Northern Ireland Water

Serviceability

(Commentary for Table 46)

Public Domain Submission

Prepared for

Utility Regulator and NI Water

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Table 46 –Serviceability Return

1.   Introduction

The information in this table is used to measure the level of maintenance activity on water infrastructure, water non-infrastructure, sewerage infrastructure and sewerage non-infrastructure undertaken within the Company, and is used to assess the asset serviceability status. The basket of indicators included in each block will together inform the assessment of serviceability to customers for the service area as a whole.

As per Reporting Requirements, we did not audit or check consistency on the following data:

- water quality data and water incident data (Lines 9 to 12, 17 to 24 and 26 to 28)

- wastewater treatment quality data (Lines 46 to 52)

- pollution incidents (Lines 13, 14, 25, 38 and 39)

2.   Key findings

- We audited the reported data and challenged the processes on a sample basis. Except where detailed below, we consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and that are properly implemented with effective quality control and governance arrangements.

2.1   Water infrastructure (Lines 1 to 8 and 13 to 16)

- The number of mains bursts have continued to decrease, driven by a combination of the mild winter weather and the ongoing mains rehabilitation programme.

- The level of distribution losses have continued to fall, however a change in the method of calculation due to new leakage management software has led to a re-adjustment of the reported leakage level for AIR14.

- The serviceability, as measured by a range of indicators has been assessed as "stable".

- The customer contacts for discoloured water (Line 13) was audited satisfactorily back to the source data from customer services. The number of discoloured related customer contacts has continued its long-term decline.

- We located an issue with the calculation used for Line 14 which we challenged the Company on. This has resulted in a correction being made to the Data table submitted by the Company. The corrected figure is 1.9 customer contacts per 1000 population (for discoloured water).

2.2   Water non-infrastructure (Lines 25, 29 and 30)

- This is first year this data has been reported and it would appear that a company is providing a generally acceptable level of availability of equipment which is equated to an acceptable level of unplanned maintenance.

- We found no material issues from our audit of events at WTW resulting from treatment difficulties or ineffective treatment categorised as 'significant' or higher (Line 25).

2.3 Sewerage infrastructure (Lines 31 to 37 and 40 to 45)

- NI Water is now able to separately identify blockages occurring on the public main sewer, public laterals and private laterals, and have been reporting on this basis since April 2013.

- For 2013/14, NI Water confirmed that only 371 of the 18,062 blockages and 74 of the 1120 collapses reported, actually occurred on a public lateral, which suggests this is not an explanatory factor for the disproportionately high number of blockages reported.

- Collapse and blockage performance is improving year on year, and we consider that the recently introduced proactive blockage hot spotting programme will help to further reduce the number of blockages year on year.

- This is first year this data has been reported and it would appear that a company is providing a generally acceptable level of availability of equipment which is equated to an acceptable level of unplanned maintenance.

2.4 Sewerage non-infrastructure (Lines 53 and 54)

- This is first year this data has been reported and it would appear that a company is providing a generally acceptable level of availability of equipment which is equated to an acceptable level of unplanned maintenance.

- Although there is a small upward movement in the service indicators used for the assessment of Line 54 the overall assessment of stable is appropriate for AIR14.

3. Audit approach

The audit consisted of an interview with the NI Water system holders to discuss the methodology and reliability and accuracy of data that has been used to populate this table. Where appropriate, we carried out consistency checks of Table 46 entries to other parts of NI Water submission.

Lines 13-14 – Customer contacts for discoloured water

The responsibility for the completion of Line 13 rests with one system holder. The contact data is provided by customer services which is then analysed so that only discoloured water contacts are reported. Our approach was to review this analysis and confirm the data reported accurately represents the customer services dataset.

We have checked the consistency of the data present and have also checked the calculation for Line 14 which is based on a division of Line 13 by the population served (000s).

Recommendation: In future years the customer services data should be subject to audit so we can establish authoritatively how their data is compiled, allowing us to confirm the accuracy of the data from Customer Services.

Line 25 - Events at WTW resulting from treatment difficulties or ineffective treatment categorised as 'significant' or higher

Although we were not required to audit this line, we check its consistency of data to other tables. The data reported in this line is based on NI Water's interaction with the DWI and the DWI's attribution of severity to events. We reviewed the basis for severity, the interaction with the DWI as well as reviewing a small sample of 3 reports to confirm the reliability of the dataset reported. We have also reviewed how all the DWI reportable events have been filtered for only those relating to treatment difficulties or ineffective treatment.

Lines 32 to 37, 40, 43 and 44 – Sewerage infrastructure

The responsibility for the compilation of previous 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.

Line 54 – Company's overall serviceability assessment for sewerage non-infrastructure

The correct line holder for this single line audit was identified post audit meetings with other line holders for the table block – Sewerage non-infrastructure hence an audit meeting was not held. A review of the methodology and company commentary has however been undertaken. The entry for the line is a text designation of the overall serviceability for the table block.

4. Company methodology

The Company's methodologies for the majority of lines are same as those described in Tables 1 to 45. Here we highlight methodologies that are not described in these table commentaries.

Line 4 – Number of mains bursts (inc Active leakage)

This value is the total number of bursts that is used to calculate the number of bursts per 1,000km for Table 11, line 11. This methodology was reviewed in detail during our audit of Table 11.

Line 6 – Interruptions to supply greater than 3 hours resulting from equipment failure

We reviewed the DG3 register spreadsheet that the Company provided. This line included incidents caused by NI Water but excludes their contactors or third party. This also exclude incidents due to severe weather and human errors.

Line 13 – Customer contacts (Discoloured water)

Although we were not required to audit this line, we check the consistency of the table entry. The number of contacts regarding water quality are provided by customer services to be analysed by the Environmental Regulation team. This analysis identifies those contacts directly attributable to discoloured water.

Line 14 – Customer contacts per 1000 population (Discoloured water)

Although we were not required to audit this line, we check the consistency of the table entry. The calculation for Line 14 is based on a division of Line 13 by the population served (000s).

Line 16 – Company's overall serviceability assessment for water infrastructure

This assessment is based on a review of past performance for a range of key serviceability measures from AIR04 to AIR14, although greater significance is placed on the more recent trend.

- Mains bursts per 1000km : improving

- Interruptions to supply greater than three hours: broadly stable (no evident trend)

- Percentage of properties affected by interruptions greater than 12 hours: broadly stable

- Percentage of iron samples exceeding 75% of PCV: broadly stable

- Number of customer contacts per 1000 population (discoloured water): currently stable

The Company then takes a view based on all the measures, which for AIR14 indicates stable serviceability.

Line 25 - Events at WTW resulting from treatment difficulties or ineffective treatment categorised as 'significant' or higher

Although we were not required to audit this line, we check the consistency of the table entry. The data reported in this line is based on NI Water's interaction with the DWI and the DWI's attribution of severity to events. This process is well embedded. The full audit trails including access to the DWI reports was available for review. We also reviewed the DWI's classification process when assessing reported water quality events.

Line 29 – Water Unplanned (reactive) maintenance, and

Line 53 – Sewerage Unplanned (reactive) maintenance

These are new entries for AIR14, both these service indicators are measured using similar methodologies. NI Water has chosen to report on the percentage availability of M&E equipment as reported through its telemetry system. This is a comparable metric for Unplanned (reactive) Maintenance as required by the reporting requirements for these two lines.

Data is extracted from NI Water's telemetry system using a database they had previously developed to identify out of service M&E equipment. This database allows the interrogation of telemetry signal data relating to M&E equipment being "not available". This is a cumulative daily report which records the cumulative days for unavailable items of plant to determine a ratio for the year of the availability of the equipment. This metric although not a direct measure of the amount of unplanned maintenance carried out is a good indicator of the serviceability measurement required for the table lines. The line entry is defined around "critical" plant, the assumption by using telemetry signals is that telemetry is provided for important plant only or that could be classed a critical.

There are some short comings in reporting methodology proposed in that;

- Some telemetry anomalies could show as "unavailable" e.g. equipment running in "hand" may show as this and be counted

- Analysis on a daily basis only picks up failures that extend from one day to the next, a failure occurring and resolved on the same day are not picked up

- Equipment not on telemetry is not included in the assessment.

These short comings will effect an absolute picture of the situation but consistent reporting on the same basis and methodology for future returns will allow comparative trends to be undertaken. The most significant short coming is the non-recording of failures repaired the same day, for major and critical assets same day maintenance could well be essential/the norm and hence as a measure of reactive maintenance for the AIR it would be a preference to also capture these to give a better picture and comparative output. The methodology should be reviewed to investigate if this short coming can be addressed for future returns.

With respect to the presenting a more meaningful indication of serviceability we would propose sub-divisions of data into asset type. We note from the methodology that the data is already available as site groupings or by asset type. Site groupings would be of use to NI Water as a monitor on area team performance etc but we would consider that information on trending of by asset type is more useful

indication of serviceability. The sub-divisions are expected to already exist in the telemetry database used to gather the data e.g.; pumps, blowers, dosing equipment, and monitoring equipment etcetera.

Line 30 – Company's overall serviceability assessment for water non-infrastructure

The Company adopts 5 serviceability indicators which is uses to track changes in service levels in water non-infrastructure between AIR periods. The 5 measures are turbidity exceeding 0.8NTU, turbidity exceeding 1.0NTU, THM compliance, Events at WTWs, coliform compliance at service reservoirs and water towers. The chart inputs are all extracted directly from lines 17-29 in Table 46. The data is displayed in graphical format with data covering the last 10 years (AIR04 to AIR14) to illustrate annual change and long term trend. The charts include a 'reference line' which is based on an average of previous chart data. Lower and upper control limits are also defined to provide a zone within which is considered to be 'stable' operation. The period that this covers varies from 3 to 7 years. Whilst preferable to have a more consistently defined sample, we note that the periods are selected to deliberately exclude unrepresentative data points from early AIR periods which would significantly skew the average upwards if they were included. The setting of the 'stable' zone by the Company, although slightly subjective, is therefore appropriate. As more data values become available the Company should look to target more consistent data sets for averaging (e.g. AIR10 to AIR14).

Lines 32 to 37 – Rising Main Failures, Gravity Sewer Collapses, Sewer Blockages

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 four network area managers and then to the Networks Sewerage Business Unit.

Line 42 – Total number of equipment failures repaired

The Company's methodology for capturing data and recording information on sewerage equipment failures follows that previously devised for Table 16a Line 4 of previous Annual Information Returns. Information is taken from NIW's Mobile Work Management system on a monthly basis extracting entries relating to reactive maintenance jobs associated with CSOs or Sewage Pumping stations. They don't have the ability to record data on non-electromechanical devices such as storage tanks anti-flood devices or flow control devices. Manual filtering of the information extracted is undertaken to remove duplicates arising from the entries of "two-man" jobs, it is also noted that some out of hours jobs may not be captured by the Mobile Work Management system. The methodology only captures equipment failures not the outcome associated with the failure, so that they cannot be filtered to only those that result in "a detrimental impact on service". Although there are some short comings with this methodology it uses the best information available to NI Water and is consistent with previous years. Overall it should give a good year on year representation of this serviceability indicator.

Line 43 – Number of pumping station emergency overflows triggered by equipment failure

The data relating to the 'number of pumping station emergency overflows triggered by equipment failure' is gathered from pollution incidents experienced in the year. Monthly data from April 13 to March 14 is manually analysed, and the number of incidents that were due to pump issues were identified and submitted in Line 43. These pollution incidents are audited quarterly by NIEA (Northern Ireland Environment Agency) and the confirmed details are then passed to NIW 6 weeks after the end of the quarter.

Line 44 – Number of sewer repairs

The Company's methodology for the collection of data on the 'number of sewer repairs' is based on data gathered by Wastewater Networks Field managers using checked and paid invoices from the Sewer Maintenance Contractor. This is submitted through their line management (Area Managers), for quality control on an excel spreadsheet to WW Business Unit on a monthly basis. This information per area is automatically transferred to a composite Excel spread sheet to enable the information to be presented in the format as required for the AIR14 return.

Line 45 – Company's overall serviceability assessment for sewerage infrastructure

The Company's overall serviceability assessment for sewerage infrastructure is based on an expert review of the trends associated with the basket of 9 serviceability indicators.

Line 54 – Company's overall serviceability assessment for sewerage non infrastructure

The Company has taken four serviceability indicators that are presented in table 46 Block D and plotted these as graphs using data from AIR04 to AIR14. The 4 service indicators are; Line 46 % non-compliant numeric WwTW discharge consents, Line 47 %PE non-compliant with numeric discharge consents, Line 50 % sample results that exceed their numeric consent, and Line 51 nr of WwTWs with compliance samples exceeding consent values. These 4 measures are similar in data they represent and as expected present a similar trend over the last 10 years. Reference lines have been added to the graphs using either averages of the last 3 years or all the data and comparisons have been made against these 'averages'.

The use of data represented in these 4 lines would appear to be an appropriate approach as it is representative of the table block upon which the overall Line 54 assessment is made.

5. Audit findings

Line 1 – Water Population
We confirm that this is consistent with Table 7 Line 17.

Line 2 – Total connected properties at year end
We confirm that this is consistent with Table 2 Line 1.

Line 3 – Total length of mains
We confirm that this is consistent with Table 11 Line 12.

Line 4 – Number of mains burst (incl Active leakage)
We confirm this is consistent with background information for Table 11 Line 11.

Line 5 –Mains burst per 1000km
We confirm that this is consistent with Table 11 Line 11.

Line 6 – Interruptions to supply greater than 3 hours resulting from equipment failure

The Company has seen an increase in the number of supply interruptions due to equipment failure when weather is exceptional or adverse, e.g. AIR11 Freeze-Thaw events. Excluding AIR11, this indicators are averaging circa 38,200 properties/yr, although for the last 3 years this is increased to circa 43,400 properties /yr.

Line 7 – DG3 Properties affected by interruptions >12 hrs (unplanned & unwarned)

We confirm that this is consistent with Table 2 Line 7. Except Freeze-Thaw events in 2010/11 this DG3 indicator is fluctuated around 1,800 properties/yr.

Line 8 – DG3 Percentage properties affected by interruptions >12 hrs (unplanned & unwarned)

We confirm that the reported figure is in line with the calculation stated in the Reporting Requirement. Except 2010/11 when the Company has seen Freeze-Thaw events, the DG3 performances have been stable.

Line 13 – Customer contacts (Discoloured water)

The customer contacts for discoloured water (Line 13) was audited satisfactorily back from the data table to the source data from customer services. The number of discoloured related customer contacts has continued its long-term decline.

Line 14 – Customer contacts per 1000 population (Discoloured water)

We located an error in the calculation used for line 14 which we challenged the Company on. NI Water had calculated the data based on the Mean Zonal Population rather than the Table 46 Line 1 – Water Population figure. NI Water is making a correction to the data table submitted. The corrected figure is 1.9 customer contacts per 1000 population (for discoloured water).

Line 15 – Distribution losses

We confirm that this is consistent with Table 10 Line 24.

Line 16 – Company's overall serviceability assessment for water infrastructure

We have reviewed the Company's graphical output of the data and can confirm the assessments:

- Mains bursts per 1000km : improving

- Interruptions to supply greater than three hours: broadly stable

- Percentage of properties affected by interruptions greater than 12 hours: broadly stable

- Percentage of iron samples exceeding 75% of PCV: broadly stable

- Number of customer contacts per 1000 population (discoloured water): broadly stable

We therefor conclude that the serviceability assessment for water infrastructure is stable.

Line 25 - Events at WTW resulting from treatment difficulties or ineffective treatment categorised as 'significant' or higher

The data presented for audit was checked in detail to ensure that the process is recorded accurately. We undertook a sample check of 3 'event' reports in order to review the category of those cases in the supporting spreadsheet.

The process used by NI Water is based on a manual process that is based on evidence and the DWI assessments provided to the Company. During 2013 there were 15 events which qualified to be included within Line 25.

Line 29 – Unplanned (reactive) maintenance

Line 53 – Unplanned (reactive) maintenance

The methodology and approach were reviewed with the system holder at audit. It was not possible to interrogate the actual database of source information as this is held on a computer in one of the regional offices remote to the main audit meeting locations and a copy of the database could not be made available for remote review. As the methodology is developed and there are trends to observe in data sets a future audit at the regional office to view the database, compilation of the data and flow though of data into the table may be of benefit.

The two reporting values for the lines are;

% Availability of M&E Equipment	AIR14			
L29 Water Non-Infrastructure	96.4%			
L53 Sewage Non-Infrastructure	94.5%			

On first review these values would appear to be an acceptable level of availability. There is the reservation that the methodology does not capture events less than one day, which may include critical M&E items as discussed in Section 4 above. A recommendation would be to look at this element of the process to see if an improvement can be made in this area and thus present better representation of the % availability figure.

Reporting requirements indicate that similar data should be reported back as far as practicable to 2003-04, the company has not done this. The Company advised that because they are reporting the line data using a new system and methodology they are not able to capture historic data to fulfil this requirement.

Line 30 – Company's overall serviceability assessment for water non-infrastructure

Based on the Company-defined upper and lower limits, all data points for AIR14 lie between the limits and hence the line entry is correctly reported as 'Stable'. This is an appropriate representation of the data reported in Lines 17-29. There were no large fluctuations in data points this year, indicating relative consistency in performance.

Line 31 – Total length of sewers

We confirm that this is consistent with Table 16 Line 14.

Lines 32 to 37 – Rising Main Failures, Gravity Sewer Collapses, Sewer Blockages

NI Water has historically reported a higher number of blockages and collapses than comparable companies in E&W, which was initially attributed to the fact NI Water's total number of blockages and collapses was inclusive of blockages/collapses on public laterals that were excluded from E&W figures.

As we reported in AIR13, NI Water is now able to separately identify blockages/collapses occurring on the public main sewer, public laterals and private laterals, and have been reporting on this basis since April 2013.

We reviewed the breakdown of blockage and collapse data for 2013/14 and found that 371 of the 18,062 blockages (2%) and 74 of the 1120 collapses (7%) occurred on public laterals. Additionally, a further 668 blockages occurred on private laterals. On the basis of these findings we conclude that the inclusion of lateral sewers in the sewer network is not the explanatory factor for the large number of blockages reported year on year, and it suggests that NI Water is an outlier and experiences a significantly higher number of blockages than comparable E&W water companies. Based on our findings in AIR13, we recommended that Company consider the implementation of a prioritised sewer main replacement programme (SMRP) targeting blockage hotspots. In response to this recommendation, we found that the Company has taken a more proactive response to repeat blockages, whereby a dedicated CCTV crew has been assigned to each area to complete CCTV inspections on all blockage hotspots and carry out cleaning, desilting and repairs, where problems are identified. For AIR14, the Company has reported a 17% reduction in blockages, which the Company attribute to this new renewed focus on repeats. Whilst the above appears to be delivering results, we consider implementation of a targeted SMRP would ensure the replacement of poorly performing sewerage infrastructure and help to further reduce the number of blockages and collapses experienced each year.

There were 16 rising main failures (Line 32) recorded in the reporting year, 39% lower than that reported in AIR13.

There were 1120 gravity sewer collapses (Line 34) recorded in the reporting year, 4% higher than that reported in AIR13.

There were 18,062 sewer blockages (Line 36) recorded in the reporting year, 2,739 (13%) fewer than reported in AIR13. We found that performance is generally improving year on year, with NI Water reporting circa 10,000 fewer blockages than in 2008/09. The Company is making significant progress in reducing the number of blockages year on year and the proactive targeting of blockage hotspots will help to further reduce the total number of blockages reported year on year.

Line 40 – Properties flooded in the year (other causes)

We confirm that this is consistent with Table 3 Line 6.

Line 41 – Areas flooded externally in the year (other causes)

We confirm that this is consistent with Table 3a Line 7.

Line 42 – Total number of equipment failures repaired

The company has returned a figure of 10,899 for AIR14 this compares to 10,333 for AIR14 (+5.5%). There is no particular explanation offered for this increase, although it is noted that the overall sewerage loads for AIR 14 compared to AIR 13 have increase by 9.3% which would indicate increased flows in the sewage networks compared to last year and statistically AIR13 was a drier than average year.

Year on year figures;

	AIR10	AIR11	AIR12	AIR13	AIR14
Sewage Equipment Failures	10,882	11,492	11,476	10,333	10,899

Line 43 – Number of pumping station emergency overflows triggered by equipment failure

The Company has reported 18 incidents of WwPS overflow as a result of equipment failure, which is consistent with the NIEA record of pollution incidents associated with pump issues.

Line 44 – Number of sewer repairs

The Company has reported 2,173 sewer repairs for AIR14, circa double the number of collapses reported during the year.

Line 45 – Company's overall serviceability assessment for sewerage infrastructure

The return for AIR 14 Line 45 is 'Stable' which, based on our review of the data and the methodology, we consider to be appropriate.

We noted that the majority of measures are stable or showing a general improvement. The only two showing any indication of negative movement being 'Properties flooded in year (other causes)' which was considered to be borderline marginal and 'Areas flooded externally in the year (other causes)' which is still considered stable.

Line 54 – Company's overall serviceability assessment for sewerage non-infrastructure

The return for AIR 14 Line 54 is 'Stable' this would seem appropriate, although there is a small rise noted for AIR14 compared to AIR12 and AIR13 it would not appear to be significant. If the rise was to continue further in subsequent annual returns then a marginal or deteriorating designation maybe considered.

6.   Assumptions

- The methodology assumes that capturing and reporting on telemetry outputs for plant "unavailable" is a good representation of unplanned maintenance which is a reasonable approach.

- We believe that all relevant and material assumptions have been disclosed above by either the Company or the Reporter.

7. Consistency checks

We can confirm that:

- Line 1 is consistent with Table 7 Line 17.

- Line 2 is consistent with Table 2 Line 1.

- Line 3 is consistent with Table 11 Line 12.

- Line 4 is consistent with background information of Table 11 Line 11.

- Line 5 is consistent with Table 11 Line 11.

- Line 7 is consistent with Table 2 Line 7.

- Line 15 is consistent with Table 10 Line 24.

- Line 31 is consistent with Table 16 Line 14.

- Line 35 is consistent with Table 16 Line 12.

- Line 37 is consistent with Table 16 Line 13.

- Line 40 is consistent with Table 3 Line 6.

- Line 41 is consistent with Table 3a Line 7.