Appendix – APR Supporting Commentary

Annual Performance Reporting 2023-24

from Southern Water

Annual Performance Report 2024-2025 Supporting Commentary

This document contains additional technical commentary and narratives on performance associated with Southern Water's 2024-25 Annual Performance Report (APR) data tables, and commentary addressing specific narrative requirements from Ofwat's Regulatory Accounting Guideline 3.15 (RAG 3.15) and the rational for publishing our APR data tables.

Publishing Rationale

All annual report data for Southern Water, including downloadable copies of our submitted data can be found on the Our Annual Reporting section of the Southern Water Website. Our APR table data is available in two formats, a consolidated excel file and in line with our open data strategy a comma separated values (.csv) file which has the data reformatted to be machine readable for analysis. This .csv file has been implemented in collaboration with other water and sewerage companies who will also publish this same .csv format to maximise the utility of this dataset for cross sector comparisons.

Links to our APR data are also available alongside other companies from the Stream open data website. Stream is a water sector group dedicated to making further progress in open data. We also continue to work collaboratively with other water and sewage companies to collate all published data for internal industry comparison purposes.

Our commitment to open data has continued with the further development of our company open data strategy, collaboration on a sector wide open data strategy, and ongoing improvements to rivers and seas watch, including adding our data to the National Storm Overflows Hub (NSOH), the adoption of an open data licence which we have applied to existing publications such as our reservoir level data, and a dataset of annual drinking water quality data at sample level available on the Stream website.

Required additional commentary – Narrative on costs

4.23 The lines in Tables 4L and 4M generally correspond to the standard lines in the PR19 business plan tables WS2 and WWS2 respectively. Where lines from the business plan tables have no corresponding lines in Tables 4Lor 4M it is because these lines were either not used by companies or by just one or two companies. Tables 4L and 4M have lines for companies to insert their own expenditure purpose categories. If companies would have allocated expenditure to any of the standard lines in the business plan tables that have not been copied across to RAG4.09 tables, they should instead allocate the expenditure to these 'freeform' lines. If these lines have been used, companies should provide commentary to explain them.

In table 4L, and additional line has been used for impounding reservoirs. In table 4M, we have used additional lines for the following:

- WFD Manage uncertainty Special case
- AMP 6 Bathing Water enhancement
- NEP - Groundwater schemes
- NEP - Flow 1 schemes

Plus the following with a nil balance:

- AMP7 WINEP3 Chemicals NDLS Permits

4.24 Companies should provide commentary to explain whether any costs have been proportionally allocated between expenditure categories in tables 4L and 4M or between enhancement and base expenditure. Companies should include details of how much has been subject to proportional allocation and which cost drivers they have used.

N/A. No proportional allocation has been applied.

4.25: In table 6A.13 to 6A.27 companies are required to report water treatment works that have not been used in the year but have not been decommissioned. Companies should provide commentary on any instances where this is the case

The following are water treatment works that have not been used in the year as result of demand management and ongoing works but have not been decommissioned, with no change from 2023-24:

Deal Low Level WSW, Gore Hartlip Hill WSW, Keycol WSW, Lewes Road Brighton WSW, Lord of the Manor WSW, Minster IOT WSW, Shalcombe WSW, St Lawrence WSW, Ventnor New WSW, and Weirwood Forest Row WSW.

4.26: Companies should provide commentary on how they have calculated population and household growth in table 4R including how they have taken account of the 2011 census.

We continue to use a population forecast created by Experian Analytics which takes account of the 2011 census and the Office for National Statistics' updated population projections. Each year the forecast is then compared against the latest published Office for National Statistics mid-year forecast to check accuracy.

4.27: Companies are encouraged to provide commentary on how they interpret 'structurally refurbished' in completing line 7C.15. If a company is unable to identify the actual length of rising main that has been replaced or structurally refurbished, then it should submit an estimate and fully explain the methodology used and the assumptions made in the accompanying commentary.

Structural refurbishment of rising mains comprises a permanent solution such as pipe replacement or bespoke in-pipe renewal such as lining with an expected design life exceeding 50 years. Refurbishment of part can be claimed but only where the affected length is greater than 50m in accordance with the Structural Sewer Rehab Policy document. Two rising main replacements have been completed and post documentation provided during 2024-25, a decrease from the prior year but in line with the two in 2022-23.

4.28: Companies should explain the basis of its estimate for line 8A.4 of all the untreated sewage sludge (primary, secondary, tertiary) produced by in-area wastewater treatment processes in the report year, and which is produced as a result of treating non-appointed liquid wastes through appointed wastewater treatment assets

The calculations for sludge Total Dry Solids (TDS) generated from non-appointed liquid wastes treated through our treatment works are based on the following:

- For domestic tankered waste a Population Equivalent (PE) has been established from the volumes received. These PEs have been applied to the receiving site's sludge make/PE to calculate the amount of sludge arising from these imports.
- The commercial tankered waste annual BOD data has been used and converted to a PE for each receiving site, assuming 60 gms/BOD/day. The calculated PE for these wastes has been applied against the sites' sludge make/PE to generate the amount of sludge from these imports.
- Other 3rd party imports are recorded via instrumentation. An assumed dry solid of 3% is used in the absence of data from process sampling.

4.29: In lines 8A.10 and 8A.13 we ask for a measure of intersiting work done by tanker. In line 8A.11 we ask for a measure of intersiting work done by truck. In lines 8A.15 and 8A.18 we ask for a measure of work done in sludge disposal operations by tanker. In line 8A.16 we ask for a measure of work done in sludge disposal operations by truck. If actual road distances are not available companies should estimate the road distance and state in the commentary if this is the case.

Radial mileages for all data sets relating to haulage movements are taken from the actual radial mileage distances submitted by our waste and recycling contractor. These are converted to ‘actual kms’ by utilising a conversion factor from miles to km and then a factor of 1.6 to convert from radial distance to ‘actual’. This is in line with previous reporting years.

4.30: In table 8A where both the incumbent and a third-party service provider undertake different stages of sludge treatment, e.g., dewatering followed by lime stabilisation, sludge quantities should not be doubled-counted and should be reported either in line 8A.1 or line 8A.2, not both. Where this situation occurs, the companies should report on the quantity involved and the line to which it has been allocated in the commentary.

N/A. Southern Water undertakes all its sludge treatment and dewatering activities.

4.31 Companies should explain the basis of their estimate of total sewage sludge produced from non-appointed liquid waste treatment reported in line 8A.4.

See commentary in 4.28 above.

4.32 The default assumption will be that the population equivalents reported in lines 7D.17 to 7D.20 will be served by sewage treatment works (STWs) at which the required output has been delivered primarily by a capex solution. Where this is not the case companies should report the population equivalent benefitting from (primarily) Opex solutions in their commentary.

As part of our reporting process, we check if schemes are delivered via capex solutions as opposed to Opex solutions. Anything delivered via an Opex solution is discarded from the reported figure and only population equivalent for capex solutions is included in these lines. No WINEP Opex schemes for tightened permits were required to be delivered for these drivers this year, so we have reported accordingly.

The difference between the PR24 forecast values & the current year values (0) for N & Chemicals is due to an assumption at PR24 we would complete all WINEP schemes by their regulatory date, and a number rolled into AMP8 instead, any remaining difference is due to the PE for each site is variable and therefore would not exactly match forecast.

4.33 Where companies have used a different methodology to calculate non-resident population in table 4R they should provide details in their commentary.

N/A

Required additional commentary – Supply-demand balance and metering

4.34 Tables 4L, 6D and 6F require companies to provide details of their expenditure and benefits delivered in the area of improvements to the supply-demand balance and development of strategic regional water resource solutions. We expect companies to include narrative commentary to report on progress and deliverables in these areas. This should include explanation of any variances from their business plan and water resources management plan proposals.

In our WRMP annual review submitted in June, we gave a detailed summary of our activities to deliver improvements to our supply demand balance and progress against WRMP19 over the last 12 months, including having submitted our revised WRMP24 for approval by the Secretary of State.

In this we highlighted that despite a warmer year and a number of major operational incidents, we maintained supply-demand balance throughout the year across our supply area without placing any restrictions on our customers' water use or applying for any drought permits or orders to increase supply through relaxations in our abstraction licence conditions.

Through an ambitious mix of demand-side and supply-solutions, our WRMP19 aimed to ensure that we provide sustainable water supplies to our customers over a 50-year period, whilst protecting the environment. On the demand side, we introduced 'Target 100' with the aim of reducing average Per Capita Consumption (PCC) across our supply area to 100 litres per head per day (l/h/d) by 2040 under average weather conditions. We also aimed to reduce leakage by 15% over AMP7.

The restrictions imposed as a result of COVID-19 at the start of AMP7 severely impacted progress on two of our key water efficiency initiatives i.e. increasing household meter penetration in our Western and Central areas and home visits. The restrictions also led to increased PCC as people stayed home and changed their water hygiene habits. This required us to reforecast our PCC position for 2024-25. PCC started to reduce following the lifting of COVID-19 restrictions and the outturn 2024-25 PCC (127.2l/h/d) is in line with our revised forecast (127.5l/h/d). It is however higher than our original WRMP19 target as a significant proportion of the workforce continues to work from home for at least a part of the week. While we experienced high PCC in AMP7, our PCC was amongst the lowest in England and Wales. Our 3-year average PCC in 2023-24 (130l/h/d) was the second lowest across all water companies in England and Wales and was much lower than the 137l/h/d average across the sector. We continue to aim for PCC of 100l/h/d under normal year conditions and, as part of our WRMP24, have revised the date for achieving this target to 2045.

We experienced high leakage in 2022-23 (108.5Ml/d) and 2023-24 (107.5Ml/d) but brought it down significantly in 2024-25 (97.7Ml/d) by implementing a number of measures as part of our leakage reduction plan. We are starting AMP8 in a good position and plan to significantly reduce leakage over AMP8 in line with our challenging WRMP24 target. As with PCC, we were not an outlier in the wider industry when it comes to leakage. We were ranked 6th among the 19 water companies in England and Wales in terms of water lost per property (3-year average) in 2023-24 despite experiencing high leakage in 2 of the 3 years used to calculate the 3-year average.

On the supply side, a key part of our WRMP19 was to develop long-term solution(s) to offset the loss of supplies as a result of changes to our abstraction licences on the River Test and River Itchen in the Western area. Following an options appraisal process to reassess the options in Western area, we replaced the WRMP19 preferred option of a 75Ml/d desalination plant on the West Southampton Coast with the Hampshire Water Transfer and Water Recycling Project (HWTWRP) to provide up to 90Ml/d in Hampshire. We are progressing with the delivery of HWTWRP by 2034 along with jointly delivering the Havant Thicket Reservoir with Portsmouth Water by 2032, as well as the Sandown water recycling option on the Isle of Wight by 2030.

Natural England introduced water neutrality in our Sussex North Water Resource Zone in the Central area as it could not rule out the impact of our groundwater abstraction at Pulborough on the protected sites in the Arun Valley. We commissioned a study to investigate any potential impact, with the Environment Agency and

Natural England included in the project steering group. The study has concluded and the report is being reviewed by the Environment Agency and Natural England.

We are progressing work on two other water recycling schemes; the Littlehampton water recycling scheme in the Central area and the River Medway scheme in the Eastern area. Both are planned for delivery by 2030. In the Price Review 2024 Final Determination, Ofwat designated these schemes, along with the Sandown water recycling scheme, to follow ‘large scheme gated’ processes, requiring assured submissions to Ofwat to release funding beyond project development. We are assessing the impact of new regulatory requirements on the delivery timescales for these schemes.

In summary, this year has seen a significant reduction in leakage, outturn PCC in line with our forecast and further progress on a number of key supply-side schemes. Progression on our WRMP19 schemes has provided us with a better understanding of the risks and challenges we face in delivering these schemes. We have used this knowledge to inform our fdWRMP24

4.35 Table 6B requires companies to report their total annual leakage. This figure should be derived from the same leakage data that is used in both leakage performance reporting (as an input to the three-year average calculation) and annual water resources management plan reporting. Companies should include explanation of any variances from their business plan and water resources management plan proposals.

In the main Annual Performance Report, and section 4.40 of this document, we have given details of the measures being used to reduce leakage with further details on our leakage performance can be found in our WRMP annual review and our Annual Report and Financial Statements. Having achieved a 9% reduction in leakage in 2024-25 we have an ambitious plan to drive further leakage reduction through the guidance of the PALM model.

4.36 Table 6D requires companies to provide detail of their smart metering programmes. We understand that several alternative smart meter technologies can be adopted by companies. Companies should include narrative commentary explaining the smart metering technologies it is utilising and the capabilities and benefits these provide.

As reported in 2023-24, following trails of clip-on devices in 2022-23 and into 2023-24 in 1,500 homes across Southampton, Andover, Midhurst, and Brighton, we demonstrated that data offered by smart meters helps household customer reduce their consumption by 3 - 5%. These trails are now complete and have given us valuable insight that has fed into our ambitious smart metering plan for AMP8. Challenges presented by COVID-19 and a global semi-conductor shortage have hit the supply- chain that manufactures our water meters. As a result, we have deferred the increase in household meter penetration from 88% to 92% to AMP8.

4.37 We expect companies to include narrative commentary to explain how the metering and leakage figures reported in Table 6D relate to their business plan and water resources management plan forecasts.

Please see above commentary on 4.35 on leakage, and 4.36 on smart metering.

4.40 Common performance measures

Mains repairs:
Southern Water remains fully compliant with the guidance with all elements of the RAG at green.

Water supply interruptions:
Southern Water remains fully compliant with the guidance with all elements of the RAG at green.

Unplanned outage:
Southern Water remains fully compliant with the guidance with all elements of the RAG at green.

Internal sewer flooding:
Southern Water remains fully compliant with the guidance with all elements of the RAG at green except for 5. Neighbouring properties. This remains at amber as whilst property checks are carried out, these are manually recorded and therefore subject to error.

Sewer collapses
Southern Water remains fully compliant with the guidance with all elements of the RAG at green.

Leakage and Per Capita Consumption (PCC):

In line with Ofwat's instruction to maintain reporting in line with the baseline methodology, there has been no change to the RAG provided to Ofwat in association with the restatement of our leakage and PCC values for 2020-21, and in association with query number SRN_APR_IP_001 provided in August 2021.

All water balance data submitted in the APR has been produced in a way that is entirely consistent with the three-year rolling average baseline. We continue to run parallel reporting internally with amendments being done on the remaining amber elements. From the 1st of April 2025 onwards, all water balance outputs will be reported aligned fully to the AMP8 convergence method baseline, and whilst we are yet to be fully compliant due to our water balance gap, further changes are being planned to make data improvements reporting with the aim of being fully compliant for all metrics where this is possible, and have a continuous improvement process in place, including monthly executive level review to ensure our leakage and other water balance outputs are reported as accurately as possible and in line with industry best practice.

We have noted an increase in our water balance gap from 3.60% to 4.19%. We had previously identified circa 36k household connections that were potentially new connections to our network but were not on our billing system. We initiated a validation programme to add these properties to our billing system. These have initially been added as unmeasured void properties. This is the main reason for an increase in void unmeasured households by 3,954 this year. These will be converted into billed properties following site visits to confirm supply type and occupant details. We engaged consultants to identify areas for further improving the robustness of both the data and processes used to calculate water balance. We are in the process of developing a plan to further improve our water balance calculations and reporting over AMP8 in view of the recommendations from this work.

As mentioned in our Annual Report and Financial Statements, Leakage has reduced for the second year in a row to 97.7 ML/d (2023–24: 107.5 ML/d). This 9% reduction is a result of our targeted leakage programme, launched in 2023 as part of our Turnaround plan. We now have five proactive programmes of work under our Leakage Recovery Plan, and over the past 12 months completed 20,820 repairs on our network, of which 12,862 were proactive leak repairs. We also completed 70 advanced pressure management schemes and, combined with optimising existing schemes. While pressure management doesn't fix leaks, it reduces the volume of water lost through existing leaks, as well as providing resilience to the network by reducing the volume of bursts by stabilising pressures within the network.

We continue to work on our ambitious plan to reduce leakage to meet the challenging targets set at PR24 including a stretch target of 70.1Ml/d by 2030. Whilst high levels of meter penetration provide a challenge to a fully green RAG status, we continue to push towards have no red and minimal amber elements in 2025-26 using the revised convergence methodology in line with our PR24 baselines.

Below are the water balance calculations for 2024-25 under both methodologies:

Ovarro method - consistent with baseline

Component (Ml/d)	Pre MLE	Post MLE	Adjustment
Household consumption (metered)	273.76	278.36	4.6
Household consumption (unmetered)	55.57	59.31	3.7
Non-household consumption (metered)	97.06	100.33	3.3
Non-household consumption (unmetered)	3.36	3.59	0.2
Distribution system operational use	2.97	3.17	0.2
Water taken unbilled - legally	10.59	11.30	0.7
Water taken unbilled - illegally	5.53	6.09	0.6
Total leakage	92.98	97.67	4.7
Distribution Input	541.82	559.81	18.0
MLE error (Ml/d)			23.69
MLE error (%)			4.19%

Per capita consumption (litres/head/day)	Pre MLE	Post MLE	Adjustment
Unmeasured PCC	164.1	175.1	11.0
Measured PCC	118.2	120.2	2.0
Overall PCC	124.1	127.2	3.1

Additional lines	Pre MLE	Post MLE	Adjustment
Leakage upstream of DMA	1.9	1.985	0.1
Distribution main losses	70.3	71.855	1.6
measured households excluding void properties	19.1	20.109	1.0
unmeasured households excluding void properties	2.1	2.191	0.1
measured non-households excluding void properties	0.7	0.752	0.0
unmeasured non-households excluding void properties	0.1	0.057	0.0
void measured households	0.5	0.561	0.0
void unmeasured households	0.1	0.061	0.0
void measured non-households	0.1	0.095	0.0
void unmeasured non-households	0.0	0.007	0.0

Convergence method – PR24 methodology

Component (Ml/d)	Pre MLE	Post MLE	Adjustment
Household consumption (metered)	273.8	278.2	4.5
Household consumption (unmetered)	52.8	56.2	3.4
Non-household consumption (metered)	97.1	100.2	3.2
Non-household consumption (unmetered)	3.4	3.6	0.2
Distribution system operational use	3.0	3.2	0.2
Water taken unbilled - legally	10.6	11.3	0.7
Water taken unbilled - illegally	5.3	5.8	0.5
Total leakage	96.9	101.6	4.7
Distribution Input	542.6	560.0	17.4
MLE error (Ml/d)			22.91
MLE error (%)			4.05%

Per capita consumption (litres/head/day)	Pre MLE	Post MLE	Adjustment
Unmeasured PCC	155.8	165.9	10.1
Measured PCC	118.2	120.2	1.9
Overall PCC	123.0	126.0	3.0

Ofwat	Pre MLE	Post MLE	Adjustment
Leakage upstream of DMA	1.9	2.0	0.1
Distribution main losses	72.3	75.8	3.5
measured households excluding void properties	19.1	20.1	0.9
unmeasured households excluding void properties	2.1	2.2	0.1
measured non-households excluding void properties	0.7	0.8	0.0
unmeasured non-households excluding void properties	0.1	0.1	0.0
void measured households	0.5	0.6	0.0
void unmeasured households	0.1	0.1	0.0
void measured non-households	0.1	0.1	0.0
void unmeasured non-households	0.0	0.0	0.0

Information on the Reporting and Assurance requirements (PSR Reach and PSR Data-Checking) for Table 3F

Having already reached the end of AMP commitment for PSR reach in 2022-23, (8.26%), we have continued to increase the number of customers on the register even further, having reached over 15% in 2024-25, with continued efforts to ensure all eligible customers are registered.

We do not collect PSR data in relation to individuals and our PSR membership breakdown is as follows

a) communication – 16,718
b) mobility and access restrictions – 92,819
c) water supply interruption - all households on the PSR
d) with security - 288 (assumed to be those households with a password on the account)
e) other needs – 205,666

PSR satisfaction was incorrectly reported as 70% for 23/24. The correct figure based on the question, "Customers will be asked whether the support provided addresses their specific requirements and needs in relation to thier water and wastewater services", should have been 63%. The 70% figure reported was based on overall satisfaction. The figure for this year 24/25 sits at 66%

Households added to the PSR - 96239
Households removed from the PSR - 8699

It has been highlighted that our total households figure contains a number of customers who are billed by South East Water on our behalf, and we will be seeking further guidance from Ofwat on the inclusion of customers registered by South East Water, or the potential removal of these customers from our household total in the coming year, as this may impact the historically reported figures for PSR reach.

Data trends, anomalies, and additional commentary in relation to non-financial data

Table

Commentary

Table 6D Demand management – metering and leakage activities

All of our metering costs are capitalised.

Most of our customers were metered as part of our Universal Metering Project from 2010 to 2015. As a result of this, the number of new optant meters installed each year is relatively small. We do not record the costs of these installations separately from the overall meter renewal programme.

To complete the table, we have pro-rated the cost of meter installation across the number of meters installed, resulting in broadly the same derived unit cost for each activity.

Table 6F WRMP Annual Reporting

Ofwat guidance, in RAG 4.13, states that the classification of the Water Resources Management Plan (WRMP) schemes delivered should be one of the following four categories, and that their expenditure should reconcile to the same categories in Table 4L:

- Supply-side improvements delivering benefits in 2020–25
- Demand-side improvements delivering benefits in 2020–25 (excluding leakage and metering)
- Internal interconnectors delivering benefits in 2020–25

- Supply-demand balance improvements delivering benefits starting from 2026

However, we do have several schemes that fall within those categories that do not form part of our WRMP, therefore a reconciliation is required to Table 4L.

Supply demend balance improvements delivering benefits starting from 2026	
Table 6F	1.640
Table 4L	1.530
Difference	**-0.110**
Reconciling Items, Supply Demand Balance Improvements (SDBI)	
WRSE costs that sit in SDBI but not related to WRMP	0.081
Imports from Gaters Mill, previously in Strategic Regional Water Resources	-0.190
Total	**-0.110**
Supply-side improvements delivering benefits in 2020-2025	
Table 6F	11.738
Table 4L	16.101
Difference	**4.363**
Reconciling Items, Supply-side improvements delivering benefits (SSIDB)	
WRMP14 related costs that sit in SSIDB but not related to WRMP	0.359
Metering costs that sit in SSIDB but not related to WRMP	4.003
Total	**4.363**

Internal Connectors and D emand-side improvements do match and so do not form part of the reconciliation below.

The ‘After 24-25’ column contains our most recent capex forecasts for AMP8 spend.

7D Sewage treatment works data

There were a significant number of changes to categories this year due to completion of a large number of site upgrades under WINEP drivers, notably P removal schemes.

Six sites were closed as WTWs and converted to pumping stations, transferring all flows to larger WTWs. Three sites (of 357, <1%) changed category due to incorrect classification last year. This is due to individuals' interpretation of the categories and is within the 1-5% accuracy band 2. One site had a change in category due to addition of tertiary treatment for operational reasons.

There are 65 treatment sites with WINEP Quality driver permit changes from last year. May sites have multiple permit limit changes for different final effluent quality determinants and Dry Weather Flow limits (DWF) as follows; four sites with Suspended solids permit limit changes, seven sites with BOD permit limit changes, eight sites with Ammonia permit limit changes, 50 sites with Phosphate permit limit changes, three sites with DWF permit limit changes, and five Pump Away sites.

There are also 19 treatment sites which are not designated under the WINEP programme which also have multiple permit limit changes for different final effluent quality determinants and Dry Weather Flow limits (DWF) as follows; two sites with Suspended solids permit limit changes, eight sites with BOD permit limit changes, three sites with Ammonia permit limit changes, four sites with Phosphate permit limit changes, five sites with DWF permit limit changes, and one Pump Away site.

There are approximately 25 treatment sites where we have completed the WINEP quality driver schemes and are awaiting sign-off by the EA following the completion of these. These sites will have new permits which are yet to feature into our permitting database (CALMs) as they are still with the EA. As this is a timing issue the values in the data table are based on the new permits being issued.

7F Wastewater network+ -WINEP phosphorus removal scheme costs and cost drivers

We report revised scheme delivery dates for Pagham and Ockley West, as agreed with the Environment Agency.

Capital expenditure has been updated to reflect actual costs for 2024-25 and the costs reported for 2025-26 onwards reflect our latest forecasts. AMP7 schemes continue to show forecast capital expenditure in the period ‘After 2024-25', as construction work is completed and final permanent scope delivered in a limited number of schemes.

Consistent with RAG4.13, paragraph 7.23, we include transitional schemes incurring spend in the year, identifying these AMP8 schemes using their ‘08SO’ WINEP/NEP reference. We also separately report two ‘Nutrient Programme Enabling’ schemes to capture costs relating to the AMP8 Phosphorus programme. These costs will be allocated to individual schemes in subsequent years to ensure that all relevant schemes bear an appropriate share of the enabling cost.

For operating expenditure, we maintain the approach of using estimates based on design criteria, as we do not have cost recording processes sufficient to isolate costs at equipment set level. These estimates are consistent with the update in our October 2023 query response, reflecting increased chemical and power costs.

Population equivalent served entries have been updated for 2024-25 actuals. Forecasts for 'After 2024-25' remain per our October 2023 query response, and 2023-24 APR submission and subsequent long dataset, consistent with our PR24 submission.

We confirm that 7F is reported in 2022-23 FYA CPIH deflated prices, as specified in RAG4.13 paragraph 7.15.

Table 8C Bioresources energy

Our bioresources electricity sub-metering programme is now complete.

From 23-24 Ofwat have asked us to add total energy consumption (MWh and £m) for electricity, heat and biomethane for both 8C.1 and the shadow values in 8C.18. To remain consistent with both APR and PR24 data previously supplied, we have not included heat in the total £m figure as this theoretical calculation has a significant material effect on the total consumption figure.

8C Bioresources energy and liquors analysis 8C.15 & 8C.16

There has been a slight increase in the sludge liquor return volumes in comparison to last year, with an 18% increase which includes an extra process stream of Gravesend SAS. The process for calculating liquor volumes was again adjusted this year due to the number of sites showing a greater than 20% discrepancy between the liquor figures calculated from operator reported sludge flows and the AM410 (the standardised Southern Water document for site capacity assessment, including the mass balance approach and process loading calculations for each site).

This year 23 process streams needed to use theoretical sludge liquor volumes from the AM410 for the liquor volumes as the flow data used for calculating the sludge liquors gave such a difference to the theoretical values for the individual streams that its validity was brought into doubt. There was also a further 9 process streams which used an adjusted theoretical sludge liquor volume from the AM410. This was an additional step to try and improve accuracy in comparison to last year, utilising the theoretical TDS through the process and the operator recording TDS into the process to determine a percentage of the theoretical throughput and use this to adjust the theoretical sludge liquor volume. This step was possible for the sites which had good information regarding inputs to the sludge process unit but lacked an output. As with last year the reasons for lack of data varied - Flow meter failure, operator time/understanding of the data required and an increase in the amount of temporary equipment being run either by contractors or site operators which were not correctly logged. This is a deterioration on last year which had only 14 process streams needing to use theoretical data though the additional step should have improved the accuracy on the theoretical data for 9 of the process streams.

In terms of concentration this year against last year there was a 9% decrease in BOD concentration and the ammonia concentration showed a 3% increase. The reason for this variation can be explained by the issues that we have been having over the year with STC receptions that has resulted in older sludge reaching the sludge processing units. Older sludge in general has a higher ammonia concentration and a lower BOD concentration because the sludge has started on the digestion process prior to arrival at the STC's.

Despite programming for collection of samples monthly and in some cases twice monthly we still ran into a number of sampling issues due to minor events in the 24 hours before a sample needed to be collected, or practical issues at site with obtaining a sample. The rolling average result each month was used for calculating the concentrations for the year and where the result was missing for a given month the rolling 3 points where figures were available prior to this has been used to fill the zero's and therefore not impact on the rolling average calculation. For a few sites this meant the calculation for the year did not necessarily have 1 sample a quarter and in some instances was on less than 4 actual samples. Broomfield Bank Centrate (missing quarter 4 sample), Chichester Centrate (missing quarters 1,2 & 4, only 1 actual sample in the data this year - most likely due to machine failure as very unreliable), Chichester SAS (missing quarters 1 & 4), Ford Centrate (missing quarter 4), Ford Primary (missing quarter 4), Ford SAS (missing quarter 3 for BOD & quarter 4), Fullerton Centrate (missing quarter 3 for ammonia), Goddards Green Centrate (missing quarters 1, 2, & 3, only 2 actual samples in the data this year), Gravesend Primary (missing quarter 2), Gravesend Centrate (missing quarter 2), Hastings Centrate (missing quarter 4), Hastings Primary (missing quarter 4), Horsham Centrate (missing quarters 1 & 3), Millbrook Centrate (missing quarter 2), Scaynes Hill Centrate (missing quarter 2), Tunbridge Wells North Centrate (missing quarters 1, 2 & 4), Worthing SAS (missing quarter 2 for ammonia & quarter 3 for both).

To improve capture of samples we need to move to an alternative method for planned monthly sample collection. We had intended to move across to outsourced sampling however at present the sample location depends on which machine is running and therefore to move to an outsourced position which doesn't need the operators to intercede would need the new sample points installing which is also expected to be within 2025/26 financial year in line with additional flow meters being installed.

11A Greenhouse gas emissions

In line with Ofwat guidance, the company is using the Carbon Accounting Workbook (CAW) v19 - V02.5.

As mentioned last year, the company have sold REGO certificates from one electricity supplier. This has impacted an increase in Scope 2 emissions in market-based scenarios, comparing to previous years when 100% of SW electricity was REGO backed.

Operational emissions have slightly increased comparing to last year for location based due to increased Scope 1 emissions, increase in fuel consumption and in fugitive emissions as this year we have included refrigerants. It has also increase Scope 3 emissions due to major outsourced activities and use of chemicals as follows:

Gross Operational emissions (LB) FY 24-25: 257,888.352 (tCO2e)

Gross Operational emissions (MB) FY 24-25: 266,263.01 (tCO2e)

Gross Operational emissions (LB) FY 23-24: 231,394.792 (tCO2e)

Gross Operational emissions (MB) FY 23-24: 281,163.386 (tCO2e)

Regarding embedded emissions, capital projects increased and purchased goods and services have decreased comparing to last year. The total AMP7 year 5 spend value for capital projects is £658M. Using the total capital projects (cradle-to-build) carbon value of 197,848tCO2e gives an average carbon intensity of 301tCO2e/£M. In comparison with the previous year's reporting, the total AMP7 year 4 spend value for capital projects was £557M. Using the total capital projects (cradle-to-build) carbon value of 152,803tCO2e gives an average carbon intensity of 274tCO2e/£M. The total AMP7 year 5 spend for purchased goods and services is £208M, which has been deflated to £173M for the assessment. Using the total purchased goods and services carbon value of 38,984tCO2e gives a carbon intensity of 225tCO2e/£M

In comparison with the previous year's reporting, the total AMP7 year spend value of purchased goods and services was £197M deflated to £165M for the assessment. Using the total purchased goods and services carbon value of 21,799tCO2e gives a carbon intensity of 132tCO2e/£M. While this suggests a reduced efficiency in year 5 due to an increase in carbon intensity for both capital projects and purchased goods and services, for capital projects, this is actually more likely due to variability in the sample projects between the years, meaning there is a lower spend on higher carbon intensity projects, which increases the overall carbon intensity of investment in year 5. For purchased goods and services, this is due to an increase in the Defra emissions intensity figure for 'Office administrative, office support and other business support services', as well as an increase in carbon intensive fleet spend.

Whilst our APR data and carbon accounting workbook are subject to external assurance, Southern Water do not currently obtain certification for our submission.

The company has engaged PAS2080 high level principles, and the 2022 UK Framework for embodied carbon. Regarding ISO 14064, this is not limited to embedded emissions, similarly SBTi. The company does not have a specific commitment with the latter. However, the company is aware of the principles of these standards.

Improvements identified through our recent PAS2080 gap analysis and AMP8 carbon management action plan. The action plan has been developed for prioritisation and gradual implementation during AMP8, starting with a number of pilot projects testing those requirements in from the start of 2025-26. The project size will gradually expand as gaps and improvements are being identified in practice. Progress on any improvements will be reported annually as in this document.

Southern Water Greenhouse gas emissions SWOT assessment

Strengths	**Operational emissions** Southern Water has a clear and strong procedure on how to collect and analyse carbon data and identify opportunities to reduce emissions. We conduct quarterly data checks to ensure not only that data is correct but also monitoring any change in emissions, causes, and potential solutions. We are currently updating a net zero business plan to 2050 including Scope 1, 2, and 3 emissions, and it also has an interim target to 2030 to reduce Scope 1 and 2 emissions, and CHP upgrades planned in AMP 8 would have a positive impact to reduce emissions. **Embedded emissions** The sample size of projects has been selected to cover all four workstreams and size of projects from small, medium and large value projects. The carbon intensities that have been derived from the 54 sample projects in AMP7 cover a range of business areas from water, wastewater, infrastructure and non-infrastructure, giving more coverage of projects in terms of both sample number and value of sample. This has included the implementation of a business-as-usual capital carbon estimating process, and the undertaking of a PAS 2080 gap analysis.
Weaknesses	**Operational emissions** We are aware we need further research and to continue to consider new innovation opportunities to reduce process emissions, and look for initiatives to reduce chemicals, and other Scope 3 emissions. We are also aware that a potential change of process emissions factors could have significant impact on emissions. Chemical currently dependent on supplier decarbonisation. AMP8 likely to significantly increase use of chemicals. **Embedded emissions** The sample size is limited in scale due to availability of project data and time available to complete assessments. The inclusions and exclusions of carbon models need further review against the latest design specification and construction approaches in order to improve their representativeness and alignment to cost models.

Opportunities	**Operational emissions** Southern Water could implement new initiatives for reducing carbon emissions, potentially setting targets for further reductions through generating more renewables and adopt green technologies. We can also explore new technologies or approaches for reducing carbon emissions, potentially leading to cost savings or other benefits. Strategic investment in research and development could unlock process emissions reduction solutions that address the organization's most challenging emission sources. Improving from feedback last year, we investigated polymer usage and refined emission factors, with lower quoted carbon impacts. We have also reported refrigerant disposal this year, based on feedback in previous reporting years. **Embedded emissions** Southern Water has a number of ongoing improvements in place, creating templates for capturing carbon data from suppliers for purchased goods and services intended to improve relevant data. In line with the new AMP8 metric on GHGs, we will be forecasting emissions with regular data updates to track and project emissions and stay on track for reaching Net Zero and performance commitment targets. Development of a new forecasting model would enable the business to see the impact to emissions as plans and operations change in real time. Deep dive studies to understand our current and future emissions from chemicals and process emissions, set to be our two largest sources by 2050.
Threats	**Operational emissions** Regulatory changes such as landbank availability for sludge disposal may require incineration which could significantly increase emissions. WINEP, WRMP and other PR24 areas would increase the company's emissions. The company might face increases in emissions due to the impact of climate change, e.g. droughts. This would require the transportation of water from other areas. **Embedded emissions** Without embedding a business-as-usual approach for carbon management through a project lifecycle the APR reporting will always be backwards looking rather than proactively reporting carbon data with real project information that will support decision-making and managing carbon. Without assessing, monitoring, and reporting carbon on projects through their delivery the quality of the approach will always be limited by the need to apply significant extrapolation through spend based carbon intensities rather than project-level carbon assessments.

Embedded emissions reporting criteria		
Category	**Description**	**Status**
Green	Provision of embedded emissions data as it relates to capital projects (cradle-to build). We anticipate good practice in this area being for companies to provide cradle-to-gate as well as cradle-to-build based data.	**Met**
	Clear evidence of external verification and certification by an appropriately qualified party as it relates to the use of standards and frameworks, and quality of data.	Not met
	Engagement with one or more recognised standard, framework, or approach for managing and reporting on embedded emissions.	**Met**
	Provision of insights into embedded emissions as they relate to construction and maintenance activities.	Not met
	Complete and detailed SWOT analysis referring to embedded emissions.	**Met**
	Provision of embedded emissions data as it relates to purchased goods and services (in addition to chemicals).	**Met**
	Evidence of both internal and external stakeholder engagement and education on its GHG emissions management and reporting approach.	Not met

Amber	Provision of embedded emissions data as it relates to capital projects (cradle-togate or cradle-to-build).	**Met**
	Clear evidence of external verification by an appropriately qualified party as it relates to the use of standards and frameworks, and quality of data.	**Met**
	Engagement with one recognised standard, framework, or approach for managing and reporting on embedded emissions.	**Met**
	Complete and detailed SWOT analysis referring to embedded emissions.	**Met**
Red	No provision of embedded emissions data as it relates to capital projects.	NA
	Incomplete SWOT analysis as it relates to embedded emissions.	NA
	No demonstrable engagement with recognised standards, frameworks, or approaches for managing and reporting on embedded emissions.	NA

Southern water has an overall status of Amber and is working towards Green status in line with the introduction of the AMP8 Operational GHG performance metrics.

End of AMP summary reports

In our PR19 business plan, we had several metrics that had a stipulation that we should at least once during the five year period we should report to assess the benefits resulting from the performance commitment, as far as possible based on primary evidence. These metrics are:

- Effluent re-use
- Access to daily water consumption data
- Replace lead customer pipes
- Surface water managementSchools visited and engagement with children

Effluent re-use

We have continued to offer Final Effluent via tanker collection from wastewater treatment works for the past 5 years, as we did for the previous 5 years. Customer demand has reduced consistently year on year over the last 5 years; going from a total of 273m3 per year in 2020/21 to 50m3 in 2024/25.

Whilst customer demand is down, we will still continue to offer the service. During the last 5 years, no capital schemes were implemented that enabled any direct piped provision of Final Effluent to customer(s). However, this service provision will still be considered as an option in future capital schemes with specific site/customer circumstances.

Access to daily water consumption data

As set out in the narrative statements on metering, our metering replacement programme was placed on hold and will now progress as part of our PR24 business plan. Other options and trials were carried out at the start of the AMP, when a strategic decision was made not to progress this initiative further.

Replace lead customer pipes

This bespoke performance commitment was not progressed due to lack of customer interest as set out in the SRN59 Past Performance technical annex of our PR24 business plan.

Surface water management

Whilst we have garnered an ODI penalty as a result, this metric was not pursued as it found that the most effective way to reduce surface water impact was through the schemes progressed through our Pathfinder projects delivered by our clean rivers and seas task force. They have lead a programme to find sustainable solutions to the large amounts of surface water that run off our roads into drains. Further information on this can be found in our Annual Report and Financial Statements.

Gap sites

Schools visited and engagement with children

We have not only consistently outperformed our performance commitment targets for this metric, but the Southern Water Schools Programme has played a key role in engaging students and communities with water sustainability and environmental education. With a focus on enhancing water literacy, promoting responsible water usage, and raising awareness about the environmental challenges associated with water, this programme has seen significant growth, innovation, and impact over the amp period. We have included details of this in our Annual Report and Financial Statements across the 2020-2025 period.

This includes a refresh and relaunch in 2023 under the umbrella brand “New Wave” in response to educator’s feedback and the changing landscape in our communities after covid. The New Wave’s programme now also encompasses classroom, outdoor and online learning opportunities alongside young person mentoring, uniformed groups workshops, educational site tours and primary age literacy employee volunteering programmes that respond to the needs of educators and communities. This has led to the following key achievements:

- **Reach and Engagement**

  Over the past five years, the Southern Water Schools Programme has successfully engaged over 200,000 students across the Southern Water region. This has been achieved through a variety of educational initiatives, both in-school and digitally, tailored to different age groups and curricula. The programme reaches students from primary schools to secondary levels, uniformed groups, home educators and Special Educational Needs schools ensuring a wide-ranging and inclusive impact.

- **Educational Resources**

  Southern Water has developed and distributed a diverse range of interactive educational resources including lesson plans, digital workshops, and videos, focusing on topics such as water conservation, pollution, water industry careers and the water cycle. These resources have been designed to complement the national curriculum, ensuring that the content is relevant and accessible to schools.

- **Water Efficiency Initiatives**

  A major component of the programme has been the promotion of water-saving practices and supporting behaviour change for future generations. Through initiatives like "Water Protectors" schools have been encouraged to track and reduce their water usage and adopt mindful water usage habits. Participating schools were engaged during water saving week to enter a competition to reduce their water usage in school and take-home challenges too. This challenge aims to empower students to make a tangible difference at school and at home.

- **Community Engagement and Events**

  Southern Water hosted numerous events, where students participated in interactive displays in their local area, enjoy hands-on STEM related activities, and receive talks from water experts. These events not only educated students but also encouraged families to get involved in water-saving efforts at home.

- **School Trips and Outdoor learning**

  The programme has included the opening of our wastewater operational site in Peacehaven, East Sussex as our first education centre adapted for school visits. Our outdoor learning programme “our River Our Water” delivered in partnership with South East Rivers Trust and Wessex Rivers Trust supports engaging students to connect with the nature of their local waterways. Both programmes have travel bursary support and over one third of the school trips to site have been for specialist SEN students to ensure a fully inclusive experience and reducing barriers to access for schools to take part in these programs.

- **Partnerships and Collaborations**

  Southern Water forged important partnerships with environmental charities, local councils, and other stakeholders to enhance the programme's impact. Collaborations with organizations such as Love Local Jobs Foundation mentoring programme Dare to Dream and the Chapter One reading programme have helped to amplify the reach and specialism offered, providing richer educational experiences and contact with our organisation.

- **Sustainability and Innovation**

  The programme has incorporated innovative, sustainable practices by using digital platforms for virtual workshops, reducing the environmental impact of physical materials and travel to schools. The integration of online resources enabled schools to continue engaging with the programme during challenging times, such as the COVID-19 pandemic, ensuring continuity in education and engagement. Online access remains a key option in our educational offer.

Feedback from schools and students has been overwhelmingly positive. 90% of participating schools reported that the programme helped students develop a greater understanding of water sustainability and responsible use of the sewer network, as well as understanding the organisations key messaging including critical thinking and debate for older age groups. Students demonstrated a higher awareness of issues like water conservation, pollution reduction, and the need to protect local water sources after engaging with the programme. Southern Water also monitored the impact of water-saving initiatives, showing measurable reductions in water consumption in participating schools.

Looking ahead to AMP8, Southern Water is committed to continuing the expansion of the Schools Programme. The focus will remain on creating more support for educators on relevant topics and accessible content, enhancing digital engagement, and continuing to promote water-efficiency, responsible sewer network behaviours, careers engagement, primary literacy and secondary aged mentoring support in schools and communities.

Over the past five years, Southern Water's Schools Programme has made a substantial contribution to educating the next generation on the importance of water conservation, sustainability, and environmental stewardship not just in our operational region but also nationally. With strong results in engagement, educational content delivery, and community involvement, the programme has become a cornerstone of Southern Water's commitment to water efficiency and public education. As we close out AMP7, Southern Water looks forward to continuing this impactful work and further fostering a sustainable water future and informed understanding of our operations, careers and initiatives that help protect the environment.