lines 10 to 13)

For AIR09 NI Water re-assessed its supply pipe leakage using the latest best practice principles, described in UKWIR Report "Towards Best Practice for the Assessment of Supply Pipe Leakage". The same approach was used for AIR10. More robust data was obtained for repair times and run times. The numbers of bursts was updated to the 2009/10 values. Company specific values were derived for AZNP and hour:day factor (see below). The estimate of supply pipe leakage for the AIR 10 Water Balance was 46.31 Ml/d; this value has been retained for AIR12.

Application of the UKWIR methodology to a combination of NI Water specific data and UKWIR default values resulted in an estimate of 62.03 l/pr/d for unmeasured households and 31.01 l/pr/d for other customer types.

To allow consistent like-for-like comparison NI Water has agreed with the Utility Regulator to keep supply pipe leakage constant through the PC10 period. We consider this approach will, however, result in a misleading split between supply pipe losses and distribution losses as we would expect both components of total leakage to reduce in similar percentages year-on-year as the Company drives down leakage.

4.3.4 Meter Under Registration (MUR) (lines 14 & 15)

The MUR estimates are the same as AIR11:

- Household MUR of 7.39%.
- Non-household MUR of 8.33%.

4.3.5 Distribution System Operational Use (line 16)

As was the case for AIR11, NI Water has undertaken a comprehensive assessment of DSOU for AIR12. The assessment, which involved deriving volumes of water used for eight separate operational activities, was based primarily on the recommendations of the UK Water Industry Report D, Appendix F and supplemented using NI Water specific information.

The volume derived for AIR12 was 2.97 Ml/d pre-MLE (4.64 Ml/d for AIR11). We checked the components, assumptions and approach and found them to be largely unchanged since AIR10 and are not considered to materially impact on the leakage estimate or the overall water balance.

4.3.6 Water Taken Unbilled (lines 17 to 19)

Water taken legally and illegally unbilled was based on a variety of different components. We found that the assessment of unbilled consumption is broadly consistent with that used for AIR11, although the Company has continued to work to ensure all components of unbilled consumption are identified, which has resulted in a number of changes. The value reported for AIR12 (20.53 Ml/d post MLE) is 27%

lower than the value reported for AIR11 (28.04 Ml/d post MLE).

We investigated this apparently significant reduction and found that it was due to a number of factors, including lower consumption in fire mains (a high consumption was assumed in AIR11 due to the freeze-thaw incident), reduction in non-household test meter consumption and moving void consumption to billed consumption when occupied void properties are identified.

NI Water has made a continuing effort to obtain a better understanding of all unbilled consumption components and has derived a relatively robust list of sources of unbilled consumption.

4.3.7 Water Delivered (potable/non potable) (lines 20 – 23)

The total volume of potable water delivered is calculated as the sum of all measured and unmeasured consumption (Lines 3 and 6) and the total volume of unbilled water taken (Line 19).

NI Water has no customers eligible for billing at non-standard rates (line 22).

4.3.8 Total Leakage (lines 24 & 25)

Total leakage is determined from both the top down (as described above) and bottom up leakage estimates

Bottom up leakage is calculated using a minimum night flow (MNF) methodology. NI Water has an extensive network of DMA's (~ 1,070 in totals) covering 99% of properties, from which MNFs are obtained to assess DMA leakage.

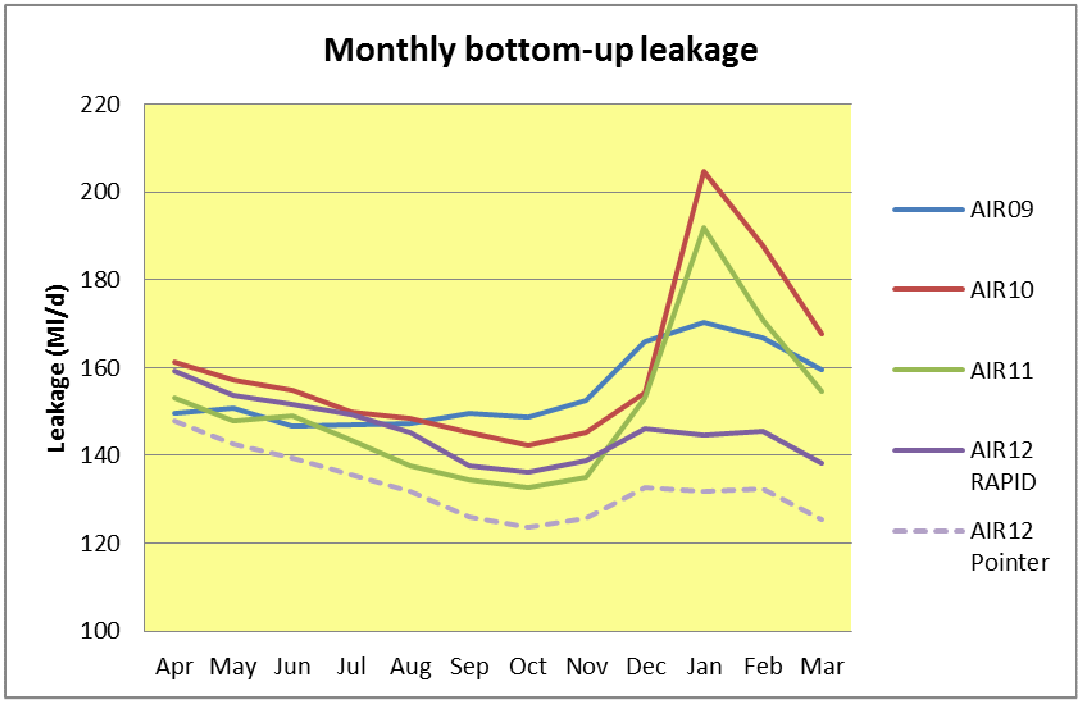
The estimate of bottom up leakage is derived from night-flows within DMAs, so require an estimate of night-use within the DMA. This is deducted from the night-flow to develop an estimate of leakage. NI Water estimates bottom up leakage on a monthly basis, by taking the 20^{th} percentile of the daily minimum 15 minute flows into the DMA between 2.00am and 6:00am.

To ensure consistency between reporting years the AIR11 estimate for household night use of 2.42 l/prop/hr has been used. Likewise, to ensure consistency between reporting years the AIR11 estimate for non-household night use of 8 l/prop/hr has been used.

We undertook a sample audit for a single DMA (Fanad Drive DMA) following the data-trail and calculations from the raw nightline data in October 2011 through to the calculated leakage value for the month. We confirm that we found no errors or omissions within the calculation process.

We examined the trend in company level leakage; this demonstrates the significant downward trend throughout the year, and the lack of a significant winter peak. This graph also increase the rise in reported leakage that has resulted from the improved

property estimates.



Like many of the England and Wales water companies the estimate of trunk mains and service reservoir leakage is significantly less robust than distribution leakage. The trunk mains leakage is estimated using the trunk mains length and a default leakage per length of mains per year of age. The leakage per length of mains per year of age was taken from 'Managing Leakage'.

The service reservoir leakage is estimated using total volume of service reservoirs and a default level of losses (expressed as a percentage of service reservoir volume). The default level of losses was derived from 'Managing Leakage'. Leakage from service reservoirs is also based on a default value. Most English and Welsh water companies undertake periodic drop tests to quantify and identify service reservoir leakage.

Trunk mains leakage remains one of the least robust components of leakage for all water companies. A recent UKWIR report presented a range of options; best practice is considered to be the use of metering at both ends of lengths of trunk mains. However, many English and Welsh water companies still rely on simple estimates, similar to that used by NI Water.

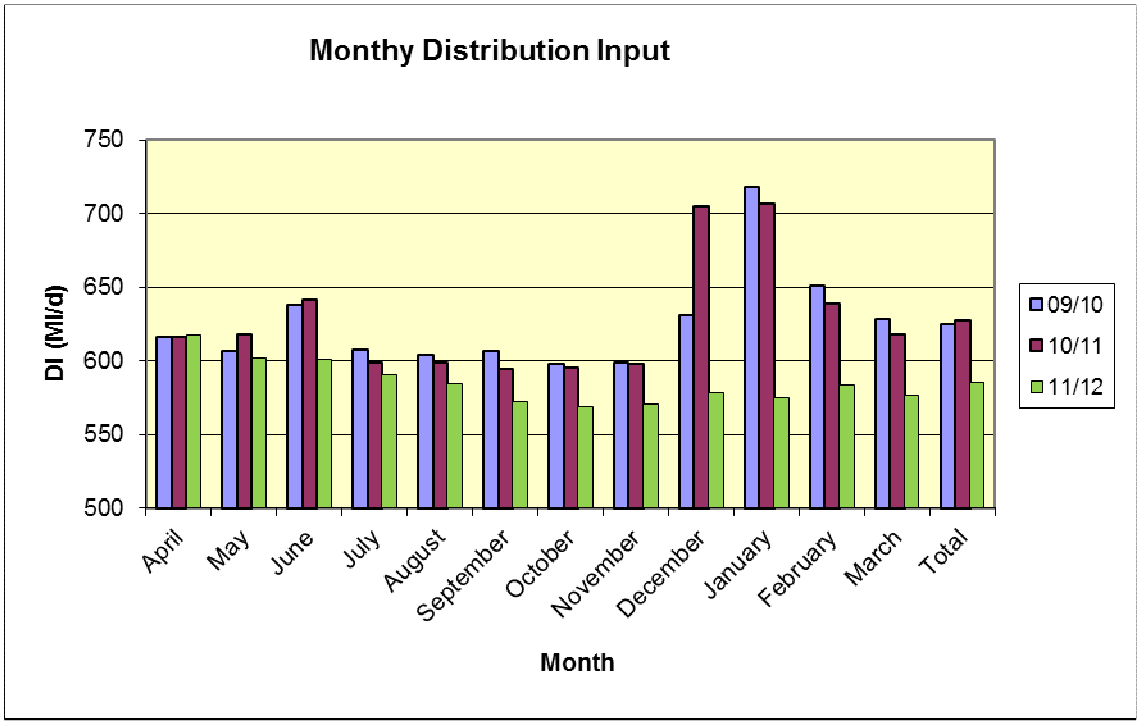
The analysis that is possible on night-lines using nonHH night use, DMA specific hour:day is very limited, due largely to the current leakage management software. NI Water are currently in the process of updating their leakage management software to allow more flexibility. This new software will result in further changes to bottom up leakage, which the Company estimate will increase reported leakage by 10 – 30 Ml/d.

The Reporting Guidelines present a specific calculation for line 25, which is not followed by NI Water; the Company's commentary explains the different leakage values that would be derived if the guidelines were followed. We concur with the Company's conclusion that the value entered in line 25 is an accurate representation of total leakage for the report year.

4.3.9 Distribution Input (line 26)

For AIR12, NI Water has reported a pre-MLE DI of 585.09 Ml/d, some 42 Ml/d below the pre- MLE DI reported in AIR10 of 627.50 Ml/d.

We reviewed the DI profile for NI Water for the report year, which highlighted the decline in DI between the months of April and November and then the complete lack of a winter peak seen in the previous two years. For both AIR10 and AIR11 NI Water experiences significant peaks in December 2010 and January 2011 due to the adverse weather can also be seen clearly.



4.3.10 Bulk Supply Imports/Exports (lines 27 & 28)

The small volume of reported exports relate to supplies to 72 individually metered NI Water customers, located in the ROI.

4.3.11 Water Balance by MLE

The Company has estimated total leakage using MNF Analysis and has reported a pre-reconciled total leakage figure of 163.74 Ml/d for AIR12. The integrated flow

method as applied by NI Water has produced an imbalance of 13.56 Ml/d, resulting in a final reported leakage figure of 168.23 Ml/d.

We note that the accuracy estimates applied to individual components used in the MLE are identical to AIR11.

For AIR12 there is sill a significant level of uncertainty, particularly since the planned new leakage management software has not been implemented (which has limited the improvements to the application of DMA based NHH night use, validity checks and availability of data).

As such, we agree that an accuracy estimate of ±15% to be appropriate for AIR12, with an expectation that this will be reduced to ±10% in the near future, when systems are further improved.

4.4 Security of Supply Index

Security of supply index – company's planned levels of service
The SOSI is a calculated column. We confirm that this calculation is correct and is consistent with that reported in Column 14 of Table 10a(i).

The Company has achieved a SOSI of 100. We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, have resulted in a significant improvement in SOSI from -26 (AIR08) to 45 (AIR09) to 88 (AIR10) to 97 (AIR11) to 100 (AIR12) for the dry year average planned Levels of Service (LoS) conditions. Changes primarily result from the lower distribution input and from revisions made during the analysis to support the development of the Water Resources Management Plan (WRMP). We have checked for consistencies with the WRMP.

We are satisfied that the Company has followed the NIAUR guidelines for the preparation of this index for the planned levels of service for average demand in a dry year.

Security of supply index – reference levels of service
As discussed in our reporting for Table 10a(ii), the Company has not calculated SOSI for the reference levels of service and these are identical to the Table 10a(i) annual average data entries. These would be expected to be different when the Company's planned Levels of Service (LoS) frequency statements are compared with the Reference LoS definitions. The Company reports in its commentary that there has been no separate assessment for a reference level of service and that, as stated in the WRMP, this is not appropriate for NI Water.

We therefore confirm that the value given here is consistent with that reported in Column 14 of Table 10a(ii).

5. Confidence Grades

NI Water reported a confidence grade of C4 for unmeasured non-household PPC.

For unmeasured household PCC, NI Water has reported a confidence grade of B3. This conforms to NIAUR's definition for PCC reliability, grade B, as an area monitor of 105 dead-end sites are utilised and the monitor does not fully comply with the UKWIR report "Best Practice for unmeasured PCC monitors" 1999. With the recent improvements to the PCC monitor we consider a reliability grade A may be appropriate in the future

For AIR12, NI Water has reported a confidence grade of B4 for Total Leakage. We confirm that the Company estimates leakage using the Minimum Night Flow Method, using night line data that is estimated with Continual Night Flow Monitoring covering over 60% of properties, recorded in excess of 20 times a year, which supports a B confidence grade. Due to the MLE adjustment of 15% applied to bottom up leakage, NI Water has assumed a 4 accuracy band. We believe an accuracy band of 3 may be appropriate once NI Water commission its new leakage management software in the next few years.

NI Water has assigned a confidence grade of B2 for Distribution Input. This is consistent with the Company's assessment of the MLE where the water balance reconciled to within 5% of Distribution Input.

NI Water has reported a confidence grade of B2 for the overall water balance for AIR12. We believe this is appropriate; it is consistent with a water balance, where the components have been reconciled to within 5% of measured Distribution Input and reflects the significant improvements that have been implemented over the last few years.

6. Consistency Checks

We confirm that the entries on Lines 31, 32 and 33 of Table 44 are consistent with the level of leakage reported in Table 10.

We confirm that the entries on Lines 18 and 19 of Table D are consistent with the Distribution Input and Level of Leakage reported in Table 10.

Date: 25 July 2012
Prepared by: HMS

Table 10a – Non financial measures – Security of Supply Index

Commentary by REPORTER

1. Background

Table 10a calculates the security of supply index (SOSI) for the company planned and reference levels of service for average demand in a dry year.

2. Key Findings

- The Company has completed the SOSI using data from the Water Resources Management Plan (WRMP). Commentary on individual column entries is given below.
- The Company has achieved a SOSI of 100 in the Report Year. We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, have resulted in a significant improvement in SOSI from -26 (AIR08) to 45 (AIR09) to 88 (AIR10) to 97 (AIR11) to 100 for the current report year for the dry year average planned Levels of Service (LoS) conditions.
- The change for AIR12 primarily results from a reduction in distribution input and a minor re-allocation of PPP output (recorded as Bulk Imports, Column 3), increasing Eastern by 10 Ml/d and decreasing Southern by 10 Ml/d. These changes are consistent with the WRMP.
- There has also been a small decrease in WAFU from 363.06 Ml/d (AIR11) to 358.69 Ml/d in the current year. This reduction is due to a re-assessment of the River Strule abstraction. However, when the pumping from River Strule to Derg WTW is completed it is likely to increase WAFU in the West WRZ by approximately 11 Ml/d.
- The Company has not prepared a table for the Critical Period, although following the freeze-thaw incident in 2010/11 the Company recognised that the critical period analysis may be relevant for NI Water and therefore asked their consultant to undertake critical period analysis. The consultant's report states that the critical period is not appropriate for water resource planning within Northern Ireland. To remain consistency with the WRMP we agree that it is not necessary for the Company to present a critical period SOSI.
- The Company does not feel it is appropriate to present scenarios based on "reference" or "planning" Level of Service as, unlike water companies in England and Wales it does not report its level of service in terms of return periods of hosepipe bans (or similar).

3. Audit Approach

The audit consisted of an interview with the NI Water system holder 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.

We were provided with a copy of the Water Resources Management Plan, against which we compared entries used in the calculations for this table. We have checked for consistency with the WRMP.

4. Audit Findings

- We confirm that the Company has submitted out-turn data reporting on Security of Supply for the (i) Planned Level of Service and (ii) Reference Level of Service for the 2010-11 reporting period.
- The Company does not report a Critical Period level of service.
- We observed that, as for previous years, Table 10a(ii) submissions are identical to the Table 10a(i) annual average data entries. These would be expected to be different when the Company's planned Levels of Service (LoS) frequency statements are compared with the Reference LoS definitions. The Company reports that this is not appropriate for its circumstances as it does not report a "Level of Service" with specific return periods for hosepipe bans for example. The Company has therefore not undertaken separate analysis for "planned" or "reference" levels of service.
- We note that there whilst has been no change in approach from AIR11 in the Company's calculation of SOSI for the dry year demand (Table 10a (i)-planned levels of service) the data has been updated based on the WRMP and the current year.
- We note that, as for previous years, the Company quote a pre-MLE distribution input whereas in Table 10 a post-MLE value is quoted. These two values are consistent, with the difference being the appropriate MLE adjustment.

4.1 General

The Company's recent focus has been on developing its WRMP and therefore for AIR12 the methodology remains unchanged from AIR10 and the data is of similar quality.

We identified that the significant changes to the parameters of the SOSI calculations, at Company level, since AIR12 may be summarised as follows:

- Column 2 – minor changes identified during the development of the WRMP since AIR11 has decreased the WAFU from 363.06 Ml/d to 358.69 Ml/d.
- Column 3 – the total is identical to AIR10 at 403.00 Ml/d, although Eastern Zone has increased by 10 Ml/d and Southern Zone has decreased by 10 Ml/d.
- Column 5 – increase in the dry year distribution input of 2.33 Ml/d (0.3%).
- Column 6 – decrease in the reporting year distribution input of 2.18 Ml/d (0.3%).
- Column 8 – a slight decrease in target headroom of 0.34 Ml/d.
- Column 11 – no change in the distribution of population across the zones.

We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, have resulted in a significant improvement in SOSI from -26 (AIR08) to 45 (AIR09) to 88 (AIR10) to 97 (AIR11) to 100 for AIR12 for the dry year average planned Levels of Service (LoS) conditions.

The increase in SOSI for AIR11 has been driven by the significantly lower distribution input for the report year.

Our detailed commentaries on the Company's submissions are given in the following sections, for Table 10a (i). As Table 10a (ii) contains identical entries we do not provide line by line commentary.

5. Company Methodology

Column 1 – Water Resource Zone (Text)

The Company has used the same 5 WRZs used in AIR11.

Column 2 – Water Available For Use (WAFU) (Ml/d)

The WAFU recorded in this column is has decreased from the value reported at AIR11 from 363.06 Ml/d to 358.69 Ml/d which was largely due to a reassessment of the River Strule abstraction. However, when the pumping from River Strule to Derg WTW is completed it is likely to increase WAFU in the West WRZ by approximately 11 Ml/d.

Column 3 – Bulk Imports (Ml/d) and Column 4 – Bulk Exports (Ml/d)

For the Report Year the Company has slightly re-allocated output from the PPP schemes which are reported as Bulk Imports (Column 3)

	Bulk Import			WRMP	
Water Resource Zone	**AIR10 (Ml/d)**	**AIR11 (Ml/d)**	**AIR12 (Ml/d)**	**Bulk Import (Ml/d)**	**PPP Name**
North	50	50	50	50	Ballinrees
East	187	197	207	180	Dunore Point
Central	19	19	19	19	Moyola
South	147	137	127	147	Castor Bay
West	0	0	0	0	n/a
Total	**403**	**403**	**403**	**396**	

We challenged the Company to explain the apparent discrepancy in the East WRZ. The Company explained that the East WRZ is 7 Ml/d higher due to Lough Island Revy being able to provide this into DI.

We had expected to see consistency between the WRMP and AIR reporting however the WRMP has reported the same bulk import values as the draft WRMP

used for AIR11. However, as the Company has explained this apparent inconsistency the difference is not material.

The Company reports no exports. This is consistent with the WRMP.

Column 5 – Dry Year Distribution Input (Ml/d)

The Company's dry year average distribution input (DI) is 45.45 Ml/d lower than its AIR11 estimate at the Company level. The Company has calculated its dry year DI from the reporting year DI and the dry year distribution input adjustment factor. Detailed calculations were carried out as part of the WRMP to derive these factors using the actual data for each WRZ. We confirm that the adjustment is consistent with the factors given in the WRMP.

The WRMP reports a very weak correlation between climate (temperature and rainfall) and DI. This is also evident in the dry year factors that have been used by NI Water of 1.12 for households and 1.05 for non-households. These are typical of factors typically used by water companies in Northern England and in Scotland, but are much lower than used by water companies in Southern England.

Column 6 – Reporting Year Distribution Input (Ml/d)

We note that the Company reports that its Reporting Year distribution input (DI) at 585.09 Ml/d which is 42.49 Ml/d lower than its AIR11 estimate at the Company level. We note that the Company uses pre-MLE estimates of DI in this table, whereas Table 10 reports post-MLE. We checked the Reporting Guidance which does not state whether Table 10a should be based on pre- or post-MLE estimates of DI.

The Company's methodology for measuring DI has been discussed as part of our audits on table 10.

Column 7 – Dry Year Available Headroom (Ml/d)

Dry Year Available Headroom is a calculated column. We have confirmed that the correct formulas have been used within the Table 10a(i) to calculate this.

Column 8 –Target Headroom (Ml/d)

The Company reported that Target Headroom values used in Table 10a are consistent with an interpolation of the 2008 and 2012 values presented in the WRMP. The Company calculated target headroom using the improved UKWIR methodology (02/WR/13/2). The aggregated values equate to 7.5%, which is consistent with the values used for AIR11 which were calculated using the previous UKWIR methodology ((98/WR/13/1). We have checked the interpolation of the values from the WRMP.

Column 9 –Surplus/Deficit (Ml/d)

Surplus/Deficit is a calculated column. We have confirmed that the correct formulas have been used within table 10a(i) to calculate the Surplus/Deficit.

Column 10 – Percentage Deficit (%)

Percentage Deficit is a calculated column. During our checking procedure, we have confirmed that the calculations are correct.

Column 11 – Zonal Population (000)

We confirm that the total population in consistent with Table 7 and that the distribution of population across the zones is consistent with the WRMP.

Column 12 – Percentage of Total Population with Headroom Deficit (%)

Percentage of Total Population with Headroom Deficit is a calculated column. We have confirmed that the correct formula has been used by the Company to calculate the Percentage of Total Population with Headroom Deficit.

Column 13 – Zonal Index (nr)

Zonal Index is a calculated column. During our checking procedure, we have confirmed that the calculations are correct.

Column 14 –Security of Supply Index (nr)

The SOSI is a calculated column. We confirm that this calculation is correct. We have also confirmed that the SOSI is consistent with that reported in line 31 of table 10.

We are satisfied that the Company has followed the NIAUR guidelines for the preparation of this index for the planned levels of service for average demand in a dry year.

6. Assumptions

The Company's assumptions are consistent with those made in the DWRMP.

7. Confidence Grades

Confidence grades are not required for table 10a.

8. Consistency Checks

We have checked for consistency with tables 7, 10 (pre MLE), D and 44 and found the values to be consistent.

Date: 25 July 2012
Prepared by: HMS

Table 11 – Water Service Activities

Commentary by REPORTER

1. Background

Network activities provide a good measure of work achieved provided they can be related to associated investment. The investment breakdown included in these reporting requirements provide this linkage, with the separation of base service expenditure from that related to enhancements in Table 35.

2. Key Findings & Recommendations

- Significant increase in lengths of mains renewals and abandonments. Company expectation to exceed 915km total length of renewals 3year target by approximately 10%.
- Error identified in omission of trunk mains from line totals; partially corrected.
- Significant increase in the total number of communication pipes being replaced, largely in line with overall increase in mains activity.
- Delay in completion of remaining zonal study models.
- Some improvements to confidence grades, but recommendation for more logical alignment of component grading.
- The reduction in the number of mains bursts reported (line 11) can largely be attributed to the mild weather experienced in 2011/12, the success of the mains renewal programme and continual improvements in data quality.

3. Audit Approach

Our audit consisted of interviews with the relevant NI Water and PPP system holders, a review of the Company methodology, the commentary and the table entries. Table entries were reviewed for consistency with previously audited data and supporting data was audited for accuracy. Confidence grades were reviewed to ensure compatibility with the methodologies used.

4. Audit Findings

4.1 General

There have been no significant changes to overall methodologies or commentary structures compared to last year, although the Company has generally carried out greater manual checking to remove data errors and duplication. The commentary segregates the inputs from Networks Water Operations (NWO) and Engineering & Procurement (EP).

Further to our comments last year regarding the layout of the Company Commentary, improvements have been made and the commentary is more unified and logical.

Following improvements made in the previous year, we are satisfied that lines are reported in accordance with the Reporting Requirements. The Company have not adopted the use of the proposed 'adjustment factor' in Line 7 which we feel would improve continuity and consistency in the table by enabling the calculation of Line 12 to match the total length extracted from GIS systems. This can then also be used as a guideline check on the reported lengths between the project and GIS systems. We do, however, recognise that this is not required under the Reporting Requirements and that neither approach is ideal.

4.2 Asset Balance at 1 April (Line 1)

This figure has been correctly carried forward from the total closing balance of last year's report.

4.3 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 (comprising of 16.42km of trunk main between Castor Bay and Forked Bridge) are correctly excluded from the line totals.

Checks carried out against source data identified the general omission of lengths of trunk mains from the totals, affecting lines 2, 6 and 7. This was raised with NI Water who conceded this was an error that had occurred due to confusion with other Reporting Requirements where trunk mains are specifically excluded. The Company duly carried out corrections to the line totals prior to final submission. However, our subsequent checks on the revised numbers identified that corrections had only be applied to Line 6. NI Water acknowledged failure to correct these in time and hence trunk mains are still not included in lines 2 and 7 in NI Water's final submission. We have calculated the correct totals in our commentary below for reference. For both lines 2 and 7, the difference is noted to be well within the accuracy band of the applied confidence grading.

Line 2 - Mains Renewals

The Company reports a substantial increase in mains renewals this year from 174.49km to 443.95km, all of which were undertaken by EP under the water quality programme (as with previous years, NWO do not carry out any main renewals works under their maintenance programme). Checks were carried out against the source data provided by the Company which confirmed the contributing lengths and line total. However, as noted above, an additional 1.871km of trunk mains should also have been included. The correct total for Line 2 is therefore 445.93km. The difference is <0.5% and hence well within the applied A2 confidence grade.

We discussed the significant increase from last year with the Company and were advised that the increase is in line with Company expectations based on a programmed mid-period increase in output and slightly above the target in year. The Company advised that they currently expect to deliver approximately 10% over the targeted 915km for the 3yr period. Our checks against the source data support this claim with the most significant lengths of renewals occurring in Lough Ross (95km), Dungonnel (42km), Moyola (30km), Rasharkin (31km) and Cookstown (48km); all significant towns, but mainly outside the densely-populated urban areas around Belfast which was identified as the prime reason for the low lengths of renewals reported last year.

Approximately 70% of the contributing lengths were identified as being undertaken by trenchless methods, a significant increase on last year and indicative of the Company's large scale adoption of pipe bursting and lining methods.

A detailed spot check of two months data was carried out on lengths reported for Lough Ross to confirm the breakdown between new, renewed and abandoned. The Company provided suitable evidence to validate the data.

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 NWO under maintenance activity and hence the EP input is zero. This year, the Line 4 total of 839.75km represents a marginal increase to the length of 837.41km reported last year. Although considered largely indicative of consistent performance levels, the underlying figures actually indicate a slight decrease in reactive flushes and a relative increase in maintenance scheduled tasks which is generally encouraging.

As adopted in AIR11, NI Water currently assigns 1 of 5 defined Maintenance Schedule Task codes and unique activity code to all flushing activities to clearly define whether the activity has been carried out as part of a regular flushing programme (categorised into weekly, monthly, quarterly or bi-annually) or a one-off/reactive operation. This enables identification of any repeat activities on the same length of main. We were also advised that the Company also has an additional code ('prime main and flush') to cover activities where flushing is carried out for non-cleaning reasons such as post-works priming of a main. The assigned activity code enables the exclusion of reactive and non-cleaning related flushes, and the Company confirmed that these activities have not been included in the line total.

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 well within the margin or error covered by the current B3 confidence grade.

Line 6 – New Mains

The reported length of new mains installed has decreased slightly from 121.17km last year to 118.16km within the Report Year. This comprises 27.02km reported by NWO and 91.135km reported by EP which includes 22.047km relating to the Ballydougan to Newry Strategic trunk main.

We note that the line total has not increased proportionately with the comparable increase in mains renewals. This is considered to be because approximately half the inputs are largely unrelated (housing developments and trunk mains), and the data suggests that the majority of the increase in renewals has involved trenchless methods requiring relatively few new mains. As noted previously, the significant reduction from previous years is largely attributable to realignment of the line total with reporting requirements through exclusion of pipe replacements and pipe bursting operations which are correctly included in Line 2.

We requested and were provided with a breakdown summary of input data by zonal area for EP which we reviewed. Our checks against the breakdown and clarifications with the Company confirmed the reported totals.

The 27.02km total reported by NWO all relates to new housing developments. The reduction from last year's total of 34.33km is considered to be directly attributable to the current decline in new housing developments.

We noted that the length of new mains from housing developments is the only component not captured and reported through the MWM system. NI Water informed us that the numbers are collated and submitted monthly into a separate database by three field managers. The system is therefore reliant on their interpretation and manual checking of work orders which in turn relies on clearly reported lengths and descriptions on the order form. NI Water admits there is no reason this data could not also be entered into the MWM system to centralise reporting and it would appear a logical step to take.

4.4 Mains abandoned and other changes (Line 7)

The Company has reported a total of 476.63km of abandoned mains this year, all of which are reported by EP under the mains rehabilitation programme. However, as noted above, an additional 3.00km of trunk mains should also have been included.

The correct total for Line 7 is therefore 479.63km. The difference is <1% and hence well within the applied A2 confidence grade. No lengths were reported by NWO for this year. Lengths are based on data provided by individual project managers.

The overall change is in line with the relative changes to lines 2 and 6 and is supported through data provided by the Company. 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.

NI Water confirmed that no adjustment factor to account for the difference between the calculated Line 12 value and the value extracted from GIS systems has been applied.

This year, the discrepancy between the calculated total (from Lines 1, 2, 6 & 7) and the measured total in Line 12 (from GIS) is -28.26km. A significant adjustment factor is considered almost inevitable due to delays in the transferral of data between systems and the reconciliation of monthly reports against final data records. This is a relatively small value, possibly indicative of improved alignment with GIS systems. However, it is difficult to draw any reliable conclusions from this figure.

4.5 Communication pipes (Lines 8-10)

The totals in lines 8-10 comprise input data from both EP and NWO. The Company reports a total number of lead communication pipes replaced during the year of 2,460 of which 341 were for quality reasons and 2,119 for maintenance. These results represent a significant increase to the 258 and 1,328 respective values reported last year. The Company provides possible explanations for these increases in their commentary which we consider reasonable. Fundamentally, they are also consistent with the general increase in mains activity. Checks against source data provided by EP indicated the majority of lead pipe replacements occurred as a result of programmed works in four discrete areas (Breda North, Carrickfergus, Ballysillan and Ballywonard) all of which are historic, urbanised areas and hence likely to contain greater proportion of lead.

The total number of non-lead communication pipes being replaced within the same period in Line 10, also increased substantially to 10,253 from 3,156 last year. Similar checks against the source data confirmed the validity of the total and we note that the increase of approx 320% is broadly consistent with the 250% increase in mains renewal activity this year.

We are therefore satisfied that the results are a valid representation of actual activity, although we note that there remains a potential for error in the designation

of numbers between lead and other materials due to the current methods of data capture (refer to Section 5 for details).

Although representing only a relatively small proportion of the totals in lines 9 and 10, NI Water reports that they have made further improvements in the data quality reported by NWO through manual checking and improved awareness of field managers. This has contributed to the identification of more lead replacements by NWO which would previously have been categorised as 'other'.

We reviewed the NWO inputs with the Company in more detail to assess the degree of manual intervention that is required to produce the line totals. NI Water advised that the 1,055 reported in Line 10, for example, is the result of filtering and manual checks on approximately 3,000 total data entries extracted from the Mobile Work Management (MWM) system and that the removal of all duplications and invalid records is undertaken manually. The majority of the invalid records relate to communication pipe repair works rather than replacements. Whilst field notes stored in the MWM system are generally adequate to enable reasonable identification between the two, automatic exclusion is not possible due to the same activity code being applied to both repair and replace operations. NI Water also advised that the activity code is also occasionally used for other defects, such as repairs to street furniture, which do not obviously fall under any activity code. The Company admits this is not ideal, although they are reluctant to adopt too many activity codes due to concerns of over-categorisation. Whilst we recognise that there is a practical balance to be achieved in adopting more activity codes, we consider the current system to be overly reliant on manual data manipulation and recommend that additional measures such as a new code is adopted to enable automatic differentiation between repair and replacement operations.

Lead is generally not as common in communication pipes as on mainland UK and tends to be clustered around the historic, urbanised areas such as Belfast and Omagh. As much of the programmed work in the last two years has been centred around these areas, the numbers of lead pipes has remained relatively high compared to previous years with a corresponding decline in non-lead pipes.

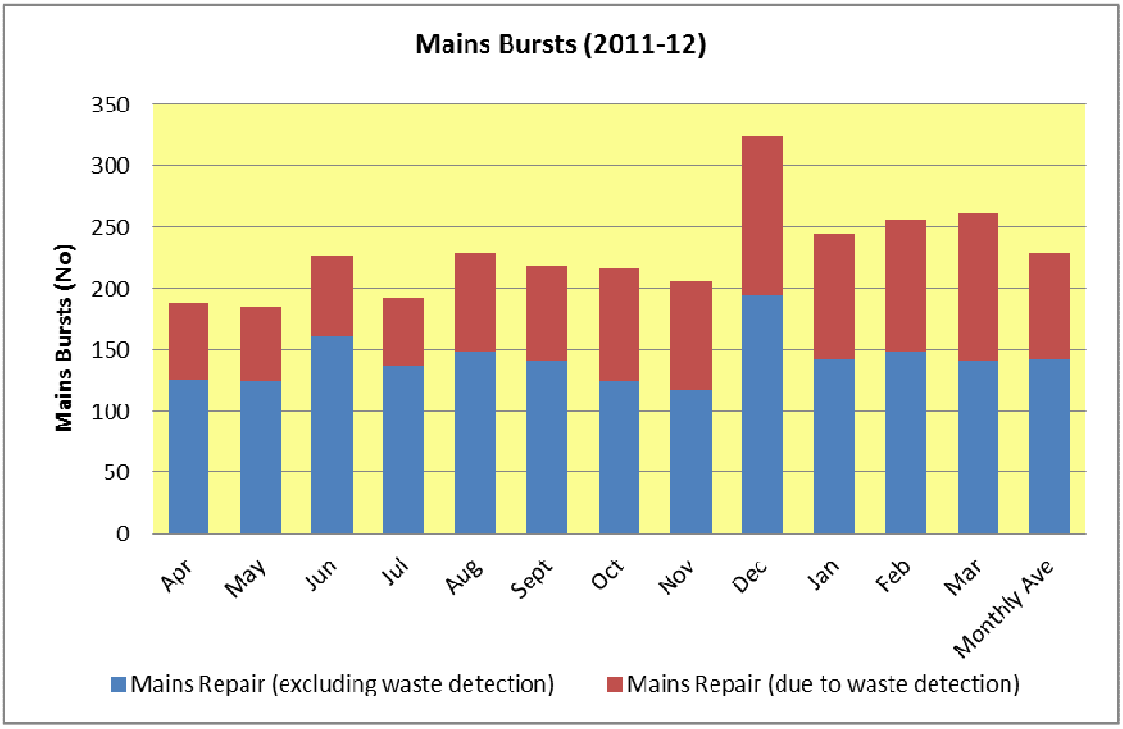
NI Water does not currently have a strategic lead replacement programme and old communication pipes (lead or otherwise) are replaced on an opportunistic basis when encountered through other capital or maintenance works.

4.6 Mains bursts per 1000km (Line 11)

There has been a significant reduction in the reported numbers of mains bursts per 1000km this year, decreasing from 137 to 101 bursts per 1000km. 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 26,499.03 km 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.

Following changes to the systems in AIR10, all data is now stored and extracted from the Mobile Works Management system (MWM). We interviewed Company representatives from Networks Water.
We reviewed the monthly summary of burst events and concluded that the decrease can be largely attributed to both the mild weather and improved data, particularly the removal of services repairs and duplicate entries (multiple jobs for a single repair).

A check against the source data confirmed the contributing total 1,706 number of reported burst mains repairs by Networks Water. An additional 1,040 repairs were undertaken due to waste detection. Additionally, 81 repairs due to third party damage on mains were deducted from the total giving a total of 2,665 repairs in the report year.



We consider that the annual total has reduced by approximately 15-20 bursts per 1000km due to the milder winter weather, approximately 2 bursts per 1000km due to additional 3rd party repairs, with the reminder due to a combination of the impact of mains renewal and the removal of mains services repairs.

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 1000km as required.

4.7 Asset Balance at 31 March (Line 12)

The total length of mains has increased by 57.22km this year to 26,499.03km, significantly more than the 6km reported last year, but less than the 82km reported

last year and 241km the year before. This figure has been taken directly from a query of its GIS system on 31/03/12. 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.
As noted in Section 4.4, the comparable total by the defined calculation method of mains changes in Lines 1, 2, 6 and 7 differs by -28.26km due to the difference in data sources.

4.8 Distribution Studies (Lines 13-17)

NI Water's zonal model development started in 1999 leading to the adoption of a distribution zonal study programme in 2001. The primary aim, to set up models to cover all 71 water supply zones, had an initial target for completion of March 2012. NI Water reports a cumulative total of 64 distribution zone studies completed since the start of the programme with the remaining 7 studies ongoing. This represents a relative slowdown in completion rates and a consequential expected 6 month extension of the completion target to September 2012. However, progress is more favourable when considered in terms of population coverage, increasing from 80.9% to 87.0%. The Company provides a full breakdown of the data in their commentary (although slightly different from the recommended table layout) and our audit confirmed the entries for lines 13-15 appear to be an accurate reflection of their current position. The percentages in lines 16-17 have been correctly calculated based on numbers of properties and population extracted from their POINTER database.

We discussed the potential reasons behind the apparent slowdown and failure to meet the original March 2012 target date with the Company. The primary reason cited relates to recent issues with changes to the frameworks and consultants who undertake the modelling work for NI Water, resulting in direct delay.

We have previously requested and reviewed copies of options reports and found them to contain all the necessary aspects of investigation, analysis and consideration of design solutions and expenditure to qualify against the Reporting Requirements. This year, we assessed a copy of the completed model options report for Limavady & North East DZS and confirm the contents were in line with requirements.

NI Water acknowledges that most models have not been re-analysed since first completion and several studies are now over 10 years old (although the majority are still less than 5 years old). NI Water remains focused on the 'Phase 1' completion of zonal studies for the currently un-modelled zones, now programmed for completion in September 2012. However, they are aware that many models are at increasing need of updating and propose that this will be the key aim of 'Phase 2'. NI Water advised that they are currently ranking all studies based on weighted scoring of age, number of properties, degree of change and known operational issues. However, they currently expect that selected studies will be weighted towards zones containing operational issues such as leakage, DG2 properties and

customer complaints. In this way, NI Water will focus on the zones that are most likely to require remedial or improvement works (targeted investment).

Currently, the construction and management of all models is undertaken by sub-consultants under the management of a lead consultant. NI Water provides strict guidelines for the development and operation of models to ensure consistency between sub-consultants. In addition, the Company carries out regular audits at various stages of model build, including cross-checks against GIS records and OS mapping to ensure the model accurately reflects the real network. In general, this set up has worked reasonably well, although NI Water admits they are looking to improve in-house skills to enable greater and more direct control and maintenance of the models to remove some of the issues that have led to recent delays. This seems a judicious approach.

No consolidation or amalgamation of zonal models has occurred this year, although NI Water expects consolidation of zones will be necessary in the future. Through discussion, we understand that the Company is considering a major reduction in the number of zones as part of its 'Phase 2' programme. Given the number of changes to the network in recent years, we agree that the current 71 DSZs are no longer particularly logical in terms of source or distribution areas or efficient in terms of the numbers of zonal models and associated boundary conditions. Improvements in computing power also mean larger models are now more feasible. We therefore agree that some significant rationalisation of zones would be beneficial.

The population figures have been adjusted to be consistent with those reported elsewhere.

4.9 Nominated Water Service Outputs (Lines 18-20)

In line with our previous recommendations, the Company has included tables of the nominated schemes within their commentary, including the relevant beneficial use date, enabling direct comparison of the line totals against the number of included schemes. In general, the Company has provided a full and detailed explanation of the line totals in their commentary. Comments on specific line total are as follows:

- Line 18 – the Company initially reported a line total of 1 relating to the completion of TMS/001 Castor Bay to Dungannon trunk main in April 2011. However, we noted that this had already been included in the AIR11 line total as 'substantially complete'. The Company agreed to amend the line total to zero and explain the apparent discrepancy in their commentary. Although 5 projects are listed, the company confirmed that TMS/004 (Project Value £c.23m) was removed and replaced by TMS/005 (Project Value £c.4m) due to funding cuts at PE10. We understand this change was agreed and approved with DWI and NIAUR. Paperwork was observed confirming the May 2012 completion of TMS/003. Other trunk mains projects (e.g. JR461) are considered to have been rightly excluded as both were reactive schemes to specific issues (Ballystockart was reaction to overburden issue caused by third party. Ballinrees required installation of a parallel main to resolve a localised capacity issue).

- Line 19 – the line total of 1 correctly represents the completion within year of output from WTW/003 Killylane. Paperwork was observed confirming the completion date.
- Line 20 – the line total of 3 consists of the completion within year of SRV/001 Carland SR, SRV/002 Ballylone SR and SRV/008 Tullyhappy SR. Paperwork was observed confirming these completion dates. The Company advised that the completion dates of 4 of the 5 outstanding projects have been delayed to PC15. We were advised that this is directly attributable to the funding cuts outlined in PE10 and that all changes have been agreed and approved with DWI and NIAUR.

5. Company Methodology

There are no significant changes to the Company's methodologies this year.

As in previous years, the majority of information in lines 2-10 is based on data extracted from the Company's centralised project database system entitled 'Captrax'. The database is a working record of all active capital works projects and is updated regularly with project information obtained directly from the relevant team. NI Water project managers are responsible for all inputs and updates on their projects based on forms submitted by site teams. All information is therefore reviewed and approved by the relevant project manager before being entered onto the database records. Internal cross-checks are also carried out on the data to ensure compatibility with other internal systems.

For mains cleaning (Line 4), information is compiled separately via Ellipse and the Mobile Work Management (MWM) system. NI Water only records the number of cleaning events and do not record the actual length of any individual flushing event. They hence continue to log by the number of events rather than by actual length. In order to report against the required units, they hence apply a fixed conversion factor of 0.156 to provide a length of mains flushed. The line total of 839.75km is therefore based on 5,383 flushing events as indicated in the Company Commentary.

Whilst heavily reliant on assumed flushing volumes and pipe sizes, the use of the 0.156 factor provides a convenient and logical approach to enable them to report on total length as required. Furthermore, provided the factor remains fixed, it also provides a stable benchmark around which to monitor performance. However, having improved their data record system, we encourage NI Water to consider reducing the reliance on this assumption and collate actual length of cleaning, particularly for regular flushing programmes where the extent is likely to be pre-defined.

With the current exception of mains from housing developments, field data is compiled by field managers via the Mobile Work Management system onto a central database. Remote access for operatives is available via 'toughbooks'.

Since April 2010, field data is collated through a standardised, electronic form which has removed many of the previous irregularities and significantly improved the capture, allocation and transfer of monthly data. The form includes defined activity codes which enables clear allocation of work activities to specific data groups. This enables simple identification of the inclusion of any activity into the line totals through a simple query process. This includes clarification between mains or communication pipes replaced for quality and those replaced for maintenance reasons.

Information on the form is always checked and updated against the final as-built records submitted at the end of the project. The monthly data collection is primarily used for monthly reporting and payments. Hence any errors are generally corrected through cross checks against the final logs and drawings and signed off by the contractor and project manager. This also explains why negative lengths are occasionally reported within monthly summaries as they represent data corrections from final records.

The Company does not declare any mains acquisitions as all water mains are installed by themselves and hence theoretically already included in their figures.

Mains burst data for Line 11 is obtained from records compiled by Networks Water. The data is compiled by interrogation of the work order code and categorisation.

Networks Water repairs are reactive and their work orders are largely in response to customer and third party calls. Networks Water is split into Repair & Maintenance and Distribution who record and report on their specific areas. Systems utilise a simple logging and reporting system based on individual work orders. Each work order is assigned a unique reference number.

The Company does not include work on valve packing, hydrants, air valves, communication pipes or mains repairs due to third party damage which is in line with the Reporting Requirements.

We undertook a sample audit of the data for November 2011 which showed that the data validation undertaken by NI Water had removed 51 jobs (20%) due to duplicate/multiple jobs for a single repair (7%), dry-holes (7%), mis-coding (2%) and services (3%).

The total length of mains in Line 12 is extracted from the Company's GIS database which is applied as the baseline figure for comparison against the other line totals. The systems are largely independent and are not updated with the same regularity. The GIS mapping system in particular requires regular updating to keep pace with new developments and other physical changes. As a result, there is invariably some difference between the totals reported on the two systems. To ensure continuity between totals, an adjustment factor can be applied in Line 7 which is considered the most suitable location as it encompasses 'other changes'. The adjustment factor principally represents the difference in year end data stored on the 'Captrax' and the GIS systems and hence some adjustment is considered

inevitable. The figure is usually positive to reflect the delay in getting data from project records onto the GIS system, although the factor can be negative if the Company removes a back-log of data. At present, NI Water does not apply a factor, and hence the line totals are not wholly consistent.

The numbers of lead and other communication pipes replaced for quality, maintenance and other reasons are extracted directly from Captrax which is based on field records and cross checked against data in the cost management system. Currently, the work activity code does not differentiate between lead and other materials and tends to default to the latter unless specifically noted on the form or manually amended. Whilst this system appears reasonably effective, it requires a significant amount of manual interpolation which is an obvious source of potential error. We therefore continue to encourage NI Water to improve the system to more effectively capture the material type.

Distribution study models are focussed around the production of zonal models based around the Company's 71 water supply zones, with typically one model to cover each zone. Zones are interlinked by defined network nodes.

Zonal studies are divided into three phases; a needs phase, an options phase and a solutions phase. The completion of each zonal study therefore includes the completion of the physical network model, as well as analysis and production of a needs report to identify possible problems on the network. This is then assessed by NI Water staff at options phase for cost implications and used to create a programme of works. Solutions are presented and passed onto design consultants for action. Models are re-visited and updated after completion of the related works (which can be several years later once all planned works have been completed). These updates are then checked and verified against field survey data in the affected locations. This concurs with the line definitions and hence validates their inclusion in the line totals. A study is defined as 'complete' once the draft options report has been formally submitted for review and action by NWO.

The models are currently built and maintained by sub-consultants based on a set of strict guidelines to ensure continuity. Models are based on a snapshot of the Company's GIS system at time of development and are not typically re-visited to check for updates unless specifically requested for a project. This inevitably results in models not being fully up to date with the current GIS system.

The GIS system was set up in 2001 and utilises an Oracle database with graphical front end and stores all infrastructure data. Data records prior to 2001 have been digitised and transferred into the database to include all existing assets. Each asset has its own unique ID reference and confidence grades are assigned to asset properties to guide to reliability. The system is updated via direct requests from water mains rehabilitation teams, new developments or engineering procurement (capital works) via a relevant manager for check and approval. All changes are undertaken centrally once approved. The Company aims to undertake all changes within 4 weeks, but acknowledges that they experience some delays, mainly

attributable to the collation of information from site teams. All changes to the GIS system are subject to a peer review to provide a level of checking.

This year, the Company has commenced a one-off, 18month project entitled ADAI, specifically aimed at updating internal asset records to improve records and attempt to remove some historic ambiguities.

In general, we consider the methods listed by the Company to be largely robust and in accordance with the reporting guidelines.

6. Company Assumptions

The calculation for Line 4 is based on a fixed, assumed flushing rate based on typical hydrant flushing volumes (currently 0.156km per flush).

Line 12 assumes that the GIS system is the most reliable source of information and hence supersedes the specified calculation from the individual line totals.

7. Confidence Grades

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 A1 due to the detailed project records held and theoretical accuracy of the data. Data provided by NWO for Lines 2-10 is applied a general confidence grade of B2. This represents a quoted improvement on the generally applied grade of B3 last year. Given the recent improvements in the reliability and accuracy of field data records, we do not consider this change unreasonable.

Last year, we made some specific recommendations regarding the confidence grades for Lines 2-10. We are pleased to note that the Company have adopted these suggestions, but are aware that there is now some inconsistency and illogic in the applied grading. Specifically, the overall confidence grade of A2 for lines 2 and 7 does not directly correlate with the A1 grades applied by EP when they are the only contributor to the lines. Likewise, the NWO grading of B3 grade applied to lines 4 and 8. These should be adjusted to be more consistent and logical.

Given the above, we therefore recommend the following:

- Align the EP grade with the overall A2 grade applied in lines 2 and 7.
- The current A1 grade remains appropriate for the zero value in Line 3.
- Align the NWO grade with the overall B3 grade applied in Line 4.

- The B2 grade for Line 6 and B3 grades for lines 9-10 are considered appropriate.

- Given recent improvements in differentiating the quality driver, increase the overall grade in Line 8 to align with the applied NWO B2 grade. We acknowledge there may be some justification to improve lines 9-10 in future if the material categorisation is improved.

- Following significant improvements to the source data at AIR10, we are satisfied that the B3 confidence grade applied to Line 11 is appropriate.

- The Company continue to report B3 grades for its data from GIS systems (lines 1 and 12). We consider this reasonable, but suggest the total is likely within a B2 grade given the estimated levels of discrepancy between line totals (<1%) and the theoretical accuracy of the GIS system.

- Given the discrete data entities, the A1 grades applied to Lines 13-17 and 18-20 are considered appropriate.

8. Consistency Checks

The Company provided further data and responses to queries following our initial audit. Following corrections to line totals, additional checks were carried out on revised tables and commentaries. Cross checks were made against previous table data to confirm consistency of results.

The number of bursts per 1000km is used in the estimation of DSOU within Table 10; we confirm the value recorded in this table has been used correctly.

Date: 25 July 2012
Prepared by: HMS

Table 11a – Water Service Activities

Commentary by REPORTER

1. Background

This table provides information on turbidity at water treatment works and is required to enable NIAUR to identify trends, which may indicate declining asset condition at treatment works. The Company is required to analyse turbidity results for each operational water treatment works that produced water for drinking purposes in the calendar year and determine 95 percentile values. The Company should identify and report number of works and their aggregated output (Ml/d) over the calendar year where the 95 percentile is greater than or equal to 0.5 Nephelometric Turbidity Unit (NTU) and less than 0.5 NTU.

2. Key Findings

- Remained the same level of failures in the number of works with 95%ile greater than or equal to 0.5NTU, but proportion of total output volume remains relatively high at almost 7.3%, primarily due to exceedences at Caugh Hill WTW.
- No sites with 95 percentile value >1.0 NTU.
- Adoption of our recommendation that improved accuracy (to 2 decimal places) in turbidity readings has been in place.

3. Audit Approach

Our audit consisted of a direct interview with the NI Water system holder, a review of the Company methodology, the commentary and the table entries. Table entries were reviewed for consistency with previously audited data and supporting data was inspected for accuracy. Confidence grades were reviewed to ensure compatibility with the methodologies used.

4. Audit Findings

The Company has continued to demonstrate ongoing improvement compared with recent performance, with the number of exceedences of the turbidity level limit in 2012 at all WTWs decreasing to 25 compared to 27 in the previous year. Please see the following table for the previous years' performance. Checks against the data confirmed that 1 exceedence occurred at a PPP site and hence only 24 of these are actually reportable under this table.

	2006	2007	2008	2009	2010	2011	2012
NIW					28	26	24
PPP					1	1	1
Total	114	50	42	39	29	27	25

The improvements shown over the last 5 years have been largely due to the commissioning of the new Alpha (PPP) sites and the closure of a number of older and more frequently failing sites, particularly those with borehole sources. This year, the changes in line totals are largely as a direct result of the closure of 3 further sites at Altmore, Gortlenaghan and Shanmoy Borewell.

This year, the number of WTWs with 95%ile above the 0.5NTU level has shown further improvement with a drop from 5 to 4 in the number of failing works. There is 1 WTW (Caugh Hill) reported at exactly 0.5NTU. This is included in Line 1 and is consistent with the Reporting Requirements. However, the respective output volume remains fairly significant at approximately 7% of the total output volume. The Company explains that out of the 4 failed works, Caugh Hill and Glenhordial will be monitored as they failed marginally over the regulatory requirements. Another failed work, Lenamore Springs is planed to be closed.

The total number of WTWs counted in lines 1-3 decreased further this year from 26 to 24 this year, a net result of the removal of service of 3 sites closed during 2011.

For clarification, NI Water does not have any sites classified as 'emergency' sites as the Company either has 'operational' or 'mothballed' sites. However, in effect sites such as Cabragh borehole can be temporarily brought online to enhance supply if required. NI Water has a very limited number of sites which could be reactivated to supplement existing supplies in emergency such as Cabragh Borewell. Prior to bringing in any source, NI Water will carry out a full Regulation 28 risk assessment by source, and this will be notified to DWI. NI Water advises that they apply to NIEA to surrender the Abstraction Licences for sites taken out of supply and hence they are no longer operational. We also note that such categorisation has no tangible impact on this table.

There has been no transfer of any works to the PPP concessionaire during the Report Year. In accordance with the guidelines, all current PPP sites have been excluded from this table.

The total output volume of 338.39Ml/d from NI Water sites totals decreased slightly (6.5%) to the 362.23Ml/d reported last year.

Checks against source data confirmed that all data has been correctly reported by calendar year.

4.1 Lines 1 and 2 – Turbidity Levels

We reviewed the 4 sites contributing to the Line 1 total. Of these sites, all reported 95 percentile NTU values were within the range 0.5-1.0 and no sites had a 95 percentile NTU value >1.

Of the 4 works, 3 of the works were relatively small contributors to output volume (typically <5Ml/d) and represented less than 1.4% of the total output volume. However, the output volume is significantly increased by the inclusion of Caugh Hill in Line 1, one of NI Water's large sites at 19.83Ml/d. The net result is a combined

output volume of approximately 7.3% of the total output volume which is a significant proportion of the total distribution input.

We investigated and asked what measures the Company was taking to rectify the issues at each site. NI Water advised as follows:

- Rathlin Borehole WTW – the smallest of NI Water's works, Rathlin, supplies water for an island community from a local borehole. Unlike other boreholes sources which are being systematically closed down, there are few options available for alternative supplies and hence NI Water has no plans to replace the current arrangements. The current reported failures are relatively marginal with the site being compliant in 2009. We therefore accept that immediate action is probably unnecessary and advise further monitoring.

- Caugh Hill WTW – as mentioned above, this site is failed marginally at 0.5NTU. The Company explains that they are monitoring the results in current year.

- Glenhordial WTW – as same as Caugh Hill, this site will be monitored as the failure is marginal over the regulatory requirements

- Lenamore Springs – Whilst NI Water recognise that there may be a potential issue, they confirmed that Lenamore Springs is scheduled for closure by the end of 2012.

- Camlough WTW – following marginal failure of the site in 2009, Camlough has displayed further deterioration in turbidity levels in 2010 with a 95%ile value only just below 1.0 NTU. NI Water explains that 2011 results looked good all year around and no remedial works were considered necessary as Camlough is timetabled for closure by the end of 2013 following conversion to supply from Castor Bay WTW. After our AIR12 submission, we were advised that the closure of Camlough is deferred to PC15. Hence they have no plans for any major changes to the current arrangements. Since our audit, we were advised by the Company that the decision to either close or refurbish Camlough WTW has been deferred to the PC15 period for financial reasons. In the meantime, the works will be maintained and operated to comply with industry best practice. It has also transpired that the sample point being used during much of last year was not giving fully representative samples of the water entering supply. This sample point has now been moved and turbidity results appear to be lower now than previously (the 95%ile for the first six months of 2011 is 0.59, and the 95%ile for the last six months is 0.40).

- Killyhevlin WTW – whilst the site failed last years, the 2009, 2010 and 2011 failures have been marginal with 95%ile values of 0.5NTU and no obvious reason for high turbidity levels as with the borehole sources. Analysis of the data identified that no NTU values were above 0.8NTU. The Company also confirmed that it has no reports of any actual PCV turbidity failures within the relevant supply zone nor has its investigations identified any potentially significant source of the turbidity. We recommended in previous year's submission that '*further action must be considered if it continues to be a problem*

in 2011/12'. In AIR12 the results came under 0.5NTU, however we recommend that Killyhevlin should be monitored regularly as it is a large site which contributes 8% of overall distribution input.

Of the 4 sites included in Line 1 last year, Rathlin remains on the list. Two sites, Altmore and Gortlenaghan were out of service at year end of 2011. The remaining 1 site, Camlough is scheduled for closure by the end of 2013 (this is now deferred to PC15) and will be no major action will be undertaken. Out of 4 sites failed in AIR12, Caugh Hill, Glenhordial and Lenamore Springs are new sites to be included in Line 1 this year.

We subsequently reviewed the Company's methodology and spreadsheet calculations behind the line totals. In general, the methods used for excluding sites and the formulae used to analyse and calculate the line totals were found to be correct and in accordance with the Reporting Requirements. The PPP sites have also been correctly excluded from their calculations.

4.2 Line 3 – Turbidity Not Recorded

Line 3 typically includes sites which are temporarily out of service for the majority or all of the year or sites which have been activated or abandoned during the Report Year. The Company include those sites which supply for part of a year, providing the defined criteria are met, but only include sites which are still in active service at the calendar year-end. Where sites are wholly abandoned during the year, NI Water excludes them on the basis that they have been permanently removed from supply and are hence no longer reportable.

Our checks against the source data confirmed that all sites reported in Line 3 have been correctly excluded on the basis of having been previously abandoned.

4.3 Line 4 – Total

The total number of WTWs operational during the Calendar Year and related output for Calendar Year are confirmed as the correct summation of the individual totals in Lines 1-3. This appears to concur with information reported in Table 12, when accounting for the differences due to reporting years.

4.4 Other Performance Indicators

The Company continue to carry out similar monitoring of iron, manganese and aluminium levels within zones through sampling at customer taps. NI Water informed us that they have not identified any significant problems with this parameter during the Report Year. We reviewed the sampling data and can confirm that performance indicators in iron, manganese and aluminium have all improved on 2009 levels and that overall compliance across all parameters remains high with only iron (98.15%), aluminium (98.77%) and odour (98.47%) below 99.0% zonal compliance, although iron has achieved the PC10 target value of 97.90%.

The Company advised that enhanced monitoring is installed where a possible problem is foreseen to ensure effective and proactive monitoring in key areas.

5. Company Methodology

The Company confirmed that its methodology remains unchanged from the previous year.

Turbidity data is collated directly from field sample data and output data based on average daily flows into distribution. All data is collated and analysed by calendar year in accordance with the Reporting Requirements and as agreed with the DWI. The different timescale explains why the distribution data may differ from other tables.

Sampling is programmed in LIMS and downloaded onto PDA for field technicians. Typically, samples are taken daily at each WTW on the basis of output volume and can be up to 365 data available per site. For smaller sites, samples are taken weekly or so. The Company keeps a record of every sample taken and categorise it according to its purpose and by date. They can then accurately exclude all non-scheduled samples which may include data errors by category and assess relative gaps in data for exclusion against the criteria. The Company advised that as sampling is generally carried out daily at all monitored sites, there are typically no non-routine samples.

The 95 percentile figure is calculated using the standard Excel function rather than the pre-defined method in the Reporting Requirements. We have previously carried out a comparative calculation using the defined method and found the difference in predicted percentiles to be insignificant.

Our review of the Company's methodology confirmed that the Company has adopted methods that are compliant with the Reporting Requirements and has applied suitable criteria for excluding non-routine sampling and works with insufficient or long gaps in data.

The Company's internal monitoring of levels of aluminium, iron and manganese is based on data obtained though samples taken at customer taps.

6. Company Assumptions

The methods employed use accurately recorded and documented data obtained from flow meters and sampling methods. There are therefore few assumptions to be made other than the standard logic that the results obtained from sampling are true representation of the whole.

Where the accuracy of turbidity data is to only 1 decimal place, the Company assume that an overall 95 percentile value of 0.5 is at the threshold 0.5NTU limit and include it in Line 1. Where the level is below the level of detection (e.g. <0.1NTU) the Company assume a value of 0.05. As this only affects the very lowest values, this has no overall impact to the calculated 95 percentile values.

Since our audit, we were advised by the Company that NI Water currently fulfils the requirements of ISO 17025 as well as DWTS. NI Water's Scientific Services have stated within their quality documentation that they will report to 1 decimal place and this has been accepted by their accreditation to meet the above requirements.

7. Confidence Grades

We queried the confidence grades during the audit as Lines 1 and 2 were assigned at A2. The Company explained that this was a genuine mistake and they should be A3, adopting our recommendation in AIR2010. However NI Water made the same mistake in AIR11. We recommend that NI Water should check the previous submissions or re-check the appropriateness of CGs. We feel this remains appropriate given the continued accuracy of the NTU value to 1 decimal place and the significant scope for fluctuation in the line total depending on the allocation of sites with exactly 0.5NTU.

We note that the uncertainty in Lines 1 and 2 would be significantly reduced if readings could be taken to 2 decimal places. We therefore continue to encourage the Company to improve the accuracy of turbidity sampling as and when opportunities arise and particularly at marginal sites such as Caugh Hill.

8. Consistency Checks

We discussed our findings directly with the Company and cross-checked our results to ensure validity. Cross checks were also carried out against Tables 9 and 12 to confirm consistency.

9. Recommendations

We recommend that NI Water should check the previous submissions or re-check the appropriateness of confidence grades.

Date: 25 July 2012
Prepared by: HMS

Table 12 – Water Explanatory Factors

Commentary by REPORTER

1. Background

This table is used in water service operating efficiency studies. The information collected in this table is used in NIAUR's operating efficiency studies. It provides explanatory factors for the number of sources, proportion of supply by source type, amount of pumping required for treatment and distribution, and the relative complexity of a company's water treatment works. Changes in these factors can have a significant impact on the Company's costs.

2. Key Findings & Recommendations

- Continuation of removal of service of low-treatment level works supplied by borehole sources and corresponding reduction in the total number of sources.
- No changes to treatment levels at existing works, all changes to line totals resulting from closures of works.
- Positive steps taken to improve pump head data reliability via new telemetry systems at key pump sites.
- A number of duplication errors identified in the calculated value of pumping head, calculated to reduce the reported pump head by a further -2.8%. Overall net decrease in the value of the calculated overall pumping head (-5.2%), primarily due to a combination of removal from service, improved lift head readings and removal of duplications.

3. Audit Approach

The audit comprised an interview with the relevant NI Water and PPP System Holders and deputies, a review of the Company methodology for data collection, an analysis of the source data and a comparison with last years table entries.

4. Audit Findings

The table is sub-divided into 3 sections relating to PPP only, NI Water only and the combined total outputs.

4.1 Block A – Lines 1 to 4 - Source Type

NI Water Inputs

In line with the guidelines, the Company has included a table of sources, detailing all the changes to water sources and treatment types that have occurred throughout the year. A separate table is included of distribution inputs. The table indicates a further reduction in the number of active sources this year from 26 to 24 due to the removal of service of 2 sites at Cabragh (borehole) and Glarryford (borehole). A

further 4 sites (Altmore, Gortlenaghan, Shanmoy and Lenamore Spring) were removed from service during the report year and are hence correctly included in the total. The Company therefore had 20 sources in service at the end of the Report Year.

We reviewed the changes and categorisation of several sites with the Company and requested minor corrections to the table to document the removal of Glarryford and Cabragh during the report year (unfortunately, we note that these have not been included in the Company's final commentary and hence they are not documented as part of the list to produce the sub-total of 26 sites). We also carried out cross checks against source flow data and can confirm that all sources have been correctly assigned and reported. Grouped boreholes are correctly treated as a single source and no site has more than one reportable source. NI Water confirmed that they have no compensatory sources to consider. Lough Island Reavey is correctly excluded from the numbers of impounding reservoirs as it now supplies another source.

We carried out consistency checks against data provided last year and confirm that the changes are consistent and in line with our expectations. The source at Altmore was removed following decommissioning of the water treatment works and modifications to supply zones. The decommissioning of the sources at Gortlenaghan, Shanmoy and Lenamore Spring completes the Company's recent programme for the removal of low level treatment type, borehole sources. At the end of the report year, only Rathlin remains as an active borehole source. However, due to its island location we were advised that there are no alternative supplies available and hence no plans for its closure. Further significant changes in the number of sources are therefore not expected.

The Company commentary refers to a number of 'anomalies' between its asset data and GIS records. We were informed that this relates to a categorisation issue on GIS relating to abandoned sites which were not being updated to reflect changes beyond this status (i.e. when fully demolished or sold off). We accept that this will have no tangible impact on reporting. NI Water confirmed they are updating the GIS records accordingly.

The Company provides a breakdown of distribution input in their commentary. The total of 585.09Ml represents a 6.7% decrease on last year. We reviewed monthly supply data with the Company and can confirm that the difference is largely due to the avoidance of the major leakage issues experienced in AIR11.

In line with our request, the Company has continued to report on the overall numbers of decommissioned and abandoned sites and categorise them by their ability to be brought back into service. The Company provides a full breakdown of the 39 abandoned borehole sources and 23 WTWs in two tables within their commentary. It should be noted that this is the status at report year end and hence the totals include removals during the report year (e.g. Altmore). We discussed the numbers with the Company and can confirm that the changes are consistent.

We noted that only a single borehole site (Lenamore Spring) is categorised as being an 'emergency' site and were advised that this is expected to also be mothballed in 2012 reducing the number to zero. We subsequently challenged whether any of these sites were necessary to be maintained as emergency sites for network resilience. NI Water advised that they are neither necessary nor particularly suitable as backup sources due to their very low output volumes and that there is generally good resilience via inter-connectivity in the maintained network. Given the low output, low treatment level and potential cost in maintaining these sites, we accept that removal from supply of these sources is appropriate. We also note that although not considered true 'emergency' sites, mothballed sites have been successfully brought back into service in the past and so a reasonable level of capability does appear to be retained at a number of sites.

All 23 WTWs listed as abandoned would not be available for operation without major investment and are essentially considered inoperable.

With reference to the totals reported in Lines 1-4, we can confirm that the relevant source type and distribution inputs have been correctly assigned and totalled for each line. Although the source numbers have changed, the proportional split of distribution input remains very similar due to the already very low proportion from borehole sources. Following the reduction and relative inactivity of the remaining borehole sources, borehole sources now account for 0.1% of total distribution input, the majority (78.4%) from impounding reservoirs.

The Company confirmed that there have been no drought conditions experienced during the Report Year.

PPP Inputs

PPP are responsible for the operation of 4 WTWs at Moyola, Dunore Point, Ballinrees and Castor Bay and report on the basis of these 4 works (Castor Bay - Forked Bridge is not a separate works but is treated as a supply source, hence 5 sources are listed).

There are no significant changes to the line totals this year. PPP continue to correctly treat the 2 additional sources from Altikeeragh IR and the River Bann for Ballinrees as chain sources and are hence excluded from the line totals.

PPP confirmed that abstractions from Lough Neagh are treated as individual river abstractions as confirmed with NIAUR.

Total

The total is the correct summation of the NI Water and PPP inputs. Checks against source data indicated that distribution inputs have been correctly assigned.

4.2 Block A - Line 5 – Average Pumping Head

Following significant increases in calculated average pumping head in the past 2 years, the Company has reported an overall decrease of -3.7% in Line 5 to 155.9m.hd (compared to 161.82m.hd in AIR11).

The chart below illustrates the overlying change over the last 6 years. NI Water and PPP only calculations produce very similar average pump heads which is not unexpected. Checks against the source calculation confirmed correct calculation methods had been applied.

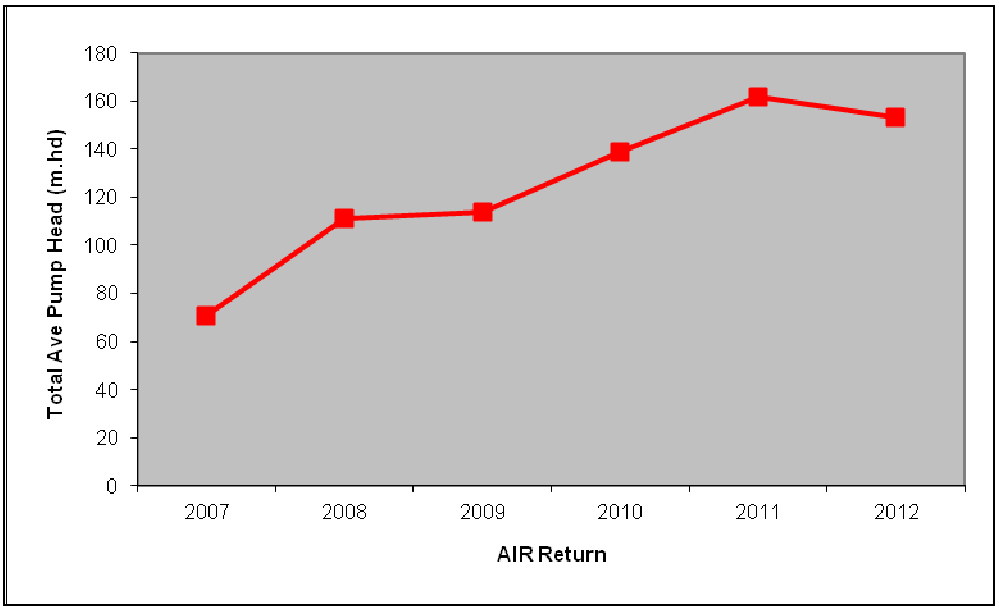


Fig 4.2 – Recent changes in calculated total average pumping head

The Company provides a detailed breakdown and explanation of the changes in their commentary which we reviewed and verified against the source data and calculation. In general we agree with the reasons stated for the changes, although some errors in the source data were identified. With specific reference to the tabled data and changes listed in their commentary we comment as follows:

- Specific checks were carried out to assess abandoned sites and possible remaining duplications. We challenged the Company regarding a number of sites (Drumabest WPS, Alcrossagh, Clay Lake bulk transfer pumps, Derg-Tullywhisker, Tullycar and Marble Arch pumps). Following further review NI Water confirmed that pump entries at Drumabest, Alcrossagh and Derg-Tullywhisker had been incorrectly included (Drumabest and Alcrossagh as out of service, Derg-Tullywhisker as duplicate). These entries contribute 2.51m.hd to the Line 5 total, the majority of which (2.35m.hd) due to the Derg-Tullywhisker pumps. Unfortunately, NI Water was unable to correct their figures in time for final submission and hence these errors have not corrected in the reported line totals. Based on the spreadsheet provided by the Company, we have therefore calculated the corrected pumping head

figures for reference based on the removal of the identified erroneous pumpsets in the table below. We therefore calculate an actual overall change in the Line 5 total from last year of -5.2%.

Parameter	NI Water Reported Figure	Auditor Calculated Corrected Figure	Approx % Difference to Reported Total
Average Pump Head – NIW Only	156.5	152.1	-2.8%
Average Pump Head – PPP	155.1	155.1	No Change
Average Pump Head – Total	155.9	153.4	-1.6%

- The overall decrease in reported line total masks contrasting changes to the NI Water only and PPP only pump head figures which changed by approximately +5% (+2% for the auditor-corrected figure) and -10% respectively. The 10% decrease in the PPP total is almost wholly due to reduced lift heads obtained by improved data measurements from new telemetry systems (a more detailed discussion of the impacts of the new system is included in subsequent sections).
- A significant proportion of the change in reported line total is due to the removal from service of pump sets (circa -4%) and the removal of duplications from the calculations following an internal audit (circa -3%). The latter increases to -5% based on the auditor-corrected figure.
- Although a large proportion of the changes to distribution pumps were due to improved information following completion of the Omagh DSZ model, the overall increase in pump head resulting from the changes and addition of new zonal models this year is negligible (<+0.2%).
- The quoted 6.7% decrease in annual average distribution input has a direct impact on the figures as many of the flows used in the calculation are based on modelled flows and not actual metered flows. However, we would expect this to actually have resulted in a net increase. Hence, we interpret the actual decrease in pump head to be greater than indicated when taking into account the relative change in distribution input.
- We carried out a number of spot checks on changes to the distribution pumps and challenged the Company to explain changes at a number of sites (including Garvallagh, Redhills and Inisclan) and the change in operational status of Ballycullen Low and Whitespots. The Company provided adequate explanations of all changes.
- The Company provides a full and detailed explanation of the changes to supply pumps which are largely explained by removals from service the introduction of 'Telemweb' at a number of sites. The only significant change relates to Drumaroad where a large increase in lift head has been reported. Due to the large flow, this accounts for an approximate 4m.hd increase in the line total. The new reading is telemetry-based and hence should be accurate. However, the Company was unable to explain why there was such

a large increase and it is noted that the value is based on a single telemetry reading and hence may be not be totally representative. Given the significance of this figure in the line total, we recommend that this figure is validated by further telemetry readings where feasible.

In line with recent Reporting Requirements, the Company has correctly amended their calculations to report in relation to total distribution input, although they continue to also provide figures based on the old method as they believe this to more accurately reflect the flow split between the companies. We do not share this view, but recognise that the Company may have concerns regarding the potential interpretation of such figures.

Following our recommendations last year regarding the targeted deployment of telemetry units to capture accurate flow and pressure data at key pumping stations, we were impressed that the Company has installed and monitored new telemetry units during 2011/12 to accurately record flow and pressure data. New telemetry systems have been installed at all PPP high lift pumps sites and a small number of other suitable NI Water sites (referred to as 'Telemweb' on NI Water sites). This has provided much more reliable and accurate lift data for this year at key locations where previously lift data was based on listed theoretical headloss and pump ratings. As the PPP high lift pumps account for approximately 65% of the total PPP pump head figure, this is a significant improvement on the overall level of accuracy and we consider this to be positive and substantive progress. It also resolves some of our concerns regarding the potentially over-conservative application of theoretical pump parameters.

Full details of the changes are provided in the Company's commentary. The typical decrease of around 10% in lift heads at PPP sites from last year is largely in line with our expectations following our conclusion last year that previously estimated PPP lift heads were likely to be over-conservative. However, we noted that some of the values at the NI Water sites varied significantly (by up to 50%) from previously estimated pressure heads. We discussed the possible reasons behind the changes with the Company and what implications could be drawn in terms of the accuracy of data obtained from zonal models, particularly as an increasing number has not been updated in over 5 years. The aging of models is likely to be a factor as illustrated by a set of pumps added at Carnbane which were not included in the DZS model which was last updated in 2003. Whilst in theory the model data should be fairly accurate, we conjecture that the model estimates may also be less accurate for low static head systems (where conservative friction losses are often assumed). We requested pipe lengths and static lifts for the NI Water pump systems including 'Telemweb' to assess if there is any correlation. The data provided by NI Water tended to support this theory and additional feedback highlighted that a number of sites were based on DZS survey results dating from 2003/04 and that significant network changes may have occurred since this time. However, due to uncertainties over the true static lift and the possible impact of booster pumps, the results were largely inconclusive. We believe it would a beneficial exercise for the Company to undertake a review of the sites with 'Telemweb' data to explain the significant variations in lift heads and provide further reassurance as to the accuracy of their

data estimation methods.

We discussed the perceived benefits and practicalities of the possible expansion of the 'Telemweb' system to further pump sets. NI Water advised that although they intend to extend the coverage, there is limited scope due to the suitability of sites and the relative significance of the pumps. NI Water had identified 30 potential sites for deployment of which only 6 had flows in excess of 5l/s. We agree that there is limited benefit to be gained from large-scale installation at minor distribution and booster pump stations and we accept that it is not also practical in many situations. However, we note that current coverage of PPP sites is only at high lift stations and that there are number of NI Water distribution sites that may still be suitable. Given the good progress made to date, we would like to see the rollout programme continued, but recommend that it is targeted at sites with significant pump head contribution (say head x flow >50) and where installation is considered practical.

Values of average pumping head are calculated from a single spreadsheet covering all relevant supply and distribution pumps in the Company's network. Checks confirmed that the spreadsheet appeared logical and robust and the information has been correctly assigned between NI Water and PPP only sites. The method for calculating pumping head is in accordance with the most recent reporting guidance. We cross-checked a number of sites against source flow data and can confirm validity of the flow data used.

4.3 Block B - Lines 6 to 12 – Treatment Type

NI Water Inputs

The number of water treatment works (WTWs) reported this year is 24, a net reduction of 1 from last year. Although both Glarryford and Cabragh officially changed status this year, Cabragh was already excluded from the AIR11 line total due to negligible and unreliable flow data and hence the net reduction of 1 is correct. Refer to the AIR11 Reporter Commentary Section 4.1 for a full explanation.

A detailed breakdown of the changes and status of sites is provided in the Company's Commentary. We checked the flow outputs of the decommissioned WTWs against the source data and can confirm that excluded sites were non-operational at the start of the year. The 4 sites non-operational at year end; Altmore (W3), Gortlenaghan (SD), Shanmoy (SD) and Lenamore Spring (SD), are correctly included as being active during the report year.

Treatment levels for all sites were verified against signed certification documents.

PPP Inputs

All 4 works operated by PPP have ozone or GAC on site and are correctly classified as W4 level treatment. No change from previous year.

Total

In total, 28 WTWs were operational during the Report Year. The line totals are confirmed as the correct summation of the NI Water and PPP inputs. Our checks against the source data confirmed the correct calculation and translation of data.

As a result of the Company's ongoing planned removal from service of relatively low-treatment level works with borehole sources, the combined numbers of WTWs in lines 6-8 have continued to reduce this year from 5 to 4. Following closures in year, this number is expected to reduce to 1 next year, with only Rathlin remaining below treatment level W3. These sites contributed approximately 0.1% of the Company's total distribution input with the percentage of flow receiving W4 level treatment showing a corresponding slight increase to 67.6% from 66.1% last year.

Although there have been major capital works at Clay Lane (W4), the Company confirmed that there have been no changes to the treatment classification of any WTWs this year. They also advised that there are currently no planned upgrades to the listed levels of treatment.

4.4 Line 13 – Potable Mains

NI Water Inputs

The total length of potable mains has increased from 26,441.81km to 26,499.03km largely in line with reported changes in new and abandoned mains. This is extracted directly from the Company's GIS systems and matches the total length of main reported in Table 11 Line 12. Our checks confirmed that the total excludes PPP-owned assets and 276km of compensatory and raw water mains.

To assess the validity of the GIS data, we investigated the potential lag time between data being provided and the GIS system physically being updated. We requested and were provided with data for the last 4 years summarising the approximate time between the listed water main installation date on as-built drawings and the date of update in GIS. The data indicated that majority (approx 90%) of updates were for mains laid within the last 2 years. Although some updates were still taking 5 years, the data indicated significant improvements in the past 2 years compared to previous years. Overall, we surmise that although there is still a potential issue with backlogging, the impact is reducing as the system improves and GIS records generally appear to being updated within a reasonable timeframe.

PPP Inputs

PPP report 16.42km of main in Band 3 which relates directly to the 600mm diameter trunk main from Castor Bay to Forked Bridge. No change from previous year.

Total

The total 26,515.45km is the correct summation of the NI Water and PPP inputs.

5. Company Methodology

The Company uses several spreadsheets to analyse and summarise the relevant data concerning sources, treatment works and pumping stations which is required for inclusion within Table 12. No significant changes to the methodologies have occurred this year.

Distribution input is based on data obtained from Leakage Section as discussed in Table 10. The distribution output from the works and applied volume within the distribution network are therefore very similar. Where not available, NI Water may obtain data from other less reliable sources as explained in their commentary.

The methodologies and spreadsheets were reviewed against the Reporting Requirements and we can confirm that the Company has correctly excluded sources from which no water has been abstracted during the Report Year. The Company has also correctly excluded non-potable water volumes. Several manual adjustments to data have been made which have been highlighted in their commentary and are considered appropriate.

The Company does not generally fully abandon source sites which are retained and 'mothballed' for possible future use. Hence, the number of operational sites can fluctuate as sites are taken in and out of service.

Calculations for Line 5 Average Pumping Head are primarily based on data and results obtained from network models, although measured operational data is used for some of the more significant pump sets. Recent improvements have seen the installation of telemetry based flow and pressure monitoring systems at PPP sites and a small number of NI Water sites, to provide data at a number of key sites. The system is referred to as 'Telemweb' at NI Water sites. Pressure values are typically based on the annual average of a set of readings from pressure monitors installed at the pump delivery and discharge points so to calculate the difference in pump pressure. Results from telemetry systems are generally consider the most accurate, followed by data from operational samples, registered pump parameters, DZS model results and GIS levels. Flow data for distribution pumps are primarily based on annually averaged flow measurements from works outputs. However, the majority of the data, including pressure heads and flow data for pumps within the distribution system are based on data from the network models. The calculation is therefore reliant on the condition and accuracy of the network models.

Currently NI Water relies on several sub-consultants to develop and manage their network models, although we understand there are plans to centralise the system once complete. NI Water issues a strict set of guidelines to ensure continuity between models. Each model is based on a comprehensive set of pressure and flow readings from a set of strategically positioned temporary loggers. Typically data is collated at 15min intervals for a full day which is then used to calibrate the model. Ground levels are based on information extracted from the Company's GIS systems.

Once the model is created, NI Water does not typically take further field measurements or re-visit the model to re-calibrate. As a significant proportion of models are now over 5 years old, NI Water recognises that there is an increasing risk that models are out-of-date and hence less reliable. However, as discussed in Table 11, NI Water is prioritising completion of the model rollout programme to cover all areas and the overall impact of changes are likely to be small.

Where models are incomplete, NI Water looks to obtain field data on pumps, but advised that such data is usually unavailable or not sufficiently reliable and hence most data in these areas are omitted from the calculation.

The spreadsheet to calculate the pumping head is managed by a single document controller and updated each year via distribution of relevant sections to other sub-consultants. NI Water confirmed that the spreadsheet utilises unique ID codes to avoid duplication and that internal checks are carried out each year to assess any changes. The calculations are based on data covering the whole distribution network and calculated in proportion to 100% of distribution input.

The Company provide a detailed and comprehensive explanation of their Line 5 methodology in their commentary, including comments on shortcomings and possible future improvements. The Company does not import or export any water and hence no account is made in the calculations.

The totals for Line 13 are taken directly from the Company's GIS system. Pipes that are unidentified (which account for <0.5% of the total) are assigned to Band 1 as the most likely category to ensure the total matches the total length of mains reported in Table 11 Line 12. The remaining mains have no documented size records and therefore are only likely to be confirmed if actually encountered in the field or removed through abandonment.

6. Company Assumptions

For calculating average pump head, the Company makes several key assumptions:

- network models are accurate and up to date representations of the actual pipe network and pump condition. In particular, the flow applied to each pump set is representative of the actual flow in that particular year.
- where applied, pumps operate in line with parameters recorded on nameplates.
- where applied, ground levels are representative of the operational head level
- no leakage occurs in the system
- where data is not known, the Company excludes the pump from the calculation. The applied data is therefore assumed to be representative of the whole.

For Line 13, unidentified pipes are assumed to be included in size Band 1 as the most likely size category.

7. Confidence Grades

There are no changes to confidence grades this year. The assignment of B2 confidence grades to Lines 1-4 is considered appropriate on the basis of the reliability and accuracy in the calculation of proportional distribution input. Even with recent improvements, the B4 grade for Line 5 is still considered appropriate given the estimations and levels of uncertainty associated with the pump head data.

8. Consistency Checks

Cross checks were made with total lengths in Table 11 to confirm consistency. PPP data was cross checked with Table 42.

Date: 25 July 2012
Prepared by: HMS

Table 13 – Non financial measures – Sewerage properties and population

Commentary by REPORTER

1. Background

This table reports on the properties connected during the year, billing information and average report year population estimates for the sewerage service.

2. Key Findings

- We were able to reconcile the property numbers reported to the Rapid extract presented by NI Water.
- However, there are some minor anomalies in NI Water's new connections data. Please refer to our Table 7 commentary for detail.
- NI Water adopted different methodologies calculating Block B figures from AIR11 to AIR12.
- We found that although the difference is immaterial, the calculation for sewerage connected population does not fully comply with the Reporting Requirements.
- We believe that the confidence grades should remain consistent with those agreed in Undertaking A.
- Methodology Statements require further improvements.

3. Audit Approach

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.

4. Audit Findings

4.1 General

The key source of information for the new connections and property data is the customer billing database, RapidXtra. This is an automated system where customer information is updated through various means including customer contact. The Company reports that data on property counts and classifications are reported monthly and reconciled with other data collection activities, such as the test metering project. During the audit we sought an update on various issues which had been raised in previous AIR and other reviews. The following provides an overview of the discussions held with NI Water:

Whilst we acknowledge that the information needed to populate this table generally requires the extraction of the relevant information form the Company's Rapid system, we believe that the methodology statements need improvement to better explain the data sources and assumptions used.

Test Meters

NI Water outlined that their test meter project is ongoing with accounts being assessed and reclassified as appropriate. The Company advised that the survey of all 10,898 test meter accounts has completed in 2011/12, 43 still need to be confirmed and uploaded to Rapid.

Site Meters

The Company explained that as part of their ongoing data checks the number of site metered properties (multiple properties being charged through a single meter) is currently being investigated and verified. To ensure these are not double counted the Company has excluded these meters from their Table 7 property counts. We understand this approach is consistent to that adopted in previous submissions.

4.2 Properties

Line 1 – Household properties connected during the year

This line reports the number of new household properties added within the Company's area of supply. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water.

We note a decrease of 937 (or 24%) new connections when compared to the 10/11 Report Year. We believe this conflicts with the assumptions on growth forecast applied in the PC13 submission. The Company explained that they maintained the Business Plan submission assumption of circa 4,600 new connections for the reason of consistency.

Line 2 – Non-household properties connected during the year

This line contains the number of new non-household properties added within the Company's area of supply during the Report Year. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water.

We note that the number of non-household properties has increased slightly by 12 properties or 5% from that reported in 10/11.

4.3 Billing

Line 3 – Households billed unmeasured sewage

We note a small increase of 6,415 (1%) reported in this line since 10/11. The Company was able to demonstrate the consistency of the number reported in this line to extracts from their property records on Rapid.

This line is calculated as the average of occupied domestic unmeasured plus the occupied test meters plus those household properties which are connected for sewerage only.

The Company adopted the different methodologies to derive Line 3 figure from AIR11 to AIR12. This line has been calculated as follow.

Household billed unmeasured sewerage	AIR11 Used in AIR11 Average calculation	April 2011 Used in AIR12 Average calculation	AIR12 Reported Average
Unmeasured household	561,692	561,692	565,207
Sewerage only household	6	6	6
Measured household (Test meters)	1,411	1,411	865
Measured household	14,642	14,642	16,989
Site meters		388	424
Total	**577,751**	**578,139**	**583,491**

The methodology has changed to include Site meters in AIR12 submission, which the difference is 0.07% and immaterial. We believe that the Company should adopt a consistent methodology between years. Otherwise, all changes in methodologies are reported in their commentaries.

Line 4 – Households billed measured sewage

Whilst NI Water has been installing meters on all new household connections since April 2007, customers are not being billed on a measured basis. As such, all household properties should be reported as unmeasured.

Line 5 – Households billed sewage

This is a calculated line, the sum of lines 3 and 4.

Line 6 – Non-households billed unmeasured sewage

As expected we note that the number of non-households billed for unmeasured water within the supply area has decreased steadily during the year. Indeed, the number of properties has decreased by 1,387 (12%) from that reported previously.

The Company explained that this was a result of their non-household metering programme. We reviewed the Company's progress in delivering this programme and our commentary on this is provided in Table 8.

	AIR12 (000's)	PC13 2011/12 (000's)	PS 2012-13 (000's)
Unmeasured Household	580.815	580.999	575.624
Measured Household			
Unmeasured non-Household	10.109	9.841	9.841
Measured non-household	22.622	22.441	22.528
Void Properties	44.605	42.477	

Note that the figure for AIR is April-March average, and PC13 is November-October average while PS is 1st of December figure. The divergences in 3 submissions are

largely a result of submission dates. Nevertheless, the three submissions are reasonably well aligned with relatively small percentage differences.

Line 7 – Non-households billed measured sewage

We note that the number of non-households billed for measured water within the supply area has increased by 248 (or 1%) properties since 2010/11.

Line 8 – Non-households billed sewage

This is a calculated line and is the sum of Lines 6 and 7.

Line 9 – Void properties

NI Water stated that they have interpreted this line as the average number of properties within their supply area which are connected to the sewerage system but do not receive a charge as there are no occupants. We found NI Water had taken the gross number of properties reported on Rapid (inclusive of measure household test meters) and subtracted the number of occupied properties reported in Line 8 above.

Occupied properties Sewerage	AIR11 Used in AIR11 average calculation	April 2011 Used in AIR12 average calculation	AIR12 Reported average
Unmeasured household	593,458	593,458	596,699
Sewerage only household	6	6	6
Measured household (Test meter)	1,427	1,427	875
Measured household	16,768	16,768	20,406
Site meter		471	513
Unmeasured non household	18,223	18,223	16,823
Sewerage only non household		21	19
Measured non household	25,115	25,115	25,472
Total	**654,997**	**655,489**	**660,813**

We found that the numbers of occupied site meters and non household sewerage only property were not included in AIR11 calculation. If the number of void property is recalculated using AIR12 methodology, it is 43,441. However we believe that the difference is 1% and this is relatively immaterial.

4.4 Line 10 – Population

We have checked the Company's methodology which the population figure is calculated as:

Table 7 Line 17 x (Table 7 Line 5 + Line 8 + Line 9) / (Table 7 Line 7 + Line 11)

However, we found that although the methodology statement states that NI Water uses the average of April 11 and April 12 figures for the above calculation, actual figures shown in the methodology statement are AIR11 and AIR12 figures as they used Table 7 figures which are average. The percentage of occupied sewerage properties is in fact an average of AIR11 and AIR12, and this is not the mid year figure. Therefore, we believe that the correct calculation for Line 10 is

1,808,829 x (658,151/806,413) = 1,476.185

Although we believe that the difference between our calculation and the reported figure is 0.2% and it is immaterial, NI Water's calculation is not fully complied with the Reporting Requirements as the figure should be a mid year estimate.

5. Additional Information

Although the Reporting Requirements state that NI Water should provide the additional information on customer numbers for 1st April 2011, 1st December and 31 March 2012, as par Table 7, the Company has not commented. We provide this information here.

Property numbers	1 Apr 2011	1 Dec 2011	31 Mar 2012	2011/12 Average
Unmeasured household	578,139	579,974	583,491	580,815
Unmeasured non household	10,661	9,841	9,556	10,109
Measure non household	22,368	22,681	22,876	22,622
Voids	655,489		660,813	658,151

6. Confidence Grades

As we discussed in our Table 7 commentary, we challenged a number of aspects relating to new connections data and the system to derive the Table 7 figures. We did not review or challenge the Company for Table 13, however we believe that since the property numbers connected to water service are not accurate, we do not consider the property numbers connected to sewerage service are accurate. Therefore, we believe that the confidence grades should remain aligned to those agreed during the Undertaking A review.

Date: 25 July 2012
Prepared by: HMS

Table 14 – Non financial measures – Sewage collected

Commentary by REPORTER

1. Background

This table records the sewage volumes collected from measured and unmeasured households and non-households, together with the volumes of trade effluent, cesspool and septic tank waste.

2. Key Findings

- The confidence grades for Lines 1 to 3 are improved from C3 to A2, and Line 7 is also improved from C3 to B3. However, we believe the confidence grades should remain as those assigned in AIR11.

3. Audit Approach

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.

4. Audit Findings

4.1 General

Line 1 – Volume unmeasured household sewage

This line summarises the volume of water delivered to household properties billed for unmeasured water that is returned to the sewerage system.

We note a small decrease in volume of 15.45 Ml/d or 6% reported in this line.

The Company has assumed that volumes returned to sewer are 95% of the volume of water delivered, factored by the percentage of the number of households billed for water against the number of households billed for sewerage services.

The Company calculates this number from the billed unmeasured household supply volume (Table 10 line 4), the number of households billed for unmeasured sewage (Table 13 line 3) and the number of households billed for unmeasured water (Table 7 line 3) and we confirm that this calculation has been made correctly.

Line 2 – Volume unmeasured non-household sewage

This line summarises the volume of water delivered to non-household properties billed for unmeasured water that is returned to the sewerage system.

The Company informed us that this volume is calculated by assuming a 95% return to sewer of volume delivered to non-households, factored by the percentage of the

number of non-households billed for water against the number of non-households billed for sewerage services.

The Company calculates this number from the Billed unmeasured non-household supply volume (Table 10 line 5), the number of non-households billed for unmeasured sewage (Table 13 line 6) and the number of non-households billed for unmeasured water (Table 7 line 8) and we confirm that this calculation is correct.

We note that this volume has decreased significantly during the year, reducing by 1.13 Ml/d which equates to a circa 16% decrease. This is consistent with the decreases observed in the unmeasured property base.

Line 3 – Volume unmeasured sewage

This line is derived by summing lines 1 and 2.

Line 4 – Volume measured household domestic sewage

This line summarises the volume of measured household domestic sewage effluent discharged to the sewerage area and billed. As customers are not being charged on a measured basis this line is reported as zero.

Line 5 – Volume measured non-household domestic sewage

This line summarises the volume of water delivered to measured non-households returned as domestic sewage (not trade effluent) to the sewer in the sewerage area and billed. We challenged the Company to provide an audit trail to substantiate the volume reported and the Company advised that this volume was based on their 'Actuals' report. We asked the Company to provide the report however we have not received it before the submission.

We note that there has been a decrease of 2.6 Ml/d or 7% in the volume compared with that reported in 2010/11. The Company explained that the sewerage volume is lower than last year due to the continued economic downturn and prior year's outturn overstated due to leakage. Due to this explanation being received immediately prior to finalisation of our commentaries we have not sought to verify the rationale of the latter item for the decrease observed.

We noted that the volumes reported are also somewhat lower than reported in the Company's Principal Statement submission. The volume reported in the Principal Statement submission was 39.930 Ml/d which is circa 9% higher than that reported within AIR12.

Line 6 – Volume trade effluent

For AIR12 the names of individual traders have been taken from the new Primary Source of Trade Effluent Customers (PSTEC) database, which is updated regularly by NI Water. The decrease in the Trade Effluent Customer database numbers is due mainly to policy changes rather than trade premises closing. In AIR11 there were 650 consented traders. This number reduced to 507 for AIR12 due to the removal of

Nursing/Residential Homes. In addition to the removal of Nursing/Residential Homes an additional 98 traders were added, mostly car washes and all small volume discharges.

Actual Trade effluent volumes have been obtained from the Billing Section. Of the 507 Consented premises 125 (24.7%) used consented rather than actual volumes. This is an increase from AIR11 and is attributable to concerted efforts to consent, low volume, strength premises such as car washes. NI Water is currently pursuing a policy to endeavour to reduce the number of premises utilising consented volumes.

As previous years, large volume and high risk customers meter readings are taken and where there are no meters the discharge volume is calculated by taking water supplied minus allowances as in line with Ofwat guidance. NI Water assumes that 95% of water delivered is returned to the sewerage system. Domestic water consumption is deducted from water supplied to trade premises i.e. 25 litres per person per day and 50 litres per person per day where there is a canteen on site.

Although having no effect on flow and load reportable data, due to recent rateable value policy changes a large number of consented traders were not charged. Reconciliations are ongoing with extracts from the corporate billing section of Customer Services which is interrogated to ascertain that all relevant data has been entered.

The volume of trade effluent for AIR12 is 31.15 Ml/d which is a 54 % increase from AIR 11 20.18 Ml/d.

The increase is due to a combination of a policy change in AIR12 to class supernatant liquors produced by sludge treatment activities at PPP plant at Duncrue as Trade Effluent (prior to AIR12 liquors from the Sludge Treatment Centre Duncrue discharged to and were treated at Belfast WwTW's). Contractual charge implications had prevented the discharges being considered as Trade Effluent. Resolution has resulted in consented discharges from PPP treatment centre having an agreed administrative charge rather than full Mogden formulae. Sludge treatment liquors at Duncrue equated to 14.3 Ml/d. Subtracting this figure from total AIR12 Trade Effluent flow of 31.15Ml /day indicates that 16.85Ml/d was attributable to other Traders. This is an overall 16.5% reduction in volume when compared with previous AIR 11 return of 20.18Ml/d.

Currently there are 507 traders, a decrease of 143 from AIR 11 (650). Analytical samples are taken from traders and analysis stored on the Laboratory Information Management System. At sites where BOD strength is not available charges are based on assumed standard strength 193 mg/l. For AIR12 standard strength was obtained by averaging the last five years weighted average monthly inlet concentrations from twelve major works, whereas, previous returns were based on one year's standalone information. For AIR12, BOD has decreased from 201mg/l to 193mg/l.

For a small number of new traders which haven't been sampled the BOD was calculated using consented COD figure and a conversion factor of 1.28 derived from five year average data.

	Average weighted		
	Settled COD (mg/l)	SS (mg/l)	BOD (mg/l)
Overall Average for 2007-2011	247	212	193

COD: BOD = 1.28

The decrease is considered to be as a result of major traders reducing volumes equating to a 24% reduction from AIR11. Policy changes: removing residential and nursing homes equating to 1.25Ml /day; using the five year average rather than one year's data and utilisation of 5% of the actual volumes discharging from hospitals. The previous AIR11 hospital data utilised actual volumes minus allowances. AIR11 reporting indicated that NI Water had investigated activities within the hospital i.e. vehicle wash/ X ray, laboratory and concluded that only 5% of the flow is actually trade. For AIR12 hospitals, implementing the 5% protocol reduced daily input from AIR11 3092m^3 to 175m^3, a significant reduction.

To provide a consistent approach NI Water has divided all trade flows by 365 irrespective of whether the trader only operates for 5 out of seven days. Investigations in AIR12 indicated that only 10 of the 507 consented traders actually operate 365 days per year, and accounts for 5.164Ml/d which is 17% of the total volume and 1456.39 tonnes/year which is 27% of the total load.

Line 7 – Volume waste water returned

This line is derived by summing lines 3, 4, 5 and 6.

Line 8 – Volume of Road Drainage

The Company had provided a volumetric estimate for the volume of road drainage returned and within their commentary provide an overview of their methodology.

We have not sought to verify the assumptions made within the methodology applied but note it is based on a number of third party data sources and assumptions.

5. Company Assumptions

Lines 1 to 2 – unmeasured volumes

The Company assumes a 95% return to sewer of volume.

Line 8 – Volume of Roads Drainage returned

As detailed within the Company's commentary a number of assumptions have been used to derive the volume reported. As stated above we have not sought to verify the accuracy of the assumptions used.

6. Confidence Grades

The confidence grades assigned to Lines 1 to 3 are improved to A2 from C3. The confidence grade for Line 7 is also improved from C3 to B3.

We understand these improvements are based on a reflection of the improvement in confidence grades for Tables 7 and 13. Whilst we acknowledge some improvements, unmeasured sewage volumes are based on several assumptions and figures used elsewhere in the Return. We therefore believe that the confidence grades should remain consistent with those assigned in AIR11.

Please refer to our Table 7 commentary for further detail on confidence grades.

Date: 25 July 2012
Prepared by: HMS

Table 15 – Sewage Treatment

Commentary by REPORTER

1. Background

This table collects details on sewage loads, sewerage service facilities and sewage sludge disposal. The information in this table is used to assist in operating efficiency studies.

2. Key Findings & Recommendations

- Changes in the methodology and the sites included have resulted in material change in the trade effluent loads reported.
- NI Water is continuing to invest in flow and load surveys and analysis to improve their understanding and the accuracy of their estimates.
- There is a small (2%) increase in sludge produced for the year compared to the previous reporting years, this relates to a 5% increase in BOD load since last year.
- The zero reporting of grit and screenings from PPP sites for the report year is surprising but the material difference of including the possible value for this would not have a significant effect on the table.
- Confidence grades for the reported values could be higher than reported for some lines as the methodologies is place are sound and in line with industry practice.

3. Audit Approach

The responsibility for the compilation of table 15 is split between a number of system holders, all of whom was audited. The Company methodologies were examined and the sources of data were reviewed.

4. Audit Findings – Sewage Treatment

4.1 Sewage – Loads (Lines 1-7)

Line 1 – Trade Effluent Load (NI Water + PPP)
Since 2008/2009 traders have paid Trade Effluent charges. Trade volumes are obtained from the billing section of Customer Services. For AIR12 the names of individual traders have been taken from a new Primary Source of Trade Effluent Customers (PSTEC) database, which is updated regularly by NI Water.

Data is based on either outflow trade meters where fitted or water meter readings allowing for domestic use and evaporation losses. Where no data is available, volumes are based on maximum consented volumes.

Analytical data is used to determine loadings. Where this is not available, standard strength was obtained by averaging the last five years weighted average monthly inlet concentrations from twelve major works rather than in previous years where one years' standalone information was used. For AIR12 BOD has decreased from

201mg/l to 193mg/l. For a small number of new traders, that hadn't been sampled, the BOD was calculated using consented COD figure and a conversion factor of 1.28 derived from five year average data (see Table 14).

AIR12 indicates a 39.5% increase in loading from the AIR11 return. The increased loading in AIR12 from 5357.197tonnes/year to AIR11 3841.35tonnes/year is predominantly due to the inclusion of five trade streams from the PPP owned and operated by the Sludge Handling Centre at Duncrue Street. Previously, supernatant liquors discharged to the network for treatment at Belfast wastewater treatment facility. However due to contractual issues they were never considered to be Trade effluent (contractual charge implications had prevented the discharges being considered as Trade Effluent). Resolution has resulted in consented discharges from PPP treatment centre having an agreed administrative charge rather than full Mogden formula and inclusion in trade loadings.

The Sludge Treatment Centre contributed 1929 tonnes/year leaving a contribution from the remaining traders of 3428.197 tonnes. When compared to the AIR11 Return 3841.354 tonnes which did not include sludge treatment centre liquors this equates to an overall 10.8% reduction. The reduction is attributable to 12 of larger companies reducing loadings, and one of the smaller contributors closing. In addition policy changes to exclude residential and nursing homes equated to 92 tonnes year reduction. The policy change to adopt only 5% of discharge from hospitals as trade effluent has also resulted in an additional reduction from AIR11 of 12.31tonnes/year.

As recommended previously NI Water has provided a consistent approach by dividing all trade flows by 365 irrespective of whether the trader only operates for 5 out of seven days. As reported in Table 14 line 6, only 10 of the 507 consented traders actually operate 365 days per year, and these premises account for 17 % of the total volume.

Table 14 line 6 commentary outlines that trade effluent discharge volume has increased for AIR12 by 54 % from AIR11 20.18Ml/d to 31.15Ml/d.

While the trade load being treated by the PPP has increased by 6.2%, this is significantly less than that treated by NI Water which has increased by 52%. On inspection of the results spreadsheet, it can be seen that no PPP works in the North West area treat any trade discharges with 29% of the 6.2% increase (326.825 tonnes/year) being treated by works in the North East area and the remaining 79% (797.73 tonnes year) being treated by facilities in the South Area.

During the year 13 large companies recorded a loading reduction of 44.8% equating to 428.58 tonnes/year. Due to the policy change to consent car wash premises the number of premises using consented flows has increased from 3% in AIR11 to 24.5% in AIR12. As these premises operating prior to AIR12 without licences, coupled with low volume the impact from these premises using consented volumes will be less and have less significance than initial impression portrays.

4.1.1 NI Water Data

Lines 2 to 5 – Loads (NI Water only)
The methodology has not changed from previous reports. The data to populate this table is extracted from a master spreadsheet populated and updated by the Asset Performance Team.

To track changes and maintain the process as live as possible the Asset Performance team monitor and update by liaising with various sections i.e. Operational Technical Support, Environment Regulation, Engineering and Procurement and the Rural Wastewater Investment Programme. Trade Effluent information is obtained from NI Water's Trade Effluent Section. The COD:BOD conversion factor was not utilised as BOD is analysed as part of the Trade Effluent analysis suite.

For AIR12, the Trade Effluent section has for the first time, due to a NI Water policy change, considered discharges and associated run off from the PPP operated Sludge treatment centre at Duncrue as Trade Effluent. A flow and load survey was carried out on the receiving Belfast WwTW, to ascertain the impact this discharge was having on the overall catchment. Due to widely differing results the information was not validated. To determine an agreed theoretical PE the Asset Performance team and Operational Staff liaised with Process Scientist and an agreed theoretical PE was derived 354,507. This is an increase of 4018.

Although Trade Effluent submissions consider only 5% of any discharge from hospitals to be associated with trade activities to provide actual load discharging to the network flow figures have been factored up to 100%.

Loads at each NI Water works which has a population equivalent greater than 250 are calculated from population figures using the typical 60g BOD per person per day assumption. Those less than 250 are derived largely from desk-top house count information from Map-Extreme and broad brush occupancy rate of three. During the 11/12 year, a flow and load programme to ascertain actual loadings was proposed. Initial surveys due to spikes, spurious readings, and duration of surveys have not provided the necessary degree of confidence. A working group comprising of staff from various Operational, scientific and Technical Support Team, chaired by Asset Performance, have been tasked with implementing best practice going forward.

The master spreadsheet was reviewed in detail, and information contained used to populate tables 17c and d. As recommended in our AIR11 report, the size banding of works has been automated eliminating any potential misrepresentations. To authenticate spreadsheet data independent assessments are carried out and signed off.

At 3 of the 15 WwTW's receiving septic tank imports, the imports are discharged at the head of the works. Conversion factors, produced by Scientific Services, are used to determine additional PE. No allowance is made for the other 12 other sites as imports generally discharge to sludge reception centres prior to transfer for further treatment to PPP works.

With the exception of lines 3 and 4, the other lines indicate slight reduction from AIR11 data. Primary treatment (line 3) had a slight increase of 9.8t BOD/year increase whereas preliminary treatment (line 4) had the greatest increase of 114.8 tBOD/year. The increase in preliminary treatment is attributed to upgrading 3 sea outfalls at Ballystrudder (Retention Tank), Mullaghboy and Whitehead and a reduction in trade PE of 3 to Ballycastle WwTW.

The confidence grade against these lines, as per previous years, is C3. As these lines are a measurement of a combination of WwTW's loading and particular treatment processes at the treatment facility this grade is reasonable as the treatment processes at the WwTWs, whether secondary, primary or preliminary treatment is unambiguous.

For line 5, a comprehensive protocol has been developed to ascertain the total theoretical PE which is utilised to derive a theoretical total load. Summation of loads receiving, preliminary, primary and secondary treatment, aligns with this figure. Previous reports have recommended that NI Water correct possible over estimation due to the inclusion of offices and commercial premises. Pointer information incorporates both commercial and unknown properties and the proportionality of residential to non residential is unclear. Due to uncertainty both elements are included when deriving PE'S/BOD loading. The load attributed to non-indigenous and commuting are also excluded. In the AIR12 period there is a very slight reduction from AIR11 of 0.44% indicating that methodology of deriving data, allowing for upgrades and closures, appears reasonably robust.

The confidence grade of C5 is based on work carried out by the Company's engineering consultants who developed a growth model for NI Water. NI Water recognises the need to improve confidence grades by targeted flow and load surveys. To date NI Water has carried out a number of flow and load studies of which only two have been incorporated. To eradicate idiosyncrasies associated with flow and load survey output interpretation within NI Water, a Flow and Load Survey Group has been established to discuss and agree on the outputs from the backlog of surveys carried out to date and those to be carried out in the future. The experience held by the individuals involved in the Group (with process, operational, engineering and procurement and asset performance backgrounds) should enable sound decisions to be made regarding the adoption of the Flow and Load Survey outputs

Line 6 and 7 – Equivalent Populations (NI Water Only)
Not all wastewater treatment works have Water Order Numerical Consents. Some have only descriptive consents which explains the variance between lines 6 and 7 in Table 15. Of the 1023 WwTW reported, only 231 have Water Order Numerical Consents.

Population figures are gathered on a theoretical basis. The confidence grade against these lines is C5, as these lines refer solely to WwTWs loading, and the majority of the WwTWs' PEs is based on a theoretical desk top approach, with some substantiation at a small number of works through on-site house counts. Implementation of Best Practice Flow and Load survey programme will improve confidence year on year with associated increase in confidence from current AIR12 C5 grade.

Of the existing 1023 (a reduction of five from AIR11) 231 have numeric consents which is a reduction of one from AIR11. Despite the trade effluent discharges from the incineration plant and ancillary activates being considered for the first time the AIR12 equivalent population is less than AIR11 by 8100. Changes to Water Order Consents, upgrading and more emphasis on flow and load data, and reduction as reported in table 15 lines 2, 5, 6 and 7 accounts for the percentage reduction.

4.1.2 PPP Data

Line 2 - Load receiving secondary treatment (PPP only)
The Biological load in Tonnes receiving secondary treatment in PPP facilities has increased slightly from AIR11 (7396.5) to (7834.5) for AIR12. The load increase could be accounted by the load at Armagh while still not triggering Band 6 increasing from 1041kg/BOD /day to 1404 kg/BOD/day. Investigations have proven inconclusive as to why the load entering Armagh has fallen in the last two years below 1500kg Band 6 limit. The network may have dead spots where sludge settles and, due to short circuiting, only a limited proportion of the settled sludge is transferred to the treatment works during storm events, or network storm overflows are operating prematurely. Loads to Ballynacor and Richill increased while loads to North Down and Ballyrickard decreased. The overall increase is not reflected in the sludge production as this has decreased.

Line 2 complies with the requirements of Table 15 to collect information of various types and sizes. The works are categorised by the highest level of treatment provided, which is a simplistic assessment of the population that receives primary, secondary treatment etc. It is not a detailed assessment of the load for each type of treatment.

All 6 PPP facilities have secondary treatment and information is based on sampling dictated by Environment Agency requirements. On one establishment at Kinnegar, monitoring is carried out daily with Omega consortia works sampling weekly. The data sets are therefore as robust and secure as line determination permits.

Omega Samples for BOD analysis are only submitted on selected dates as per the Sampling Schedule agreed between NIEA & NI Water Contract Management Team on a yearly basis (52 sample days in total for each WwTW Facility). Since BOD data is not taken on a daily basis, the daily BOD load is calculated for the days in which BOD data is available. An average daily BOD Load to the works is then calculated and multiplied by the number of days in the reporting period to obtain the total load received at the works over this period: (confidence grade B3). For Kinnegar the BOD is measured daily, and converted into a daily loading; to provide an annual loading for BOD: (Confidence Grade A3). Loadings for Omega Works equates to 6060.99 tonnes/annum and Kinnegar 1773.46 Tonnes/annum. Due to proportionality overall confidence grade for total 7834.5 tonnes /annum of B3 is supportable.

The increased load receiving biological treatment is not reflected by sludge produced as this has decreased AIR 11 7.612ttds versus AIR12 7.575 ttds (Table 42 line 40).

Line 3 - Total load receiving preliminary treatment (PPP only)
A zero return has been reported for Line 3, as all six PPP facilities are secondary treatment works.

Line 5 – Total load entering the sewerage system (PPP only)
Prior to AIR11 this line was reported as "not applicable" as it was considered that the PPP Contractors did not operate the catchments. To align with previous Reporters recommendation that the load from PPP facilities should be incorporated, the Asset Management Section has used the PPP WwTW PE (derived from measured flow at each of the six PPP WwTWs). Flow and load data equates to 7834.5tonnes BOD/year which is a slight increase from AIR11 when 7396.4tonnes BOD /year was reported. The confidence grade which can be supported has increased from AIR11 B3 to B2 to take cognisance of prescriptive monitoring carried out at PPP facilities. The PPP Contractors carry out sampling 52 times per year and at Kinnegar the contract requires daily sampling.

Lines 6 and 7 - Equivalent Population served (Resident) (PPP only)
The equivalent population served by the treatment facility utilises calculated load data at from the two PPP operations summated based on 60g/h BOD (276,000 + 80.759).

The calculation at one operation, a single works would be classed as very accurate as 24hr composite samples are taken every day and recorded. The other operation consists of 5 sites where at least weekly sampling is recorded, this still gives a good representation of the load process by the facilities.

The value in lines relates to the line 2 entry. Both lines 6&7 are the same as all 6 works have numerical consents.

4.2 Sewerage Service Facilities (Lines 8 – 9)

4.2.1 NI Water Data

Line 8 – Number of sewage treatment facilities (NI Water only)

The number of wastewater treatment works (1023) differs from the total of 1036 reported in Table 17c as the former does not include 3 screened outfalls and 10 unscreened outfalls. The total number of works excluding screened and unscreened outfalls has reduced by five from 1028 in AIR11 to 1023 in AIR12. This is explained by six Wastewater Treatment works being rationalised and transferred to larger treatment facilities. Flows from Gosheden catchment which previously were treated onsite now gravitate to another wastewater facility. Four others have been decommissioned, two new wastewater treatment plants have been commissioned, together with a reduction of 1 screened and 3 unscreened outfalls results in an overall decrease of five wastewater treatment works from AIR11.

The confidence grade for line 8 remains as A2 (as for AIR11). In AIR12 a small number of WwTW's have been removed from the list due to realisation of private ownership, or where individuals have installed their own septic tank, rendering the facility serving only one property. There is also the possibility that a number of small

WwTW's are under the ownership of the NI Housing Executive or may have become private due to customers installing their own private septic tanks or converting 2 houses into 1.

Line 9 – Treatment Capacity available (NI Water only)
During AIR12 due to upgrading, provision of additional design information, changes to Water Order Consents, the design capacity has increased from AIR11.

However confidence in the data is low. This is primarily due to older NI Water facilities treatment capacity being based on industry standard design criteria. Of the 1023 facilities reported 709 have PE's of less than 100 which are generally served by septic tanks and the number of WwTW with greater than 100PE but less than 250 is 82.

Although the new PPP facilities have a confidence grade of B3, the disproportionate effect of the NI Water data results in a much lower grade of D3 overall.

4.2.2 PPP Data

Line 8 - Number of sewage treatment facilities (PPP only)
We confirm there are six PPP facilities, identical to the reported in AIR11.

Line 9 - Treatment capacity available (PPP only)
Data is based on the actual design specification and there is no change from AIR11. Omega has a contract capacity of 19.6 tonnes and Kinnegar 10.8 tonnes, 30.4 total. Based on Line 2 data, the daily load receiving secondary treatment equates to 21.4 Tonnes BOD/yr indicating a presumed overall head room of 9 tonnes BOD.

The reported value is design value no investigation into performance or as constructed capacity has been undertaken to revise this value. No outages have been reported during the year to reduce the figure.

4.3 Sludge Disposal (Lines 14-16)

4.3.1 NI Water Data

Lines 14–17 - Sludge Disposal
The Company confirmed that the procedures in place for the disposal of sludge are well controlled and robust. All sludge produced by NIW has been transported to PPP incineration facilities for disposal. As all sludges are disposed of through incineration or are disposed of in an appropriate manner by the PPP contractor during incinerator outage, there is not a concern that the control measures in place may allow some unsatisfactory disposal to occur.

The mass of sewage sludge disposed in the year has remained relatively constant over the past few years, reflecting both stable operation of the system and a relatively constant population, as well as good data recording facilities that have been in place for some time, allowing accurate capture of the mass of sewage sludge produced. The reported figure in line 15 is 31.4 ttds compared to 30.5 ttds last year.

The Company continues to have a well controlled management system for controlling sludge movements both as liquid and cake through use of a GPS logging system and the recent introduction of weighbridges at the 8 cake transfer sites.

The Company has included the weight of grit and screenings in the reported data (0.7ttds) which accounts for the difference between produced and transferred to PPP. This value is calculated from skip volumes using a 30% dry solid conversion, which is appropriate.

4.3.2 PPP Data

Line 14 - Percentage Unsatisfactory Sludge Disposed (PPP only)
The Company has reported that no unsatisfactory sludge has been disposed of during the year.

Whist the Sludge Disposal Contractor is self regulating, the protocol in place and third party involvement by The Department of Agriculture, who carries out soil analysis and identifies package numbers, provides security.

Line 15 - Total Sludge Produced (PPP only)
The volume of sludge produced is reported the same as AIR11 as would be expected for a consistent operation and stable population.

A large proportion of the sludge produced is pressed at Ballynacor, the cake transferred from here to Duncure Street for incineration is weighed via a weighbridge and dry solids content of each load is measured. This process gives a high confidence in the recorded values.

Sludge leaving Kinnegar is measured by the PPP contractor, cross-check samples are taken by NI Water for independent analysis, again indicating a high level confidence in the recorded values.

Monthly reports produced by the PPP contractor for sludge produced and processed are scrutinised by NI Water on a monthly basis with numeric checks and cross checks as the validated reports are the method of payment to the PPP contractor.

The auditor questioned if grit and screenings had been included in the reported values of ttds produced in the year. The company advised that this value is zero as all skips at the PPP sites had not been emptied in the report year. Given the capacity of the PPP sites and population served compared to NI Water sites a value equivalent to 20% of the NI Water value for grit and screenings disposed of would have been expected (approx 0.1ttds).

Line 16 - Total sewage sludge received from NI Water (PPP only)
This is a repeat of the NI Water table line 16 – sludge transferred to PPP.

Line 17 – Total sewage sludge disposal (PPP only)
This is the correct sum of lines 15 and 16.

4.3.3 Total

Line 14 - Percentage Unsatisfactory Sludge Disposed (NI Water + PPP)
See Line 14 comments above.

Line 15 - Total Sludge Produced (NI Water + PPP)
There is a small circa 1.0 ttds increase in sludge produced from that reported in the last three years which have been relatively stable at approx 38 ttds (38.1 ttds AIR11, 37.9 ttds AIR10, 38.0 AIR09). NI Water have cited more accurate measurement and timing of data capture related to the PPP operations as a possible explanation along with variations in quantities produced. The percentages involved with PPP sites are too small to have a material effect the variation comes from the NI Water operations. Various factors such improvement in treatment works, addition of first time sewerage schemes and increase in population (resident and holiday) are possible factors along with improved measurement practices. It can be noted that the percentage increase in sludge produced is 2% compared to the percentage increase in load receiving secondary treatment.

Line 17 - Total Sludge Disposed (NI Water +PPP)
The value is equal to reported volume produced.

5. Company Methodology

5.1 Sewage – Loads (NI Water Only)

Line 1 – trade effluent
For the larger industrial traders where discharge flow meters are fitted and operating, this data has been used. Where no discharge meters are fitted, discharge volumes are based on metered water supplied, with the normal procedure of an allowance deducted for domestic and process use onsite.

For sites where neither discharge flow nor water supply data is available, discharge volume has been estimated as 100% of the consented volume.

No conversion from COD to BOD is required for this data as the trade effluent group analyse effluent for BOD, as well as COD which is used for charging.

Line 2 to 13 – sewage loads and treatment facilities
We reviewed in detail the asset performance master spreadsheet which is used to populate this and other tables. The spreadsheet allows the basic data on each STW to be entered such as works name, design pe, treatment process etc, and then the data can be manipulated to populate the various parts of the tables. The spreadsheet also covers Tables 17b, 17c and 17d as they contain comparable information. Inputs to the spreadsheet are gathered from a variety of information sources as shown below.

- Environmental Regulation Team. Updated consents and regulatory obligations.
- Operations Technical Support. STW improvements and changes to treatment process.
- Engineering & Procurement. New works, extensions and modifications.

Population data is gathered on a theoretical basis from properties in the catchment and standard occupancy assumptions. It is planned to check and improve this data with a series of flow and load surveys in the future to improve the confidence grade in Lines 6 & 7. Tourist populations are excluded as required, based on the proportion of pe in hotels, caravans and tent pitches.

The Auditor was advised that it is possible for a number of issues to arise which create uncertainty within the dataset. For example, a septic tank serving two houses is classified as a single sewage works. However, if one property is then sold, the septic tank is only then serving one house and is no longer designated a sewage works. Such updates are not always discovered, hence a small reduction in the confidence grade. Small septic tank STW's can also be easily overlooked as overgrown underground structures giving further uncertainty.

Treatment capacity available (Line 9) is calculated from design capacity in terms of population equivalent served, converted to BOD load.

Data reported has been reconciled with the previous Reporting Year, with full details stated in the Company commentary.

We reviewed a number of spreadsheets and data checks carried out by the Asset Performance Team, together with confirmatory emails on data queries and checks.

The general reductions in loads and population equivalents served in the NIW only Table 15 are matched by equivalent increases in the data for PPP Table 15.

5.2 Sewage – Sludge Disposal

NI Water has a robust methodology for calculating lines 15 to 17. The assumption is made that transfer of sludge to the PPP contractor for incineration allows zero to be entered into line 15 (unsatisfactory disposal) with an A1 confidence grade. Other checks and balances carried out by NI Water strengthen this assumption.

The volume produced and transferred (Lines 15 & 16) are reported as the same values less screenings and grit and are based upon robust measurements and logging of liquid sludge by meter and cake by weighbridge coupled with measured average of %ds.

The most inaccurate aspect of the methodology is the measurement of grit and screenings where a standard assumed 30%ds is used across the board to convert weighbridge measurements into ttds.

The methodology for deriving the PPP volume is similar to the NI Water methodology, whereby recorded wet tonnes are converted to ttds using measured average percentage dry solids.

6. Assumptions

It is assumed that the mass of sludge produced is the same as that disposed of, given that there is negligible sludge storage within the system.

Refer also to our commentary on Tables 17d and 17g for further assumptions that have been made in the background data used to estimate populations, loads and sludge volumes.

7. Confidence Grades

For line 1, a confidence grade of B2 was considered appropriate for this data. Whilst acknowledging year on year improvements, policy changes, increased consents and the accuracy of meter readings, it was agreed that the confidence grade should remain as B2. We confirm the protocols and checks reviewed support this grade.

For Lines 6 & 7 (PPP data), a confidence grade of B2 has been proposed which is an increase from B2 last year. Data is based upon weekly 24hr composite samples, hence the proposed CG is considered appropriate.

For lines 14 to 17 the contributors to NI Water and PPP entries have differing approaches to representing confidence grades for these lines. The approach to NI Water entries has been that the methodologies in place are consistent and robust resulting in high confidence grades. The only exception to this is the lines which include calculated tonnes of grit and screenings where it is recognised that the inclusion of the assumed 30%ds for conversion introduces a higher level of inaccuracy.

Calculation of the PPP entries follow the same level of vigour and consistency in the methodology, however the line owners have also taken into consideration the available accuracy of measurement into account. For instance where every load of sludge cake is weighed and sampled to provide %ds for calculation of ttds, it may be considered that a very high confidence grade could be attributed to the data, but instead an allowance has been made that %ds is variable throughout a load and that onsite measurement and even lab testing has inaccuracies so a high confidence grade can never be given to this type of information. The audit team feel this is a presenting the data as being of poorer quality than it is. Although the measurement of sludge using dry solids conversion and extrapolated sampling has a degree of error the method is best practice and aligns with other UK water company methods. Added to this it can be considered that frequent sampling although containing an inherent margin of accuracy for each sample should, over the period of a year, even out these errors to produce a total value with a good confidence grade.

For Line 14, as no unsatisfactory sludge has been disposed of, and protocols are robust and data secure, we would accept that an A1 confidence grade is acceptable. The company has adopted A1 for NI Water table and A2 for PPP table; A2 overall. We accept the issue that sludge can't be measured to an accuracy of <1% hence A2 has been used but feel in this case reporting of zero can be A1.

For Line 15, 16 & 17 as discussed above, the methodologies and record keeping systems in place would suggest a high confidence grade for the data. For both NI Water and PPP entries the volumes of sludge excluding screenings and grit appear to be recorded with an 'A' confidence grade for the methodology element to an accuracy (as a yearly average)of +/- 5%; hence A2 would be appropriate for these elements. The introduction of grit and screenings which does rely upon an element of

estimation reduces the confidence grade from 'A' to 'B', however because the volumes are small the percentage error resulting from this is small and the overall reporting value is probably still within the '2' band and B2 would be appropriate. Also for line 16 totals transferred and received NI Water/PPP the confidence grade can be taken as high as this element does not include the grit and screenings part. A summary of the confidence grades presented by the company and the auditors' opinion is as follows.

Line		NIW Data	Auditor	PPP Data	Auditor	Total	Auditor
14	% Unsatisfactory	A1	A1	A2	A1	A2	A1
15	Total Sludge produced	B2	B2	B3		B3	B2
16	Total Transferred / Received	B2	A2	B3	A2	-	-
17	Total Disposed of	B2	B2	B3	B2	B3	B2

8. Consistency Checks

No consistency checks are required for this table.

Date: 25 July 2012
Prepared by: HMS

Table 16 – Sewerage Service Activities

Commentary by REPORTER

1. Background

Network activities provide a good measure of work achieved, provided that they can be related to associated investment. The investment breakdowns included in these reporting requirements provide this linkage, with the separation of base service expenditure from that related to enhancements on table 36.

2. Key Findings

- Reconciliation of lines 1 & 2 with 14 & 15 does not follow the table definition, instead adjustments are made in line with the Company GIS database which is appropriate and consistent with AIR11.
- There is an inconsistency between the reporting of WwTW IDs in line 17a but excluding WwTW UID's from line 16a, however reporting is consistent with AIR11.
- No drainage area plans have been completed and there are none ongoing at present. This is a consequence of the expiry of the previous framework for studies and ongoing delays in procurement of a new framework.
- The number of reported collapses and blockages are still very high when compared to English and Welsh water companies, despite the recent transfer of private sewers to English and Welsh ownership.
- For lines 12 and 13 we would recommend a B4 for AIR12. Whilst quality of the reported data is good, it does not differentiate between failures on the main sewer and failures on laterals, and as such is not strictly in accordance with the reporting requirements. When NI Water is able to assess the number of collapses/blockages occurring on lateral sewers, we would support an improvement to the confidence grade.

3. Audit Approach

The responsibility for the compilation of table 16 is held by a single manager who collates information from a number of contributors. The manager and contributors to the various lines were audited. The systems and methodologies used to gather data were reviewed.

4. Audit Findings

4.1 General

The methodologies for collection of data into the table are unchanged from last year and continue to give generally good data with only minor short comings.

4.2 Asset Balance (Lines 1 to 2) (NI Water only)

The total length of sewers at the start of the report year is consistent with the asset balance at the end of the previous year (lines 14 and 15, column 4) and was carried forward correctly.

NI Water, unlike other water companies, is responsible for most lateral sewers as well as main sewers. Only the main sewers are included in the lengths reported in lines 1 and 2 as there are very few laterals mapped. The laterals that are mapped within GIS are clearly distinguished from main sewers and are excluded from these totals.

4.3 Changes during Report Year (Lines 3 to 11) (NI Water Only)

Entries for lines 3 to 11 are an amalgamation of data from different sections of NI Water; Engineering and Procurement (E&P), Network Sewerage, Developer Services and Asset Management.

Line 3 – New Critical Sewers

New critical sewers are added onto the Company's GIS system in two ways, through adoptions by Developer Services and completion of capital projects by E&P.

Sewers laid by E&P are new public sewers within roads and other public areas. Information is captured on the Company's CPMR database which has been designed with regulatory reporting in mind. Data is entered by contractors via a portal to the database and is approved by the appropriate project manager. The data collection by this process is quite extensive; drop-down boxes are used to define critical and non critical sewers. Approval by the project manager and the link to contractor payments helps with data verification. Improvements were put in place for AIR11 including improved quality assurance with further sense checks and exception checks undertaken on the data and spend.

Developer Services maintain a database of new adoptions which feed into the GIS database of sewer records. The methodology is unchanged from last year improved QA checks are in place however, with the coordinator undertaking cross checks and sense checks on data.

The identification of critical sewers as part of this process does not follow completely the guidelines of the WRc Rehabilitation Manual. Although the definitions of critical sewers are known by Developer Services they do not use all parameters and rely on size of sewer being greater than 450mm dia as the main classification criteria. As the majority of new critical sewers are housing developments this will capture the most, if not all critical sewers. However, it was suggested by the auditor that the next revision to the adoption certificate proforma could be changed to try and close out this issue through the collection of additional information relating to the classification of critical sewers.

Line 4 – Critical Sewers Inspected by CCTV

There were 6.02km of critical sewer inspected by CCTV/Man Entry by E&P, 31.470km of critical sewer inspected by Networks Sewerage and 15.611km by Asset Performance.

The sewer inspected by E&P generally relates to new sewers inspected following their construction. The classification into critical and non-critical sewers is made by the delivery team project managers. There may be an issue with respect to when the sewer was surveyed compared to the report year as the date of survey relates to the date of construction in their database. This difference is largely immaterial if the Company consistently reports in this manner and double counting between report years does not occur. This procedure has been confirmed again for this year resulting in consistent reporting of this line.

The information gathered by Networks Sewerage means that it is not possible to classify whether the sewers that were inspected by CCTV were critical or non critical, therefore it is assumed that the proportion of sewers inspected by CCTV that are critical is the same as the proportion of NI Water's sewer stock that is critical. It was planned for AIR12 that NI Water uses it's Corporate Asset Register to report on CCTV/Man Entry surveys undertaken using the information held on the critical sewer layer, thus removing the requirement to proportion survey work. It is understood that this has not been done and the reporting of line 4 is the same as previous years.

Line 5 – Critical Sewers Renovated

There was only 2.55km of critical sewers renovated by E&P in the reporting year, compared to 9.60km last year. The classification into critical and non-critical sewers is made by the delivery teams.

There has been a small length (310m) of critical sewers renovated by Network Sewerage in the reporting year, this is not an activity that is normally carried out by them, last year the reported value was zero.

Line 6 – Critical Sewers Replaced

There were 2.64km of critical sewers replaced by E&P in the reporting year. The classification into critical and non-critical sewers is made by the delivery teams. This makes up the entire entry for line 6.

Line 7 – Abandoned Critical Sewers and Other Changes

A zero entry has been reported for this year for this line.

Line 8 – New Non-critical Sewers

As with line 3 (new critical sewers) new non-critical sewers are added onto the Company's GIS system in two ways, through adoptions by Developer Services and completion of capital projects by E&P.

There were 24.69km of non-critical sewers laid by E&P and 157.20km of non-critical sewers adopted by Developer Services. The commentary relating to line 3 applies to this line also because of the complementary nature of the information.

Line 9 – Non-Critical Sewers Renovated

There were 5.32km of non-critical sewers renovated by E&P during the Report Year along with a small amount (938m) by network sewerage, an activity that would not normally be carried out by them.

Line 10 – Non-Critical Sewers Replaced

There was only 1.02km of non-critical sewers replaced by E&P during the Report Year which made up the whole line total. Although Network Sewerage reported zero for this line the lower confidence grade for collection of their information has reduced the overall value for the line entry.

Line 11 – Abandoned Non-critical Sewers and Other Changes

Only 0.72km of non-critical sewer has been reported abandoned. This comes from the Company's CPMR database and reported by E&P; network sewerage would not normally undertake this activity.

4.4 Sewer Collapses and Blockages (Lines 12 to 13) (NI Water Only)

There were 81 collapses per 1000km and 1620 blockages per 1000km reported in 09/10. Rising main failures account for 2.1% of collapses.

The above figures appear to be extremely high when compared to water companies in England and Wales. Whilst the figures include blockages and collapses on private and public lateral sewers, we would have expected to see a degree of data convergence for 2011/12, following the transfer of private sewers to English and Welsh water company ownership in October 2011. Whilst the transferred assets in England and Wales did not include private laterals, the additional collapses/blockages reported in England and Wales on transferred assets (at companies we are aware of) were in proportion to the additional length of sewer transferred, and not 5-8 times the number as reported in NI Water.

As reported previously, the Company has added critical and lateral sewer base layers to NI Water's Corporate Asset Register. Work is also progressing on identifying sewer repairs as a result of CCTV surveys. As such, NI Water will hopefully be in a better position to report on whether collapses or blockages have occurred in a private lateral, public lateral or public main sewer for AIR13.

4.5 Asset Balance at March 31 (Lines 14 to 15) (NI Water Only)

Based on the formulae, lines 14 & 15 should be the summation of data entries from lines 1 & 2 and lines 3 to 11. However, NI Water does not follow this approach, instead opting to adjust lines 14 and 15 to corrected figures obtained from their GIS database. This approach has allowed them to report the correct entries in lines 3 to

11 and also a more appropriate value for the total lengths reported in lines 14 and 15. As such, this is considered a reasonable and pragmatic approach.

Reconciliation of the asset balance correction is needed as the Company continues to update and improve its GIS database.

Lengths of critical sewers have not changed significantly since the categorisation of a large number of previously unallocated sewers resulting from a study in AIR10 to improve the identification of critical sewers. However, large proportions of data on sewer attributes are missing which makes some classifications very difficult, for instance depth of sewer is not known for 12.8% of records. Further investment to improve the identification could be undertaken but the benefit to the Company of doing this is probably limited.

The total length of sewers at the end of the reporting period is 15090.35km, an increase of 1.2% from AIR11 and largely in line with new sewer activity. The proportion of critical sewers has stayed relatively static at 24.2%, the respective, small increase in length largely due to identification of previously unallocated sewers on GIS as a result of the Company's ongoing review of assets rather than any newly laid sewers.

4.6 Intermittent Discharges (lines 16a, 16b, 17a and 17b) (NI Water Only)

NI Water has used the value of UIDs reported last year as a baseline for reporting UIDs this year. Line 16a, number of UIDs excluding CSOs is the AIR11 reported value less the number removed from the network through capital projects. The AIR 11 value is an estimate calculated by applying the percentage of NIEA classified UIDs to the total number of IDs. Although there has been some further reconciliation of ID numbers in lines 17a & b this approach would appear appropriate.

The information for line 16a and 17a (historic from AIR11) is only based upon combined pumping station overflows. Foul-only pumping station overflows are not included as they do not have a formal NIEA classification. Similarly overflows within the boundaries of WwTWs are not included in line 16a as it is expected that any improvements to overflows at works are expected to be included in improvements at works, the total number of overflows at works are however included in line 17a. This approach is consistent with previous year's reporting.

Information for lines 17a and 17b is extracted from the Asset Performance Team Data which is updated throughout the year. Changes are only made to the database when signed up to by the business unit which allows robust control of the information. Details of the additions and removals are fully documented in Company commentary.

The Regulator guidance on the preparation of lines 16a and 17a is not explicit but NI Water has continued their methodology from last year which includes WwTW and foul only PS overflows in the total for line 17a but excludes unsatisfactory WwTW and foul only overflows from the total for line 16a. There is a possible discrepancy in information, but year on year reporting is consistent. An estimate of the number of foul-only pumping station UIDs and WwTW UIDs is not known.

4.7 Drainage Area Plans (lines 18 and 22) (NI Water Only)

The Company uses a definition of all networks greater than 250PE for line 20, total number of drainage areas. This would appear a reasonable approach and results in 261 being reported for the line, an increase of 1 from last year as a result of a change to the network and completion of a pump away scheme. The Company's ongoing programme of studies is based upon drainage areas with a resident population greater than 1000 and hence they have only 109 areas out of the 261 in their programme.

The Company has not completed any DAP studies in the Report Year and have returned a zero in line 19 for studies in progress. This lack of investment is a result of the expiry of the previous 5 year framework for drainage areas studies in 2010 and the non renewal of it because of procurement issues. It is not known when this framework will be let allowing continuation of the Company's DAP study programme.

The Company has used a 2003 baseline for reporting model builds including all those built or maintained after this date.

The percentage completions and percentage coverage of population has reduced very slightly since last year because of the increase in drainage areas from 260 to 261.

The confidence grades associated with the lines are appropriate. Line 18 has an appropriate A1 associated with the zero entry. The confidence grade for line 22 has been maintained at B3 the same as last tear when it was increased as a reflection of the improved accuracy of table 13, connected population.

4.8 Nominated Sewerage Service Outputs (lines 23 to 25) (NI Water Only)

The Company originally had 117 UIDs in their PC10 plan, but this was reduced to 68 in a savings exercise. 44 have been reported for this year. The Company maintains a spreadsheet of outputs against their plan, this is populated from their Captrax database which collates information on capital schemes.

The completion of 44 last year plus the 20 completed in 2010/11 and a further 2 completed to date in 2012 bring them close to achieving their revises PC10 target of 68. The suggestion made last year by the auditor for the Company to include a commentary on progress against target in the Company commentary for line 23 has been taken up.

For line 24 NI Water is reporting 6 outputs which comprises 4 carry over and 2 additional outputs there have been no new start project delivered. 3 projects are in progress but have not achieved beneficial use. The details behind change to the programme and carry over have been presented by the Company in their commentary. The Company's CIM database is used to collate the information, this information relies on having correct beneficial use dates which are understood to be maintained though project management checks. Manual checks are carried out to compare spend profile against predicted dates and ensure correct information. The company also cross checks the information between CIM and Captrax.

It is understood the plan for 2011/12 was to achieve the 10 or 11 outputs against the 6 reported some are currently suffering late delivery, one outfall project is not needed and not claimed.

Line 25 - Investments in improvements to small WwTW. The definition for 'small' wastewater treatment works is taken as <250PE which is those included in the rural wastewater improvement programme, this is as previous Annual Information Returns. The spend obtained from the Company's accounting system using and applicable filter and has been adjusted for COPI to 07/08 prices which is correct.

5. Company Methodology

5.1 Asset Balance (lines 1 to 2)

These lines are equal to lines 14 and 15 of the previous year's return.

5.2 Changes during Report Year (lines 3 to 11)

Information is collected from a variety of sources to complete these lines.

Both Engineering and Procurement (EP) and Developer Services (DS) carry out the activities in lines 3 to 11 for NI Water. The PPP contractors may also carry out these activities. The method of compiling the information is similar to AIR11.

EP collates information from the sewerage infrastructure monthly returns. Data is entered directly by contractors via a portal. The database has been developed with the reporting of AIR returns in mind and has comprehensive data fields to collect appropriate information about new assets. Drop-down boxes are used to allow the selection of critical and non-critical sewers. The information entered by contractors is checked and approved by E&P. The information is cross-checked against invoices prepared by the contractor, which ensures that work being completed and invoiced is being reported.

The components of lines 3 and 8 (new critical and non-critical sewers) that are the responsibility of DS are those sewers constructed by developers and then adopted by NI Water. Design drawings are submitted by developers for approval by DS Once as-constructed drawings are submitted (and inspection of the new sewers is passed), DS issues a preliminary adoption certificate and the sewers are mapped in GIS, but marked as "unadopted". Following the defects liability period (12 months) a final adoption certificate is issued by DS and the status of the sewers is changed to "adopted" in GIS. When the final adoption certificate is issued, the details are logged onto a spreadsheet tabulating the diameter and lengths of pipe for each scheme. This information is used to generate the lengths of new sewer for lines 3 and 8.

The collation of information by DS for identification of critical/non-critical is not entirely to WRc guidelines as discussed in section 4.3 above, the Company is going to review it's methodology for next year with a view to improving the confidence of information reported in lines 3&8.

5.3 Sewer Collapses and Blockages (lines 12 to 13)

The number of sewer collapses and blockages per 1000km is calculated based on other data as follows:

- line 12 (sewer collapses) = [table 16a line 1 (rising main failures) + table 16a line 2 (gravity sewer collapses)] / [table 16 line 14 (length of sewers at end of year)]
- line 13 (sewer blockages) = [table 16a line 3 (sewer blockages)] / [table 16 line 14 (length of sewers at end of year)]

5.4 Asset Balance at March 31 (lines 14 to 15)

These should be calculated from the previous lines as:

- line 14 = line 1 + line 3 + line 8 – line 7 – line 11
- line 15 = line 2 + line 3 – line 7

However the Company adjusts the entries to allow reconciliation of the sewer stock data recorded on its GIS database as discussed above and as previous AIR returns.

5.5 Intermittent Discharges (lines 16 and 17)

Lines 16a and 16b

The methodology for this line changed from AIR09 to AIR10 following the clarification of a query. In AIR09 the Company reported on the number of UIDs classified by NIEA to date, for AIR10 and AIR11 the Company made an estimate of the total number of UIDs based on those classified to date and the total number. A historic percentage generated at AIR10 was used for AIR11. This figure reported for AIR11 has now become a baseline for calculating AIR12. The change in UIDs during the year has been applied to the values reported last year, this would appear a reasonable approach.

Lines 17a and 17b

The methodology for these lines is unchanged from last year. Rationalisation exercises have been undertaken to identify the incorrect entries such as dual manholes and bifurcations. In addition an independent consultant is undertaking an exercise to ascertain any additional sewerage system overflows which may exists but for which NI Water has yet to apply for a Water Order Consent. This work was completed last year but the verification process is ongoing due to the large amount of data those catchments completed have been included in AIR12 (36nr).

5.6 Drainage Area Plans (lines 18 and 22)

Data for this line is obtained from the maintained plan of drainage studies and is unchanged form last year.

5.7 Nominated Sewerage Service Outputs (lines 23 to 25)

Data for line 23 is maintained in a spreadsheet along with beneficial use date, analysis of the spreadsheet is undertaken to determine the return for the table.

Data for lines 24 & 25 comes from CIM based on Q4 cross referenced to PM information on programme dates.

6. Confidence Grades

The Company has assigned a confidence grade of B3 to line 1, repeating the CG for line 17a in last year's return from which line 1 is copied. The confidence grading recognised that the GIS record is not complete, and that there will be some unmapped sewers.

The Company has assigned a lower confidence grade of C3 to line 2, a repeat of the CG assigned to line 15 in AIR11.

The Company has assigned a confidence grade of B2 to line 3 as last year, the data is a combination of two sources EP and DS. The considered confidence grades of the two data sources are presented in the Company commentary and the lower value reported to represent the line.

The Company had initially assigned a confidence grade of B3 to line 4, a repeat of last year. The line is a mixture of A2 from EP and AM and C4 from Network Sewerage. In previous years the C4 component was small compared to the A2 component resulting in overall B3. This year the Network Sewerage element approx 2/3rds of the line total which raises the question of continued appropriateness of the grading. We suggested a return to C4 may be appropriate for this year given the make-up of the line data and the Company concurred with our assessment, amending the grade assigned in their final submission to align with our expectations.

The Company has assigned a confidence grade of B2 to lines 5 and 7 which is a reduction from A2 last year. The reduction is a result of the increase in component from DS which has a lower confidence grade compared to EP, we consider this appropriate.

Line 6 and line 10 were B3 last year but is reported B2 this year. This improvement is a result of the reporting of zero entries from Network Sewerage this year which last year had contributed to the line with elements at C4. The overall B2 grading is appropriate.

The Company has assigned a confidence grade of B2 to line 8 as last year.

The confidence grades for lines 9 & 11 appear reduced from A2 last year to B2 which we deem appropriate. In AIR11 we agreed a B2 grade was appropriate but an A2 grade was reported (even though the commentary did propose that B2 was going to be submitted). This has been corrected in AIR12.

The Company has assigned a confidence grade of B2 to line 8 as last year.

The Company has assigned a confidence grade of B3 to lines 12 and 13, on the basis the data is derived from checked and paid invoices, and relies on the total length of main (L14 confidence grade B3) in its calculation. As the methodology for lines 12 and 13 is unchanged, you could argue for maintaining a C5 for AIR12, however, we believe a B4 is probably more appropriate in this instance. When NI Water is able to assess the number of collapses/blockages occurring on lateral sewers, we would support an improvement to the confidence grade.

The confidence grade for line 15 has remained at C3 for this year. Although the Company's GIS data still has a high degree of missing information we believe the C3 confidence grade is appropriate.

The Company has assigned a confidence grade of C2 to lines 16a and 16b. This is a repeat of last year and is appropriate as generation of the line data includes estimates of the number of intermittent discharges as well as those listed by NIEA.

Confidence grades have improved from B4 to B3 for lines 17a and 17b. This is a result of the continuation to improve data and complete the verification of the work undertaken by an independent consultant to rationalise information. B3 is appropriate.

Confidence grades vary between A1 and A2 for lines 18-21. Since the data is pure direct measurement we support this grading.

The confidence grade for Line 22 has maintained at B3 which is a reflection of the grading for the population data reported elsewhere in AIR12.

Confidence grades for lines 23-25 are unchanged from last year. Line 23 is A1 as would be expected. Line 24 has been allocated B3 as the company is not confident all data for this line is fully captured and the expected margin of error as a percentage for the low value of the line results in B3. The A2 confidence grade for line 25 is not an A1 despite good data as the reporting metric is investment value which the company considers has potential for inaccuracy greater than 1% which we would concur with.

8. Consistency Checks

- Lines 12 and 13 are consistent with lines 1-3 of table 16a and line 14 of table 16.
- Lines 14 and 15 are not consistent with lines 1, 2, 3, 7, 8 and 11, as discussed in the body of this report but the reason this is understood.

Date: 25 July 2012
Prepared by: HMS

Table 16a – Sewerage Service Serviceability Indicators

Commentary by REPORTER

1. Background

This information in this table is required to measure the level of maintenance activity undertaken within a Company.

2. Key Findings

- It is still not possible to distinguish failures on laterals from failures on main sewers, although NI Water has recently added critical and lateral sewer base layers to NI Water's Corporate Asset Register. Work is also progressing on the identification of sewer repairs resulting from CCTV inspections.
- The improved collapse/blockage performance would suggest an improvement in wastewater infrastructure serviceability; however, it is difficult to draw strong conclusions until a consistent methodology is established over several years to determine the real trend.
- The Company has reported a total of 11,476 equipment failures repaired in the year. This is consistent with last year which was a big increase on 2010. The Company is attributing to the continued abnormally wet weather conditions as a contributory factor to this which resulted in an increased burden on sewage pump stations.

3. Audit Approach

The responsibility for the compilation of table 16a is split between 2 system holders, each of whom was audited. The audit consisted of an interview with the line owners to discuss the methodology and data used to generate this table.

4. Audit Findings

4.1 General

As highlighted previously NI Water is responsible for most laterals, whereas their England & Wales counterparts are not. We would expect blockages and collapses on public laterals to account for a reasonable percentage of the totals reported in Table 16a, and have previously recommended that NI Water develops systems to enable the identification of critical and lateral sewers and thus identify what proportion of collapses and blockages occur on public laterals.

We confirm that the Company added critical and lateral sewer base layers to NI Water's Corporate Asset Register for AIR10 and work is also progressing on identifying sewer repairs as a result of CCTV surveys. As such, NI Water should be in a better position to report on whether collapses or blockages have occurred in a private lateral, public lateral or public main sewer for AIR13.

4.2 Sewers – Maintenance (lines 1 to 4)

There were 24 rising main failures (Line 1) recorded in the reporting year, 35% lower than that reported in AIR11.

There were 1191 gravity sewer collapses (Line 2) recorded in the reporting year, 5% lower than that reported in AIR11.

There were 24,444 sewer blockages (Line 3) recorded in the reporting year, 1,596 fewer than reported in AIR11. As above, this could suggest an improvement in wastewater infrastructure serviceability; and the Company suggests that a more proactive approach to maintenance has been adopted; however, it is difficult to draw strong conclusions until a consistent methodology is established over several years to determine the real trend.

Equipment Failures (line 4)

In terms of equipment failures, the systems used for managing and recording M&E maintenance were upgraded at the end of 2008 and are operating well. Initial problems with remote field communications have been overcome by improvements to band width and are performing well. Further development is required to enhance the ability of the systems to differentiate between failures which cause a detrimental impact on service to customers or the environment, and those which don't, and the Company is continuing to review actions in this area. Manual review of the monthly return figures is used to filter the information for the AIR Return.

The return figure for 2012 is only slightly less than 2011 which was 5.6% up from 2010 and therefore remains at a higher than expected level despite the investment made. This high return is attributed to the abnormal weather experienced in the reporting period as very wet weather experienced in 2010/11 continued into 2011/12. This high rainfall has put an increased load on the sewage pump stations which has translated into increased equipment failures. This probable explanation was accepted last year and poor weather has continued for the Report Year; a high proportion of failures would expect to be attributed to pump stations.

5. Company Methodology

5.1 Rising Main Failures, Gravity Sewer Collapses, Sewer Blockages (Lines 1 to 3)

Network failure data is collated by the Networks Sewerage field managers using checked and paid invoices from the sewer maintenance contractor under the '309 contract'. The base data that is collected differentiates between rising main failures, gravity sewer collapses and sewer blockages. This data is submitted on a monthly basis to the three network area managers and then to the Networks Sewerage Business Unit.

This information is then compiled to give totals for the whole year. We reviewed the monthly returns and confirm the accuracy of the consolidated totals.

5.2 Equipment Failures Repaired (line 4)

The Company recorded the relevant information for this category in the Mobile Work Management (MWM) system. This is the second full report year of the mobile work management system known as "Ellipse" which was introduced in late 2008. Data is gathered on sewage pumping stations, terminal pumping stations, CSOs etc, but currently is not recorded for non-electromechanical equipment such as storage tanks or hydrobrakes.

The systems also are currently unable to differentiate between a pump failure and the outcome of that failure i.e. whether there was a detrimental impact. Pump blockages are also recorded even if the blockage was due primarily to a flash flood rather than an actual pump failure.

A description of the process which gathers the information regarding failure and repair is best illustrated by e.g. a pump failure as follows:

- Failure is recorded by either telemetry (approximately 90% of cases) or by a mobile operator site visit (10% of cases).
- Alert is passed to the Function Supervisor in the Work Control Centre. Details are passed out to the mobile technicians via 'toughbooks'. These are mobile laptops fitted with wireless communication and record details of the failure. The technician then completes the repair and records job completion and/or any further work requests.
- Data is passed back to the Work Control Centre and recorded via Ellipse.

The system has been observed in operation at company work control centre at previous audits and is unchanged this year.

5.3 Information Analysis

Implementation of the new system for collecting data at the end of 2008 has improved the collection of data. The 'Ellipse' work management system and associated 'toughbooks' are working well, early communication issues have been overcome by increasing the band width of the data link.

The Company is using the improved data gathering to target problem areas with high failure rates to see if there are fundamental causes which can be addressed to reduce recurrences.

The Company is also using the failure data pro-actively to drive planned maintenance regimes. Thus high failure rates in equipment may result in an increased planned maintenance frequency, or vice versa. Also, more modern pump sets that are less prone to blockage and ragging are being reviewed and installed where appropriate.

The Company is introducing improved control systems and optimisation systems where possible to prevent blockages. These systems detect increased motor electrical current usage from a partial blockage and instigate a brief temporary pump reversal to attempt to unblock the pump before full blockage occurs and intervention

is required. These systems have only been installed as a pilot scheme to date so the benefit is not particularly noticeable however a business case has been approved for installation of more of these 'intelligent' pump stations in the future.

6. Assumptions

No significant assumptions to report.

7. Confidence Grades

The Company has assigned a confidence grade of B2 to lines 1 to 3 on the basis the data is derived from checked and paid invoices. Whilst quality of the reported data is good, it does not differentiate between failures on the main sewer and failures on laterals, and as such is not strictly in accordance with the reporting requirements. As such the reported confidence grade should be consistent with Table 16 Lines 12 and 13.

The Company has assigned a confidence grade of B2 to Line 4. The data quality is good however failures from non-electromechanical systems are not recorded. There is some inability of the system to identify when a failure caused a detrimental impact to service which relies upon manual intervention to filter results. On this basis we support the confidence grade assigned.

8. Consistency Checks

- Line 2 = Table 16 Line 12 multiplied by Table 16 Line 14 divided by 1,000 minus Table 16a Line 1
- Line 3 = Table 16 Line 13 multiplied by Table 16 Line 14 divided by 1,000.

Date: 25 July 2012
Prepared by: HMS

Table 16b – Sewerage Service Serviceability Indicators

Commentary by REPORTER

1. Background

This table illustrates sewage treatment works performance in relation to consent standards for biochemical oxygen demand (BOD), suspended solids (SS) and ammonia (NH_3). The performance estimate made enables the trend in performance to be identified and serviceability assessments to be made.

2. Key Findings

- Steady performance across all indicators at NI Water sites.
- Improvement in ammonia performance at PPP sites, while BOD and SS performances at PPP sites declined.

3. Audit Approach

The audit consisted of discussions with the line owner to understand the methodology, inspection of the data held within the Laboratory Information Management System (LIMS) and how this is extracted for the purpose of generating the data for this table, and review of the spreadsheet that is used to carry out the analysis for this table.

4. Audit Findings

4.1 General

There have been no significant changes to the data sources or methods used to calculate the line totals this year. We found no errors in the Company's calculations.

The Company provide a detailed list of all excluded sites in their commentary which we reviewed with the Company. Of the 66 NI Water sites excluded for BOD and SS, 2 are listed as being out of service at 31st March 2012. Checks against the source data confirmed that all 2 sites were taken out of service during FY11/12 and it was noted that the majority of these sites were compliant prior to exclusion. The remainder have all been correctly excluded due to size banding. No NI Water sites have been excluded for insufficient data.

None of the 6 PPP sites has been excluded from all performance tables for AIR12. All PPP sites have been included with 2008 data based on the pre-upgrade status when under NI Water ownership.

For clarity, the Company includes a list of approximately 700 small sites which are excluded on the basis of size banding.

The Company has a number of sites without relevant numerical consents (i.e. relating to BOD, SS, NH_3) which are not monitored and not recorded in LIMS. However, these sites are predominantly all Band 1 or 2 sites and hence excluded on

the basis of size banding anyway and hence have no impact on the line totals. These sites are included within the 700 small sites listed in their commentary.

NI Water has provided performance charts to indicate change over time in each indicator since AIR08. AIR08 did not have full 3-year data therefore, NI Water would leave AIR08 figure out from the graphs or use dashed line between AIR08 and AIR09 so that the data from AIR08 could be seen as not directly comparable.

Although the charts indicate an overall improvement in all parameters compared to last year, these annual movements are considered insignificant when compared to the range of data points over the last 3 years, all of which are typically within +/-2%, and a number of other potential influencing factors including:

- Potentially moving baseline due to ongoing and periodic tightening of consent levels
- Site closures and temporary usage
- Impact of temporary consent relaxations
- Seasonal variations (e.g. extreme weather events)
- Other network events (e.g. abnormal effluent discharges)

Furthermore, the Company informed us that the actual number of sites failing consent levels has actually fallen slightly from FY09/10 levels. In 2010, 22 sites failed their Water Order Consents. This reduced to 16 in 2011 which was reported in AIR12. Whilst we have not verified this claim, we agree that the results are probably more indicative of a relatively steady and consistent performance, and recognise that real trends may only become apparent in future years as the historical data set grows.

The Company's performance against specific parameters is discussed in more detail in the following sections.

We identified that the Company had not referred to operating costs in their commentary and requested an explanation. NI Water advised that they believe the requirements are being addressed by the 'Cost to Serve' Project which automates coding of jobs within the financial systems enabling more detailed and site and job specific information on running costs. The Company also advised that details of this have been fully disclosed in Tables 17b-f and did not feel the need to repeat these details here which we accept.

4.2 BOD Performance

NI Water Only

Predicted performance indicates a slight decline across all event indicators ranging from 87.9% to 93.6%, although levels remain within +/-1% of previous years' results. The changes cannot be considered significant at this stage as stated in Section 4.1.

PPP Only

Predicted performance for BOD for all 6 PPP sites has decreased from event indicators ranging from 94.3% to 71.7% to within the range 71.7% to 76.4%. We expected higher performance as the rolling 3 year data set gradually removes lower performance results from the pre-upgrade status at the sites. The Company explains that in 2010, 5 PPP sites were assessed for projected compliance, with one site excluded due to insufficient data. In 2011, this 6 site was now included. The 2 years differ due to an increase in sites reported on of 20%, along with the different compliance characteristics of the new site. A better indication of projected performance will be seen in AIR13 when the same sites will be used year-on-year.

Total

We can confirm that final totals are a correct conglomeration of the previous tables.

4.3 SS Performance

NI Water Only

Predicted performance indicates a slight improvement across all event indicators ranging from 91.2% to 94.8%, although levels remain within +/-2% of previous years' results. The changes cannot be considered significant at this stage as stated in Section 4.1.

PPP Only

Predicted performance for all 6 PPP sites has declined from 94.3% to 68.3% in all categories. The Company explained that this is because in 2010, 5 PPP sites were assessed for projected compliance, with one site excluded due to insufficient data. In 2011, this 6 site was now included. The 2 years differ due to an increase in sites reported on of 20%, along with the different compliance characteristics of the new site. A better indication of projected performance will be seen in AIR13 when the same sites will be used year-on-year.

As with BOD, we checked the performance of the excluded site, Ballynacor WwTW, and can confirm that the site would report as 100% if listed.

Total

We can confirm that final totals are a correct conglomeration of the previous tables.

4.4 Ammonia Performance

NI Water Only

Predicted performance indicates a slight decline across all event indicators ranging from 92.7% to 94.6%, although levels remain within +/-2% of previous years' results. The changes cannot be considered significant at this stage as stated in Section 4.1.

PPP Only

All of the 6 PPP sites now have 3 years of data.

We have seen a significant improvement from 71.7% to 90.6% in AIR12 as the 2008 data is omitted from the data set and all of 6 sites are included in the data.

Total

We can confirm that final totals are a correct conglomeration of the previous tables.

5. Company Methodology

There are no significant changes to the Company methodology this year. The Company continues to report on results from the last 3 years in accordance with the guidelines.

For consistency across tables, the population equivalents used to allocate size bands are based on population equivalents at 31st March 2012 taken from the AIR12 returns. However, the performance data used to calculate the event forecasts is based on the calendar year. Whilst in theory this means that the two data sets are misaligned, in practice, as the totals use a set calculation based on a rolling 3 years of data, the overall impact is considered insignificant. NI Water excludes works that were out of service on 31st March 2012, even though a full set of data may exist for the respective calendar year to ensure continuity between tables. We agree with this approach as a reasonable compromise and expect any discrepancy to be well within the limits of the assigned confidence grade.

The Company identifies all STWs that it is responsible for and downloads the current and historical consent conditions for each STW from LIMS, then excludes some from the analysis for the following reasons:

- no numerical consent (includes sites that only have urban wastewater treatment directive consents)
- size band 1 or 2 (ie <500 PE)
- insufficient data (if less than the specified 3 years of data needed with 6 or more samples in each year)
- site taken out of service within the financial year (on the basis that the table is providing a prediction of future compliance rather than past performance)

For the remaining STWs, the analysis is carried out in accordance with the guidance set out by NIAUR; although the Company elects to use the equivalent excel function for calculating the 95 percentile. The calculation process is a mechanical one, identical to previous years, and we can confirm that it complies with the procedure set out in the guidance.

We can also provide the following clarifications:

- sample data is downloaded from LIMS, which holds all test results
- tests are carried out by NI Water accredited laboratories

- information in LIMS has been through various quality control procedures, both in the laboratory and entering the data. Any results that are abnormally high are retested. If the second test supports the first test result, then the first result stands. Otherwise, with further evidence, the result is changed
- changes to results in LIMS are clearly identified with the original result, the new result, the date of the change and the reason for the change.
- only samples that were taken for regulatory compliance monitoring purposes are used in the analysis. Ad-hoc samples that might have been taken for other reasons (e.g. by operations for process monitoring) have not been included in the analysis
- the sample data is divided by the consent condition that was in place at the time that the sample was taken to produce a normalised value, therefore any changes to consent conditions are accounted for.

6. Assumptions

Results that are "below the limit of detection" are assigned a value equal to half the limit of detection.

The performance data taken from the calendar year is assumed to be representative of the period to the end of the Report Year.

7. Confidence Grades

The Company has assigned a confidence grade of A2 to all lines. On the basis of the data collated and pre-defined methods for calculating line totals, we believe this to be appropriate and justified.

8. Consistency Checks

Reporting Requirement states that Lines 3, 6 and 9 are copied from Table 15 Line 8, which are not consistent for NI Water and Total. As we mentioned above, there are circa 700 Band 1 and 2 sites in NI Water area, and they are excluded from Table 16b figure. Hence these lines for NI Water and total do not match with Table 15 Line 8.

Date: 25 July 2012
Prepared by: HMS