SUMMARY OF AUDIT FINDINGS

Table 5 – Lines 19-20, 22-25: Customer Satisfaction Measures

PREPARED BY	X
DATE	9 June 2021

Rating	Meaning
	No material exceptions and compliant with requirement
	Content with the reported data but supporting information needs to be complete and/or improvement identified for AIR22, or other noteworthy comment
	Minor exceptions
	Material exceptions
N/A	Not applicable to report

1. Key Findings

The key findings of the AIR21 Table 5 audit, against the AIR21 Table criteria are summarised below.

AIR21 Table Criteria	RAG	Assessment
Independent review of performance against PC15 target (where relevant)	N/A	N/A
Methodology – consistency with the reporting process with clear control points		The methodology for multiple lines has changed since AIR19 and is now finalised. The methodology for Lines 24 and 25 were adapted to suit COVID restrictions (e.g., use of online and telephone surveying). NI Water provided further clarification on certain aspects of the new methodology, including the digital surveying method used for domestic customers and spread of data obtained. The Company also provided detail on reasons why this year's data is not directly comparable to previous years.
Assumptions – reasonableness and applicability		Processing assumptions are reasonable and applied as agreed with the Utility Regulator (UR).
Source data – completeness		Data for Lines 19, 20, 22 are sourced from the system and collated by NI Water through clear processes and reports. Data for Lines 23, 24, 25 are generated by NI Water through reports clearly identified and handled by independent research companies, which follow specified methods of data sampling, collection and reporting.
Clarity of audit trails – evidence of appropriate audit trail		At audit, NI Water provided evidence of audit trails for the reported numbers.
Confidence grades – documentation of appropriateness and rationale		We agree with the rationale for the confidence grades stated as: A2 for Line 19, 20 and 22 and A1 for Line 23-25. NI Water provided clarification on why confidence grade for Line 24 and 25 has remained unchanged, in view of changed methodology and source data. For Lines 24 and 25, it was noted that a smaller data sample size was obtained for the survey of domestic customers (784 for AIR21, compared to 1009 for AIR20). It was also noted that the survey was held at a later date (end of April) compared to previous years (January); due to this, seasonality would have had an impact on the survey results.
Governance – evidence of quality assurance and of final sign-off		Responsibilities for integrity of data and commentary clearly defined, data and commentary approvals governed through SharePoint tasks. Final sign-off confirmed.

2. Audit Scope

The scope of this audit was the Customer Satisfaction Measures which comprises Table 5 Lines 19-20 and 22-25. Line 21 is no longer used and excluded from the AIR Table set [Table 5] submitted by NI Water to the UR.

3. Performance and Significant Events

Total contacts and unwanted contacts

Lines 19-20

The definition of 'contact' and 'unwanted contact' were updated in AIR19 and remained unchanged in AIR21. The new meanings were agreed by the Customer Measures / Satisfaction Working Group (CM/SAT-WG) who report to the Consumer Engagement Oversight Group (CEOG) and endorsed by the UR.

The opening of communication channels including on social media and NI Water's website has been the main factor contributing to the drop in telephone contacts (Line 19) since AIR19. According to the definitions introduced in AIR19, three categories of contacts (requests for information, run of water and switchboard contacts) are no longer considered as 'unwanted' as these events do not cause customers unnecessary aggravation. This explains why the number of unwanted contacts (Line 20) has dropped significantly since AIR 19, compared to AIR17 and AIR18 as shown in the table below.

Table Line No & Description	AIR17	AIR18	AIR19	AIR20	AIR21
Line 19 - Total contacts	257,866	250,753	252,844	190,729	182,029
Line 20 - Unwanted contacts	110,197	105,964	75,569	67,013	70,204

The total contacts (Line 19) are reported as 182,029 in AIR21, which is slightly lower than in AIR20 (about a 5% drop). However, the unwanted contacts (Line 20) reported in AIR21 were slightly higher than in AIR20 (about a 5% increase).

As in previous reporting years, the total number of contacts and unwanted contacts are obtained monthly from the All Received CorVu report, which NI Water receives from X, the external service provider contracted to run the service. The estimate of unwanted contacts is then calculated using the CMS categories of contacts logged within RAPID.

The Company explained that slight decline in total contacts (Line 19) in AIR21 could be attributed to businesses being shut due to the COVID pandemic; for instance, there is typically a wave of contacts associated with businesses querying their annual billing, which was reduced this year. At audit, it was also highlighted that weather can have a significant impact on unwanted contacts (Line 20). Lower number of unwanted contacts in AIR20 can be partly attributed to mild weather and limited extreme weather during that financial year; similarly, it was explained that the increase in unwanted calls in AIR21 year may be correlated to higher demand observed due to warm weather in May 2020 and incidences of frost and pipe bursts over the winter period of the AIR21 report year.

NI Water keep monitoring monthly performance against target values for unwanted contacts. The targets were generally met. It reported that 35% and 55% of the total unwanted contacts related to Sewerage Services and Water Services, respectively. The remaining 12% is associated with other services such as metering and billing. The top complaints under both services related to sewer blockages and water supply issues. This is in line with the previous years.

The Company explained that the algorithm for deriving Unwanted Contacts has been refined since AIR19. NI Water recognises that the absence of 'chase' calls count may lead to an undercount of Unwanted Contacts, but in the Company's opinion, this is more than compensated by the overcount of other

categories such as network issues, which often are domestic issues and not related to NI Water's service failures. The Company is convinced that this is the most practical and realistic algorithm that can be developed through the current system.

NI Water believes that an accuracy band 2 of +/-5% is most appropriate and that this is justified by uncertainties associated with manual handling and logging of data for the CMS category, which seems sensible. The A reliability band attributed to Line 19 and Line 20 seems reasonable. We are satisfied with the processes and templates demonstrated during the audit and the clarity of results presented. The resulting A2 confidence grade remains in line with AIR20.

As in the previous reporting years NI Water listen to a sample of both 50 wanted and 50 unwanted contacts each month (a total of 1200 samples annually) to ensure they are logged and processed correctly by X. The Company then provides feedback to X on the outcomes of its monthly check including any required corrective measures. Fifteen anomalies were found in the AIR21 reporting period. While this is increased from 4 last year, it still amounts to a very small proportion of the total sample (1.25%). This increase may be due to extra CMS codes introduced to address COVID-related issues. COVID restrictions and shutdowns also resulted in frequent disruptions to billing, which may have caused additional confusion.

First Point of Contact Resolved (FPOCR)

Line 22

The definition of First Point of Contact Resolved provided by NI Water is consistent with the Company's AIR20 definition, i.e. 'when a contact requires an action and the action is completed and there has been no prior contact from the same property on the same issue within a 90-day period then it shall be counted as FPOCR'.

The definition provided by the UR[1] is as follows: 'A contact is deemed to be dealt with at first point if there is no repeat contact from the same property on the same issue in the time-period applying. The First Point of Contact Resolved measure is calculated as follows: (FPOCR / Contacts) x 100 by time periods.'

The main difference is that since AIR19, NI Water calculate the value reported in Line 22 as the number of FPOCR divided by the total number of events, where event is defined as the same issue reported by the same property one or more times, not by the total number of contacts (as was done up to AIR19). The Company has previously advised that this methodology has been agreed with the UR.

The figure for FPOCR is based on the following criteria:

1. A 90-day historic window – a report run on 31 May for the month of May would look back to 31 January to check whether there was a repeated call in that time window. NI Water explained that for future AIRs, the Company will consider expanding the time window to a 90-day backward period and 90-day forward period in agreement with the UR.

2. Same CMS category – a contact that has been made regarding the same issue in the given historic window (as more than one contact may have been made by the same customer about different issues).

3. Same property – a contact that has been made with reference to same property (as customers may have multiple properties in a given area).

[1] Annual information return reporting requirements and definitions manual 2020, Version 1.0 – March 2020, Chapter 5 Key outputs Customer service - 2

The adoption of the new methodology since AIR19 has resulted in a significant change in the FPOCR figures, which were 90.4% in AIR21 and 90.0% in AIR19, up from 65.8% and 66.5% in AIR18 and AIR19, respectively.

The number reported in the Data Table was 90.4% in AIR21, which is the same figure as reported in AIR20. This was confirmed to be coincidental, based on a review of the source data for both AIR20 and AIR21.

We consider that a confidence grade of A2 Line 22, is appropriate, for the reasons stated for the numbers in Lines 19 and 20. This is also in line with AIR19.

Customer Advocacy measure

Line 23

A Customer Experience and Insight Specialist, X, has been appointed to undertake independent 'Voice of the Customer' surveys. The new methodology for conducting the survey can be summarised as follows:

- whilst in previous reporting years the survey was conducted on 800 customers (4 waves per year of 200 customers), in AIR20 all customers interacting with NI Water are requested to complete the survey;
- the survey targets customers' interactions with any part of the business, not only billing and operational areas (Water and Wastewater) as was done in previous reporting years.

As in previous years the survey was conducted on all resolved contacts only (from telephone and written channels). NI Water need to align the closed date and actual closed date fields in the report to ensure the contact is effectively resolved. A list of resolved contacts is provided daily by NI Water to X, who conduct the surveys via text message or similar.

The customer advocacy measure is represented by Net Promoter Score, calculated as the percentage of customers responding to the question

"Based on your recent experience with us, how likely are you to recommend NI Water? Please respond 0 for very unlikely up to 10 for very likely"

…….with grades 9 and 10 (promoters), minus the percentage of those responding with grades 0 to 6 (detractors). Percentages of detractors and promoters are calculated over the total number of respondents to the survey, which is the sum of detractors, promoters and 'passive' customers (i.e. respondents with grades 7 and 8). Those responding 'Don't know' do not form part of the calculation.

This methodology is clearly outlined in the 'NPS Calculation' document attached to the commentary. The difference from AIR20 is that 0 has been included as the lower level score for detractors.

The value reported for Line 23 can fall between -100 (worst score) to +100 (best score). The calculated value in AIR21 is 42, which is the same as the value reported for AIR20. This was confirmed to be a coincidence based on a review of the source data and methodology. These values are an improvement from 32 in AIR19, which indicates an upward trend from AIR18 (31) and AIR17 (27).

Omnibus survey question 1 and 2

Lines 24-25

X is an independent firm contracted by NI Water to carry out the annual Omnibus survey. Due to the COVID pandemic and associated restrictions, significant changes were adopted to the survey methodologies. As part of the AIR21 survey, domestic and non-domestic customers, who may or may not

have contacted NI Water, were asked whether they are happy with service received from NI Water (Line 24) and whether they would recommend NI Water (Line 25).

Domestic customers were surveyed through an online platform of Knowledge Base. In this system, panellists are recruited via a random probability unclustered address-based sampling method, meaning that all households have a possibility of being selected to join the panel. Letters were sent to selected addresses (using the Postcode Address File) inviting them to become members of the panel. Members of the public who are digitally excluded are also able to register to the Knowledge Panel either by post or by telephone, and are given a tablet, an email address, and basic internet access which allows them to complete surveys online.

For the purposes of the Omnibus surveys (Lines 24-25) only panellists from Northern Ireland, and in effect, NI Water Customers were used. A total of 1,200 panellists were registered, from which 784 survey responses were received (about 65%).

Non-domestic surveys were conducted via telephone. The survey is derived from a random sample of businesses in Northern Ireland, with quotas applied to ensure that the survey mirrors the profile of the Northern Ireland business community insofar as this is possible, building quota requirements by region with a view to ensuring maximum geographical representativeness.

The sample size of domestic customers that responded (784) is significantly lower than previous years - (1009 and 1035 in AIR20 and AIR19, respectively, when surveys were conducted face to face. The sample size for non-domestic surveys was the same as in AIR20 (500).

Line 24 is the combined, weighted percentage of domestic and non-domestic customers responding 1 (strongly agree) and 2 (tend to agree) on a 1 to 6 scale. We report in the table below the calculation used to check the figure in the Data Table for Line 24.

	Respondents (Nr)	**Score (% satisfaction)**	**Weight***	**Weighted score****
Domestic	784	83	0.61	50.68
Non-domestic	500	77	0.39	29.98
Total	**1284**			**80.7**
*The Weight is calculated as Nr. Respondents / total Nr. Respondents; ** The Weighted score is the Score (% satisfaction) multiplied by the Weight; *** The total Weighted score is the sum of the domestic and non-domestic Weighted score.				

From the numbers stated in the commentary, overall satisfaction increased to 83% for domestic customers (up from 70% in AIR20) and to 77% for non-domestic customers (up slightly from 75% in AIR20). The combined score of 80.7 indicates that overall satisfaction has increased by 9% since last year (71.6% in AIR20).

The score for Line 25 is calculated using Net Promoter Score methodology based on results from the following statement; if people could choose their water company how likely would you be to recommend your water company to a friend or colleague where 1 is ‘not at all likely to recommend‘ and 10 is ‘extremely likely to recommend’. Like Line 24, the total score is the sum of the weighted scores from domestic and non-domestic surveys.

	Respondents (Nr)	Score	Weight*	Weighted score**
Domestic	784	7.23	0.61	4.41
Non-domestic	500	7.62	0.39	2.97
Total	**1284**			**7.4**

*The Weight is calculated as Nr. Respondents / total Nr. Respondents; ** The Weighted score is the Score (% satisfaction) multiplied by the Weight; *** The total Weighted score is the sum of the domestic and non-domestic Weighted score.

As shown in the table above, the AIR21 mean score for Line 25 is 7.4, which is slightly lower than the AIR20 score (7.6).

The Company stated that the AIR21 results for Lines 24 and 25 are not comparable to previous years for the following reasons:

- Domestic customers surveyed had decreased to 784 compared to the 1,009 surveyed the previous year.
- The survey was carried out later in the year (April). Previously the survey had been carried out in January and there is potential for a seasonal impact on the customers' responses.
- It should also be noted that this smaller sample size was obtained during a unique year in which all of Northern Ireland was affected by the COVID pandemic and therefore this may have impacted the response rate and the answers obtained.
- Whilst the non-domestic sample size was the same as previous years, the data is not comparable due to the COVID restrictions-driven lockdowns, with many businesses shut and a freeze to billing at the beginning of the year.
- NI Water does not have control over the order in which the survey questions are asked, there is potential for the previous question asked to impact the responses given.

The reasons provided above appear sound and adequately justify why results are not directly comparable to previous years given the unique circumstances of this report year.

Despite the altered methodology, the confidence grade for Lines 24 and 25 remain unchanged at A1. At the audit, it was clarified that whilst there were unforeseen constraints that limited sample size and impacted timing of the surveys, the methodology itself was deemed to be sound. Whilst the sample size for domestic respondents was smaller, it was also deemed to be representative; source survey data on respondent demographics was provided to support this.

4. Summary of Audit Checks

Our audit was attended by the NI Water team responsible for the derivation of numbers for Table 5, Lines 19-20 and 22-25. The team confirmed the new definitions and changes in methodology for data collation adopted since AIR19 and responded to the questions on the draft Table 5 commentary provided pre-audit.

We checked the reported numbers for Lines 19-20 and 22-25 against those generated by the underlying reports and found the numbers to be consistent. We also checked that results for this report year are broadly consistent with the AIR17, AIR18 and AIR19 numbers.

5. Confidence Grades

In Section 3 we have provided commentary on the reliability and accuracy of data for each audited line within the scope of our audit. We generally agree with the rationale for the confidence grades stated as: A2 for Line 19, 20 and 22 and A1 for Line 23-25.

We note that entries in Lines 23-25 are given the highest confidence grades because scores are generated by specialised and independent service providers. For Line 24-25, the service provider ensures that the samples used for the surveys are randomly selected, and despite the domestic sample size being significantly reduced this year, they are representative of the population from which they are drawn. Further, the service provider has assured NI Water that there were no fundamental changes to how the data was reviewed and scored and therefore the confidence grades have remained the same.

Typical sources of errors such as in sampling design, data analysis and processing should be minimal as data collection and management is carried out following clear procedures by experienced professionals specialising in this type of service. This suggests that data is reliable and that the true population parameter (satisfaction and likeliness of recommending NI Water) should be within +/-1% of the sample estimate.

6. Challenges to the Company, Recommendations & Suggested Actions

Challenges & Resolution:

a) In response to our AIR19 challenge/recommendation that a description of the calculation of scores should be included as part of the audit trail. NI Water has provided details of the Net Promoter Score Algorithm and calculations to derive the Line 23 number.

b) For Lines 24 and 25, NI Water has provided additional detail on the unique circumstances of the report year that makes the AIR21 survey results not directly comparable to the results from previous years. The Company has also provided further commentary on why the confidence grades for these lines have remained unchanged from AIR20 to AIR21, despite the altered methodology adopted this year.

Recommendations:

a) We recommend that the Company consider options for overcoming challenges associated with the new methodology adopted for Lines 24 and 25 given the possibility of continuing COVID-related restrictions in the next report year – AIR22. These challenges include low survey response rates (among domestic customers) and inconsistent survey timings.

b) Another recommendation for future AIRs is to provide context of any change in methodologies/definitions, agreed with the UR i.e. statement of context for movement between numbers across report years due to changes in method or data.

SUMMARY OF AUDIT FINDINGS

Table 10: Lines 1-31 Water Delivered

PREPARED BY	X
DATE	8 June 2021

Rating	Meaning
	No material exceptions and compliant with requirement
	Content with the reported data but supporting information needs to be complete and/or improvement identified for AIR22, or other noteworthy comment
	Minor exceptions
	Material exceptions
N/A	Not applicable to report

1. Water Balance and the Reported Leakage Outturn for PC15.

The UR's AIR21 Reporter letter guidance for Table 10 highlighted specific requirements for our review and audit. We have formulated the UR requirements as two objectives, outlined as follows.

- **Objective 1:** The Reporter should review and comment on NI Water's Water Balance and the reported Leakage outturn figure for PC15.
- **Objective 2:** Based on the projection that the PC15 Leakage target will not be met, the Reporter should also consider and comment on NI Water's approach during the PC15 [2015-16 to 2020-21] period, the actions taken to address shortfalls [in 2016-17, 2017-18, 2018-19, 2019-20 & 2020-21]; and the potential reasons, and contributing factors to **NI Water's failure to achieve the PC15 Leakage outturn target.**

Our review and commentary concerning the Objectives 1-2 requests are given in Appendix A to this Table 10 commentary. With respect to Objective 1, we identified that NI Water's overall water balance's confidence grade of A2 at the beginning of the PC15 period reduced to B2 in the second year and remained at this level to the 2020-21 (AIR21) report year. The shortfall in the PC15 outturn leakage value for AIR21 is 4.7Ml/d against the AIR21 leakage target. As expected, the PC15 trend of the measures of the largest components of the NI Water's water balance reflects the reported annual Distribution Input (DI) values. But, we note that the high PCC value (170.8l/h/d) for the AIR21 report year is atypical when set against an industry average figure of 153.8l/h/d.

The Table 10 audit review of NI Water's approach to water balance accounting and leakage estimate, actions taken to address shortfalls in leakage target delivery, potential reasons and contributing factors to the Company's failure to achieve the PC15 leakage outturn target (Objective 2) identified that there are uncertainties over the effectiveness of NI Water's Leakage Reduction Plan actions particularly with respect to the quantum of leakage savings (in Ml/d terms) and how these relate to the components of the water balance and the material assumptions of the leakage estimation process.

The disaggregation of total leakage estimate into its 3 component parts for the water balance and leakage reporting is a feature of the latest Ofwat/UKWIR (2017)'s 'Consistency of Performance Reporting Measures - Leakage" method currently being applied by England and Wales water companies for annual leakage reporting. We identified that there is room for improvement in the association and prioritisation of the Company's leakage reduction plan measures with the components of the reported annual average leakage. **We suggest that both the UR and NI Water consider the introduction of this approach in the PC21 period so that NI Water's PC21 leakage performance can be benchmarked against the England & Wales water companies, and for consistency with recent advances in annual leakage reporting practice.**

The high level contributing factors to the failure of NI Water's PC15 leakage targets include: weather patterns [rainfall, sunshine hours, ground temperatures leading to main burst outbreaks (with similarities to the freeze/thaw pipe failure mechanisms experienced in the past)], COVID impacts in AIR20 & AIR21, upward trend in DI (billed unmeasured household volumes) and household PCC over the PC15 period and

changes in level of DMA operability. In addition, through our audits, we identified that some of the variables of the standard leakage estimation methods used by NI Water are fixed. The fixed variable are: household night use, supply pipe leakage, PCC meter under-registration, hour to day factor, trunk mains leakage and service reservoir leakage. **We suggest a rapid review of the status of these variables in relation to the expected changes year-on-year, in tandem with changes in Distribution Input (DI) through the PC21 period.**

We are unable to investigate the impact of these contributing factors further within the scope and timescales of the standard AIR21 audits of the Company's Table 10 submission.

We suggest further in-depth review of the water balance and leakage beyond the scope and timescales of the AIR21 Table 10 audits – to look critically at the underlying assumptions and the relative contributions of the different factors to the PC15 reported leakage outturn and to assess implications for the PC21 reporting period.

2. Key Findings

AIR21 Table Criteria	RAG	Assessment [Lines 1-30: Water Balance & Leakage] and Line 31 [Security of Supply Index (SoSI)]
Independent review of performance against PC15 target (where relevant)		Failed AIR21 leakage target. Failed AIR21 SoSI target. Failed PC15 leakage target in 5 of the 6 PC15 report years. Several contributing factors including scale of the leakage reduction target, funding and resource constraints (Company's NDPB status), weather, COVID etc
Methodology – consistency with the reporting process with clear control points		The Company's methodology is broadly consistent with the NIAUR Guidance. The reporting process is transparent with auditable systems.
Assumptions – reasonableness and applicability		Some assumptions are dated and needs updating. Some variables are fixed e.g. household night use, supply pipe leakage, PCC meter under-registration, hour to day factor, trunk mains leakage and service reservoir leakage.
Source data – completeness		Yes, with the assumptions implemented for the water balance & leakage assessments.
Clarity of audit trails – evidence of appropriate audit trail		There is evidence of appropriate audit trail.
Confidence grades – documentation of appropriateness and rationale		No change from the applied AIR20 confidence grades.
Governance – evidence of quality assurance and of final sign-off		Yes.

- **Water Balance & Leakage:** We can confirm that the Company has adopted the principles of the NERA/UKWIR Demand Forecasting Methodology for estimating components of the water balance.

  NI Water felt that the PC15 leakage target was challenging and made reference to Section 3.4 of the UR PC15 FD Annex F and discussions with the UR in this regard.

  The Company pointed to its PC15 recovery action plan (with a range of actions including: plans to increase Active Leakage Control (ALC) FTE count, focus on repair times and review/pilot of industry leakage innovations etc) and the linked PC21 Target and Business Plan which aims to reduce leakage by 8Ml/d over 6 years.

- **SoSI:** The Company has failed to achieve a SoSI score of 100 in AIR21. A deficit of 0.12 Ml/d in the West zone has resulted in a SoSI score of 99.

  NI Water confirmed that a new 17 Ml/d Trunk Main to transfer water from the North zone to the Central zone has received funding and is planned to be completed in PC21.

  This trunk main will resolve any future issues within this Zone and once complete the SoSI will return to 100%.

We can confirm that our post-audit actions were addressed by the Company with the NI Water's pre-audit table commentaries [Table 10, L1-30 & L31] updated for submission.

3. Audit Scope

The audit involved review and discussion of NI Water's documents provided pre-audit. There were two audits: for the water balance and leakage reporting [Table 10, Lines 1-30] and security of supply index (SoSI) [Table 10, Line 31].

The water balance audit meeting was attended by X, X and X. The SoSI audit meeting was attended by X, X and X.

The Table 10 Lines 1-30 audit involved discussion of the UR's AIR21 water balance and leakage audit requirements, methodology, commentary, data table as well as the systems and data assumptions used to populate Table 10.

The Line 31 audit covered the derivation and calculation of the SoSI report for AIR21.

4. Performance and Significant Events & Line Commentaries

Overview of the Water Balance

NI Water has reported an annual average leakage of 157.71Ml/d at year-end, a reduction of 2.82Ml/d from the value of 160.53Ml/d for AIR20. Despite this reduction, the Company has failed its leakage target of 153Ml/d by approximately 4.7Ml/d. The leakage target is consistent with the targets set out in the UR PC15 FD Annex F (Section 3.4).

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

The AIR21 report year has similar cumulative rainfall and sunshine to that of the average weather across the PC15 period. The first 12 weeks of AIR21 had higher than average sunshine and lower than average rainfall which coincided with higher demands at the start of the year. The monthly Distribution Input (DI) for AIR21 is higher than the monthly DI profiles for AIR20 at the start and end of the 1st April to 31st March AIR report year. The periods of increased demand corresponds to the periods of Government imposed lockdowns, and the work from home guidance associated with the COVID-19 pandemic.

Minimum ground temperatures were near to the PC15 period average. But these reduced significantly in the second week of January 2021. The temperatures recorded were the lowest since the freeze/thaw event of 2010-11. The low temperature resulted in a mains burst outbreak similar to that of the freeze/thaw. NI Water recovered quickly to the immediate impact of the January event but leakage recovery from a number of small defects across a large number of DMAs was slower.

The water balance reconciliation reduced marginally from 3.49% (AIR20) to 3.37% (AIR21) but is within the 5% tolerance allowed for MLE. As the imbalance is above 2% but less than 5%, the B2 confidence grade attached to the overall water balance is appropriate.

Table 10-1 compares the water balance for AIR20 with that for AIR21.

Table 10-1: Comparison of AIR20 and AIR21 Water Balance

Component	AIR20			AIR21			Diff – AIR21 Final Estimate less AIR20 (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	121.86	10	**123.88**	113.59	10	**115.19**	-8.69
Unmeasured Household Consumption	305.02	10	**317.76**	328.81	10	**342.21**	+24.45
Unmeasured Non-H'hold Consumption	5.52	15	**5.53**	4.52	15	**4.52**	-1.01
SPL	39.91		**39.91**	39.91		**39.91**	0.00
DSOU	3.05	25	**3.05**	3.13	25	**3.14**	+0.09
Water taken unbilled	15.50	25	**15.71**	12.73	25	**12.86**	-2.85
Top Down Leakage	177.67			174.86			
Distribution Input	588.71	2	**586.56**	597.73	2	**595.72**	+9.16
Bottom Up Leakage	157.15	10	**160.53**	154.74	10	**157.71**	-2.82
Water Balance Variance	20.53 (+3.49%)			20.12 (+3.37%)			

We provide additional comments below, on the components of the water balance against the:

- ❑ Table 10 line definitions of the UR Guidance [NIAUR_air21_repreq_Sec2_Chap10 01.00.PDF] for water delivered volumes and water delivered components; and the
- ❑ Reporter letter guidance for Table 10.

Measured Volumes (Lines 1 to 3)

Line 1 – Billed measured household volumes continues to be zero as there is no household metering in Northern Ireland.

Line 2 – Billed measured non-household volumes correspond 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 (115.19Ml/d) is less than the value reported for AIR20 (123.89Ml/d) by 8.7Ml/d or 7.6%. The confidence limit of 10% applied to this component in the water balance has not changed for the AIR21 report year.

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 (Table 7), the regional average per capita consumption (PCC, adjusted for meter under registration (MUR)) and the assumed supply pipe leakage (SPL) for

unmeasured households. See Line 25 commentary for our observations on the use of fixed SPL in the water balance, for leakage calculations.

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. This approach is consistent with the approach taken for the Company's AIR20 report. We consider this to be an appropriate means of deriving unmeasured non-household consumption.

Unmeasured Water Delivered per Property (Lines 7 and 7a)
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. The applied confidence grades B4 [Line 7] and B3 [Line 7a] are unchanged from the Company's AIR20 submission.

At audit, we discussed the 22% reduction in the estimated water delivered per unmeasured non-household value (Line 7) from 633.38l/prop/d (AIR20) to 518.41l/prop/d (AIR21) and we established that the reduction in unmeasured non-household properties [Table 7, Line 8] is a reflection of the COVID impact in a pandemic year with small businesses particularly affected by the COVID restrictions.

Unmeasured per capita Consumption (Lines 8 and 9)
The historic trend of reported unmeasured PCC from 2010-11 (AIR11) to AIR21 is shown in Figure 10-1 below.

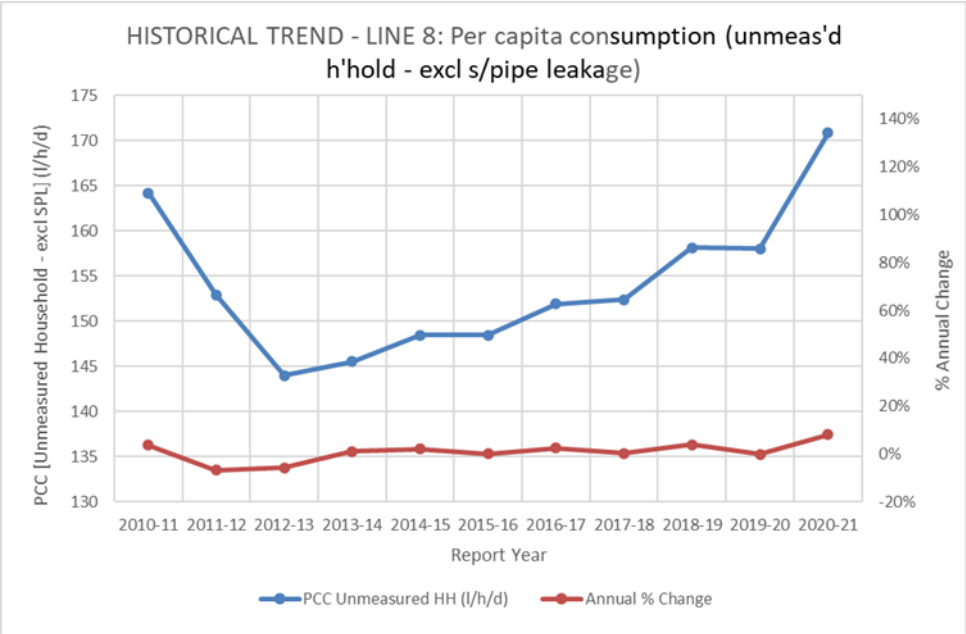

Figure 10-1: Historic Trend of Reported Unmeasured PCC [Line 8] Numbers

We note that the high PCC value (170.8l/h/d) highlighted for the AIR21 report year in Figure 10-1 (highest value reported since AIR11) is atypical when set against an industry average value of 153.8l/h/d.

NI Water acknowledges the atypical nature of the reported PCC and noted that this is associated with high demand events and the unusual household demand analyses undertaken throughout the COVID-driven Government lockdown restrictions. The Company states that a review is underway by X to determine the most appropriate methodology to calculate household consumption in these circumstances. The review will include appropriate monitoring of households particularly in rural and remote rural areas.

In order to derive a Company specific estimate of the PCC for unmeasured household properties, NI Water continues to employ domestic consumption monitors at PCC sites. The PCC sites are small (average size of 48 properties), permanently bounded, monitored for leakage, and flows into them are recorded by meters. 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.

NI Water states that it has installed fast-logging systems on a number of PCC sites reporting 1-minute logged averages for the assessment of domestic consumption at these sites. For AIR21, a Company specific MUR value of 7.39% (specific to the Company's consumption monitor meters) was used for unmeasured PCC and this value originated from a project commissioned by NI Water and undertaken by X.

The applied confidence grade B3 [Line 8] is unchanged from the Company's AIR20 submission.

Supply Pipe Leakage (Lines 10 to 13)
Supply pipe leakage (SPL) contributes to the 'Top Down Leakage' estimate which in turn informs the magnitude of the water balance variance as demonstrated below (using the AIR21 water balance values).

'Top Down Leakage' = Measured DI – Water Delivered to Customers (or used for other purposes) + SPL

Using numbers from the AIR21 water balance:

Measured DI = 597.73Ml/d and assumed SPL = 39.91Ml/d

Water Delivered is:

Billed Measured Volumes = [0 + 113.59 +328.81 +4.52] + DSOU [3.13] + Water Taken Unbilled [12.73] or 462.78Ml/d

Therefore 'Top Down Leakage' = 597.73Ml/d – 462.78Ml/d = 134.95 + 39.91Ml/d = 174.86 Ml/d (see Table 10-1 above).

For AIR21:

Water Balance Variance = Measured DI [597.73Ml/d] – Sum of Water Balance Components [577.61Ml/d] = 20.12Ml/d.

The difference between the 'Top Down Leakage' and the 'Bottom Up Leakage' reflects the water balance variance calculated as 174.86-154.74 = 20.12Ml/d.

Given the significance of the SPL to the water balance variance and the reported leakage estimate, it is surprising that the SPL is a fixed component of the water balance throughout the PC15 period. As demonstrated above, the fixed SPL is directly related to the magnitude of the calculated water balance variances and the reported PC15 Table 10 leakage estimates. See further comments below under the section titled "Fixed Variables in AIR21 Leakage Calculations".

We note that the total volume of Underground Supply Pipe Leakage was assessed in 2013-14 to be 39.91Ml/d based on the approach described in the UKWIR report 'Towards Best Practice for the Assessment of Supply Pipe Leakage' and determined from the on 2012-13 Company data.

At audit and through its Table 10 commentary, NI Water states that the SPL assessment was required to remain unchanged for the duration of the PC15 period and that this was agreed with the Utility Regulator at the 39.91Ml/d level. When asked, the Company was not able to provide a verifiable evidence in support of this claim.

NI Water also advised that the trend over recent reporting years has shown that the number of unreported customer side leakage defects, resulting in the issue of a Leak Notice, has continued to

increase since the last SPL review in 2013-14 based on the 2012-13 report year data sets. In AIR21 the number of issued leak notices was consistent with the previous year. **For this reason, we suggest a rapid review of the fixed SPL value used in the water balance calculations and the associated leakage reports.**

Meter Under Registration (MUR) (Lines 14 and 15)
Line 14 – meter under-registration (measured household) is reported as zero and this is consistent with the zero entry in Line 1.

Line 15. At audit, the Company explained that the NIAUR has determined that during the PC15 period the **non-household MUR_{NHH}** should be reduced to 5.47% for the 2020-21 report year [*Email correspondence: X/X cc X, X and X dated 12 November 2014 timestamp 12:55*]**.** NI Water advised us that during AIR21 X undertook a study to review the non-household MUR_{NHH} estimate for NI Water and concluded with a figure of 5.75%. The Company also advised that, for AIR21, the X-derived MUR_{NHH} figure of 5.75% (revenue meters) was used to derive the Line 15's meter under-registration (measured non-households) as total measured consumption [107.42Ml/d] x MUR [5.75%] = 6.18Ml/d. We note that the MUR_{NHH} figure used for AIR21 is 0.28% higher than the number in the UR's email.

We note that the MUR_{HH} value applied to the unmeasured household consumption is 7.39% (X estimate for PC15, PCC meters) to derive the MUR_{HH} component of the billed **unmeasured households as:** unmeasured household volume (excluding MUR_{HH}) [271.14Ml/d] x MUR [7.39%] = 20.04Ml/d.

We also note that the Company has been investigating the use of fast-logging technology and fast-logging data since AIR19. It has also been looking into the potential for use of PHC approaches for the calculation of the billed unmeasured household component of the water balance. NI Water advised that this work would consider potential updates to the current MUR [MUR_{HH} & MUR_{NHH}] values used for the water balance.

Distribution System Operational Use (Line 16)
The volume derived for AIR21 was 3.14Ml/d (3.05Ml/d for AIR20). We note that the DSOU estimation approach is unchanged from AIR20.

Water Taken Unbilled (Lines 17 to 19)
There has been a reduction of 2.85Ml/d in the reported Water Taken Unbilled from AIR20 (15.71Ml/d) to AIR21 (12.86Ml/d).

We note that as a result of the findings and subsequent amendments to the Gross Measured Consumption report, an element of billed measured NHH consumption reported in AIR21 was transferred into the water taken unbilled component of the water balance.

The confidence limit of 25% applied to this component in the water balance has not changed for the AIR21 report year.

Water Delivered (Potable / Non-Potable) (Lines 20 to 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 non-potable customers or customers eligible for billing at non-standard rates (Lines 21 to 23) so these lines continue to be zero.

Total Leakage (Lines 24 and 25)
The processing rule for Line 24 (Distribution losses) is a calculated field derived from the sum of Line 26 minus Lines 16 and 20. So, the numbers reported by the Company through Lines 16, 20 and 26 can be used to derive this Table entry, and has been used by NI Water for the AIR21 submission.

The post-MLE total leakage reported by NI Water for AIR21 is 157.71Ml/d. The AIR20 estimate was 160.53Ml/d.

We note that NI Water did not use the NIAUR's processing rule for Line 25 data submissions [on file as "NIAUR_air21_repreq_Sec2_Chap10 01.00.PDF", page 18 of 21] in Table 10.

Through our audits, using the Table 10's Lines 10, 11, 12, 13, 24 and the Table 7's Line 3, 4, 5, 6, 7, 8, 9, 10, 11, 13 numbers, we applied the NIAUR Guidance processing rule to derive a Line 25 number (for audit comparison purposes) and we obtained a value of 157.53Ml/d. The value obtained from this audit check is similar to the NI Water's reported number of 157.71Ml/d [a difference of 0.18Ml/d or 0.1% which is not material].

The pre-MLE water balance is associated with two leakage estimates:

1. A bottom up or BU estimate (calculated based on the minimum night flow of MNF approach using DMA data, with the addition of fixed trunk mains leakage [TML] and service reservoir leakage [SRL] values); and

2. A top down estimate determined from application of the integrated flow method or IFM approach, and is derived from measured DI less water delivered to customers/used for other purposes, with the addition of the assumed SPL.

BU Estimate and Legitimate Night Use Allowances:

The estimate of bottom up leakage, based on the MNF approach, is derived from night-flows within DMAs, so requires an estimate of legitimate night-uses (household [HHNU] and non-household [NHHNU]) within DMAs. The HHNU and NHHNU allowances are deducted from the night-flows to develop an estimate of the BU leakage.

NHHNU is updated dynamically within the Company's leakage reporting software tool - X. The tool utilises an integrated non-household night use model based on the best practice as outlined in the UKWIR Report 'Estimating Legitimate Non-Household Night Use Allowances'. The Company reports an equivalent industry weighted measured NHHNU night use value of 17.6 l/prop/hr (AIR21) against 20.4 l/prop/hr (AIR20) – a reduction which reflects the impact of COVID19 restrictions and a decrease in non-household consumption over the AIR21 report year.

Since AIR19, NI Water has been investigating use of fast-logging technology. There is an on-going project of installing fast-logger points on a number of its PCC sites and parts of the Company's rural network. NI Water hopes that the project will enable the Company to improve its understanding of demand trends across its supply network and to facilitate estimation of HHNU in a dynamic fashion.

With information from the Company's fast-logging data downloads over the last 2 years, NI Water has reviewed and attempted to recalculate its HHNU estimate for AIR21, with a new estimate which is 26% higher than the previous value. NI Water states that more detailed analysis is required to substantiate the new estimate and has therefore used the AIR20 HHNU value of 2.64l/prop/d (not the new estimate) for the derivation of its BU leakage estimate introduced into the AIR21's pre-MLE water balance. The Company states that analysis is on-going to determine the most appropriate use of fast-logging data and that this could lead to a change in its approach for the calculation of HHNU in the future.

The MNF-based BU estimate is supported by an extensive DMA network (of approximately 1090 DMAs) covering 98% of all properties in Northern Ireland. All DMAs are monitored and provides 15 minute flow data into NI Water's corporate software systems and for leakage analysis. DMA minimum night flows (MNF) continue to be determined using a 20th percentile minimum rolling hour method. Minimum night flows are recorded on a daily basis. The BU estimate involves use of a hour-to-day factor (**HDF**) to reflect changes in leakage rates associated with changes in pressure through the day.

Top Down Estimate:

NI Water's top down leakage estimate, aligned with the IFM approach, and is derived as:

- Distribution Losses [Ml/d] + SPL [Ml/d]. But Distribution Losses [Ml/d] = Measured DI [Ml/d] – Water Delivered (Potable)[with applied meter under-registration (PCC MUR) assumptions, Ml/d] – Distribution System Operational Use [Ml/d].

As expected, the top down estimate informs the estimation of the water balance variance carried through to the MLE reconciliation and the post-MLE leakage estimate.

Fixed Variables in AIR21 Leakage Calculations:

The variables of the leakage estimation process, based on the MNF and the IFM approaches include: HHNU, NHHNU, SPL, MUR, HDF, TML, SRL. Through the evolution of the PC15 annual leakage reports, the following leakage estimation variables are fixed, as demonstrated by the values used for the AIR21 and AIR20 leakage reports shown in Table 10-2 below.

Table 10-2: Fixed Variables in AIR21 Leakage Calculations

Leakage Calculation Variable	AIR20 Leakage Estimate	AIR21 Leakage Estimate	Comment
Household night use, HHNU (l/prop/hr)	2.64	2.64	AIR10 estimate is 2.42l/prop/hr [AIR19=2.83]. NI Water states that the HHNU would be updated annually. But it has not used the result of its latest assessment for AIR21. The AIR20 was used despite the 1.6% increase in DI from AIR20 to AIR21. So, there is uncertainty over the HHNU value used in the PC15 outturn leakage calculation.
Supply Pipe Leakage, SPL (Ml/d)	39.91	39.91	At audit, NI Water states that the fixed SPL value was agreed with the UR for PC15. But we have not seen any evidence to substantiate this claim. Note that SPL=39.91 is based on analysis of 2012-13 data, which is now dated. NI Water has questioned this value as the trend in the number of unreported customer side leakage defects [highlighted through the issue of a Leak Notice] has increased by 52% since the SPL review based on the 2012-13 data.
PCC Meter Under-Registration PCC MUR (%)	7.39	7.39	Uncertainty over the representativeness of the PCC monitored property sites. MUR estimate based on X assessment and is specific to NI Water's domestic consumption monitor meters. It has remained constant throughout PC15.
Hour to Day Factor, HDF (hrs)	23.2	23.2	Based on the 2012-13 data, which is now dated. NI Water plans to improve on its HDF estimates in PC21
Trunk Mains Leakage, TML (Ml/d)	13.66	13.66	Uncertainty of these values is recognised by NI Water as the Company continues to develop an assessment for these variables based on a flow balance methodology.
Service Reservoir Leakage, SRL (Ml/d)	4.53	4.53	

We are surprised that the above variables are fixed year-on-year given the dynamic nature of these leakage estimation variables that ought to be informed by year-on-year changes to the associated data sets.

We note that the confidence limit of 10% applied to this component in the water balance has not changed for the AIR21 report year. We consider that the confidence grade of B3 used for the Table 10 submission is appropriate.

Distribution Input (Line 26)
NI Water has reported a post-MLE DI value of 595.72Ml/d: an increase of 9.16Ml/d from the AIR20 value of 586.56Ml/d. The increase is thought to be due to increased household water consumption associated with the COVID restrictions.

Bulk Supply Imports / Exports (Lines 27 and 28)
Line 27 – there are no bulk imports, so a zero value is reported, consistent with the bulk import reports of previous years.

Line 28 - The small export (0.41Ml/d) reported is associated with a total of 78 small exports to the Republic of Ireland.

Water Treated at Own Works to Own Customers (Line 29)
We note that with the exception of the 78 small exports above [Line 28], all water treated at NI Water works are used by the Company's customers. The Line 29 entry [595.31Ml/d] was derived from Line 26 DI [595.72M/d] less the Line 28 [0.41Ml/d] value. We can confirm that this calculation is appropriate.

Overall Water Balance (Line 30)
The AIR21 reported overall water balance confidence grade of B2, is unchanged from AIR20. We consider that the applied confidence grade is appropriate as the water balance components reconciled with measured DI to less than 5%, consistent with the confidence grade B2 applied to the DI report – Line 26.

Security of Supply Index (Line 31)
The Company has failed to achieve a SoSI score of 100 for the first time since at least AR13, with a SoSI score of 99 for AIR21. The AIR20 SoSI score was 100. We can confirm that the SoSI calculation is correct and that it is consistent with that reported in Column 14 of Table 10a(i). We are confident that the Company has followed the UR guidelines in the preparation of this SoSI calculation.

Significant changes between the Company's AIR20 and AIR21 SoSI assessments include:

- ❑ The number of water resource zones (WRZs) have increased from 5 to 7, as a result of the publication of the 2020 Water Resources and Supply Resilience (WR&SR) Plan
- ❑ The contributions from NI Water Clear PPP sites are now being included in Column 2 (WAFU) of Table 10a(i), whereas this was previously included in Column 2 (Bulk imports)
- ❑ The dry year uplift factor has decreased from 7% in 2012 to 1.7% in 2020
- ❑ The total target headroom has reduced from 44.07 Ml/d in AIR20 to 20.23 Ml/d in AIR21.

The AIR21 SoSI has been calculated by reference to values in the 2020 WR & SR Plan whereas the AIR20 SoSI score was based on the 2012 Water Resources Management Plan (WRMP). We are satisfied that these significant differences are largely due to the change from 2012 WRMP figures to the 2020 WR & SR Plan figures.

We identified a number of corrective actions including: clarification of aspects of the Table commentaries, validation of assumptions and correction of commentary typos. We can confirm that these actions have been addressed post-audit.

5. Summary of Audit Checks

Our audit checks for Table 10 addresses the requirements of the following two documents.

a) Reporter Letter dated 31st March 2021 – Table 10 specific guidance. See Section 1 of this commentary and appendix A.

b) Reporter guidance checklist incorporated into the NIAUR Table 10 guidance on file as "NIAUR_air21_repreq_Sec2_Chap10 01.00.PDF".

6. Confidence Grades

The applied confidence grades to Lines 7 [estimated water delivered per unmeasured non-household], 7a [estimated water delivered per unmeasured household], 8 [per capita consumption (unmeasured household – excluding supply pipe leakage)], 25 [total leakage], 26 [DI] and 30 [overall water balance] are unchanged from AIR20. We consider the stated confidence grades to be appropriate as they reflect the methodologies which underpin the water balance component estimates and data accuracy.

7. Challenges to the Company, Recommendations & Suggested Actions

7.1 Challenges

Our audit challenges to the Company may be summarised as follows.

1. Basis of the 22% reduction in the estimated water delivered per unmeasured non-household value (Line 7) from 633.38l/prop/d (AIR20) to 518.41l/prop/d (AIR21) – impact of COVID restrictions in a pandemic year.

2. Explanation of the high PCC value (170.8l/h/d) reported for the AIR21 report year (highest value reported since AIR11) - atypical when set against an industry average value of 153.8l/h/d.

3. Justification of fixed variables in the AIR21 leakage calculations. The fixed variables of concern with respect to the water balance and leakage calculations are:

   - household night use, supply pipe leakage, PCC meter under-registration, hour to day factor, trunk mains leakage and service reservoir leakage.

4. Mismatch of fixed SPL variable with inference drawn from increased trend of Leak Notices issued by NI Water since AIR13 – linked to number of unreported customer side leakage defects.

5. Current meter under-registration (and household night use) values used in the water balance vs potential updates using fast-logging data downloads collected since AIR19.

7.2 Recommendations & Suggested Actions

1. Undertake a rapid review of the status of the fixed variables of the AIR21 leakage calculation and assess potential impact of fixing these variables on the reported total leakage estimates.

2. Work with the UR to undertake a further in-depth review of the contributing factors to the failure of the PC15 outturn leakage targets to look critically at the underlying assumptions and the relative contributions of the different factors and to assess implications for PC21 leakage performance reporting.

3. In concert with the UR, consider the introduction of the "Ofwat/UKWIR (2017)'s 'Consistency of Performance Reporting Measures - Leakage" - https://www.ofwat.gov.uk/publication/reporting-guidance-leakage/reporting approach in the PC21 period for consistency with recent advances in annual leakage reporting practice.

4. Adoption of the consistent reporting method would facilitate the benchmarking of NI Water's PC21 leakage performance against the leakage performance and innovations being introduced by England & Wales water companies.

TABLE 10 Commentary: Appendix A – Reporter's Responses to the UR's Specific Requirements

A. Introduction

The UR's AIR21 Reporter letter guidance for Table 10 highlighted specific requirements for our review and audit of Table 10. We have formulated the UR requirements as two objectives, outlined as follows.

Objective 1	The Reporter should review and comment on NI Water's Water Balance and the reported Leakage outturn figure for PC15.
Objective 2	Based on the projection that the PC15 Leakage target will not be met, the Reporter should also consider and comment on NI Water's approach during the PC15 [2015-16 to 2020-21] period, the actions taken to address shortfalls [in 2016-17, 2017-18, 2018-19, 2019-20 & 2020-21]; and the potential reasons, and contributing factors to **NI Water's failure to achieve the PC15 Leakage outturn target.**

Our review and commentary with respect to the Objectives 1-2 requests are given in the following sections.

B. Objective 1 – Review of Water Balance & PC15 Leakage Outturn

As shown in Figure 10-2, the reported annual Distribution Input (DI) has increased by 6.3% over the 2015-16 to 2020-21 period, from 560.48Ml/d (2015-16) to 595.72Ml/d (2020-21).

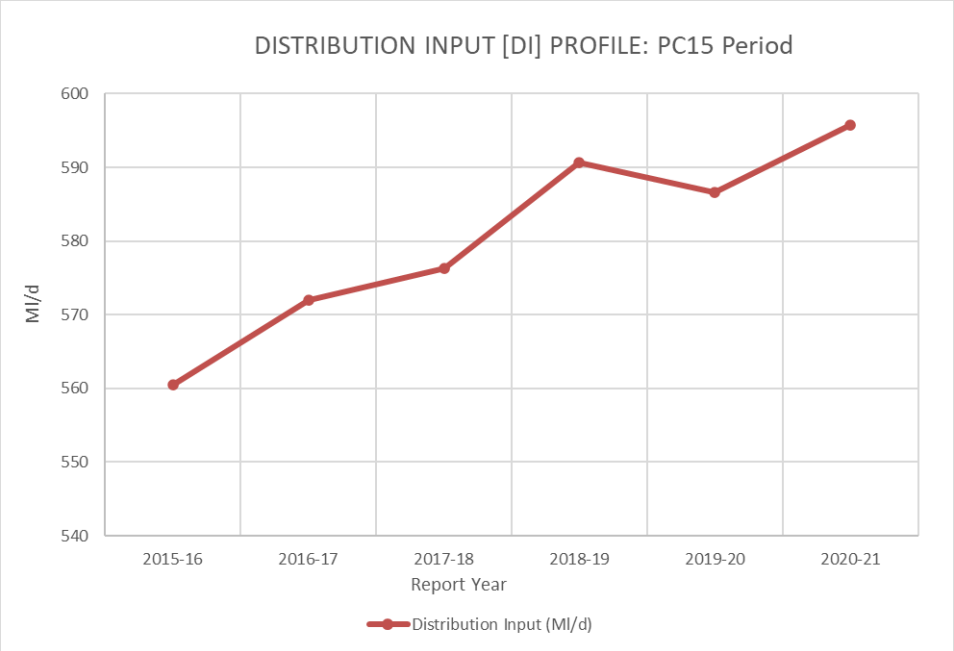

Figure 10-2: Annual Distribution Input Profile [PC15 Period]

A comparison of the annual PC15 leakage target, with the actual reported leakage with the difference between the two compared, is shown in Figure 10-3. In Figure 10-3, it can be seen that:

- ❑ the reported annual average leakage has reduced by 2.6%, from 161.99Ml/d (2015-16) to 157.71 Ml/d (2020-21) during the PC15 period.

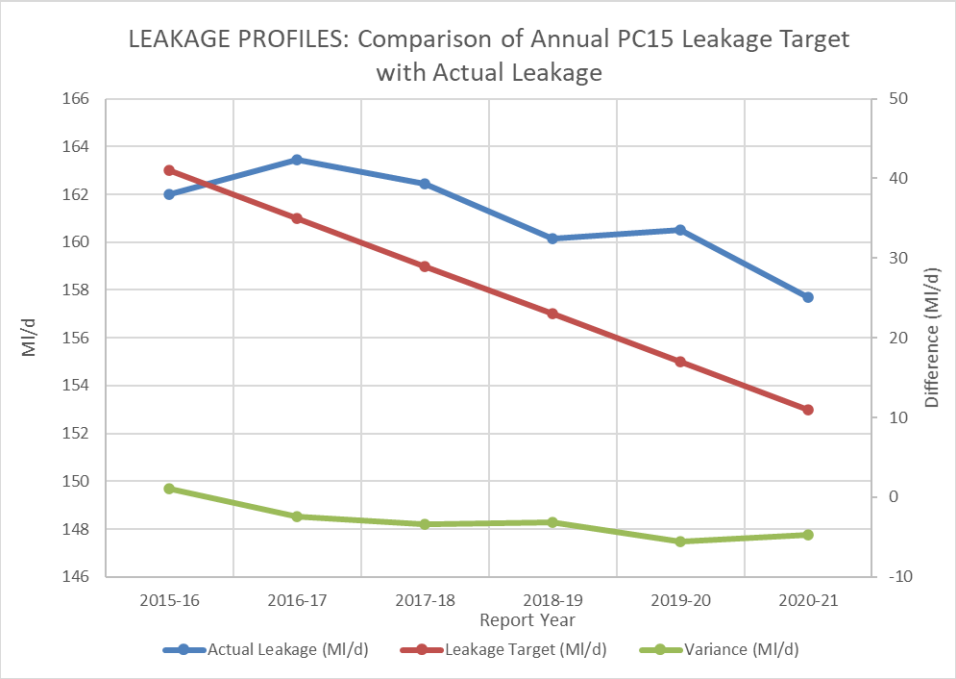

Figure 10-3: Annual Distribution Input Profile [PC15 Period]

The three components of total leakage are: Distribution Losses (DL), Trunk Mains Leakage (TML) and Service Reservoir Leakage (SRL). Across the PC15 period, the annual reported DL has reduced by 3.5% from 122.08Ml/d (2015-16) to 117.8Ml/d (see Figure 3), but the assumed values for TML and SRL have remained fairly constant or treated as fixed variables. This suggests that the assumptions underpinning the TML and SRL contributions to the total leakage reports across PC15 may be unrealistic and unrepresentative. For example, AIR20 TML = AIR21 TML = 13.66Ml/d but the shortfall in AIR21 leakage report against target is 4.7Ml/d. AIR20 SRL is also equal to AIR21 SRL = 4.53Ml/d.

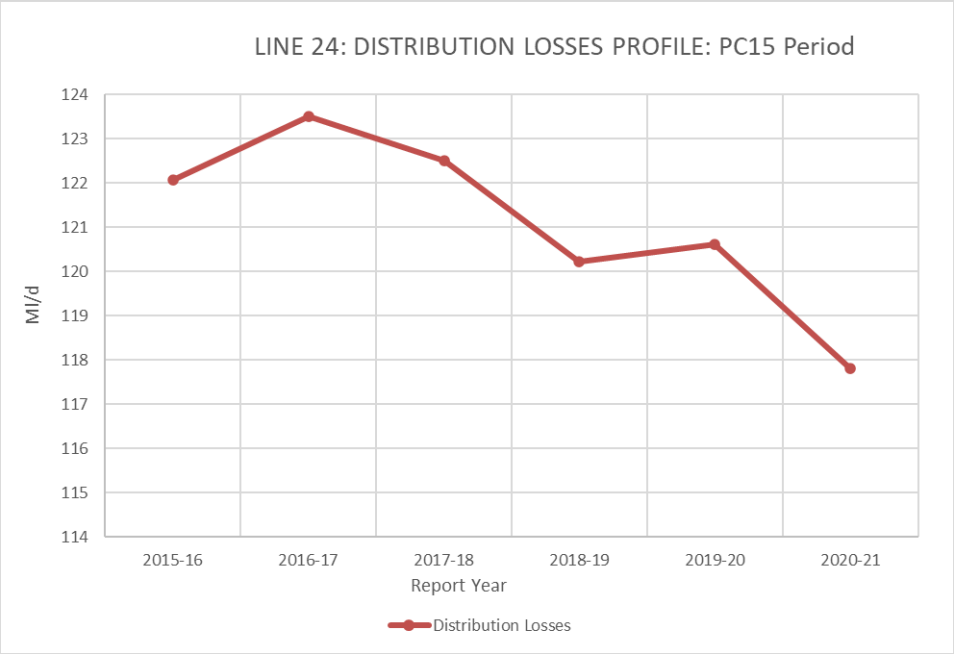

Figure 10-4: The Reported Annual Distribution Losses over the PC15 Period

At the beginning of the PC15 period, the confidence grade associated with the overall water balance is A2, with the following attributes.

a) Unmeasured household per capita consumption (l/head/d) was estimated from the Company's own consumption monitor following the UKWIR report 'Best practice for unmeasured per capita consumption monitors' report (1999)'.

b) Unmeasured non-household water delivered (l/prop/d) was estimated from the Company's own consumption monitor of different SIC (Standard Industrial Classifications).

c) Total leakage (Ml/d) was estimated using the Minimum Night Flow Method, with the resulting leakage reconciled to within 5% of the residual using the Integrated Flow Method. The night line data were estimated with Continual Night Flow Monitoring covering more than 80% of properties, with recordings more than 20 times a year and with sample surveys on service reservoirs and trunk mains for SRL and TML estimation.

d) For DI, the sum of the separately estimated water balance components reconciled with the measured DI to within 2%. Measured DI was estimated from water-into-supply meters which recorded 95% of the DI volume - the meters used are regularly recalibrated in accordance with the manufacturers' recommendations.

e) The overall water balance reconciled with measured DI, to within 2%, with an accuracy of +/- 5%.

We identified that the 2015-16 (AIR16) overall water balance's high confidence grade of A2 reduced to a lower grade B2 in AIR17. We also identified that the reduced confidence level is attached to the Company's water balance reports in the period 2016-17 to 2020-21 (AIR21). We therefore note that there has been a decrease in the reliability of one (or several) of the components of the water balance, which has driven the water balance reconciliation error to beyond 2% in 5 of the 6 years of the PC15 period.

The trends associated with the largest component of the NI Water's water balance (the Billed Unmeasured Household volumes and the Billed Measured & Unmeasured Non-Household volumes) are shown in Figures 10-5 to 10-9.

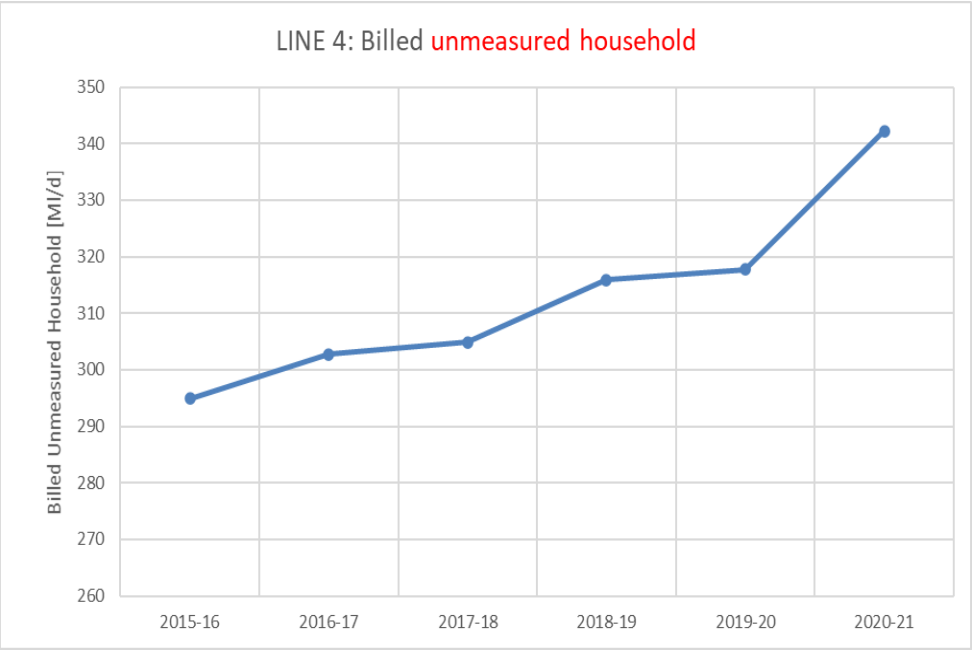

Figure 10-5: Annual Billed Unmeasured Household Volumes

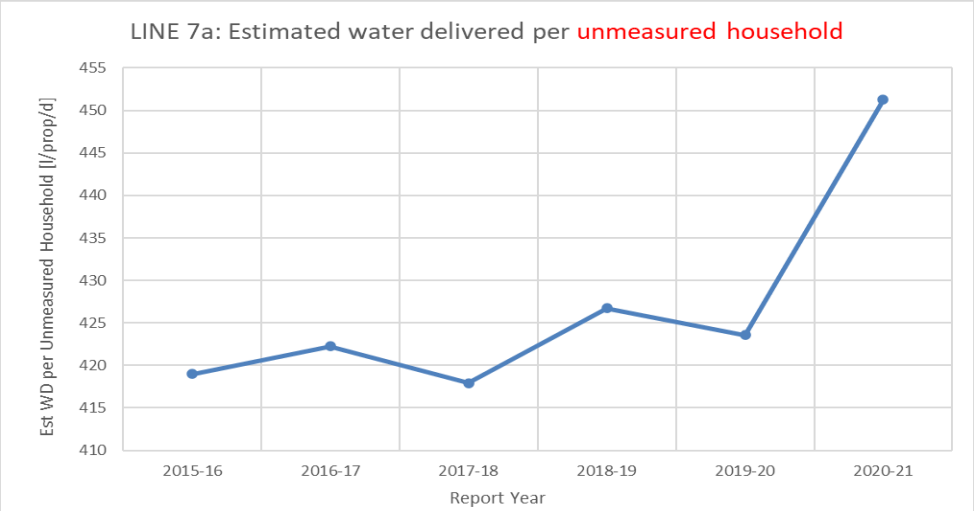

Figure 10-6: Annual Estimated Water Delivered per Unmeasured Household

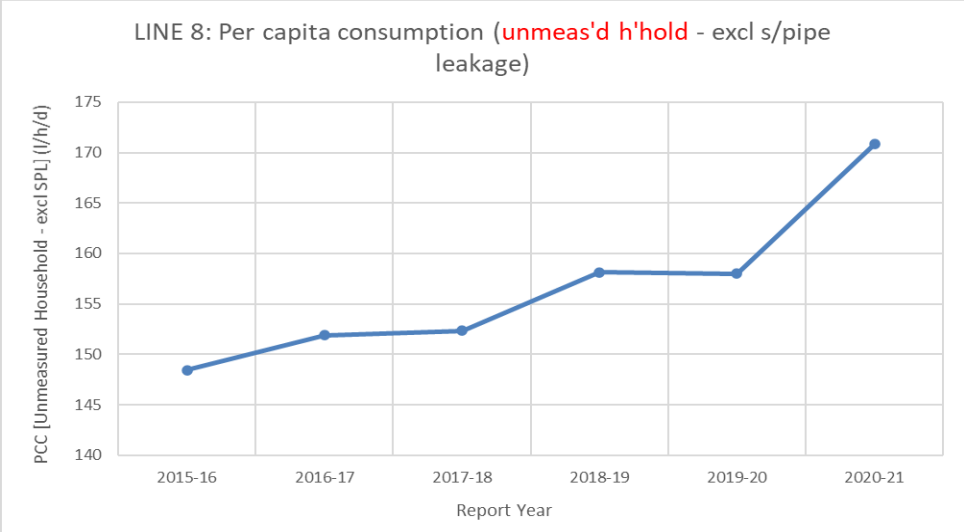

Figure 10-7: Annual Per Capital Consumption – Unmeasured Household

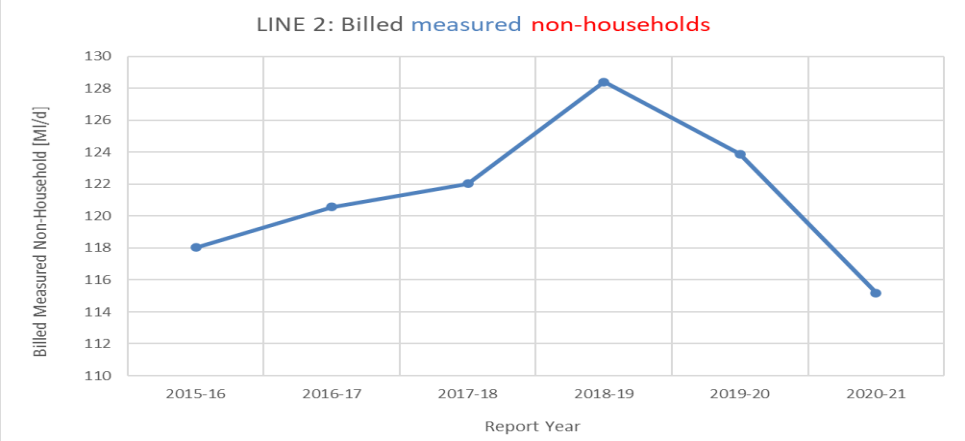

Figure 10-8: Annual Billed Measured Non-Households

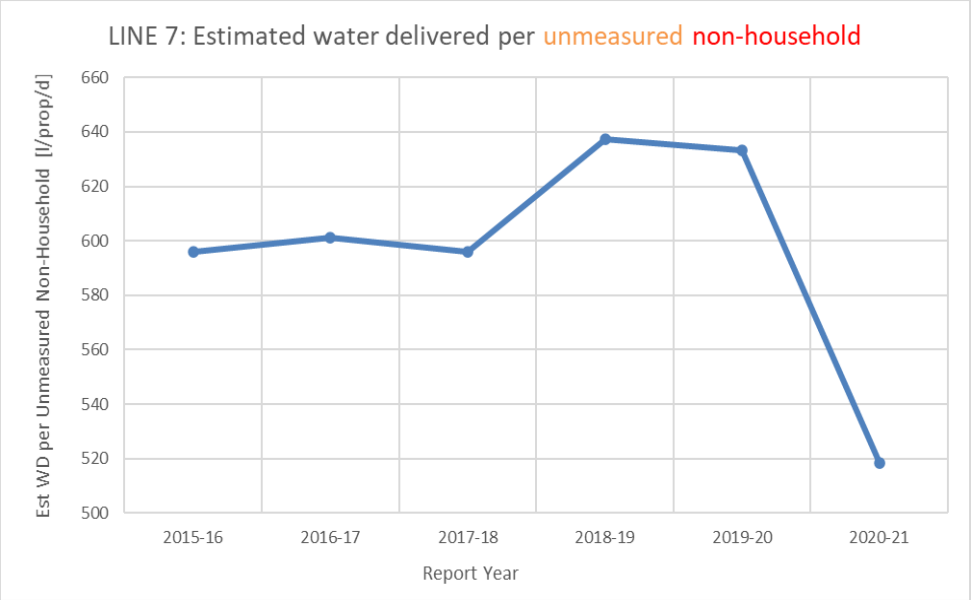

Figure 10-9: Annual Estimated Water Delivered per Unmeasured Non-Households

C. Objective 2 – Leakage Performance Target Failures - NI Water's Approach, Actions, Reasons & High-Level Contributory Factors

C1 NI Water's Approach

We note that during the PC15 period [2015-16 to 2020-21], the Company has followed the industry's standard historical approaches for the estimation of annual average total leakage values, with the application of the following techniques:

- ❑ Minimum Night Flow method for bottom up leakage estimates.
- ❑ Integrated Flow Method for top down leakage estimates.
- ❑ Reconciliation of water balance using Maximum Likelihood Estimation (MLE) to obtain post-MLE leakage estimates reported annually through the Table 10, Line 25 entries.

We also note that use of the above methods has involved a range of assumptions (some dated – including household night use allowance, meter under-registration and supply pipe leakage and hour to day factor.

In addition, we identified that for the Company's AIR21 water balance and leakage calculations, NI Water has used a number of fixed variables. We suggest a rapid review of these variables in relation to the expected changes year-on-year, in tandem with changes in measured DI values over the PC21 period.

C2 Actions Taken to address the PC15 Shortfalls and Potential Reasons for the Failure of the PC15 Leakage Targets

The Company failed to achieve its leakage targets in 5 of the 6 PC21 report years. We note that, over the PC15 period, NI Water has responded to the shortfalls in leakage target delivery with a Leakage Reduction Plan which has involved the following continuing actions.

a) DMA studies & "hot spot" rehabilitation schemes

b) Targeted DMA leak detection reporting

c) Logging/review of PRV stock

d) 24hr modulated flow control on WPSs

e) Six monthly review of the natural rate of rise (NRR)

f) DMA studies an optimisation project workstreams

g) Pressure management schemes

h) Increased leakage detection resources

i) Procurement of Utilis satellite SAR imagery for leak detection

j) Innovation – noise logging, PT logging (calm network)

k) Continuation of pressure logging programme

l) SMART metering

m) Fast logging installations

We identified that there are uncertainties over the effectiveness of the above Leakage Reduction Plan actions particularly with respect to the quantum of leakage savings (in Ml/d terms) and how these relate to the components of the water balance and the material assumptions of the leakage estimation process. We therefore identified that there is room for improvement in the association of the leakage reduction plan measures with the components of the reported annual average leakage.

The total leakage estimate in any report year [Table 10, Line 25] is made up of 3 components:

- distribution losses [Table 10, Line 24]
- trunk main losses and service reservoir leakage [both part of the bottom up leakage estimate introduced into the pre-MLE water balance].

The disaggregation of the total leakage estimate into its 3 component parts for the water balance and leakage reporting is a feature of the latest Ofwat/UKWIR (2017)'s "Consistency of Performance Reporting Measures Leakage" method being applied by England and Wales water companies for annual leakage reporting from the report year 2020-21 onwards. The method has been applied alongside the historical standard approaches to leakage estimation in the water companies' report to Ofwat since 2017-18 on a "shadow" basis.

We suggest that both the UR and NI Water consider the introduction of this approach in the PC21 period so that NI Water's PC21 leakage performance can be benchmarked against the England & Wales water companies, and for consistency with recent advances in annual leakage reporting practice.

C3 Contributing Factors to the Failure of the PC15 Leakage Targets

The high-level contributing factors to the failure of NI Water's PC15 leakage targets include the following:

- Weather patterns [rainfall, sunshine hours]
- ground temperatures leading to main burst outbreaks (with similarities to the freeze/thaw pipe failure mechanisms experienced in the past)
- COVID impacts in AIR20 & AIR21
- upward trend in DI (billed unmeasured HH volumes) over the PC15 period; and

- changes in level of DMA operability.

In addition, through our audits, we identified that some of the variables of the standard leakage estimation methods used by NI Water are fixed. The fixed variable are: household night use, supply pipe leakage, PCC meter under-registration, hour to day factor, trunk mains leakage and service reservoir leakage. **We suggest a rapid review of the status of these variables in relation to the expected changes year-on-year, in tandem with changes in Distribution Input (DI) through the PC21 period.**

We are unable to investigate these factors further within the scope and timescales of the standard AIR21 audits of the Company's Table 10 submission.

SUMMARY OF AUDIT FINDINGS

Table 11 – Water Service. Activities only not the asset balance. Lines 2-11 & 13-28

PREPARED BY	X
DATE	9 June 2021

Rating	Meaning
	No material exceptions and compliant with requirement
	Content with the reported data but supporting information needs to be complete and/or improvement identified for AIR22, or other noteworthy comment
	Minor exceptions
	Material exceptions
N/A	Not applicable to report

1. Key Findings

The key findings of the AIR21 Table 11 audit, against the AIR21 Table criteria are summarised below.

AIR21 Table Criteria	RAG	Assessment
Independent review of performance against PC15 target (where relevant)		Good performance overall however some non-material findings are noted below. Line 6b: The PC15 target for mains renewed was 905km, the reported figure for PC15 has a cumulative total of 835.17 km. NIW have therefore not achieved the PC15 target. We note that there a number of reasons for the lack achievement of this target - these include the shortfall in the Company's 2019-20 FD15 funding which resulted in late start of multiple projects, with consequences for failure to achieve beneficial use on nominated outputs. Line 8d: NIW did not meet the annual target for 1,844 lead communication pipes replaced however over PC15 NIW have achieved 11,082 lead communication pipe replacements which exceeds the PC15 target of 11,064. As the cumulative total exceeds the PC15 target this is not considered a material issue. Line 23: Three WTW schemes (Derg WTW MCPA upgrade, Ballinrees WTW MCPA upgrade and Dorisland WTW) have been delayed due to a decision by NIW to change their approach to WTW projects. Pilot plant trials are being undertaken to test the new approach. All delayed schemes are scheduled for completion in PC21. Derg WTW and Ballinrees are subject to enforcement notices, both schemes are programmed for completion before the enforcement notice date, these delays are therefore not considered material. Line 24: Drumaroad WTW Clear Water Tank did not achieve Beneficial use as programmed for PC15, March 2021. NIW state that this is due to COVID-19 restrictions limiting work. The updated programme for the project is to achieve Beneficial Use in the first year of PC21 (2021/22). Line 27: NIW did not achieve the annual baseline target of 57 events in AIR21 due to COVID-19 restrictions on community events. As the cumulative total exceeds the PC15 target this is not considered a material issue.
Methodology – consistency with the reporting process with clear control points		Methodologies were found to be consistent with current processes. There are a few exceptions which should be considered for future AIRs. Line 11: In AIR20 there was a significant reduction in the number of third-party damage pipe replacements which were being considered in the Line 11 calculations, this reduction is also seen in AIR21 figures. Through discussion in the audit it is understood that this is as a result of a change in the team responsible for following up with third parties. It is suggested that NIW look at the process for

AIR21 Table Criteria	RAG	Assessment
		identifying and following up on third party damage to ensure that the reported number accurately reflects activities. This is considered a minor exception. Line 13: The Company's report of the cumulative number of distribution zone studies completed has remained constant since 2012-13. It is considered that future AIRs would be more reflective to report on progress against the watermains infrastructure investment model (WIIM) work packages. Line 25: NIW stated in the audit that some of the catchment management plans are now 7 years old, these will therefore need to be updated in the PC21 period. Targets for updating the catchment management plans are to be agreed between NIW and the Utility Regulator (UR).
Assumptions – reasonableness and applicability		Assumptions reasonable and applied appropriately.
Source data – completeness		Data sources clearly identified with no material concern and appear to have been well managed. Improvements could be made to Line 4, Mains Cleaned, where the flushing factor has changed from 0.316km per flush in AIR19 and 0.329km per flush in AIR20 to 0.317km per flush in AIR21. The factor was derived based on a sample of mains flushing events, but NIW has not provided information about the sample size used. Lines 18, 19, 20: it is noted that the reduced sampling at customer taps resulting from COVID-19 restriction meant that the AIR21 figure is not representative. This has had a material impact on reported figures however it is noted that this was not within NIW's control.
Clarity of audit trails – evidence of appropriate audit trail		Line 8c, 8d and 10: NIW stated in the audit that there are remaining problems when analysing work orders where is it not clear if communication pipes have been fully replaced or only repaired at a localised burst. NIW also stated that it is not clear when replaced pipes are lead, as a result some lead pipes maybe reported in Line 10 line where they should have been included in Line 8c or 8d. Information should be captured to determine which line pipe bursts should be reported against; information required includes pipe material and if the pipe is fully replaced or patch repaired.
Confidence grades – documentation of appropriateness and rationale		Confidence grades appear to have been appropriately assigned.
Governance – evidence of quality assurance and of final sign-off		The SharePoint workflow process is in place for document checks and approvals.

2. Audit Scope

Six separate audits were carried out with the key NI Water system holders. The audits were held on; 19th May, 26th May, 1st June, 2nd June and 4th June.

In accordance with the UR guidance, audits were completed for the Table 11 lines with the exception of the asset balance lines 1 and 12.

3. Performance and Significant Events

3.1. Performance against PC15 Target

The following 13 measures have PC15 targets associated with them. NI Water (or NIW)'s performance against these targets in 2020/21 may be summarised as follows.

Length of new, renewed or relined mains delivered under the watermain rehabilitation programme (Line 6b).

a) Year-6 performance. The Year 6-reported number is 104.13km which is made up of 82.48 km and 21.65 km of renewed and new mains respectively. Relining was not used as a watermains rehabilitation method in 2020/21.

b) Cumulative by the end of Year-6 of PC15 performance. NIW is behind the cumulative target for PC15 FD forecast of 905km. The cumulative length delivered by NIW over the six-year period in PC15 is 835.17 km (116.92km, 172.27km, 126km, 166.52km, 149.33km and 104.13km in AIR16-21 respectively). The reported value is 69.83km less than the cumulative PC15 FD target for the same period of 905km (130km, 144km, 129km, 167km, 147km and 188km in AIR16-21 respectively). We note that there a number of reasons for the lack achievement of this target - these include the shortfall in the Company's 2019-20 FD15 funding which resulted in late start of multiple projects, with consequences for failure to achieve beneficial use on nominated outputs.

Lead communication pipes replaced under the proactive lead replacement programme (Line 8d)

a) Year-6 performance. NIW replaced 1,675 lead pipes through its proactive lead replacement programme (sub-programme 23). This performance falls short of the PC15 FD target for the year of 1,844 lead pipes by 169 pipes.

b) Cumulative by the end of Year-6 of PC15 performance. A total of 11,082 lead pipes have been replaced in PC15 since 2015/16 (1,922, 1,867, 1,767, 2,070, 1,781 and 1,675 in AIR16-21 respectively), which exceeded the 6-year FD target of 11,640 lead pipes (based on annual average of 1,844 lead pipes) by 18.

Percentage of overall compliance with drinking water regulations (Line 18)

a) Year-6 performance. NIW achieved an overall compliance of 99.94 for AIR21, which exceeded the baseline target for the year (99.79%) by 0.15%, however it should be noted that sampling was significantly reduced due to COVID restrictions, the reported numbers are therefore not representative.

b) Cumulative by the end of Year-6 of PC15 performance. Not applicable.

Percentage compliance at consumers tap (Line 19)

a) Year-6 performance. NIW achieved 99.91% compliance at consumers tap, which exceeded the baseline target for the year (99.69%) by 0.22%, however it should be noted that sampling was significantly reduced due to COVID restrictions, the reported numbers are therefore not representative.

b) Cumulative by the end of Year-6 of PC15 performance. Not applicable.

Percentage iron compliance at consumers tap (Line 20)

a) Year-6 performance. NIW achieved 99.56% of iron compliance at consumers tap, which exceeded the baseline target for the year (97.10%) by 2.46%, however it should be noted that sampling was significantly reduced due to COVID restrictions, the reported numbers are therefore not representative.

b) Cumulative by the end of Year-6 of PC15 performance. Not applicable.

Percentage of service reservoirs with coliforms in >5% samples (Line 21)

a) Year-6 performance. No service reservoir sites had more than three failures during the year, as profiled in the baseline forecast.

b) Cumulative by the end of Year-6 of PC15 performance. Not applicable.

Completion of nominated trunk main schemes (Line 22)

a) Year-6 performance. Northern Zone Resilience Phases 1 and 2 achieved Beneficial Use in Year 6 (2020/21) (AIR21). This scheme was agreed to be reported for Beneficial Use after Phase 2. Beneficial Use for Phases 3 and 4 will be reported during the PC21 period.

b) Cumulative by the end of Year-6 of PC15 performance. NIW has delivered 4 nominated trunk schemes in PC15 against the baseline target of 3 schemes since 2015/16. One of the completed schemes, the Carland to Cookstown Trunkmain project was originally planned for PC13 but delivered in 2015/16. So, NIW has delivered only three PC15 schemes to date. They are the Castor Bay to Belfast TM which was delivered as planned in 2015/16, the Carland to Cookstown Trunkmain which was delivered in 2016/17 having been brought forward from 2020/21 and Northern Zone Resilience Phases 1 and 2 was delivered in 2020/21.

Completion of nominated water treatment works schemes (Line 23)

a) Year-6 performance. Killyhevlin WTW achieved Beneficial Use in Year 6 (2020/21) (AIR21)

b) Cumulative by the end of Year-6 of PC15 performance. NIW has delivered three outputs in PC15; the Glenhordial WTW was delivered in 2015/16, Rathin Borehole was delivered in 2019/20 and Killyhevlin WTW was delivered in 2020/21. The following WTW have been delayed and will now be delivered in the PC21 period; Derg WTW MCPA upgrade (expected BU date November 2022), Ballinrees WTW MCPA upgrade (expected BU date November 2023) and Dorisland WTW (expected BU date August 2022). Delay of these WTWs is in part due to COVID restriction but in a larger part due to the decision by NIW to change their approach to WTW projects by commissioning pilot plant trials where appropriate in order to inform the correct solution. NIW stated that they will be submitting a Change Control to the UR for the Derg WTW scheme.

Completion of nominated improvements to increase the capacity of service reservoirs and clear water tanks (Line 24)

a) Year-6 performance. Killyhevlin CWT achieved Beneficial Use in Year 6 (2020/21) (AIR21)

b) Cumulative by the end of Year-6 of PC15 performance. NIW has delivered three outputs since 2015/16. Drumaroad WTW Clear Water Tank, which was programmed for Beneficial Use in March of 2021, has been delayed, due to the impact of COVID-19 restrictions. The project is currently expected to achieve Beneficial Use in the first year of PC21 (2021/22).

Number of Catchment Management Plans (Line 25)

a) Year-6 performance. Zero outputs were delivered in AIR21 against the baseline target of 0 for the year.

b) Cumulative by the end of Year-6 of PC15 performance. NIW completed a total of 15 catchment plans in PC15 (3 in AIR16, 7 in AIR17, 3 in AIR18, 0 in AIR19, 2 in AIR20 and 0 in AIR21) against the baseline total of 33 (6 in AIR16, 7 in AIR17, 7 in AIR18, 6 in AIR19, 7 in AIR20 and 0 in AIR21).

NIW advised that, all the required 'live' catchment management plans have been completed. The remaining outputs against the baseline target involve out of service (either abandoned or closed) catchments. NIW demonstrated evidence that this was discussed with the UR at ORG and CMPs and that the change was later reflected by the UR in the Cost and Performance Report 2018-19. On this basis the PC15 target has been met.

Number of school visits (Line 26)

a) Year-6 performance. 226 school visits were carried out against the baseline target of 176 visits for the year. Due to COVID-19 restrictions all visits were carried out virtually.

b) Cumulative by the end of Year-6 of PC15 performance. NIW continues to outperform the annual baseline target of 176 visits since 2015/16. NIW has carried out a total 1,494 school visits (277,

257, 219, 246, 229 and 266 visits in AIR16-AIR20 respectively) against the cumulative baseline target of 1,056 visits, an outperformance of 438 visits over the six-year period.

Number of other educational visits (Line 27)

a) Year-5 performance. 12 education visits were carried out against the baseline target of 57 visits for the year. NIW have not achieved their Year-6 target due to COVID-19 restrictions which have resulted in many community organisations no longer undertaking activities.

b) Cumulative by the end of Year-6 of PC15 performance. NIW carried out a total 412 educational visits (65, 64, 62, 66, 143 and 12 visits in AIR16-AIR21 respectively) against the cumulative baseline target of 342 visits, an outperformance of 70 visits over the six-year period.

Percentage service reservoirs where sample taps have been assessed and are to required standard (Line 28)

a) Year-6 performance. NIW achieved 100% against the baseline target of 100% for the year.

b) Cumulative by the end of Year-6 of PC15 performance. A total of 291 sample taps were installed out of 291 to be addressed.

3.2 Performance Against AIR20

A summary of the reported values for the measures in Table 11 from AIR16 to AIR21, and the movements from AIR19 to AIR20 and AIR20 to AIR21 are shown in Table TC_T11_1 below.

Table TC_T11_1: Summary of Performance against AIR20.

	DESCRIPTION	UNITS	DP	REPORTING YEAR 2015-16	CG	REPORTING YEAR 2016-17	CG	REPORTING YEAR 2017-18	CG	REPORTING YEAR 2018-19	CG	REPORTING YEAR 2019-20	CG	REPORTING YEAR 2020-21	CG	Change from AIR19 to AIR20 (Value)	(%)	Change from AIR20 to AIR21 (Value)	(%)
B	CHANGES DURING REPORT YEAR																		
2	Mains renewed	km	2	105.24	A2	161.29	A2	120.55	A2	154.66	A2	133.94	A2	96.65	A2	-20.72	-13.40%	- 37.29	-27.84%
3	Mains relined	km	2	0.00	A1	0.00	A1	0.00	A1	0.00	A1	0.00	A1	0.00	A1	0.00	0.00%	0.00	0.00%
4	Mains cleaned (total)	km	2	1,191.68	B3	1,665.69	B3	2,008.61	B3	2,257.19	B3	2390.31	B3	2189.2	B3	133.12	5.90%	- 201.11	-8.41%
6	New mains	km	2	76.51	B2	75.22	B2	92.43	B2	83.91	B2	81.68	B2	64.92	B2	-2.23	-2.66%	- 16.76	-20.52%
6a	Total length of new, renewed or relined mains	km	2	181.75	B2	236.51	A2	212.98	A2	238.57	A2	215.62	A2	161.57	A2	-22.95	-9.62%	- 54.05	-25.07%
6b	Length of new, renewed or relined mains delivered under the watermain rehabilitation programme	km	2	116.92	A2	172.27	A2	126.00	A2	166.52	A2	149.33	A2	104.13	A2	-17.19	-10.32%	- 45.20	-30.27%
7	Mains abandoned and other changes	km	2	105.51	A2	167.55	A2	124.24	A2	158.49	A2	135.13	A2	89.05	A2	-23.36	-14.74%	- 46.08	-34.10%
8a	Lead communication pipes replaced as a consequence of water quality sample failures	nr	0	37	B2	44	B2	43	B2	35	B2	18	B2	17	B2	-17.00	-48.57%	- 1.00	-5.56%
8b	Lead communication pipes replaced as a consequence of customers notifying NI Water that they are replacing their lead supply pipe	nr	0	703	B2	599	B2	574	B2	562	B2	455	B2	324	B2	-107.00	-19.04%	- 131.00	-28.79%
8c	Opportunistic lead communication pipes replacement undertaken under the watermain rehabilitation programme or during burst service pipe repairs	nr	0	660	B2	1801	A2	76	B3	75	B3	41	B3	28	B3	-34.00	-45.33%	- 13.00	-31.71%
8d	Lead communication pipes replaced under the proactive lead replacement programme	nr	0	1,922	B2	1,867	A2	1,767	A2	2,070	A2	1781	A2	1675	A2	-289.00	-13.96%	- 106.00	-5.95%
9	Total lead communication pipes replaced	nr	0	3,322	B2	4,311	A2	2,460	A2	2,742	A2	2295	A2	2044	A2	-447.00	-16.30%	- 251.00	-10.94%
10	Communication pipes replaced - other	nr	0	3,915	B3	5,608	B2	3,769	B2	4,232	B2	5664	A2	3739	A2	1432.00	33.84%	- 1,925.00	-33.99%
11	Mains bursts per 1000km	nr	0	74	B3	80	B3	91	B3	92	B3	82	B3	88	B3	-10.00	-10.87%	6.00	7.32%
D	DISTRIBUTION STUDIES																		
13	Cumulative number of distribution zone studies completed	nr	0	71	A1	71	A1	71	A1	71	A1	71	A1	71	A1	0.00	0.00%	0.00	0.00%
14	Distribution zone studies ongoing	nr	0	0	A1	0	A1	0	A1	0	A1	0	A1	0	A1	0.00	0.00%	0.00	0.00%
15	Total distribution zones identified for study	nr	0	71	A1	71	A1	71	A1	71	A1	71	A1	71	A1	0.00	0.00%	0.00	0.00%
16	Cumulative % distribution zone studies completed	%	1	100.0	A1	100.0	A1	100.0	A1	100.0	A1	100.0	A1	100.0	A1	0.00	0.00%	0.00	0.00%
17	Percentage population/properties - completed studies	%	1	100.0	A1	100.0	A1	100.0	A1	100.0	A1	100.0	A1	100.0	A1	0.00	0.00%	0.00	0.00%
E	WATER QUALITY COMPLIANCE MEASURES																		
18	% overall compliance with drinking water regulations	%	2	99.83	A2	99.86	A2	99.88	A2	99.90	A2	99.90	A2	99.94	A2	0.00	0.00%	0.04	0.04%
19	% compliance at consumers tap	%	2	99.74	A2	99.77	A2	99.81	A2	99.83	A2	99.84	A2	99.91	A2	0.01	0.01%	0.07	0.07%
20	% iron compliance at consumers tap	%	2	98.40	A2	98.66	A2	98.85	A2	98.94	A2	98.89	A2	99.56	A2	-0.05	-0.05%	0.67	0.68%
21	% Service Reservoirs with coliforms in >5% samples	%	2	0.00	A1	0.00	A1	0.00	A2	0.00	A1	0.00	A1	0	A1	0.00	0.00%	0.00	0.00%
F	NOMINATED WATER SERVICE OUTPUTS																		
22	Completion of nominated trunk main schemes	nr	0	2	A1	1	A1	0	A1	0	A1	0	A1	1	A1	0.00	0.00%	1.00	100.00%
23	Completion of nominated water treatment works schemes	nr	0	1	A1	0	A1	0	A1	0	A1	1	A1	1	A1	1.00	0.00%	0.00	0.00%
24	Completion of nominated improvements to increase the capacity of service reservoirs and clear water tanks	nr	0	0	A1	0	A1	1	A1	0	A1	1	A1	1	A1	1.00	0.00%	0.00	0.00%
G	ADDITIONAL WATER SERVICE OUTPUT MEASURES																		
25	Number of Catchment Management Plans	nr	0	3	A1	7	A1	3	A1	0	A1	2	A1	0	A1	2.00	100.00%	- 2.00	-100.00%
26	Number of school visits	nr	0	277	A1	257	A1	219	A1	246	A1	229	A1	266	A1	-17.00	-6.91%	37.00	16.16%
27	Number of other education events	nr	0	65	A1	64	A1	62	A1	66	A1	143	A1	12	A1	77.00	116.67%	- 131.00	-91.61%
28	% Service Reservoirs where sample taps have been assessed and are to required standard	%	1	0.0	A1	0.0	A1	72.9	A2	98.3	A1	100.0	A1	100.0	A1	1.70	1.73%	0.00	0.00%

It is clear from Table TC_T11_1 that NIW's Table 11 water service activity measures for the reporting year have generally declined since AIR20. This can in part be explained by COVID-19 restrictions and due to having reached the end of PC15 with a number of the PC cumulative targets having already been achieved in Year-5. Changes of note are summarised below:

- The length of mains renewed (Line 2) has decreased by 37.29km between AIR20 and AIR21, the AIR21 figure is 50.01km lower than the AIR19 figure.
- There has been a 20.51% reduction in new mains (Line 6) between AIR20 and AIR21 and a 25.07% reduction in total length of new, renewed or relined mains (Line 6a) in the same period. The length of new, renewed or relined mains delivered under the watermain rehabilitation programme (Line 6b) has reduced 30.27% between AIR20 and AIR21.
- There has been a 34.10% reduction in the mains abandoned and other changes (Line 7)
- Lead communication pipes replaced as a consequence of customers notifying NI Water that they are replacing their lead supply pipe (Line 8b) has reduced by 28.79% between AIR20 and AIR21.
- There has been a reduction of 33.99% in communication pipes replaced – other (Line 10) between AIR20 and AIR21.
- There has been a reduction of 91.61% between AIR20 and AIR21 in number of other education events, this is due to COVID-19 restrictions.

4. Summary of Audit Checks

Changes During the Report Year (Lines 2 to 11)

The overall methodologies and commentary structures for these lines have not changed significantly compared to last year. The commentary features the inputs from the Customer Services Directorate (CSD) Networks Water Operations and Asset Delivery (AD) teams for Lines 2 to 10. Trunk main lengths are included in the totals, with details of trunk mains included in the commentary as required by the UR reporting requirements.

Line 2: Mains renewed.

NIW renewed 37.29 km less mains than last year and 58.01 km less mains than two years ago. The AD team renewed 95.67 km of watermains, of which 82.48 km were watermains rehabilitation, 5.01 km were distribution mains related to A6 Roadworks and Gortycavan schemes and 8.18 km were trunk mains. The CSD team delivered 0.98km of smaller schemes involving social housing redevelopments and minor mains diversions or realignments. The total mains renewed in AIR21 is therefore reported as 96.65km.

Line 3: Mains relined.

NIW has not carried out any spray lining of mains activity in AIR21 as the Company has assessed that this technique is approximately equivalent in cost to replacement of mains. Spray lining is expected to have a life span of 25 years and replacement of mains has a life span of 100 years. NIW therefore do not considered this a cost-effective approach. Other structural lining methods such as standard slip-lining techniques to replace existing mains are included in Line 2 as defined by the UR reporting requirements.

Line 4: Mains cleaned (total).

Mains cleaning is performed by the CSD team. The total length of mains cleaned in AIR21 (2,189.20km) is 201.11 km less than in AIR20 (2,390.31km).

The flushing factor used to convert from number of mains flushings to length of mains flushed has reduced slightly from 0.329km per flush in AIR20 to 0.317km per flush in AIR21. The audited line commentary states that an assumption of 0.317km per flush is used but the line methodology (bullet 11) states that this is 0.318km – the difference is not material. The factor was derived based on a sample of mains flushing events, but NIW has not provided information about the sample size used.

NIW stated that the flushing programme has generally not been affected by COVID-19 Contingency Planning, however it was temporarily suspended for a period from early June 2020 to early August 2020

due to a sustained period of high demand on the distribution network. This corresponds with a period of prolonged warm weather. NIW state that there was no adverse impact caused by the suspension, on returns for the reporting year. NIW stated that they are able to evidence this by showing that only 50No. MST's were not completed out of total no. of 6270 in the system.

Line 6: New mains.

NIW installed 16.76 km less new mains in AIR21 (64.92 km) than in AIR20 (81.68 km), the AIR21 reported number is the lowest reported number 2013/14. The CSD team delivered 43.27 km of new mains with the remaining 21.65 km delivered by the AD team in AIR21, in contrast to 62.78km and 18.90 km respectively in AIR20.

The AD team delivered a similar length of new mains (AIR21 21.65 km) in comparison to AIR20 (18.90 km). The CSD delivered 19.51 km less new mains, AIR21 (43.27 km) compared to AIR20 (62.78 km). It is stated by NIW that this was as a result of the COVID-19 Pandemic which caused a suspension in progression of some developments which would have required new mains. It is NIW expectation that the housing market will recover more rapidly once COVID-19 restrictions are lifted and the reported number for AIR22 should return to levels which are more comparable to previous years.

Line 6a: Total length of new, renewed and relined mains.
This is a calculated line as the sum of Lines 2, 3 and 6, which is 161.57km in AIR21, a decrease of 54.05 km on last year (215.62 km). At audit, the sum was checked and confirmed to be correct and consistent with the line definition of the AIR21 Reporting Requirements and Definitions Manual.

Line 6b: Length of new, renewed or relined mains delivered under the watermain rehabilitation programme.
The reported length for this line has decreased from 149.33 km in AIR20 to 104.13 km in AIR21. AIR21 is the lowest reported number since AIR13 (AIR13 326.41 km, AIR14 226.13 km, AIR15 222.66 km, AIR16 116.92 km, AIR17 172.27 km, AIR18 126.00 km, AIR19 166.52 km, AIR20 149.33 km and AIR21 104.13 km). The reported figure was checked during the audit.

Line 7: Mains abandoned and other changes.
NIW reported 46.08 km fewer abandoned mains in AIR21 (89.05 km) than in AIR20 (135.13 km) and 69.44 km fewer than AIR19 (158.49 km). The majority of the AIR21 number was reported by the AD (88.01 km) while the remaining (1.04 km) was reported by the CSD team for smaller schemes involving social housing redevelopments and minor mains diversions. NIW stated that the reduction in CSD abandoned mains, 1.04 km in AIR21 compared to 1.64 km in AIR20 can be explained by the impact of COVID-19.

The reported length includes both wholly abandoned mains and those replaced by renewals as per definition for this line in the UR's Reporting Requirements and Definitions Manual.

Line 8a: Lead communication pipes replaced as a consequence of water quality sample failures.
This activity is carried out solely by the CSD team. A total of 17 lead communication pipes were replaced as a consequence of water quality failure in AIR21, in comparison to 18 in AIR20 and 35 in AIR19. While comparable to the AIR20 figure, the AIR21 is the lowest reported annual value in PC15 (37 in AIR16, 44 in AIR17, 43 in AIR18, 35 in AIR19 and 18 in AIR20).

Line 8b: Lead communication pipes replaced as consequence of customers notifying NI Water that they are replacing their lead supply pipes.

This activity is also carried out solely by the CSD team. The reported value in AIR21 is 324 which is 131 less than the previous year's report of 455 and 238 less than the AIR19 figure of 562. It is also the lowest reported annual number in PC15 to date, where there is a decreasing trend from 703 (AIR16) to 599

(AIR17), 574 (AIR18), 562 (AIR19), 455 (AIR20) and 324 (AIR21). NIW stated that this decreasing trend reflects a reduction in the number of lead pipes remaining.

Line 8c: Opportunistic lead communication pipes replacement undertaken under the watermain rehabilitation programme or during burst service pipe repairs.
There has been a great variability in the value reported for this line in the previous years: 2,747 (AIR15), 660 (AIR16), 1801 (AIR17), 76 (AIR18), 75 (AIR19) and 41 (AIR20). The reported value for AIR21 (28) is 30.71% lower than the previous year and significantly lower than other previously reported figures. It is noted that AD have reported zero opportunistic lead communication pipes, this is due to the CPMR system not recording this measure. NIW state that the potential for recording this is something that they will look at for AIR22.

Line 8d: Lead communication pipes replaced under the proactive lead replacement programme.
Unlike other lead communication pipes replacement activities, this activity is delivered solely by the AD team and is related to the outcomes of sub-programme 23 in PC15 Year-5. The reported AIR21 number (1675) is 106 lower than the previous year (1781). NIW did not meet the annual target for 1,844 lead communication pipes replaced however over PC15 the Company achieved 11,082 lead communication pipe replacements which exceeds the PC15 target of 11,064.

Line 9: Total lead communication pipes replaced.
The reported value for AIR21 (2,044) is a summation of Lines 8a, 8b, 8c and 8d as per the UR's Regulatory Reporting and Definitions Manual definition for this line. This year's value is 251 lower than the previous year (2,295) and much lower than the values reported in AIR16 (3,322) and AIR17 (4,311).

Line 10: Communication pipes replaced - other.
In AIR21, NIW replaced 3,739 communication pipes (other), which is consistent with the range over the PC15 years of 5,664 (AIR20), 4,232 (AIR19), 3,769 (AIR18), 5,608 (AIR17) and 3,915 (AIR16). The AIR21 number is built up from 2,211 from the AD team and 1,528 from the CSD team. NIW stated in the audit that there are remaining problems when analysing work orders where is it not clear if communication pipes have been fully replaced or only repaired at a localised burst. NIW also stated that it is not clear when replaced pipes are lead, as a result some lead pipes maybe reported in this line where they should have been included in Line 8c or 8d.

Line 11: Mains bursts per 1000km.
The reported AIR21 number (88 bursts per 1000km) is 6 more than AIR20 (82 bursts per 1000km) and comparable to reported figures for the rest of the PC15 period AIR19 (92 bursts per 1000km), AIR18 (91 bursts per 1000km), AIR17 (80 bursts per 1000km) and AIR16 (74 bursts per 1000km).

We note that the reported number is derived from the total number of recorded burst events (minus those attributable to third party damage) divided by the total length of mains. The number of bursts is calculated directly from monthly reports from the Mobile Work Management or MWM system compiled by the Water Business Unit. The reports summarise job split between those generated through proactive and non-proactive detection methods.

We note that the reported AIR21 number is comprised of 1,268 reported burst mains (non-proactive) repairs by CSD Networks Water team and 1,132 proactive repairs by the active leakage control team minus 29 bursts due to third party damage.

The number of bursts detected through pro-active actions has increased by 8% since AIR20. The number of non-proactive detection bursts has increased by 7%. The number of bursts due to third party damage is comparable to AIR20, but significantly lower than AIR17 to AIR19, this was explained by NIW to be as a result of a change in team responsible for following up third party damage. The total number of reported

bursts has increased by 7% from AIR20 (2211) but is comparable to AIR18 (2444) and AIR19 (2467) (see Table TC_T11_2).

Table TC_T11_2: Components of burst data from AIR14 to AIR21 and the changes over the last two years.

Burst Numbers Summary Table	AIR17	AIR18	AIR19	AIR20	AIR21	Percentage Changes	
						AIR19 to AIR 20	AIR20 to AIR 21
CSD Networks Water (non-proactive detection)	1313	1394	1451	1186	1268	-18.3%	6.9%
CSD Networks Water (pro-active detection)	883	1116	1111	1051	1132	-5.4%	7.7%
Third Party Damage	61	66	95	26	29	-72.6%	11.5%
Total	2135	2444	2467	2211	2371	-10.4%	7.2%
Burst Rate per 1000km	79.7	91.1	91.5	81.9	87.8	-10.5%	7.2%

Distribution Studies (Lines 13 to 17)

Line 13: Cumulative number of distribution zone studies completed.

The Company's report of the cumulative number of distribution zone studies completed has remained constant since 2012-13. It is considered that for future AIRs, it would be more reflective to report on progress against the watermains infrastructure investment model (WIIM) work packages.

Line 14: Distribution zone studies ongoing.

Nil value reported. NIW has upgraded its previous zonal study methodology with the Water Mains Infrastructure Investment Model (WIIM) methodology. In the reporting year, NIW completed seven hydraulic model rebuilds including Camlough Newry West, Castor Bay Tandragee, Derg Strabane, Lough Macrory Beragh, Lough Macrory Killyclogher Omagh, Killyhevlin / Enniskillen and Belleek Garrison. The Company is in the process of rebuilding the 20 hydraulic models shown in Table TC_T11_3.

Table TC_T11_3: Hydraulic models rebuilding in AIR21 (Source: NIW Commentary document for AIR21).

S/No	Hydraulic Models Rebuilds in Progress 2019-2020	Status	Year To Be Completed	Numbers of Properties
1	X	Phase 2	2021	11,947
2	X	Phase 2	2021	6,053
3	X	Phase 2	2021	22,439
4	X	Phase 2	2021	18,809
5	X	Phase 2	2021	19,344
6	X	Phase 2	2021	20,474
7	X	Phase 2	2021	25,344
8	X	Phase 2	2021	17,034
9	X	Phase 2	2021	18,884
10	X	Phase 2	2021	25,538
11	X	Phase 2	2021	27,988
12	X	Phase 2	2021	11,913

S/No	Hydraulic Models Rebuilds in Progress 2019-2020	Status	Year To Be Completed	Numbers of Properties
13	X	Phase 2	2022	7,107
14	X	Phase 2	2022	42,212
15	X	Phase 2	2022	2,013
16	X	Phase 2	2022	15,328
17	X	Phase 2	2022	16,760
18	X	Phase 2	2022	20,508
19	X	Phase 2	2022	13,121
20	X	Phase 2	2022	51,322

Line 15: Total distribution zones identified for study.
NIW has identified 71 distribution zones. The Company advised that these zones have been combined into 54 model areas that reflect the current configuration of water resource zones.

Line 16: Cumulative % distribution zone studies completed.
NIW has completed all the planned distribution zone studies and has reported 100%. This is consistent with AIR20.

Line 17: Percentage population/properties – completed studies.
NIW has covered 100% of the population or properties associated with the completed distribution zone studies and has reported 100%. This is consistent with AIR20.

Water Quality Compliance Measures (Lines 18 to 21)

All targets for water quality compliance measures were achieved in AIR21. During 2020 as a result of the COVID-19 pandemic, with the agreement of the Drinking Water Inspectorate (DWI), NI Water reduced potable water sampling. All sampling at customer taps were stopped from 16th March to 18th May 2020. A reduced number of parameters were sampled upstream at Service Reservoirs in the same timeframe. From 18th May 2020 sampling returned to the regulatory frequencies, with the exception of a small number of parameters which are customer tap specific. This has created a shortfall in regulatory sampling at customer tap for the calendar year 2020. NIW state in its commentary that they were able to ensure that the quality of water supplied to customers was effectively monitored and maintained throughout the period.

Line 18: % overall compliance with drinking water regulations.
The reported AIR21 value (99.94%) is higher than the previous year value of 99.90%. This year's figure also exceeds the NIW's target of 99.79% and the highest compliance achieved in PC15 to date, with improving trend since AIR16. However, it is noted that the reduced sampling at customer taps means that the AIR21 figure is not representative.

Line 19: % compliance at consumers tap.
The reported AIR21 value (99.91%) is higher than the previous year's value of 99.84%. This year's figure also exceeds the NIW's target of 99.69% and is the highest compliance achieved in PC15 to date, with improving trend since AIR16. However, it is noted that the reduced sampling at customer taps means that the AIR21 figure is not representative.

Line 20: % iron compliance at consumers tap.
The reported AIR21 value (99.56%) is higher than the previous year's value of 98.89%. This year's figure also exceeds the target of 97.10%. However, it is noted that the reduced sampling at customer taps means that the AIR21 figure is not representative.

Line 21: % service reservoirs with coliforms in >5% samples.
No service reservoir sites have had more than 3 failures during the year. NIW advised us that it has an ongoing service reservoir cleaning programme to maintain this. All sites achieved 95% compliance.

Nominated Water Service Outputs (Lines 22 to 24)

Through our audits, we established that DWI have full visibility of the programme and sign off of individual outputs to confirm delivery of outputs reported in Lines 22-24. We have checked the number of nominated outputs in these lines against the corresponding schemes in Tables 40 and 40a and found these to be consistent.

Line 22: Completion of nominated trunk main schemes.
One nominated trunk main scheme was completed in AIR21. Northern Zone resilience Phases 1 and 2 achieved Beneficial use in 2020/21. Phase 3 and 4 are programmed to reach beneficial use in the PC21 period.

Line 23: Completion of nominated water treatment works schemes.
Killyhevlin WTW achieved beneficial use in 2020/21. There are 3 remaining WTWs which have not achieved Beneficial use in PC15, these are programmed to be completed in the PC21 period as follows:

- JN538 Derg WTW MCPA upgrade (expected BU date November 2022)
- JL795 Ballinrees WTW MCPA upgrade (expected BU date November 2023)
- JA319 Dorisland WTW (expected BU date August 2022)

Delay of these WTW schemes has been impacted by COVID-19 but the main reason for delay is due to a decision by NIW to change the Company's approach to WTW projects. Pilot plant trials are being undertaken to test the new approach. All delayed schemes are scheduled for completion in the PC21 period.

Line 24: Completion of nominated improvements to increase the capacity of service reservoirs and clear water tanks.
Killyhevlin CWT achieved Beneficial Use in 2020/21.

Drumaroad WTW Clear Water Tank did not achieve March 2021 Beneficial Use as programmed for PC15. NIW state that this is due to COVID-19 restrictions limiting work. The updated programme for the project is to achieve Beneficial Use in the first year of PC21 (2021/22).

Additional Water Service Output Measures (Lines 25 to 28)

Line 25: Number of Catchment Management Plans.
Zero catchment management plans have been completed in AIR21 and NIW has completed 15 'live' catchment management plans so far in PC15.

The number of abandoned/closed catchments has been revised from 23 as stated in PC15 FD plan to 21 as Knockbracken and Ballintemple sites have subsequently been sold. NIW has submitted a change control to revise the total number of catchment management plans in the baseline plan from 40 to 36. NIW stated in the audit that some of the catchment management plans are now 7 years old, these will therefore be updated during the PC21 period, targets for updating the catchment management plans are to be agreed between NIW and the UR.

Line 26: Number of School Visits.
A total of 266 school visits were carried out in AIR21 against the annual baseline target of 176. NIW has consistently outperformed its annual baseline target in PC15 since AIR16. The accumulative output

targets up to year six of PC15 is 1,056, the current actual output up to year six is 1,493. The total number school visits reported were checked against the spreadsheet tracker and found to be consistent. Due to COVID-19 restrictions all AIR21 school visits were carried out virtually.

Line 27: Number of Other Educational Events.
A total of 12 events took place in AIR21 which is significantly lower than previous years in PC15 (65, 64, 62, 66 and 143 events in AIR16-20 respectively). NIW did not achieve the annual baseline target of 57 events in AIR21 due to COVID-19 restrictions on community events. However, NIW has consistently outperformed its annual baseline target of 57 events in years one to five of PC15. The accumulated output target for PC21 is 342, the actual output is 412. The total number of other educational events reported were checked against the spreadsheet tracker and found to be consistent.

Line 28: Percentage Service Reservoir Sample Taps.
NIW installed 291 sample taps in PC15. With no remaining service reservoir taps to be addressed, the PC15 target was achieved in AIR20, as a result no sample taps were installed in AIR21. The reported number is 100%, which is consistent with AIR20.

5. Confidence Grades

As shown in Table TC_T11_1, the confidence grades used have remained the same as last year. The rationale and appropriateness of the assigned confidence grades were discussed at audit and found to be reasonable.

6. Challenges to the Company, Recommendations & Suggested Actions

Challenge: Some AIR20 Table 11 Auditor recommended actions not addressed.

The Auditor highlighted a number of our AIR20 Table 11 recommended actions as "outstanding" – i.e. that the actions have not been addressed. Subsequent to the audit, NIW provided a summary of the status of these "outstanding" actions on file as "180820 Recommendations - Reporter's AIR20 Report v2.xlsx". The "outstanding" actions are noted below, with the current NIW status notes [*blue text*].

a) All Lines: In many cases targets are not clearly stated in the Commentary. It is recommended for AIR21 to include a table in all Commentary documents detailing the targets and achieved levels for each year in PC15. This table should also include where there has been changes to the targets as a result of change controls or other agreements with the UR and DWI [*Regulatory targets and progress against targets is covered in the Board overview each year. Closed*].

b) Line 4: Flushing factor used to convert from number of mains flushings to length of mains flushed has increased from 0.316km per flush in AIR19 to 0.329km per flush in AIR20. The factor was derived based on a sample of mains flushing events. It is recommended that NIW provide information about the sample size used to derive the flushing factor in the Line 4 methodology [*This information was included in the data supplied for this return but was edited out for clarity. This can be easily added into the AIR 21 return*].

c) Line 8c: Lead communication pipes replacement is not recorded in CPR system, there is therefore a risk that the reported figure is lower than the achieved figure. It is recommended that changes are made to the CPR system to record all reported parameters [*This data is now being correlated each Month by X on behalf of NIW to enable an accurate figure to be reported on in AIR 21*].

d) Line 13: Consideration to be given to PC21 reporting method for zonal studies, the reported figures do not reflect the ongoing work completed by NIW to maintain and update hydraulic models [*A target date of Jan 2021 is to be agreed for a meeting with the UR to have the AIR 21 reporting guidance amended. It may be more appropriate to change this approach for PC21 rather than starting a new approach for the last year of PC15 but this will need to be discussed at the suggested meeting in January. Telecon between X and X: X indicated that UR will not be modifying AIR reporting*

requirements until PC21. But happy to consider the change for AIR22. Target date amended to 31/01/22].

Recommendations:

The following recommendations are made from our audit observations of the contents of the AIR21 Table 11 submission.

a) Line 8c: NIW should consider updating the CPMR system to record lead communication pipe replacements. For each replaced pipe, the system should record the pipe material and a note of whether the pipe is fully replaced or repaired.

b) Line 8c, 8d and 10: NIW stated in the audit that there are remaining problems when analysing work orders where is it not clear if communication pipes have been fully replaced or only repaired at a localised burst. NIW also stated that it is not clear when replaced pipes are lead, as a result some lead pipes may be reported in Line 10 entry where they should have been included in Line 8c or 8d. We therefore recommend that NIW captures information to determine which line pipe bursts should be reported against; information required includes pipe material and if the pipe is fully replaced or patch repaired.

c) Line 11: In AIR20 there was a significant reduction in the number of third-party damage pipe replacements which were being considered in the Line 11 calculations. Through discussion in the audit it is understood that this is as a result of a change in the team responsible for following up with third parties. We suggest that NIW look at the process for identifying and following up on third party damage to ensure the reported number accurately reflects activities.

d) Line 13: The Company's report of the cumulative number of distribution zone studies completed has remained constant since 2012-13. It is considered that for PC21 it would be more reflective to report on progress against the watermains infrastructure investment model (WIIM) work packages.

SUMMARY OF AUDIT FINDINGS

Table 16 – Sewerage Services. Activities only not the asset balance. Lines 3-13c & 16a-33

PREPARED BY	X
DATE	11 June 2021

Rating	Meaning
	No material exceptions and compliant with requirement
	Content with the reported data but supporting information needs to be complete and/or improvement identified for AIR22, or other noteworthy comment
	Minor exceptions
	Material exceptions
N/A	Not applicable to report

1. Key Findings

The key findings of the AIR21 Table 16 audit, against the AIR21 Table criteria are summarised below.

AIR21 Table Criteria	RAG	Assessment
Independent review of performance against PC15 target (where relevant)		Some areas with a PC15 performance target have failed to meet the required performance. These are Lines 26 (Improvements to nominated UIDs), 27 (Improvements to nominated WWTWs) and 28 (Small WWTWs delivered as part of the rural wastewater investment programme). We note that there a number of reasons for the lack achievement of this target - these include the shortfall in the Company's 2019-20 FD15 funding which resulted in late start of multiple projects, with consequences for failure to achieve beneficial use on nominated outputs.
Methodology – consistency with the reporting process with clear control points		Methodology found to be clear and reporting consistent with documented methods. Errors identified in numbers reported against Lines 20 & 21 have been corrected. No material changes in reporting methodology since AIR20.
Assumptions – reasonableness and applicability		Assumptions reasonable and appropriately documented.
Source data – completeness		Source data well referenced in the methods and commentaries. Master spreadsheets and evidence of NIEA sign-off reviewed in the audit meetings.
Clarity of audit trails – evidence of appropriate audit trail		Audit trails clear
Confidence grades – documentation of appropriateness and rationale		Consistent documentation of confidence grades and rationale. Highest grades assigned where outputs are signed-off by NIEA.
Governance – evidence of quality assurance and of final sign-off		Changes have been made to Lines 20(Total sewerage drainage areas), 21 (Cumulative % drainage area plan studies completed) and 33 (Number of sustainable WwTW solutions delivered p.e. <250) since the audit meetings to revise the figures. The SharePoint workflow process is in place for document checks and approvals.

2. Audit Scope

A series of interviews was conducted with NI Water staff responsible for the collation and reporting of relevant data for the population of Table 16.

In accordance with the UR guidance, audits were completed for the Table 16 lines with the exception of the asset balance Lines 1, 2, 14-15.

3. Performance and Significant Events

Line 3: 1.19 km of new critical sewers reported. This includes:

- 0.09 km delivered through transfer of developer services schemes (where critical sewers are defined as > 600mm diameter) and
- 1.1 km added to the network via the capital delivery programme (where criticality is defined in GIS based on multi-criteria approach including pipe diameter and proximity to critical customers).

Source data taken from developer services systems and the Capital Programme Monitoring Report (CPMR) system.

Line 4: 118.46 km critical sewers inspected. Figure comprised of totals from Capital Delivery, in-house inspection team and contractor inspections managed by the asset performance team as part of the DAP programme. For the in-house element, the proportion of critical sewers is estimated at 25%. The same assumption was applied in previous years and is derived from the % of critical sewers as a proportion of the total NIW sewer network.

Lines 5 & 6: Length of critical sewers renovated and replaced is 3.71 km and 2.5 km respectively. Data sourced from the CPMR system and includes outputs from the planned capital programme and unplanned/reactive work undertaken. Specific designations for replaced/renovated are captured in CPMR.

Line 7: No critical sewers abandoned in the reporting period.

Line 8: 88.77 km of non-critical sewers added to the network. Methodology mirrors that of Line 3 for assets classified as non-critical. Small proportion added via capital programme, but majority added via the sewers for adoption process.

Lines 9 & 10: Length of non-critical sewers renovated and replaced is 4.82 km and 1.68 km respectively. Methodology and data sources as per Lines 5 & 6, but for sewers classified as non-critical.

Line 11: 600m of non-critical sewers were abandoned.

Line 11a: Total length of sewer renovated and replaced is 12.71 km, a reduction from 18.52 km reported in AIR20, but consistent with the PC15 target requiring an average of 11 km to be replaced/renovated per year.

Line 12: 80.4 sewer collapses per 1000km. Reporting is consistent with Table 46. Data is derived from GIS (total network length) and monthly reporting of operational data from Ellipse work management system. Contractors are responsible for collating and reporting monthly data, which is subject to NIW validation by field managers.

It was noted that changes were made to the reporting process during 20/21 (the AIR21 report year) to improve the quality of data submitted by contractors and to increase the accuracy of reporting of repeat blockages through greater automated data collection.

Line 13: 872.1 sewer blockages per 1000km. Figure is derived based on the same principles and source data as Line 12. Duration data for Lines 13a, b and c are recorded as the time between the initial customer contact to the call centre through to the work order being marked as complete in Ellipse by field staff.

Total number of blockages recorded was 14417 (includes blockages < 6hours, not shown in Table 16). We were able to verify from the source data that Line 13 and 13a, b and c were derived from the same data set.

Line 16a: progress of the UID programme has been hampered by land ownership and access issues. These include not being able to reach agreement on land value with landowners, not being able to identify the

landowner in some cases and the fact that discussions are now necessary with 11 different councils. Only one scheme was completed at Islandreagh SPS, therefore reducing the reported figure to 133 from the previous years' 134.

Line 16b: no change from last years' figure of 253 as no CSO schemes were completed during the year.

Line 17a: Reported figure of 1783 reflects the total number of discharges from WwTW and SPS assets and excludes CSOs. Changes from the previous year include:

- SPS constructed at Ballybogey to pump flows from the decommissioned WwTW
- An increase of 7 in the number of overflows within WwTW sites from 674 in AIR20 to 681.

It was noted that NIW has begun work on cleansing the GIS system, updating CSO and SPS overflow data and conducting event duration monitoring. This is expected to improve confidence in data in future years and is likely to result in some changes from AIR22 onwards.

Line 18: Cumulative number of DAPs completed is reported as 82 and these are listed in the file embedded in the method document. 71 discrete catchments now have DAPs in place, and 11 of those catchments have been through the process twice. The priority for revisiting and updating DAPs is based on business need and catchment drivers. The aim is to balance increasing the area covered by DAPs with ensuring that large urbanised or otherwise 'critical' catchments have DAPs that are robust and up to date.

Line 19: 58 DAPs are in progress.

Line 20: Figure originally reported as 249 catchments with > 250 Population Equivalent. However, it was identified during the audit that the figure should be 255, as 6 PPP sites had been omitted in error. This figure only changes with growth/decline in domestic and trade flows which shift catchments above or below the 250 PE threshold.

255 reflects an overall reduction of 2 from AIR20, the net result of declining trade flows due to COVID in some catchments and other catchments added to the list due to housing growth. The Master WwTW PE datasheet was reviewed as part of the audit. We can confirm that NIW corrected the Line 20 and 21 numbers post-audit, in response to our audit feedback.

Line 21: The error identified in Line 20 also affects the calculation for Line 21 and this has now been updated. The percentage (%) figure has been revised to 32.2 on the basis of adding the 6 PPP sites to the figure in Line 20.

Line 22: 89% of PE is covered by a completed study. The Omega contract provide the figures to feed into the PE calculation. Therefore, this line is unaffected by the omission in Line 20.

During the audit, we randomly selected two DAPs from the completed list and NIW provided the DAP model build and verification reports to demonstrate completion. These were Belfast and Downpatrick DAP.

Line 23: % WwTW discharges compliant with numeric consents is reported as 95.2. This represents NIW sites only (229) and excludes the six PPP sites. Source data is held in the Lab Information Management System (LIMS) and the monthly reports produced to track regulatory compliance against look-up table conditions.

Line 24: % of total PE served by WwTWs compliant with numeric standards reported as 99.2 and includes the only upper tier failure during 20/21 at Ballykelly WwTW. Line 24a excludes upper tier failures and therefore the Ballykelly PE.

Line 25: % compliance for WwTW with descriptive consents is reported as 90.91. Compliance is based on meeting the requirements of NIEA inspection and reporting includes sites in the range >20 and <250 PE. Criteria for compliance is defined by NIEA who generate the data and report non-compliance to NIW. Of 308 WwTWs, 28 were non-compliant during 20/21. The 90.91 figure is confirmed by the NIEA and the email from NIEA for AIR21 was shown in the audit as evidence of source data.

Line 26: Reporting consistent with Table 40a which sets out full details of the UID improvement delivery. 1 UID was delivered in 20/21 at Islandreagh WwPS and signed-off as operational on 31st March 2021. Confidence Grade A1 based on NIEA sign-off against guidelines on Beneficial Use.

PC15 period total was 56 in the original baseline, and NIW has delivered 60 in total during the period. However, a revised target of 76 was agreed, of which NIW has delivered one output with the rest rescheduled to be delivered in the PC21 period.

Line 27: Improvements were made to 3 WwTW sites: Ballybogy, Greyabbey and Ballyvoy. All sites were sign-off as beneficially complete by NIEA during March 2021 on the basis of successful sampling programmes. Reporting is consistent with Table 40A.

The in-year target of 7 sites has not been achieved. The sites not completed in 20/21 are Ards North (x3 sites) and Ballykelly.

Confidence Grade of A1 based on NIEA sign-off of two-week sampling programme.

Line 28: 12 WwTW sites were delivered as part of the Rural Wastewater Investment Programme for sites <250pe. NIEA set the standards for design and then monitor treatment performance through the commissioning process, signing-off on the sampling programme, before shifting the consent conditions to descriptive. 12 sites delivered against an in-year target of 8, though additional sites were catch-up from previous years. Therefore, the in-year target has been achieved, but NIW has failed the PC15 period target (44 outputs have been claimed against a period target of 45). Outputs are signed-off by NIEA on the basis of 2-3 samples rather than the two-week programme required for larger sites, and this is reflected in the A2 Confidence Grade.

Line 29: 128 CSO monitors were installed in-year bringing the PC15 total to 279 and achieving the target for the period. NIEA has agreed that all installation criteria have been met and that the reporting methodology developed by NIW is consistent with NIEA requirements.

Line 30: Two WwTWs were upgraded to comply with PPC Regulations during the period. A commitment was made at PC15 to undertake a programme of upgrades profiled across the 5-year period. The PPC outputs defined for the reporting year were Magherafelt and Strabane WwTW and beneficial completion of both schemes was achieved on March 31st, 2020.

Line 31: No Impermeable surface water was removed from the combined sewer system in 20/21. The target for the PC15 period was met prior to 20/21, therefore the 20/21 target was 0. Outputs are reported and evidenced via the CPMR system.

Line 32: No sustainable WwTW solutions delivered for site >250 PE. No target. NIW had hoped to deliver Ballykelly WwTW output early, but this will now complete in PC21.

Line 33: Reported as 0 but being revised at the time of the audit to show 1 sustainable WwTW solution delivered for sites <250 PE. Lisnagunogue WwTW, one of the 12 sites contributing to Line 28, has had solar panels installed as part of the enhancement scheme, which meets the requirements for reporting against Line 33 in line with the criteria defined in the FD.

Target in PC15 period was 3, which has been achieved. Confidence Grade of A1 based on sign-off from NIEA as meeting the criteria for beneficial use. We can confirm that NIW has updated the post-audit version of Table 16 to reflect the Lisnagunogue output in Line 33.

4. Summary of Audit Checks

We have reviewed the Word and Excel files provided by NI Water during and following the audit, including review of workbooks containing source information and the calculations underpinning the figures reported in Table 16.

5. Confidence Grades

Rationale for confidence grades was reviewed in the audits. We found documentation and rationale for confidence grades to be consistent. Highest grades are assigned where outputs are signed off by NIEA.

6. Challenges to the Company, Recommendations & Suggested Actions

Challenges & Resolution:

a) Error found in figures reported for Lines 20 and 21 related to the exclusion of the 6 Omega PPP Wastewater treatment sites. Agreed audit action to correct the figure in Line 20 to include the 6 wastewater PPP sites and to re-run the calculation for Line 21 to reflect the corrected figure in Line 20. We can confirm that NIW corrected the Line 20 and 21 numbers post-audit, in response to our audit feedback.

b) Figure reported in Line 33 required update (in progress at the time of audit). Action: Update Table 16 to reflect the Lisnagunogue sustainable improvement output in Line 33. We can confirm that NIW has updated the post-audit version of Table 16 to reflect the Lisnagunogue output in Line 33.

Recommendations:

None.

SUMMARY OF AUDIT FINDINGS

Table 40 – Capital Investment Monitoring. Columns 1-72.

PREPARED BY	X
DATE	9 June 2021

Rating	Meaning
	No material exceptions and compliant with requirement
	Content with the reported data but supporting information needs to be complete and/or improvement identified for AIR22, or other noteworthy comment
	Minor exceptions
	Material exceptions
N/A	Not applicable to report

1. Key Findings

The key findings of the AIR21 Table 40 audit, against the AIR21 Table criteria are summarised below.

AIR21 Table Criteria	RAG	Assessment
Independent review of performance against PC15 target (where relevant)		Varied performance on progress on the schemes audited. Overall, an under delivery of the water non infrastructure programme and full delivery of the expected sewerage service was noted. We note that there a number of reasons for the lack achievement of the BP targets for some schemes - these include the shortfall in the Company's 2019-20 FD15 funding which resulted in late start of multiple projects, with consequences for failure to achieve beneficial use on nominated outputs.
Methodology – consistency with the reporting process with clear control points		At audit, the overall methodology was demonstrated and is consistent with current reporting process. The Line Methodology for Table 40 provided has been finalised and provided this year. It is written in an instructional manner at a high level of detail. We suggest that NIW improves the AIR21 evidence of document control for AIR22.
Assumptions – reasonableness and applicability		Reasonable and appropriate assumptions applied. Mis-coding of some PC identifiers.
Source data – completeness		Source data is taken directly from the Capital Programme Monitoring and Reporting (CPMR) system, with good reconciliation with Oracle data, and Business Case information. Programme changes and output dates are captured within the CPMR.
Clarity of audit trails – evidence of appropriate audit trail		Audit processes and evidence of approvals were seen within CPMR.
Confidence grades – documentation of appropriateness and rationale		N/A. But we note that project information in CPMR reconciles well with the more accurate financial information from Oracle and are subject to NIW's ongoing quarterly reviews.
Governance – evidence of quality assurance and of final sign-off		Through our audits, we have seen evidence of good governance covering both financial and project output information.

- NI Water's method for proportional allocation of expenditure is applied consistently across the capital programme areas as set out in the Company's Capital Investment Driver Allocation (CIDA) manual. The rules set out are reasonable and are followed in the sample checks audited. We did not identify any material concerns in this regard.
- We note from Table 40 that the overall expenditure in 2020-21 of £174.711 (nominal, excluding IFRS and INTERREG adjustment lines), when adjusted to 2012-13 prices using OBR RPI inflation is equal to

£144.04m. This is £9.36m above the baseline FD of £134.68m (2012-13 prices). These values are consistent across Table 40 and the relevant commentaries. We also note that NI Water (or NIW) was not fully funded to the FD.

- We identified variances between actual and forecast spend from the acceleration of Clear Water Tank schemes (in sub programme 06) and reprofiling of waste water projects into the PC21 period, due to delays introduced by land issues and COVID impacts. Phase 1 of Queens Bridge Syphons remains one of the largest project overspends in PC15.

- We also identified underspend in the Water Mains Rehabilitation subprogramme (08. Base maintenance spend in 2020-21 was also managed in 2020-21 with a spend of £80.20m against a baseline of £89.26, and will continue into the PC21 period.

2. Audit Scope

The initial audit was carried out on 25th May against the principles and requirements of the UR guidance. The Reporter Letter's specific UR guidance for Table 40 states that:

- ❑ *The Reporter should carry out a sample audit of schemes in accordance with the requirements set out in Section 4.0 of Chapter 40 and Section 4.0 of Chapter 30 of the AIR21 information requirements. Any issues with the proportional allocation of expenditure and the appropriateness and consistency of interpretation/application of the Company's Capital Investment Driver Allocation (CIDA) guidance should be highlighted.*

The Capital Investment Monitoring' audit of Table 40 focused on NIW's data table, with the Table 30 commentary, and line methodology documents provided after the initial audit.

We sampled schemes/projects in Table 40 across scheme types to examine the proportional allocation of expenditure, the appropriateness and consistency of interpretation and application of the company's CIDA guidance. The sampled schemes include those from the sub-programmes highlighted in the UR's guidance for AIR21 reporting and are schemes which contain significant costs in the coming years. A range of PC nominated and non PC nominated schemes were chosen. These are shown in Table TC_40_1.

Table TC_40_1: Sample Schemes for Audit

Sub-programme	Scheme audited		PC Project Period	PC nominated
Wastewater treatment works (16)	X	X	PC15 project outside other categories (06)	Yes
Service reservoirs and clear water tanks (06)	X	X	Project expected to be completed before PC21 start, no carry over (01)	Yes
Sewerage programme – Unsatisfactory intermittent discharges (12)	X	X	Rolling project with continual outputs (00)	Yes
Water trunk mains (05)	X	X	PC15 project outside other categories (06)	Yes
Wastewater treatment works (16)	X	X	Project begins and completes in PC15 (03)	Yes
Watermains rehabilitation (08)	X	X	PC15 project outside other categories (06)	Yes
Leakage sub-programme (09)	X	X	Rolling project with continual outputs (00)	No

3. Performance and Significant Events

Performance against PC15 targets

We audited schemes, the majority of which form the PC15 nominated outputs in Table 40a 'Nominated Outputs Delivered by PC15 Capital Projects and Programmes of Work' against the information given in Table 40 'Capital Investment Monitoring' and the associated commentary given in Table 30. The outputs

were found to be consistent across these documents. Our commentary from the audit of these schemes with PC15 nominated outputs are summarised as follows:

- *X – Wastewater treatment works (16)*
  This scheme, a part of the Living With Water Programme (LWWP), does not have baseline milestone dates to compare performance against as it is a reportable only PC15 nominated output. The scope of the scheme is to add an ASP lane as there is currently insufficient capacity to take the existing lanes out of supply for maintenance. Some delays to the intended programme were described during the audit, linked to the high profile nature of this scheme within the LWWP programme.

  The planned completion date of summer 2022 is considered reasonable. The scheme's output is expected to be delivered in the PC21 period.

- *X – Service reservoirs and clear water tanks (06)*
  Baseline information indicates that this project was due to achieve Beneficial Use by the end of March 2021 in PC15. Minor delays meant that the project is now planned to be completed in September 2021, pushing the achievement of Beneficial Use date into PC21. The delays are understood to be due to changes in project scope, with an increase in costs over the next two years from £9m to £11m.

- *X – Sewerage programme – Unsatisfactory intermittent discharges (12)*
  There are no baseline milestones in Table 40. However, it was noted that the scheme has been delayed due to inability to deliver the benefits before the dependent tunnel project progresses.

- *X – Water trunk mains (05)*
  There are no baseline milestones in Table 40. However it was noted that the first phase of the project was intended to be delivered in PC15 with Phase 2 in PC21. NIW considers that the project is on track to meet the May 2022 completion date of the PC21 period.

- *X – Wastewater treatment works (16)*
  This project had a baseline Beneficial Use in 2017. However securing the land required to commence the project has been a significant barrier. In the last year the impact of COVID was also attributed to the delays with the scheme now expected to reach completion in year 2 of PC21, 2022-23.

- *X – Watermains rehabilitation (08)*
  There are no baseline milestones in Table 40. However it was noted that the outcome of this project contributes to wider mains rehabilitated targets, measured using a 'km of main rehabilitated' type metric. No forecast Beneficial Use date is detailed. However, NIW considers that the scheme is on track, and that an end date of 30th June 2021 is achievable.

- *X – Leakage sub-programme (09)*
  This project was chosen as it has the highest expenditure line within the leakage sub-programme. It is a rolling project and therefore no milestones are recorded. Expenditure is confined to the PC13 and PC15 periods.

Expenditure projections

We reviewed the scheme expenditures to date against baseline information and considered the suitability of future projected spend to deliver the required outputs.

Table TC_40_2 presents this information for the schemes selected for audit, based on NIW's Table 40 submission.

Table TC_40_2: Assessment of Expenditure Projections – Sample Schemes

Sub prog	Scheme name	Actual and forecast spend (£m)			BU date	Reporter agreement (✓/X)
		PC13 (2013-15)	PC15 (2015-21)	PC21 (2021-27*)		
16	X	-	19/20 = 0.320 20/21 = 3.492	21/22 = 5.506 22/23 = 1.929	Baseline: n/a Projected/Actual: n/a	✓
06	X	13/14 = 0.055 14/15 = 0.108	15/16 = 0.012 16/17 = 0.005 17/18 = 0.154 18/19 = 0.822 19/20 = 4.351 20/21 = 7.334	21/22 = 1.170	Baseline: 31/03/2021 Projected/Actual: Not detailed	✓
12	X	-	15/16 = 4.807 16/17 = 4.594 17/18 = 0.913	-	N/A rolling project	✓
05	X	-	17/18 = 0.040 18/19 = 0.089 19/20 = 0.655 20/21 = 2.455	21/22 = 2.311 22/23 = 1.277 23/24 = 1.089	Baseline: n/a Projected/Actual: n/a	✓
16	X	13/14 = 0.036 14/15 = 0.056	15/16 = 0.012 16/17 = 0.046 17/18 = 0.059 18/19 = 0.133 19/20 = 0.099 20/21 = 0.951	21/22 = 4.559 22/23 = 0.667	Baseline: 28/02/2017 Projected/Actual: Not detailed	✓
08	X	-	16/17 = 0.200 17/18 = 0.000 18/19 = 0.720 19/20 = 1.822 20/21 = 1.318	21/22 = 0.390	Baseline: n/a Projected/Actual: n/a	✓
09	X	13/14 = 2.442 14/15 =2.309	15/16 = 1.895 16/17 = 1.872 17/18 = 1.629 18/19 = 1.741 19/20 = 2.804 20/21 = 2.804	-	N/A rolling project	✓

*PC21 expenditure in Table TC_40_2 has been forecast as far forward as 2023-24 only at this time.

- *X – Wastewater treatment works (16)*
  The actual and forecast spend profile for this scheme appear appropriate and are in line with the planned completion date. No baseline is provided in the populated Table 40 for this scheme.

- *X – Service reservoirs and clear water tanks (06)*
  The expenditure profile indicates that this scheme is on track to meet its completion date. Changes in project scope were identified as the reasons for increase in costs in next two years from £9m to £11m.

- *X – Sewerage programme – Unsatisfactory intermittent discharges (12)*
  Expenditure of £10.3m was confined to the period between 2015-16 and 2017-18 in the baseline profile. However, the interdependency of this scheme with an adjacent tunnelling project which was delayed meant the benefits of the scheme could not be realised until the tunnelling project is complete. For this reason expenditure of £7.5m is justifiably remaining to be spend between 2020-21 and 2023-24.

- *X – Water trunk mains (05)*

There is no baseline expenditure in Table 40. However it was noted that there has been a significant increase in expenditure following ECI involvement and scoping work with the forecast expenditure rising from £4.7m reported in the AIR20 submission to £7.9m in this submission. The project is forecast for completion in May 2022, but with a further spend of £1m+ in 2023-24. We queried this with the Company.

- *X – Wastewater treatment works (16)*
  Baseline expenditure for this scheme of £1.56m of spend in 2016-17 has been significantly altered due to issues securing land. Land challenges and the associated delays have resulted in increased forecast costs at completion of £6.7m in Year 2 of PC21, 2022-23. Originally a pump away solution, the scope has also developed in line with the NIEA consultation.

- *X – Watermains rehabilitation (08)*
  There is no baseline expenditure in Table 40. However minimal expenditure remains in 2021-22 in line with the completion milestone, which is at the end of June 2021.

- *X – Leakage sub-programme (09)*
  There is no baseline expenditure in Table 40. However this rolling project has had consistent actual expenditure reported throughout PC13 and PC15, with annual spend ranging between £1.6-2.8m.

Proportional allocation

We reviewed the service cost allocation and purpose allocations applied by NIW, to the schemes audited, with findings outlined in Table TC_40_3.

Table TC_40_3: Proportional Allocation Assessment – Sample Schemes

Sub prog	Scheme name	Service cost allocation (%)				Purpose allocation (%)				Reporter agreement (✓/X)
		W Infra	W Non Infra	S Infra	S Non Infra	Q	B	E	G	
16	X	-	-	-	100	-	-	-	100	✓
06	X	22	78	-	-	-	-	100	-	✓
12	X	-	-	100	-	2	-	98	-	✓
05	X	100	-	-	-	-	-	-	100	✓
16	X	-	-	-	100	67	18	-	15	✓
08	X	100	-	-	-	57	43	-	-	✓
09	X	67	33	-	-	-	52	-	48	✓

At audit, NIW demonstrated the values highlighted in Table TC_40_3 through the CPMR system. We can confirm that the proportional allocation values have been calculated accurately using CIDA manual.

- *X – Wastewater treatment works (16)*
  This scheme has been allocated 100% to the sewerage non infrastructure service cost allocation and 100% to the supply demand balance (SDB) purpose allocation. Both of these allocations are correctly assigned for this type of scheme.

- *X – Service reservoirs and clear water tanks (06)*
  The service cost allocation has changed from 100% Water Non-Infra to 22:78% with the smaller portion now assigned to Water Infra, the purpose allocation has changed from 100% supply demand balance (SBD) to 100% ESL (enhance).

  We consider that the changes made are appropriate, consistent with the scheme development and project evolution.

- *X – Sewerage programme – Unsatisfactory intermittent discharges (12)*

The baseline service cost allocation of 100% Sewerage Infra remains as forecast. The baseline purpose allocation of 100% to ESL (enhance) has been reduced to 98% with 2% now assigned to quality. This has been revised appropriately, with a better definition of the project scope.

- *X – Water trunk mains (05)*
  There are no baseline service cost or purpose allocations in Table 40. The scheme is assigned 100% to Water Infra service cost allocation, and 100% growth for purpose allocation. We agree with NIW that these allocations are appropriate for the nature of the scheme.

- *X – Wastewater treatment works (16)*
  The baseline service cost allocation of 57% Sewerage Infra and 43% Sewerage Non-Infra has been adjusted in the forecast to 100% Sewerage Non-Infra in line with the scope of this project. The baseline purpose allocation of 56% growth, 24% quality and 20% supply demand balance (SDB) allocation has been adjusted slightly in line with the scheme scope to 67%, 18% and 15% respectively. This project was originally envisaged as a pump away solution. However it has increased in scope to a WwTW following NIW's consultation with the NIEA.

- *X – Watermains rehabilitation (08)*
  There are no baseline service cost or purpose allocations in Table 40. The 100% Water Infra service cost allocation and 57% quality, 43% base purpose allocations are both considered reasonable.

- *X – Leakage sub-programme (09)*
  There are no baseline service cost or purpose allocations in Table 40. The service cost allocation is split 67% Water Infra, 33% Water Non-Infra. The purpose allocation is split 52% base, 48% supply demand balance (SDB).

4. Summary of Audit Checks

Methodology

The method used by NIW to produce its Table 40 submission is documented. The steps involved were demonstrated during the audit. Supporting documents produced by the Company for Tables 30, 40 and 40a inform and demonstrate consistency with Table 40. The data tables and commentaries for these tables are in line with the requirements of the UR guidance.

The Line Methodology clearly details data sources, processes and reconciliation checks required. IFRS and INTEREG line adjustments neatly resolve differences in between CPMR and financial reporting. Reconciliation checks described in the method statement were discussed during the audit and were consistent with previous AIR audits, with rounding taking place differently on each system, suitably reconciled for the reporting table. Differences of £1k considered acceptable, greater variances (>£2k) are queried with the finance team. Justifications for reconciliation changes are communicated via email, and are often due to month end close out discrepancies which can be resolved.

Audit checks for allocation discrepancies across the Table 40 reporting lines did not identify any concerns, lines did not exceed 100% allocation supporting the success of previously introduced internal reconciliation checks. Audit discussion highlighted that Primavera P6 EPPM software is now beginning to be used to develop project programmes for input to CPMR. It is hoped that the introduction of this software will bring automation benefits in future updates of beneficial use and milestone dates, as projects progress.

Source data

The two primary data sources of Table 40 data sets are the CPMR governance system (the Capital Programme Monitoring and Reporting) and the financial system, Oracle.

Clarity of audit trails and governance

The governance process was explained by the Company during the audit. It was evident that the gated processes set out are followed, with spot checks across the audit sample, meeting sign off expectations. The Company explained how business cases are submitted to a Capital Investment Panel with key internal senior stakeholders approving expenditure and project progression.

5. Confidence Grades

Confidence grades are not applicable to Table 40 entries.

6. Challenges to the Company, Recommendations & Suggested Actions

Challenges & Resolution:

Through our audits, we asked NIW to:

a) Provide its Table 40 line methodology as well as its Table 30 and Table 40 commentary documents which were not available during the initial audit. This action was fulfilled post audit.

b) Confirm that PC identifiers have been correctly assigned as per Table A1 [PC Period Identifier] of the UR's reporting requirements document for Chapter 40. On occasion in the audit sample, PC identifiers used in Table 40 did not appear to align with the guidance. For example, a project named 'X' suggests a discrete phase of works, however it is assigned to the '00' rolling project with continual outputs PC identifier. We queried this with the Company.

c) The Northern WRZ Resilience (JL790) project is forecast for completion in May 2022, but with a further spend of £1m+ in 2023-24. We also queried this with the Company.

Recommendation:

We suggest that NIW ensures that projected/actual Beneficial Use date checks/updates are part of future AIR reporting process so that project managers are involved with populating this field ahead of reporting and audit. This information was absent for projects JS274 and KS235 at the AIR21 audit.

SUMMARY OF AUDIT FINDINGS

Table 42 – PPP reporting. Lines 1-52

PREPARED BY	X
DATE	16 June 2021

Rating	Meaning
	No material exceptions and compliant with requirement
	Content with the reported data but supporting information needs to be complete and/or improvement identified for AIR22, or other noteworthy comment
	Minor exceptions
	Material exceptions
N/A	Not applicable to report

1. Key Findings

The key findings of the AIR21 Table 42 audit, against the AIR21 Table criteria are summarised below.

AIR21 Table Criteria	RAG	Assessment
Independent review of performance against PC15 target (where relevant)	N/A	There are no PC15 targets for T42 Lines 1-52.
Methodology – consistency with the reporting process with clear control points		The methodologies are coherent and consistent with the reporting process. The main exception to this is Line 52. For aspects of the Line 52 data entries, we identified a mismatch between the approach used by NI Water when set against the UR guidance processing rule. NI Water explained the basis of its approach, matching the available data sets. We suggest that the Company engages with the UR with respect to sludge tracking data expectations. The methodology for calculation of Lines 23 & 24 was queried for values below Level of Detection (LOD). The Auditor can confirm that this was resolved in the post-audit documents.
Assumptions – reasonableness and applicability		Through our audits we have seen evidence of reasonable assumptions.
Source data – completeness		A number of additional documents were provided post-audit to show evidence of source data.
Clarity of audit trails – evidence of appropriate audit trail		There were several formatting/ text issues identified in the pre-audit line methodologies and commentaries. Additionally, errors were found in Lines 23, 24 and 40 of the data table. The Auditor can confirm that these amendments have been addressed within post-audit documents. Formatting/ text issues were also identified within the pre-audit data table for lines 25, 26, 27, 35, 36 and 41. In general clear evidence was provided during the audit to demonstrate compliance with the UR guidance.
Confidence grades – documentation of appropriateness and rationale		The only change in confidence grade from AIR20 was for Line 49. This change was justified, and our reviews and audits support the reported confidence grades. Although, COVID-19 affected the sampling of the loads received by the STW's NI Water confirmed that NIEA were happy with this process due to the unprecedented circumstances of the pandemic.

AIR21 Table Criteria	RAG	Assessment
Governance – evidence of quality assurance and of final sign-off		The SharePoint workflow process is in place for document checks and approvals.

2. Audit Scope

Audits of Table 42 data were carried out on the 26th May, 3rd June and 4th June against the principles and requirements of the UR guidance for reporting. Our audits consisted of a series of Teams conference calls with NI Water's staff responsible for the preparation of the AIR21 data and the PPP contracts team.

Through the audits we reviewed methodologies, commentaries, data tables and additional supporting documents. An additional post-audit call was also arranged on 7th June to discuss the additional documents sent post-audit for Lines 21-22 and 25-52.

3. Performance and Significant Events

Block A – Project description

Line 1-6 is the Project Description (static and factual data relating to the PPP contracts).

No changes from the AIR20 reports.

Block B – Payment to PPP concessionaire

Line 7 is the Unitary charge for capacity and only applies to the Alpha sites, which are paid monthly to the concessionaire on invoice.

Since AIR20 costs have increased by an inflationary amount. During the audit it was noted that not all the unitary charge for capacity is subject to inflation which is why the percentage increase (1.14%) is lower than inflation. The values in this line are consistent with the supporting document provided for audit and on file as *'AP8 03 0010 Income Statement Charge Test 2020-21.xlsx'*.

Line 8 is the Unitary Charge for variable charges and applies to all PPP concession sites, which are paid monthly to the concessionaire on invoice.

Compared with the AIR20 report the total variable charge for Alpha, Omega and Kinnegar sites have increased. The increases where stated to be due to inflation and flow variations. Omega and Kinnegar were also affected by indexation of charges, and Kinnegar additionally affected by increases in SS and BOD volumes. We can confirm that NIW's explanation of movements in the commentary for Alpha and Omega matched the information contained within the data table supporting documents on file as: *'Alpha volumes AIR21 vs AIR20.xlsx'* and *'WW Volumes AIR20_21.xlsx'*; and for Kinnegar matched *'Kinnegar 2001-2020 Trends.xslx'*.

Line 9 is the Unitary Charge deductions, these are applicable to all PPP concession sites. However, for the 2020/21 report year the only recognised (undisputed) deductions were for Alpha sites. No deductions are included in Line 9 for the Omega or Kinnegar sites.

Through prior agreement with NI Water the Alpha contractor submit invoices which include the recognised performance deductions. For the 2020/21 report year a total of X performance deductions were made, this is a smaller deduction than in AIR20 (X). We identified that the significantly smaller deductions in AIR21 deductions compared with AIR20 were due to the temporary relaxation of contracted Water Quality standards rather than improvements in assets or operation. Through our audits, we established that sufficient information was provided to justify the deductions, and the values were consistent with the supporting document provided for audit on file as *'AP8 03 0010 Income Statement Charge Test 2020-21.xlsx'*.

The Auditor notes that the Omega and Kinnegar sites obtained disputed performance deductions during the report year which have not been credited; therefore, these are not included within Line 9.

Line 10 is the cost of atypical expenditure incurred by the concessionaire.

All three concessionaires incurred atypical expenditure in 2020/21. This included any payments or credits agreed in monthly invoices between the parties beyond the Unitary Charge payments due and includes provisions for claims.

The reported AIR21 atypical expenditure for Alpha (X) was slightly more than AIR20 (X), Kinnegar had gone from AIR20 (X) to AIR21 (X), and Omega reduced from X (AIR20) to X (AIR21).The values in this line are consistent with the supporting document provided for audit on file as *'AP8 03 0010 Income Statement Charge Test 2020-21.xls'*.

Line 11 is the Efficiency Gains at the PPP contract level.

Some changes for cost reductions have resulted in efficiency gains in the report year against the baseline contract at award. During AIR21, efficiency gains of X and X have been achieved by the Alpha and Omega schemes respectively. These are slightly larger efficiency gains (more negative) than AIR20. There are no new efficiency measures since AIR20.

Line 12 is the Total PPP payments and is the sum of Lines 7-10.

This line is also the source data for Table 43 line 4, the Auditor can confirm that the values are consistent with Table 43. The values are also consistent with the supporting document provided for audit on file as: *'AP8 03 0010 Income Statement Charge Test 2020-21.xls'*.

Line 13 is the Capital Repayment line. It relates to paying off finance lease liability.

The reported numbers are consistent with the extracts of the Company's financial accounts for Alpha and Omega provided in the commentary. The Alpha, Kinnegar and Omega numbers are consistent with the supporting document provided for audit and on file as: *'Finance Lease Repayments – All Contracts.xlsx'*. This report line applies to all PPP contract areas and has increased for all contracts since AIR20.

Line 14 is the Maintenance line.

This line is allocated based on a straight-line assumption over the life of the contract following a change implemented in 2013/14. This reflects the assumption that the unitary charge does not fluctuate with changes in the capital maintenance spend in any year. The straight-line amount has been allocated to the sites on the basis of the total amounts included in the original contract's financial models. The line commentary explains the allocation by site and is sufficiently detailed and supported by the document *'Finance Lease Repayments – All Contracts.xlsx'* provided for audit. The values have not changed since AIR20 as expected.

Line 15 has been deleted and is no longer used.

Line 16 is the Atypical Payments Capitalised.

The Company has provided a nil return for this line for all three PPP contracts, resulting in no change from AIR20.

Line 17 is the Total Capitalised PPP payments and calculated by the summation of lines 13 to 16.

The Auditor can confirm that the line has been correctly calculated. The total capitalised payments have increased for all contracts since AIR20 and we identify that this is because of the increase in capital repayment within Line 13.

Line 18 is the Total PPP Expensed and is the summation of line 12 (Total PPP Payments) minus line 17 (Total Capitalised).

This line calculates the total charge to the Profit & Loss (P&L) account throughout the reporting year arising from payment of PPP contracts. The AIR21 charge to the P&L account has increased for Alpha, Kinnegar and Omega since AIR20.

Line 19 is the Interest.

This applied to all PPP contracts, the entries to this line represent the notional interest on the finance lease. As expected, the interest for all PPP contracts have gone down since AIR20. The values in this line are consistent with the supporting document provided for audit and on file as: *'Finance Lease Repayments – All Contracts.xlsx'.*

Line 20 is the Total PPP Opex and is calculated by subtracting Line 19 (Interest) from Line 18 (Total PPP Expensed). The Auditor can confirm that his line has been calculated correctly.

Block C – Water Distribution Data
Line 21 is the Distribution Input (DI).

The reported data is only relevant for the Alpha PPP Contract. The line is expected to be linked to Table 10 Line 26, the Auditor can confirm that the Table 10 line 26 commentary matches this line. The total DI across Alpha sites is 267.96Ml/d [AIR21] which is an increase from the reported AIR20 value (258.58Ml/d). The reported Alpha values are consistent with the supporting document provided for audit on file as: *'Average head updated 2020-21 GWD #1.xls'*.

The confidence grade is stated as B2 which is appropriate for the reported data.

Line 21a is the Water Treatment Works Capacity.

This data is specified in the contract arrangements for each site in the Alpha contract. The reporting guidance refers to this as 'Q_{minreq}' for each site and in line with the Alpha Contract requirements. There has been no change to the minimum required capacity in the report year. The Auditor found that the confidence grade for the line is appropriate at A1.

Line 22 is the Length of Mains.

This is the length of the DBFO link main from Castor Bay to Forked Bridge, that the Alpha Ops Contractor manages. This length of main was derived from "as-built" record drawings and is used in Table 11 Line 12. However, as Table 11 Line 12 is not within the Reporter's AIR21 Audit Scope, consistency across the Tables has not been checked. There has been no change in the 16.42km length of main and confidence grading of A2 between AIR20 and AIR21.

Block D – Water Resource and Treatment Data
Lines 23 & 24 reports the Turbidity 95%ile greater or equal to 0.5NTU and Turbidity 95%ile less than 0.5NTU respectively. These lines only apply to the Alpha sites which are Moyola, Ballinress, Castor Bay, Dunore Point and Forked Bridge.

The Auditor notes that X take the samples which are then analysed in-house at the NI Water laboratory. Data is fed back into NI Water's Laboratory Information Management System, LIMS, from which compliant information can be extracted. The LIMS compliance manager extracts the raw sample data via a software query applied to the database. It was discussed during the audit that the SQL used to extract data had been updated since AIR20. NI Water stated that the update to the query doesn't change reported numbers, but it has helped to further automate the process and output values that previously had to be manually calculated. We consider that the confidence grade of A2 applied to these lines are appropriate in view of the analytical data variables present in the data sets.

We note that the line methodology referenced the 2017 water quality regulation, whereas at AIR20 referred to the 2010 regulations. NI Water stated that the AIR20 methodology should have referred to the 2017 regulations. However, NI Water confirmed there have been no updates in the turbidity elements of the regulations that would have affected Lines 23-24 between the 2010 and 2017 regulations.

The effect of COVID-19 was discussed during the audit and it was confirmed by NI Water that there was no shortfall of turbidity water treatment samples. Additionally, the effect of the 'Temporary reduction in Water Quality Performance measure (2020)' was queried during the audit and it was confirmed that this measure had no effect on lines 23 and 24.

Line 25 is the Source Type.

The source type is only applicable to the Alpha PPP sites. There is no change to the reported sources in this line from AIR20. The reported inputs should correspond with the inputs in Table 12 (Block A). As Table 12 is excluded from the Reporter's AIR21 Audit Scope, consistency has not been checked. The confidence grade for the line is appropriate at A1.

Line 26 is the Treatment Type.

The treatment type is only applicable to the Alpha PPP contract. There is no change to the reported treatment types in this line from AIR20. The reported inputs should be consistent with the inputs in Table 12 (Block B). As Table 12 is excluded from the Reporter's AIR21 Audit Scope consistency has not been checked. Balinrees, Castor Bay, Dunore Point, and Moyola are all reported as a W4 category, this is the category intended to capture processes with very high operating costs. The confidence grade for the line is appropriate at A1.

Line 27 is the Average Pumping Head (APH).

The AIR21 reported APH values are compared with the AIR20 values in the table below:

	Report Year	Balinrees	Castor Bay	Dunore Point	Moyola	Total
APH (m.hd)	AIR20	127.4	138.0	173.0	146.5	152.1
	AIR21	132.3	138.0	173.0	146.4	153.0

The derivation of the APH values is part of Table 12 methodology and commentary which are outside the scope of the Reporter's Audits for AIR21, therefore, this has not been reviewed. The values in this line should be consistent with data in Table 12 Line 5. However, as Table 12 is outside of the Reporter's AIR21 Audit Scope consistency has not been checked. The values in this line are consistent with the supporting document provided for audit and on file as: *'Average head updated 2020-21 GWD #1.xls'*.

Block E – Sewerage Data

Lines 28 & 29 are the Total length of sewer & Total length of critical sewer respectively. These two lines apply to two sites in the Omega Contract: Ballynacor and North Down.

The Auditor notes that the lengths have been derived from "as-built" sewer records and have not changed from previous years (21.13km). In the line methodology it is stated that Ballyrickard, Richhill and Armagh sites also have pipelines. During the audit it was established that these pipelines are of insufficient length of main to record in line 28. Additional text was added to the line methodology post-audit to clarify this point. The confidence grades for these lines are appropriate at B2.

Block F – Sewage Treatment and Disposal Data

Line 30 is the Population equivalent of total load received.

The data is provided by the Omega & Kinnegar Ops Contractors. This line is derived from measured total load highlighted in Line 31, using standard industry value of 60g BOD per person per day in the calculation.

The line methodology and the UR guidance for the data table states that this line is consistent with Table 15 line 6 and Table 17b line 2 respectively. However, as both Table 15 and 17b are excluded from the Reporter's AIR21 Audit Scope, consistency has not been checked.

The AIR21 Omega total has gone down since AIR20; whereas, the Kinnegar AIR21 value has gone up. The values in this line are consistent with the supporting documents provided for audit on file as: *'Kinn BOD pe.xlsx', 'Kinnegar Total % Performance 2020 21 NIAUR.xls'* and *'Predicted PE – AIR21.xlsx'*.

Line 31 Load received by STW's.

The total load is based on analytical data derived from samples taken from the inlet of all the PPP wastewater treatment works. The line methodology and data table stated that this line is consistent with Table 17d. However, as Table 17d is excluded from the Reporter's AIR21 Audit Scope consistency has not been checked.

The AIR21 Omega total has gone down since AIR20; whereas, the Kinnegar AIR21 value has gone up. The values reported for this line are consistent with the supporting documents on file as: *'Kinn BOD pe.xlsx', 'Kinnegar Total % Performance 2020 21 NIAUR.xls'* and *'Predicted PE – AIR21.xlsx'*.

The effects of COVID-19 on this line numbers were discussed during the audit. NI Water stated that COVID-19 may have contributed to some of the differences in loads between AIR20 and AIR21. For example, Ballynacor AIR21 value (X kg BOD/day) had reduced from its AIR20 value (X kg BOD/day). The Company noted that closure of a number of food businesses associated with Ballynacor at various points during the pandemic is likely to be a contributing factor. The reduction in sampling due to COVID-19 was also discussed. NI Water stated that there had been less samples taken over the year for Kinnegar due to COVID-19. NI Water confirmed that the COVID-driven sampling arrangements were agreed with NIEA.

Lines 32-36 STW Consents Data.

These lines are related to the consents data namely: Suspended Solids, BOD5, COD, Ammonia and Phosphates for the associated works. The consents data are derived from the Water Order Consent held by the Contractor for each of the sites which have been provided by the NIEA. The Water Order Consents are set on lower and upper tier limits with pass/ fail being based on look up tables, a breach of the upper tier limits being classed as a failure. The applied confidence grades of A1 are deemed appropriate for these lines. The UR guidance states that these lines should be consistent with Table 17b. However, as this table is not within the Reporter's AIR21 Audit Scope consistency has not been checked.

Line 37 is the Classification of Treatment Works.

There has been no change to the treatment facility classifications since AIR20. The UR guidance states this line should be consistent with Table 17b line 8 and the line methodology states it should be consistent with Table 17c and 17d. These tables are outside of the Reporter's AIR21 Audit Scope so no further comment can be made. The applied confidence grade of A1 is appropriate.

Line 38 is the Size band of sewage treatment works.

This is related to the size band based on BOD loading for each site (applied to Omega and Kinnegar sites). The inputs for this line have not changed since AIR20. The UR guidance states this line should be consistent with Table 17c and the line methodology also mentions it should be consistent with Table 17d. Both these tables are outside of the Reporter's AIR21 Audit Scope and therefore no further comment can be made. We consider that the confidence grade of B3 is appropriate.

Block G Sludge Treatment and Disposal Data

Line 39 is the Total sludge imported from NI Water.

This is the amount of sludge imported from the NI Water's operated sites (non-PPP sites) in the report year expressed in thousands of tonnes of dry solids (TTDS). The NI Water sludge is received at two sludge treatment sites, Ballynacor Sludge Disposal Facility and Duncrue St Sludge Facility. The sludge is measured by weigh bridges or slogger meters on receipt of the sludge at these sites and not on dispatch. The total sludge measured for AIR21 is X TTDS.

The AIR20 reported number for this line include sludge from Kinnegar. For AIR21, this year the Kinnegar values have not been captured. This is in line with the Reporter's recommendations for AIR20. The AIR21 values are consistent with the supporting document provided for audit and on file as: *'Table 42 Sludge Mass Balance 202021 AIR21 Version.xlsx'*.

The UR guidance states this line should be consistent with Table 17g. But as Table 17g is excluded from the Reporter's AIR21 Audit Scope, no further comment can be made. We consider that the confidence grade of B2 is appropriate.

Line 40 is the Sludge produced by the PPP facility.

This is the amount of sewage sludge resulting from the treatment of sewage on the PPP facility in the report year expressed in thousands of tonnes of dry solids (TTDS) of sludge produced. All sludge from the Kinnegar site is transferred to the incineration plant at Duncrue Street. A back calculation is used to establish the indigenous sludge at Ballynacor by subtracting the import slogger data (which records both inputs from NI Water and PPP facilities at North Down Ards, Ballyrickard, Richhill and Armagh) from the exported cake transferred to Duncrue Street. The reported values are consistent with the supporting document provided for audit and on file as: *'Table 42 Sludge Mass Balance 202021 AIR21 Version.xlsx'*.

NIW identified that COVID-19 potentially contributed to the decrease in sludge at Ballynacor, whilst Kinnegar was affected by difficulty in sourcing a replacement pump due to Brexit.

Line 41 is the Sludge exported to Duncrue Incinerator.

This is the amount of sewage sludge exported from the PPP facility to the PPP facility at Duncrue Street in the report year expressed in thousands of tonnes of dry solids of sludge produced. All sludge is delivered to Duncrue Street Sludge Treatment Facility, including all Company and PPP sludge, for incineration or for disposal through other alternative routes. Grit and screenings are excluded from this volume, as these will always end up at landfill sites. All NI Water's sludges are not included in this line but are captured in Table 42 Line 39. At Duncrue Street the sludge is either incinerated or disposed of by alternative disposal routes.

The Auditor notes that a confidence grade of B2 is applied to Line 41 data which has not changed since AIR20.

Line 42 is the Sludge Exported to Other PPP Facilities.

To avoid double counting with Line 41 this line does not include exports to sites where the sludge only passes through en-route to Duncrue. Zero entries were recorded in this line which is no change from AIR20.

Line 43 is the Sludge exported to NI Water.

The contract does not have provision for PPP sludges to be exported to NI Water. Zero entries were recorded in this line which is no change from AIR20.

Line 44 is the Sludge disposed of from site to - Farmland Untreated.

Zero entries were recorded against this line - no change from AIR20. The UR guidance states this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 45 is the Sludge disposed of from site to - Farmland Conventional.

Zero entries were recorded against this line - no change from AIR20. The UR guidance states this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 46 is the Sludge disposed of from site to - Farmland Advanced.

The PPP Contractor disposed of X TTDS of sludge in the report year [AIR20: X TTDS]. This decrease is due to the PPP Contractor's choice of alternative compliant disposal routes. The applied confidence grade of B3 is appropriate. The UR guidance states that this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 47 is the Sludge disposed of from site to Incineration.

This is the amount of sewage sludge disposed of, to incineration from the PPP facility in the report year expressed in thousands of tonnes of dry solids of sludge produced. This value is calculated as the total sludge received at Duncrue minus total sludge disposed off-site.

The AIR21 reported value is X TTDS being incinerated as the PPP contractor's preferred method of disposal, a slight increase since AIR20 [AIR20: X TTDS]. The Auditor considers that the applied confidence grade of B2 is appropriate. The UR guidance states this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 48 is the Sludge disposed of from site to – Landfill.

This is the amount of sewage sludge disposed of to landfill from the PPP facility in the report year expressed in thousands of tonnes of dry solids of sludge produced. The disposal route to landfill is mainly for grit and screenings. The Kinnegar Contractor disposed of some X TTDS of Screenings (no grit produced) while the Omega Contractor disposed of X TTDS of Screenings and Grit. The total disposed to landfill from Kinnegar and Omega during the report year was X TTDS which is an increase since AIR20 (X TTDS). The applied confidence grade of B3 is appropriate. The UR guidance states that this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 49 is the Sludge disposed of from site to – Compost.

The AIR21 value has been reported as X TTDS; whereas at AIR20 this line had entries of zero. Therefore, the confidence grade has changed to B3 (previously A1 at AIR20), NI Water explained the basis of the new confidence grade – the values originated from a contractor and cannot be verified. The UR guidance states that this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 50 is the Sludge disposed of from site to - Land Reclamation.

This is the amount of raw cake that was delivered to industrial sites during the report year. The PPP Contractor disposed of X TTDS via this disposal route during AIR21. This is an increase from AIR21 with X TTDS sludge disposed through this route. The UR guidance states this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 51 is the Sludge disposed of from site to - Other (Willow Coppice).

Zero entries are reported for this line - no change from AIR20. The UR guidance states that this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

Line 52 is the Sludge disposed of from site – Total.

This is the total amount of sewage sludge disposed through all discharge routes by the PPP concessionaire for the report year expressed in thousands of tonnes of dry solids of sludge produced, excluding any sludge returned to NI Water for further treatment or disposal. The UR guidance's processing rule for this line states that the line entry should be calculated as sum of Lines 44 to 51.

Most of the sludge from the individual PPP sites is exported to Duncrue to be disposed of. The disposal of this exported sludge is recorded in the Omega sludge service and totals columns, rather than split over the individual sites. Therefore, the only columns in the data table that comply the UR guidance's processing rule is the Omega sludge service (column Z) and totals columns (columns AB, AC and AE).

We note that the total sewerage service number is the sum of Lines 39 and 40 and that this equals to the line 52 entry. This shows that that the inputs and disposal of sludge are in balance. The UR guidance states this line should be consistent with Table 17g. As this table is outside of the Reporter's AIR21 Scope, consistency has not been checked.

4. Summary of Audit Checks

Through our audit, we checked NI Water's line methodologies, commentaries, data tables and supporting documents and we can confirm that these are consistent with the Company's Table 42 data entries.

5. Confidence Grades

The only change in confidence grade from AIR20 to AIR21 was for Line 49 'Sludge disposed of from site to – Compost'. We agree with NI Water's justification for this change in the Line 49 confidence grade for AIR21. Our reviews and audits support the reported confidence grades.

6. Challenges, Recommendations & Suggested Actions

Challenges & Resolution:

Through our audits, we asked NIW to:

a) Amend typos/provide clarifications on the numbers, commentary and methodology associated with a number of the Table 42 entries for Lines 7, 8, 9, 10, 12, 13 & 14. **We can confirm that our audit queries in this regard were addressed by the Company post-audit.**

b) Provide information to help justify/support use of alternative approach to the derivation of Line 52 numbers in columns U-Y, or justify why it is not possible apply the UR's processing rule for the derivation of the Line 52 numbers in these columns. **NI Water explained the basis of its approach, matching the available data sets. We consider that this issue can be resolved through NIW's engagement with the UR on the sludge tracking data expectations – see recommendation below.**

c) Assess the impact of using 0 to represent values below the limit of detection in the Line 23 [Turbidity 95%ile greater or equal to 0.5NTU] and Line 24 [Turbidity 95%ile less than 0.5NTU] data table entries. This was a feedback from our AIR20 audit. At audit, NIW tested use of 0 instead of the 50% of LOD used to derive the pre-audit numbers. The test showed that the change had no impact on the reported numbers. **The Auditor can confirm that the Lines 23-24 methodology was updated post-audit to reflect the approach of using a value of 0 when results are less than the LOD.**

d) Disaggregate the data for Lines 23 and 24 which had been filled in as a total in column I, rather than on an individual site basis within columns J-N. **The Auditor can confirm that the data table was amended post-audit.**

e) Amend the pre-audit version of the data table to show the correct total value for the Omega sites and correct the line methodology statement which states that Duncrue and Ballynacor had inputs of 0. **The Auditor can confirm these changes had been made in the post-audit documents.**

Recommendation:

For future AIRs and to document the Company's use of an alternative approach for the derivation of Line 52 numbers in columns U-Y of Table 42, we suggest that NI Water engages with the UR with respect to sludge tracking data expectations for Line 52.

SUMMARY OF AUDIT FINDINGS

Table 43 – Lines 5-15

PREPARED BY	X
DATE	14 June 2021

Rating	Meaning
	No material exceptions and compliant with requirement
	Content with the reported data but supporting information needs to be complete and/or improvement identified for AIR22, or other noteworthy comment
	Minor exceptions
	Material exceptions
N/A	Not applicable to report

1. Key Findings

The key findings of the AIR21 Table 43 audit, against the AIR21 Table criteria are summarised below.

AIR21 Table Criteria	RAG	Assessment
Independent review of performance against PC15 target (where relevant)	N/A	
Methodology – consistency with the reporting process with clear control points		Methodology is consistent with the reporting process and remains unchanged from AIR20
Assumptions – reasonableness and applicability		Assumptions are appropriate. This applies to a number of figures where cost data is not available at site level and a proportional split has to be made on the basis of factors e.g. site area, flow, number of samples taken etc. In all cases, these are reasonable.
Source data – completeness		Detailed source was been provided and reviewed during the audit meetings.
Clarity of audit trails – evidence of appropriate audit trail		We have seen evidence of appropriate audit trail
Confidence grades – documentation of appropriateness and rationale	N/A	
Governance – evidence of quality assurance and of final sign-off		We have seen evidence of appropriate governance and sign-off

2. Audit Scope

The scope of this audit covers Operational Costs related to Public–Private Partnership (PPP) sites, recorded in Lines 5-15 of Table 43. Lines 1-4 [L1-PPP Concession, L2-Service Area, L3-Name of Works & L4-Payment to Concessionaire] are covered by our audit of Table 42 [Lines 1, 2, 3 & 12]. Interviews were conducted with NI Water staff responsible for contract and financial management of the Alpha, Omega and Kinnegar sites.

During the Table 43 audit, methodologies and commentaries were reviewed, and a range of supporting documents were audited to verify source data and ensure alignment with the Utility Regulator's guidance notes. We also compared the AIR21 reporting methodology and figures against AIR20 to identify changes to methodology or material variance.

3. Performance and Significant Events

Line 5: Payment to Concessionaire

Line 5 records payments made against each site by the concessionaire to the operating company per site and includes operating costs and profit. Totals are reported as X for Water Sites (Alpha contracts) and X for Wastewater sites (Omega & Kinnegar contracts).

For Omega sites and Kinnegar, data is provided by the PPP contractor. Since Alpha sites were brought back in-house, the data is provided by internal transfer. Figures reported in Line 5 are consistent with Table 21, Line 22a and Table 22, line 21a which reflect the same payment costs. The line is limited to Operational costs and therefore capital maintenance and other capital/financial charges are not included.

Reporting methodology remains unchanged from AIR20, and it should be noted that the rationale for gaps in the Table are:

- Scheme 5 was delivered as a link main from Castor Bay WTW under the DBF&O contract and therefore the Operational Costs are built-into Scheme 2.
- Schemes 6 & 7 were delivered under a Design, Build, Finance & Handover contract, and while there are ongoing Capital payments, there are no recurring operational costs.
- Scheme 14 - Ballynacor Lagoons were an existing asset and the scheme included an obligation on the concessionaire to remediate as part of the scope. The work was carried out, and no further operational costs apply.

Figures are comparable to AIR20 with no material variance.

Line 6: Power

Power data for each site is derived from the relevant meter point reference numbers (MPRN) and invoicing data recorded in the Oracle system. With the exception of Billinrees where the figure is the total taken from two MPRNs, all other sites have a single MPRN. NI Water is unable to split out the power costs for Kinnegar, as they are included as part of the Concessionaires payment to the Operating Company. Variance from last years' figures is immaterial, with overall power cost for Water sites down 1.1% compared to AIR20 figures with a range between -4% and +4% for individual sites.

Greater variance is evident for Omega sites, with a +/- 10% range for sites compared to AIR20 figures. However, power use for wastewater sites is primarily driven by flows and the variance in power is broadly consistent with the -3% to 8% range in flow variance between AIR20 and AIR21.

Duncrue Street has a single meter point which includes Belfast WwTW, operated by NI Water, and the Sludge Incinerator site, operated under PPP. Therefore, NI Water applies a standard methodology to calculate the split between power consumption at the Incinerator and Treatment sites based on throughput and flows. This method attributes 55% of the metered costs to the incinerators and 45% to Belfast WwTW for the reporting year, a marginal change from AIR20 (51.7% Incinerator site, 48.3% WwTW).

We confirm that totals for Water and Sewerage (columns 20 and 21) are consistent with line 2 totals in the PPP only section of Tables 21 and 22.

Line 7: Other Direct Costs

This line captures costs associated with abstraction licences only (where applicable). Inflationary increases have been applied by NIEA to licence charges, which represent a 2.3% increase over AIR20.

Line 8: Sum of Lines 6 & 7

Line 9: General and Support expenditure

Total expenditure for the reporting year is X, with a split of X for Wastewater and X for Water sites. This reflects the general administration costs of managing the PPP contracts, and the data comes directly from project cost centre codes. The majority of cost is staff cost but figures also include procurement of consultancy services. Expenditure has reduced by X compared to the AIR20 figure of X.

Line 10: Sum of Lines 8 & 9

Line 11: Scientific Services

Laboratory costs associated with the monitoring of wastewater quality parameters amounted to X during AIR21. The majority of costs are related to Omega sites (X) with X for sampling at Kinnegar. Values are zero for Alpha sites as the costs are paid directly as part of the Unitary Charge. Costs are calculated from the Scientific Services spreadsheet where the total number of samples taken at PPP sites is used to derive the total proportion of NI Water's sampling costs incurred at each PPP site. The methodology remains unchanged from AIR20. Costs reflect a decrease from X spent in AIR20, mainly due to a reduction in sampling from daily to weekly at Kinnegar during the COVID lockdown period.

Line 12: **Rates**

Rates for Alpha sites are based on Water Distribution Input (DI) values – i.e. the volume of water supplied to the network from each PPP site. For AIR21 rates have increased by 1.6% from AIR20 to X.

Rates at Wastewater sites total X, which reflects a 22% increase over AIR20. This is due to a revaluation exercise undertaken by Land & Property Services, the outcome of which significantly increased the rateable value at all sites except North Down. The change was anticipated and provision of additional funding for rate increases was made in the FD.

For the Incinerator site at Duncrue, the method applied remains unchanged from AIR20, where 15% of the rates are applied to the PPP on the basis that the Incinerator area is 15% of the Belfast WwTW site area. A similar principle is used to split the costs for the Wastewater and Sludge elements at Ballynacor, with 65% of costs applied to Wastewater and 35% to Sludge.

Line 13: Terminal Pumping Station Costs

As per Line 6, terminal pumping costs are calculated from Meter Point Reference Number (MPRN) data and invoicing data held in the Oracle system. North Down and Ballynacor WwTWs are the only PPP sites with terminal pumping stations (TPS).

Total power costs for TPS in AIR21 are X, a marginal increase over AIR20 costs of X.

Line 14: Estimated sludge costs.

This line records the total costs associated with the Omega PPP sludge sites at Duncrue Street and Ballynacor. The figure was derived as a sum of entries in Lines 5, 10, 11 & 12, and therefore shows the same figure as Line 15. Line 15 is a calculated field as per the processing rule in the UR guidance for Table 43. The methodology to estimate the sludge costs remains consistent with AIR20, and reported cost for AIR21 is X, an increase from AIR20 (X), but less than AIR19 (X).

Line 15: **Sum of Lines 5, 10, 11 & 12**

Line 15 provides the total operating expenditure associated with PPP assets including Operator costs and profit for each site (concessionaire payment) and associated costs incurred by NI Water. This is auto calculated from the sum of Lines 5, 10, 11 and 12, by each PPP contract site and showing the total for each contract area.

The estimated sludge costs for Ballynacor and Duncrue Street shown in line 14 are not included to avoid double counting.

AIR21 figures are X for Water and X for Wastewater, a slight increase from X Water and X Wastewater in AIR20.

4. Summary of Audit Checks

We have reviewed the Word and Excel files provided by NI Water during and following the audit, including review of workbooks containing source information and the calculations underpinning the figures reported in Table 43.

5. Confidence Grades

There are no requirements to record confidence grades for Table 43, Lines 5-15.

6. Challenges to the Company, Recommendations & Suggested Actions

No actions or recommendations were identified.