# Cost Water
# PR24 data tables commentary

October 2023

# Costs (wholesale) water PR24 Data Table Commentary

# CW1 Totex analysis - water resources and water network+ (post frontier shift and real price effects)

## AMP7

Please refer to Past Delivery section for detailed commentary on our AMP7 numbers.

## AMP 8

### Base operating expenditure

Base operating expenditure for AMP8 has been assessed using our planned outturn for 2024/25 based on our latest Board approved forecast. This has been reconciled to our 2022/23 actual expenditure included in our latest Annual Performance Report. To ensure that we put forward a stretching and ambitious plan we have performed a series of Botex benchmarking exercises. These included a review against the Ofwat econometric models to understand how our current expenditure compared to that of our peers.

We have challenged ourselves to target an overall Botex cost base that will be assessed as efficient against a peer group assessment. We appreciate Ofwat will use econometric models to make this assessment using data over a number of years. Over AMP7 we have seen companies across the sector overspending against the allowed determination from PR19 as the industry attempts to meet more stretching delivery targets, a challenge that is expected to continue into the future. We are therefore of the opinion that in the econometric modelling assessment, more weight should be placed on nearer term data points. However, we have followed Ofwat's approach of modelling with all years back to 2011/12 in our botex benchmarking.

There are a small number of costs which are not included within the Ofwat econometric models (unmodelled costs). These unmodelled costs are closely managed and continually reviewed by the business to minimise them as far as possible. For example, we keep abstraction licences under continual review and process rate rebate claims to drive future rates down or mitigate increases. For additional commentary on rates and third party costs, please refer to the commentary for CW10 and CW11 respectively.

Energy market prices increased significantly in 2022/23 due to the war in Ukraine. Whilst we had previously purchased forward contracts for 2022/23 which largely protected us from this cost shock, we had much less protection in place for 2023/24, 2024/25 and almost no protection into AMP8 as would be usual for this point in the regulatory cycle. Thus, whilst market prices have been falling back somewhat since 2022/23 our actual cost incurred will increase sharply in 2023/24 and again in 2024/25 as we move from paying our pre 'war in Ukraine' hedge price to a price partially reflecting the increase in market prices as a result of it. These higher prices will continue into AMP8 unless market prices fall back further.

We have engaged with Ofwat on this subject and have put forward a cost adjustment claim, together with real price effect adjustments, as the most appropriate way to fund these costs.

As a result of this, and other benchmarking analysis, we have put forward a plan for base operating expenditure which is stretching and ambitious, whilst also being achievable. We have taken the approach of allocating our AMP 8 total base operating expenditure on a straight line basis across the 5 years presented given its reasonably consistent nature.

Our future assumption on the nature and extent of the principal use recharges between business units is unchanged. As the business unit of principal use, Wastewater Network+ incurs the gross Capex charge for shared assets in the first instance. The calculation of the Opex recharges between price controls uses the same allocation used for information services operating expenses under the assumption that this closely equates to the number of personnel in each area and therefore asset users.

We are not categorising any costs as atypical within this table.

There are no costs associated with equity issuances within this table.

### Base capital expenditure

Water Capital Maintenance, on a pre frontier shift and real price effect bases, comprises £556 million within AMP8, with a broadly flat profile of around £111 million per annum.

Within the business plan, capital maintenance costs are organised into three broad areas:

- Cross Business: this area comprises business-wide back office programmes (e.g. IT, laboratories and vehicles investments) that contribute to both Water and Water Recycling. Their expenditure is coded to each service in proportion to the expected benefit and in line with the regulatory accounting rules of principal use.
- Water Recycling Capital Maintenance: this area contains investments entirely attributable to capital maintenance of Water Recycling assets such as gravity and vacuum sewers, manhole covers, pumping stations, storage tanks, overflows, treatment plants and long sea outfalls.
- Water Capital Maintenance: this area contains investments entirely attributable to capital maintenance of Water assets such as boreholes, reservoirs, water towers, tunnels, pipelines and treatment plants.

In addition, both water and water recycling programmes include improvement programmes that are not classed as enhancement. These often do not contribute to asset health as they do not replace or upgrade existing assets and instead involve construction of new assets that are required to comply with existing historic permits and legislation. Some examples include our compliance with revised understanding of DWI Regulation 26 which requires us to install ultraviolet disinfection equipment and contact mains to ensure adequate disinfection. These are new assets but funded by capital maintenance as the standard is not new.

Base funding also has to fund the production of many investigations and strategic plans such as WRMP.

Both of the categories Water and Water Recycling also include maintenance of buildings, roads and fencing, electrical supplies and generators, telemetry and control systems, health and safety equipment, lifting and access assets such as fixed cranes, grid flooring, handrails and ladders, as well as spend for the proportion of diversion projects not funded by the developer who requested the diversion.

Investments in these areas can be categorised as either modelled allowances or as manual schemes.

- Modelled allowances represent a level of projected spend that has been arrived at through analysis using Copperleaf Predictive Analytics to forecast the long-term maintenance needs of our assets based on economics and risk. Such investments do not identify specific assets for intervention. More detail is available at ANH38 Asset System Resilience Appraisal
- Manual schemes are individually created solutions intended to address a specifically-identified need that does not overlap with a modelled allowance. This includes assets for which there is no deterioration model but also schemes that are necessary to improve performance, as modelled investments (as explained further within the ASRAP commentary) are not on their own sufficient to maintain long term stable performance when constrained to fit within the regulatory funding allowance. The manual investments therefore provide short term mitigation to maintain performance ahead of a longer-term increase in capital maintenance.

The contents of these portfolios are discussed in greater detail in the service-specific paragraphs that follow.

## Contribution of Cross Business to Water Capital Maintenance

Six programmes within the Cross Business sub-portfolio are coded in full or in part against Water Capital Maintenance, contributing a total of £107 million. These comprise programmes of investment in IT, Facilities, Fleet, Labs, Parks & Conservation and SMART.

## Modelled Investments within Water Capital Maintenance

Eight modelled programmes of work, developed using Predictive Analytics, contribute a total of £227 million (pre RPE and frontier shift) to the AMP8 Water Capital Maintenance spend. These programmes encompass:

- River Intakes
- Boreholes
- Raw Water Pumping
- Raw Water Mains
- Water Treatment Works
- Storage Points
- Booster Pumping Stations
- Treated Water Mains

The ASRAP commentary provides more detail of the Predictive Analytics process leading to the development of these programmes.

During optimisation of the overall capital maintenance plan, the modelled programmes were fixed (meaning that the optimiser was not allowed to defer them) other than raw water mains which was allowed to be deferred in a value-based optimisation along with the manual schemes.

## Manual Schemes within Water Capital Maintenance

The remainder of the schemes in the Water Capital Maintenance plan were manual schemes, consuming a total of £237 million (pre RPE and frontier shift). Some of these, such as those dealing with metering, were fixed as they provide the base contribution to the smart metering enhancement programme; others were subject to a value-based optimisation.

Schemes selected by the value-based optimisations are typically those providing short-term mitigations to maintain performance. Substantial examples include enhanced pressure monitoring, reservoir dredging, improvement of hydraulic models and GAC regeneration, with substantial schemes planned at Alton WTW (increasing GAC capacity to 50Ml/day) and Clay Hill (new contact tank).

## RPE

The assumptions concerning Real Price Effects have been set out in detail within the commentary for SUP11.

## Efficiency challenge

For the last two years of the current AMP, we have used the frontier shift challenge set by the CMA in its re-determination. For each year of AMP8, we have chosen to use the most challenging and ambitious end of the Economic Insight plausible range, 0.8% pa, for all categories of cost and for each price control. Refer to the commentary for SUP 11 for further detail.

## Enhancement expenditure

Please refer to the commentary within CW3 for details of enhancement expenditure.

## Developer Services Summary

The data populated for the following lines relates to Developer Services activities for Water expenditure and revenue. This includes; infrastructure charges, site-specific services and diversions.

The data populated correlates with data presented in tables DS1e for water revenue, DS2e for water expenditure and table CW11 water diversions.

Year 3 (2022/23) for AMP7 has been populated in line with our 2022/23 APR submission. All future years have been reported based on forecast shown in table DS4. All future years have been populated to report in 'treated water distribution' only.

All assumptions and explanations of the data can be found in the developer services tables mentioned.

The data populated here is inclusive of frontier shift and real price effect.

# Operating Expenditure Lines 1.1 - 1.6

### CW1.3 - Developer Services Operating Expenditure

This is the data for Developer Services water site-specific costs, as per Opex expenditure reported in table DS2e.

# Developer services revenue Line 1.7

### CW1.7 - Grants and Contributions Operating Expenditure

This is the data for Developer Services water revenue for all Developer Services activities, including; infrastructure charges, site-specific services and diversions. This data is in line with data reported in table DS1e.

# Capital expenditure Lines 1.8 - 1.13

### CW1.10 - Developer Services Capital Expenditure

This is the data for Developer Services water site-specific costs, as per Capex expenditure reported in table DS2e.

# Developer services revenue Lines 1.14 - 1.15

### CW1.14 - Grants and Contributions Capital Expenditure

This is the data for Developer Services for water for all Developer Services activities, including; infrastructure charges, site-specific services and diversions. This data is in line with data reported in table DS1e.

# Cash expenditure Lines 1.16 - 1.18

### Cash expenditure

The only cash expenditure incurred that is not included in our operating cost totals relates to our forecast pension deficit payments. In line with the pension deficit plan, the final two payments occur in the first two years of AMP8.

# Atypical expenditure Lines 1.19 - 1.24

We are not categorising any costs as atypical within the data tables.

# CW1a Totex analysis - water resources and water network+

This table is completed pre frontier shift and real price effects as discussed in the commentary to SUP11. Please refer to the commentary in CW1 details of movements.

### Developer Services Summary

The data populated for the following lines relates to Developer Services activities for Water expenditure and revenue. This includes; infrastructure charges, site-specific services and diversions.

The data populated correlates with data presented in tables DS1e for water revenue, DS2e for water expenditure table CW11 water diversions.

Year 3 (2022/23) for AMP7 has been populated in line with our 2022/23 APR submission. All future years have been reported based on forecast shown in table DS4. All future years have been populated to report in 'treated water distribution' only.

All assumptions and explanations of the data can be found in the developer services tables mentioned.

## Operating expenditure Lines 1a.1 - 1a.6

### CW1a.3 - Developer Services Operating Expenditure

This is the data for Developer Services water site-specific costs, as per Opex expenditure reported in table DS2e.

## Developer services revenue Line 1a.7

### CW1a.7 - Grants and Contributions Operating Expenditure

This is the data for Developer Services water revenue for all Developer Services activities, including; infrastructure charges, site-specific services and diversions. This data is in line with data reported in table DS1e.

## Capital expenditure Lines 1a.8 - 1a.13

### CW1a.10 - Developer Services Capital Expenditure

This is the data for Developer Services water site-specific costs, as per Capex expenditure reported in table DS2e.

### CW1a.12 - Third Party Services

As explained in table commentary for CW3, we have presented enhancement spend gross of third party costs to align to Ofwat's PR19 approach and assist with cost assessment. We have also shown third party enhancement costs on this line and provided visibility of a line by line breakdown of the split of enhancement third party costs in table CW13, using the lines for 'third party contributions'.

### CW1a.14 - Grants and Contributions Capital Expenditure

This is the data for Developer Services water revenue for all Developer Services activities, including; infrastructure charges, site-specific services and diversions. This data is in line with data reported in table DS1e.

# CW2 Base expenditure analysis - water resources and water network+

Please refer to the base expenditure commentary within CW1 for commentary in relation to CW2.

# CW3 Enhancement expenditure - water resources and water network+

We have provided detailed business cases to support our planned enhancement expenditure. Each line of expenditure in the table is cross referenced to an enhancement case included in our plan as an appendix. We have developed a comprehensive evidence base covering all our enhancement expenditure and aligned the structure of our enhancement cases to the evidential requirements set out by Ofwat in the Final Methodology Appendix 9, Annex 1 . The enhancement expenditure reported in this table is at the heart of our business plan and feeds many other data tables such as:

- Tables which aggregate categories of spend such as CW(W)1, CW(W)1a, RR30 and SUM4
- Tables which provide more detail for specific lines of investment such as CW7, CW8, CW19, CWW19, CWW22, BIO6 and SUP12
- Tables which present the same data cumulatively such as CW(W)9
- Tables which present the long term forecast beyond 2030 such as LS3 and LS4
- Tables which provide the details of early expenditure accelerated ahead of 2025 such as CW(W)12 and CW(W)17
- Tables which provide the whole life cost of the AMP8 investments such as CW(W)13
- Tables which provide the associated benefits such as CW(W)15, LS1 and OUT3
- Tables which provide the associated non-financial outputs of the expenditure such as CW5, CW(W)6, CWW20 and BIO5
- Tables presented in the appendices showing how customers are protected via PCDs
- Tables which feed the financial modelling and associated bill impacts such as RR2 and PD9

Ensuring alignment between all of these tables that draw data from our enhancement programmes has been an enormous logistical task, in large part due to emerging regulatory guidance both for WINEP and PR24 table formats since the Final Methodology was published in December 2022. We have worked with our internal assurance and external auditor teams to ensure that data is presented correctly, but we welcome the opportunity to work closely with Ofwat in the coming months through the query process to assist Ofwat teams in their assessment of our plans.

For opex reported in this table the expenditure includes both the planned operational costs for on-going operation of the new assets created, as well as for one-off costs for activities that cannot be capitalised.

The expenditure presented in this table is excluded from table CW(W)2 as those costs are base expenditure to operate and maintain assets already in service prior to 2025.

Because of the integrated nature of our asset systems with other water suppliers, a proportion of our enhancement programme is recovered from adjacent companies to whom we provide a service, for example water exports to supply their customers, or treatment of sewage collected from their customers. At PR19 we presented our enhancement expenditure in table W(W)S2 net of these third party contributions to comply with the guidance for the those expenditure tables. Following queries on this subject, in their Final Determination Ofwat reallocated third party expenditure into the enhancement totals in order to facilitate cost assessment modelling of the gross total enhancement cost. We have followed this precedent at PR24 and presented enhancement costs in table CW(W)3 as gross to facilitate cost assessment modelling. This means we have also deliberately excluded the third party enhancement costs from the third party tables CW(W)11, so that validation checks of the totals between those tables align. However, to make third party contributions to our enhancement programme visible we have included details of these in the additional lines provided in table CW(W)13.

Due to the number of additional lines available, we have combined all AMP7 additional lines. A reconciliation is provided below to the individual components making up the total of Additional line 1; AMP7 use.

Table 1 AMP7 additional lines reconciliation (£m)

| Other enhancement (freeform lines - by exception) | 2022/23 | 2023/24 | 2024/25 |
|---|---|---|---|
| Innovation fund projects capex | - | - | - |
| Innovation funct projects opex | 1.436 | 4.262 | 1.501 |
| Low pressure capex | 0.553 | - | - |
| Low pressure opex | - | 0.029 | 0.029 |
| Improvements to river flow capex | - | 6.508 | 4.667 |
| Improvements to river flow opex | - | - | 0.050 |
| Total AMP7 use capex | 0.553 | 6.508 | 4.667 |
| Totl AMP7 use opex | 1.436 | 4.291 | 1.580 |

## Supply-demand balance Lines 3.41 - 3.59

Lines CW3.56-58 Strategic regional resource solutions: We have shown the AMP7 forecast and actual costs of the RAPID schemes on this line consistent with PR19 Final Determination. However, for AMP8 we have instead included the costs of the RAPID schemes on line CWW3.184, since in line with Ofwat Q&A reference 244, we propose to use a separate (additional) price control for these costs, and the additional price control column is not present in table CW3. We provide an AMP8 enhancement case for the Strategic Regional Options as part of the commentary for that table.

## Other enhancement (Freeform lines - by exception) Lines 3.130 - 3.139

Table 2 Additional lines description

| Line reference | Additional line use | Rationale |
|---|---|---|
| Additional line 1 | AMP7 use | This line was used for AMP7 costs, please refer to table 'AMP7 additional lines reconciliation' table above for breakdown of costs associated with this line. |
| Additional line 2 | PFAS | PFAS is a discrete new investment that does not fit into another Ofwat Investment Category |
| Additional line 3 | (Unused) | Line 3 was used for an earlier iteration of reporting but later removed. Therefore, Line 3 is unused. |
| Additional line 4 | LARS meters | LARS meters is a discrete investment that does not fit into another Ofwat Investment Category |
| Additional line 5 | DWI ECAF | DWI ECAF is a discrete new investment and has been requested to not be put with the other Cyber investment so it has been put in as an additional line. |

# CW4 Raw water transport, raw water storage and water treatment data

## Raw water transport and storage Lines 4.1 - 4.12

### CW4.1: Total number of balancing reservoirs

Current numbers have been provided by the water resources team.

The reported numbers reflect the number of reservoirs classified as Network + Raw water storage as set out in RAG 4.09 guidance.We only include reservoirs which have one or more days storage. For 2022/23 reporting year Clapham (Bedford) reservoir has been removed as it was not used.

1. Heigham Large Deposit Reservoir - for Heigham WTW
2. South Clifton - for Hall WTW
3. Saltersford Raw Water Reservoir - for Saltersford WTW

The purpose of these reservoirs is to provide resilience rather than storage and as such they do not have an abstraction licence or a natural catchment. Saltersford was a new addition to the list for 2020/21 following review of the guidance. The total number is: three.

For 2023/24 Clapham (Bedford) reservoir returns to service and is included in the figures. We do not envisage changes due to WRMP24 in the forecast period.

### CW4.2: Total volumetric capacity of balancing reservoirs

Current numbers have been provided by the water resources team.

The capacity of balancing reservoirs reflects the design/construction capacity of the reservoir where possible and is clarified by our Reservoir Safety Manager. This value has changed this reporting year due to the removal of Clapham (Bedford) reservoir: This value is 399.26Ml.

For 2023/24 Clapham (Bedford) reservoir volume is includedWe do not envisage changes due to WRMP24 in the forecast period.

### CW4.3: Total number of raw water transport stations

Current numbers have been provided by the water resources team.

In line with guidance as described above, reporting for 2022/23 has not changed since 2021/22 the figure remains:

10 no. transfer pumping stations including one no. gravity intake system at Ravensthorpe Reservoir.

This increased by one in 2020/21, following review of the guidance including Empingham raw water transfer to Saltersford raw water reservoir. This was unchanged for 2021/22 and remains the same for 2022/23.

We do not envisage changes due to WRMP24 in the forecast period.

### CW4.4: Total installed power capacity of raw water transport pumping stations

Current number of stations have been provided by the water resources team. As a result we do not envisage changes in the installed power capacity due to WRMP24 in the forecast period.

### CW4.5: Total length of raw water transport mains and other conveyors

There are some planned raw water transport schemes, particularly some large connector schemes, due to be delivered during AMP8.

### CW4.7: Energy consumption for raw water consumption

The commentary for this line has been merged with that for CW4.50, energy consumption for water treatment.

### CW4.8: Total number of raw water transport imports (nr.)

There are currently no raw water treatment imports (2022/23) and we are not predicting any future raw water imports as part of our WRMP24 plan.

### CW4.9: Water imported from 3rd parties to raw water transport systems (Ml/d)

There is currently no raw water imported from third parties to water treatment works (2022/23), and we are not predicting any future raw water imports as part of our WRMP24 plan.

### CW4.10: Total number of raw water transport exports (nr.)

There are currently no raw water treatment exports (2022/23) and we are not predicting any future raw water exports as part of our WRMP24 plan.

### CW4.11: Water exported to third parties from raw water transport systems (Ml/d)

There is currently no raw water imported from third parties' to water treatment works (2022/23), and we are not predicting any future raw water imports as part of our WRMP24 plan.

### CW4.12: Total length of raw and pre-treated (non-potable) water transport mains for supplying customers

There are currently no plans for new non-potable mains schemes.

## Water treatment - other information 4.43- 4.55

### CW4.43: Peak week production capacity (PWPC)

Company PWPC for 2022/23 is 1,780.09Ml/d. The SWORPS data used is verified and audited by the leakage team. The forecasted PWPC uses the demand forecast from the submitted WRMP24 plan.

### CW4.44: Peak week production capacity having enhancement expenditure for grey solutions improvements to address raw water quality deterioration

For 2022/23 there was one enhancement scheme delivered to address raw water quality deterioration. This was for Wighton WTW where the PWPC was 1.30Ml/d.

### CW4.45: Peak week production capacity having enhancement expenditure for green solutions improvements to address raw water quality deterioration

There are currently no green solutions in place or planned to meet raw water quality deterioration.

### CW4.47: Number of treatment works requiring remedial action because of raw water deterioration

For the financial year 2022/23 there is one scheme (an ion exchange plant extension at Wighton WTW for nitrate treatment) which had investment and falls into the grey category of improvements (line 44).

For the financial year 2023/24 there is an obligation to deliver one scheme (to install nitrate treatment via an ion exchange plant) at Gayton WTW. This investment falls into the grey category of improvements (line 44).

The Drinking Water Inspectorate (DWI) have supported all AMP8 schemes, with the exception of the Denton Lodge scheme. Confidence in these is high in terms of the data we have used.

All of the schemes at water treatment works require construction and the associated governance, pre-work and planning, or significant invasive work in a phased approach and therefore the obligation dates are in the last two financial years of AMP8.

Our nitrate schemes, for construction of treatment, all have catchment management requirements as part of them too. This is to implement actions within the catchment wherever possible in order to try to prevent further deterioration of the raw waters. Nitrate treatment plants have been proposed at the following sites, with obligation dates in the last two financial years of AMP8:

**Table 3 Proposed Nitrate treatment plants**

| 2028/29 | 2029/30 |
|---|---|
| Houghton St Giles WTW | Two Mile Bottom boresite |
| Nunnery Lodge boresite | Congham WTW |
| Risby WTW | Lyng Forge WTW |
| Twelve Acre Wood boresite | Denton Lodge WTW |
| Ryston WTW | Clay Hill WTW |
| North Pickenham WTW | |
| Marham WTW | |
| Ringstead WTW | |

For taste and odour compliance, schemes have been proposed at the following sites due for completion in 2028/29 financial year:

**Table 4 Proposed schemes for Taste and Odour improvements**

| Proposed WTW sites for taste and odour improvements |
|---|
| Codham WTW Water Quality Odour |
| Bocking WTW Water Quality Odour |
| Earls Colne WTW Taste and odour |

For compliance with the requirement for drinking water to be wholesome, schemes for reducing the concentration of per-and poly fluoroalkyl substances (PFAS) to comply with the tiered guideline values have been proposed at the following WTWs in the 2029/30 financial year:

**Table 5 Proposed WTW's for PFAS reduction schemes**

| Proposed WTW's for PFAS reduction schemes |
|---|
| Branston Booths WTW |
| Alton WTW |
| Ardleigh WTW |
| Beck Row WTW |
| Grafham WTW |
| Clapham WTW |
| Covenham WTW |
| Elsham WTW |
| Etton WTW |
| Hall WTW |
| Heigham WTW |
| Marham WTW |
| Morcott WTW |
| Thorpe-Mousehold WTW |
| Pitsford WTW |
| Ravensthorpe WTW |
| Saltersford WTW |
| Stoke Ferry WTW |
| Watton WTW |

| Proposed WTW's for PFAS reduction schemes |
| --- |
| Wing WTW |
| Parsonage Street WTW |

In addition to these schemes, there are three further investments proposed for the same PFAS compounds. These schemes cover investigations and sampling within catchments and of the GACs; these are all part of the PFAS strategy, which was required to be submitted to DWI as part of the PR24 proposals.

## CW4.48: Zonal population receiving water treated with orthophosphate

The zonal population receiving water treated with orthophosphate is calculated from the information reported to the DWI in the Details Tables provided annually in accordance with the Information Direction. All Public Water Supply Zones (PWSZ) receiving orthophosphate dosed water are identified in the Details Tables which also document the population of each PWSZ.

There has been a steady increase in the population receiving orthophosphate dosed water, which is partly due to the increase in the number of WTWs with orthophosphate dosing plant in operation, as well as the general increase in total population we serve. This now stands at 100 per cent for 2022/23, (up from 98.58 per cent for 2021/22), meaning that the population served is 4,972,797.

We forecast for future years that our full population, as forecast for AMP8 and beyond will be classed as receiving orthophosphate dosed water. We expect the Anglian Water population to increase to 5,283,511 by the year 2029/30 (a 6 percent increase from 2022/23). Note that the population forecast has been aligned with our WRMP24 projection.

## CW4.50: Energy consumption for raw water transport and water treatment

This table captures energy consumption for raw water transport and for water treatment.

The data covers the years 2022/23 to 2029/30. The structure of the information replicates that used in the 2022/23 Annual Performance Report (APR). This commentary does not seek to replicate the APR commentary, more to explain any material differences, changes to assumptions and outline methodology.

All 2022/23 information has been replicated from the APR for that year. For the following years, the following represents the outline methodology:-

**For 2023/24**

We have populated our APR template with the budgeted consumption for that year;

1. the total energy consumption from transport and on-site fuel on all water function sites is assumed not to have changed from 2022/23. The exception is for the gas forecast to be delivered to the administration function (a share of which is allocated to all water function sites), where the budgeted gas consumption has been used;

2. Additional consumption as a result of new capital schemes (Revenue Impact of Capital Schemes, or RICS) being delivered in the year has been added;
3. An assumption of base energy efficiency has been added, consistent with historic averages for the water function.

**For 2024/25 to 2029/30**

We have assumed that the consumption forecast will follow on from that for 2023/24, adjusted for:-

- Change in the forecast of water abstraction since 2023/24, pro-rata to energy consumption;
- RICS for schemes forecast for delivery from 2024/25 to 2029/30;
- The same base energy efficiency assumption as 2023/24.

For 2022/23, the total energy consumption across both lines was**131,463 MWh**, 46,158 MWh for raw water transport and 85,304 MWh for water treatment. This was 3.97 per cent higher than the previous year, 2021/22, the main component of the change being high demand for water due to the exceptionally hot and dry weather during the summer period.

For 2023/24, we are budgeting for more normalised conditions of demand and supply, rather than the most recent extremes, with a total across both lines of**126,365 MWh**, 44,985 MWh for raw water transport and 81,379 MWh for water treatment. The total includes for 500 MWh of forecast RICS and 1,400 MWh of assumed efficiencies across both lines.

The forecast for 2024/25 across both lines is**125,939 MWh**, 44,873 MWh for raw water transport and 81,066 MWh for water treatment. The changes from 2023/24 are driven by a small forecast increase in abstraction plus a total of 971 MWh from forecast RICS and 1,400 MWh of assumed efficiencies across both lines.

The forecast for 2025/26 across both lines is**125,016 MWh**, 44,560 MWh for raw water transport and 80,456 MWh for water treatment. The changes from 2024/25 are driven by a forecast decrease in abstraction consumption of 560 MWh plus a total of 1,036 MWh from forecast RICS and 1,400 MWh of assumed efficiencies across both lines.

The forecast for 2026/27 across both lines is**123,285 MWh**, 43,905 MWh for raw water transport and 79,380 MWh for water treatment. The changes from 2025/26 are driven by a forecast decrease in abstraction consumption of 457 MWh plus a total of 125 MWh from forecast RICS and 1,400 MWh of assumed efficiencies across both lines.

The forecast for 2027/28 across both lines is**122,026 MWh**, 43,302 MWh for raw water transport and 78,724 MWh for water treatment. The changes from 2026/27 are driven by a forecast decrease in abstraction consumption of 313 MWh plus a total of 454 MWh from forecast RICS and 1,400 MWh of assumed efficiencies across both lines.

The forecast for 2028/29 across both lines is**121,426 MWh**, 42,574 MWh for raw water transport and 78,852 MWh for water treatment. The changes from 2027/28 are driven by a forecast decrease in abstraction consumption of 660 MWh plus a total of 1,460 MWh from forecast RICS and 1,400 MWh of assumed efficiencies across both lines.

The forecast for 2029/30 across both lines is**124,386 MWh**, 41,712 MWh for raw water transport and 82,674 MWh for water treatment. The changes from 2028/29 are driven by a forecast decrease in abstraction consumption of 1,038 MWh plus a total of 5,397 MWh from forecast RICS and 1,400 MWh of assumed efficiencies across both lines.

A number of assumptions have been made in calculating the Raw Water Transport and Water Treatment energy consumption data. We have applied the same assumptions as we did in calculating Raw Water Abstraction (see commentary for RES1.24). In addition, we have included energy from solar sources generated and used on site.

## CW4.51: Total number of water treatment imports

There are currently no water treatment imports (2022/23) and we are not predicting any future raw water imports as part of our WRMP24 plan.

## CW4.52: Water imported from 3rd parties to water treatment works

There is currently no water imported from third parties' to water treatment works (2022/23), and we are not predicting any future raw water imports as part of our WRMP24 plan.

## CW4.53: Total number of water treatment exports

There are currently no water treatment exports (2022/23) and we are not predicting any future raw water exports as part of our WRMP24 plan.

## CW4.54: Water exported to 3rd parties from water treatment works

There is currently no raw water imported from third parties' to water treatment works (2022/23), and we are not predicting any future raw water imports as part of our WRMP24 plan.

## CW4.55: Total number of water treatment works effluent discharges requiring new MCERTS flow monitoring

There are currently no new works requiring new MCERTS flow monitoring and none predicted for the next AMP period.

# CW4a Transition and accelerated programme

There are no planned schemes within raw water transport, raw water storage and water treatment for the transition and accelerated programme. Therefore, table CW4a contains no data.

# CW5 Treated water distribution - assets and operations

## Assets and operations Lines 5.1 - 5.30

### CW5.1: Total installed power capacity of potable water pumping stations

The rated power capacity increase seen in the years from now to 2025 relate to the pumping stations serving our strategic pipeline. The rated power capacity increase seen in the years 2026-30 are primarily driven by our WRMP24 with a few additional sites being driven by growth.

### CW5.2 - 3: Total volumetric capacity of Service Reservoirs and Water Towers

AMP7 forecast includes the new assets being constructed as part of the WRMP19 programme and is aligned with APR Table 6F.

AMP8 forecast includes the new assets planned as part of the WRMP24 programme which are also reported in table CW8, but excludes two schemes (CAM4 and SWC8) as these are planned to be completed in AMP9.

### CW5.4: Water delivered (non-potable)

2022/23 base-line figures have been aligned to APR out-turn values.

The forecast figures for water delivered (non-potable) have been derived from the revised draft WRMP24 forecast. These reflect values for non-potable demand in our South Humber Bank water resources zone and include an initial assessment of non-potable demand requirements for hydrogen production and carbon capture.

### CW5.5: Water delivered (potable)

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast water delivered values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). These values include the effects of demand management options (full smart meter rollout by 2030, water efficiency), metering policy, non-household water efficiency, Covid impacts and government led interventions included in the preferred plan. The forecast figures exclude distribution losses and DSOU values.

The full forecast methodology and preferred plan details are provided in our 'Revised Draft WRMP24 Technical Report: Demand Forecast' and 'Revised Draft WRMP24 Technical Report: Demand Management Preferred Plan' reports.

Despite a population increase of 310,000, we expect potable consumption to decline from 1024.31Ml/d (2023/24) to 998.25Ml/d (2029/30).

### CW5.6: Water delivered (billed measured residential properties)

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast water delivered (billed measured residential) values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). These values include the effects of demand management options (full smart meter rollout by 2030, water efficiency), metering policy, Covid impacts and government led interventions included in the preferred plan. With demand management and despite growth we expect these values to remain relatively stable rising from 552.7Ml/d in 2023/24 to 557.5Ml/d by 2029/30.

### CW5.7: Water delivered (billed measured businesses)

2022/23 base-line figures have been aligned to APR out-turn values. Our calculation method uses meter reads to derive consumption. It will include consumption from some properties that our void during the year as long as they have meter reads. Due to the complex nature of tracking void properties throughout the year we do not believe it robust to try and report occupied and void property consumption separately. Void consumption is not reported in the water taken unbilled lines and so is not double counted

Forecast water delivered (billed measured business) values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). These values include the effects of non-household demand management options included in the preferred plan.

Non-household consumption has been derived from the WRMP forecast using regression analysis of the various industrial sectors and forecasting future consumption based upon the East of England Forecast Model (EEFM) and appropriate factors, GVA (Gross value Added), employment and population growth.

With demand management and despite growth we expect these values to remain relatively stable decreasing from 299.7Ml/d in 2023/24 to 299.12Ml/d by 2029/30.

## CW5.8: Proportion of distribution input derived from impounding reservoirs

2022/23 base-line figures have been aligned to APR out-turn values.

Historical Distribution input (DI) data used to derive the proportional split is supplied by the Leakage Team. The past three years data has been used to derive an average split and this has been applied for the forecast period. We, consequently forecast the proportion of distribution input derived from impounding reservoirs will be approximately 2.1 percent.

**Table 6 % Proportion of distribution input**

| | 2020-21 | 2021-22 | 2022-23 | 3-year average |
|---|---|---|---|---|
| Proportion of distribution input derived from impounding reservoirs | 0.02 | 0.022 | 0.021 | **0.021** |
| Proportion of distribution input derived from pumped storage reservoirs | 0.403 | 0.40 | 0.417 | **0.407** |
| Proportion of distribution input derived from river abstractions | 0.073 | 0.070 | 0.068 | **0.070** |
| Proportion of distribution input derived from groundwater works, excluding managed aquifer recharge (MAR) water supply schemes | 0.504 | 0.508 | 0.495 | **0.502** |

The reported baseline estimates are based upon distribution input (DI) from the following reservoir sources:

- Ravensthorpe WTW (Ruthamford North RZ): 100 percent yield from natural inflow ("natural"). WTW supplied from both Ravensthorpe Reservoir and Hollowell Reservoir
- Alton WTW (East Suffolk RZ): natural yield from Alton Water
- Pitsford WTW (Ruthamford North RZ):natural yield from Pitsford Reservoir

## CW5.9: Proportion of distribution input derived from pumped storage reservoirs

2022/23 base-line figures have been aligned to APR out-turn values.

Historical Distribution input (DI) data used to derive the proportional split is supplied by the Leakage Team. The past three years data has been used to derive an average split and this has been applied for the forecast period. We, consequently forecast the proportion of distribution input derived from pumped storage reservoirs will be approximately 40.7 percent.

The reported baseline estimates are based on distribution input (DI) from the following reservoir sources:

- Alton WTW (East Suffolk RZ): pumped yield from Alton Water
- Ardleigh WTW (South Essex RZ): pumped yield from Ardleigh Reservoir
- Covenham WTW (East Lincolnshire RZ): 100 percent pumped yield from Covenham Reservoir
- Grafham WTW (Ruthamford South RZ): 99 percent pumped yield from Grafham Reservoir
- Pitsford WTW (Ruthamford North RZ): pumped yield from Pitsford Reservoir
- Wing WTW and Morcott WTW (Ruthamford North RZ): pumped yield from Rutland Water

## CW5.10: Proportion of distribution input derived from river abstractions

2022/23 base-line figures have been aligned to APR out-turn values.

Historical Distribution input (DI) data used to derive the proportional split is supplied by the Leakage Team. The past three years data has been used to derive an average split and this has been applied for the forecast period. We, consequently forecast the proportion of distribution input derived from river abstraction will be approximately 7 percent.

The reported baseline estimates are based DI from the following river abstraction sources:

- Bedford WTW (River Ouse)
- Elsham WTW (River Ancholme) - (Combined site BH/SW)
- Hall WTW (River Trent)
- Heigham WTW (River Wensum) - (Combined site BH/SW)
- Marham WTW (River Nar) - (Combined site BH/SW)
- · Stoke Ferry WTW (River Wissey) - (Combined site BH/SW)

## CW5.11: Proportion of distribution input derived from groundwater works, excluding managed aquifer recharge (MAR) water supply schemes

2022/23 base-line figures have been aligned to APR out-turn values.

Historical Distribution input (DI) data used to derive the proportional split is supplied by the Leakage Team. The past three years data has been used to derive an average split and this has been applied for the forecast period. We, consequently forecast the proportion of distribution input derived from groundwater works will be approximately 50.2 percent.

## CW5.12: Proportion of distribution input derived from artificial recharge (AR) water supply schemes

No such schemes are operated by the company. Forecast values maintained as zero, as no schemes are proposed in AMP8.

## CW5.13: Proportion of distribution input derived from aquifer storage and recovery (ASR) water supply schemes

No such schemes are operated by the company. Forecast values maintained as zero, as no schemes are proposed in AMP8.

## CW5.14: Proportion of distribution input derived from saline abstractions

No such schemes are operated by the company. Forecast values maintained as zero, as no schemes are proposed in AMP8.

## CW5.15: Proportion of distribution input derived from water reuse schemes

No such schemes are operated by the company. Forecast values maintained as zero, as no schemes are proposed in AMP8.

## CW5.16-20: Total number of potable water pumping stations that pump into and within the treated water distribution system and the split to groundwater, surface water, relift and third party imports

The number of sites increase seen in the years from now to 2025 relate to the pumping stations serving our strategic pipeline. The number of sites increase seen in the years 2026-30 are primarily driven by our WRMP24 with a few additional sites being driven by growth.

## CW5.23: Energy consumption fortreated water distribution

This table captures energy consumption for treated water distribution.

The data covers the years 2022/23 to 2029/30. The structure of the information replicates that used in the 2022/23 Annual Performance Report (APR). This commentary does not seek to replicate the APR commentary, more to explain any material differences, changes to assumptions and outline methodology.

All 2022/23 information has been replicated from the APR for that year. For the following years, the following represents the outline methodology:-

For 2023/24

- we have populated our APR template with the budgeted consumption for that year;
- the total energy consumption from transport and on-site fuel on all water function sites is assumed not to have changed from 2022/23. The exception is for the gas forecast to be delivered to the administration function (a share of which is allocated to all water function sites), where the budgeted gas consumption has been used;
- Additional consumption as a result of new capital schemes (Revenue Impact of Capital Schemes, or RICS) being delivered in the year has been added;
- An assumption of base energy efficiency has been added, consistent with historic averages for the water function.

For 2024/25 to 2029/30 we have assumed that the consumption forecast will follow on from that for 2023/24, adjusted for:-

- Change in the forecast of water abstraction since 2023/24, pro-rata to energy consumption;
- RICS for schemes forecast for delivery from 2024/25 to 2029/30;
- The same base energy efficiency assumption as 2023/24.

For 2022/23, the total energy consumption was **154,135 MWh** which was 2.05 per cent higher than the previous year, 2021/22, the main component of the change being increased demand for water due to the exceptionally hot and dry weather during the summer period.

For 2023/24, we are budgeting for more normalised conditions of demand and supply, rather than the most recent extremes, with a total of **151,257 MWh**. This includes for 1,077 MWh of forecast RICS and 1,641 MWh of assumed efficiencies.

The forecast for 2024/25 is **156,395 MWh**. The changes from 2023/24 are driven by a small forecast increase in abstraction plus 6,774 MWh from forecast RICS and 1,641 MWh of assumed efficiencies.

The forecast for 2025/26 is **156,084 MWh**. The changes from 2024/25 are driven by a forecast decrease in abstraction consumption of 668 MWh plus 1,998 MWh from forecast RICS and 1,641 MWh of assumed efficiencies.

The forecast for 2026/27 is **153,898 MWh**. The small changes from 2025/26 are driven by a forecast decrease in abstraction consumption of 545 MWh plus 1,641 MWh of assumed efficiencies.

The forecast for 2027/28 is **152,907 MWh**. The small changes from 2026/27 are driven by a forecast decrease in abstraction consumption of 374 MWh plus 1,024 MWh from forecast RICS and 1,641 MWh of assumed efficiencies.

The forecast for 2028/29 is **154,628 MWh**. The small changes from 2027/28 are driven by a forecast decrease in abstraction consumption of 788 MWh plus 4,150 MWh from forecast RICS and 1,641 MWh of assumed efficiencies.

The forecast for 2029/30 is **161,235 MWh**. The small changes from 2028/29 are driven by a forecast decrease in abstraction consumption of 1,238 MWh plus 9,487 MWh from forecast RICS and 1,641 MWh of assumed efficiencies.

A number of assumptions have been made in calculating the treated water distribution energy consumption data. We have applied the same assumptions as we did in calculating Raw Water Abstraction (see commentary for RES1.24). In addition, we have included energy from solar sources generated and used on site.

### CW5.25: Total number of treated water distribution imports

The reported data is supported by analysis which is has been provided by the leakage team. Forecast values have been maintained as a constant.

### CW5.26: Water imported from third parties to treated water distribution systems

Historical data used to derive a three-year average value and this has been applied for the forecast period.

### CW5.27: Total number of treated water distribution exports

The reported data is supported by analysis which is has been provided by the leakage team. Forecast values have been maintained as a constant.

### CW5.28: Water exported to third parties from treated water distribution systems

Historical data used to derive a three-year average value, and this has been applied for the forecast period.

### CW5.29: Peak seven day rolling average distribution input

For our revised draft WRMP24, we have produced a three day peak projection for our Critical Period forecast. This has been produced at the water Resource Zone level based upon our PCC and peak DI analysis. This is reflected in our peak forecast, showing a >20 percent increase in demand for our peak period.

## Water balance - Company level Lines 5.31 - 5.39

### CW5.31: Measured household consumption (excluding supply pipe leakage)

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Measured household consumption (excluding supply pipe leakage)' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). These values include the effects of demand management options (full smart meter rollout by 2030, water efficiency), metering policy, Covid impacts and government led interventions (included in the preferred plan. With demand management and including growth we expect these values to increase from 527.4Ml/d in 2023/24 to 540.4Ml/d by 2029/30.

The full forecast methodology and preferred plan details are provided in our 'Revised Draft WRMP24 Technical Report: Demand Forecast' and 'Revised Draft WRMP24 Technical Report: Demand Management Preferred Plan' reports.

## CW5.32: Unmeasured household consumption (excluding supply pipe leakage)

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Unmeasured household consumption (excluding supply pipe leakage)' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). These values include the effects of demand management options (full smart meter rollout by 2030, water efficiency), metering policy, Covid impacts and government led interventions (included in the preferred plan. With demand management and with growth we expect these values to decrease from 130.6Ml/d in 2023/24 to 102.6Ml/d by 2029/30.

The full forecast methodology and preferred plan details are provided in our 'Revised Draft WRMP24 Technical Report: Demand Forecast' and 'Revised Draft WRMP24 Technical Report: Demand Management Preferred Plan' reports.

## CW5.33: Measured non-household consumption (excluding supply pipe leakage)

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Measured non-household consumption (excluding supply pipe leakage)' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). These values include the effects of non-household demand management options included in the preferred plan.

Non-household consumption has been derived from the WRMP24 forecast, using regression analysis of the various industrial sectors and forecasting future consumption based upon the East of England Forecast Model (EEFM) and appropriate factors, GVA (Gross value Added), employment and population growth.

With demand management and despite growth we expect these values to remain relatively stable decreasing from 298.8Ml/d in 2023/24 to 298.2Ml/d by 2029/30 (noting that without demand management this would be 308.2Ml/d)

## CW5.34: Unmeasured non-household consumption (excluding supply pipe leakage)

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast Unmeasured non-household consumption (excluding supply pipe leakage)' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). These values include the effects of non-household demand management options included in the preferred plan.

Non-household consumption has been derived from the WRMP24 forecast, using regression analysis of the various industrial sectors and forecasting future consumption based upon the East of England Forecast Model (EEFM) and appropriate factors, GVA (Gross value Added), employment and population growth.

With demand management and despite growth we expect these values to remain relatively stable increasing from 1.2Ml/d in 2023/24 to 1.24Ml/d by 2029/30 (noting that over-all approximately 99.5 percent of our non-household customers measured)

## CW5.35: Total annual leakage

2022/23 base-line figures have been aligned to APR out-turn values.

Total Leakage has been derived from our revised draft WRMP24 - Normal Year Annual Average forecast (2021/22 base-line). Total Leakage losses are derived from the WRMP24 leakage forecast and are expected to decrease to approximately 151.5Ml/d by 2029/30, once leakage and metering demand management options have been included.

The full forecast methodology and preferred plan details are provided in our 'Revised Draft WRMP24 Technical Report: Demand Forecast' and 'Revised Draft WRMP24 Technical Report: Demand Management Preferred Plan' reports.

## CW5.36: Distribution system operational use

2022/23 base-line figures have been aligned to APR out-turn values.

The value for 'Distribution system operational use' has been derived from Water-Balance data provided by the Leakage Team from the base-line for the WRMP24 forecast (2021/22) and has been maintained as a constant for the plan period, as in the WRMP.

## CW5.37: Water taken unbilled

2022/23 base-line figures have been aligned to APR out-turn values.

The value for 'Water taken un-billed' has been derived from Water-Balance data provided by the Leakage Team from the base-line for the WRMP24 forecast (2021/22) and has been maintained as a constant for the plan period, as in the WRMP.

## CW5.38: Distribution input

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast distribution input (demand) has been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. This includes the effects of demand management options (full smart meter rollout by 2030, water efficiency and leakage reduction), metering policy, Covid impacts and government led interventions.

The full forecast methodology and preferred plan details are provided in our 'Revised Draft WRMP24 Technical Report: Demand Forecast' and 'Revised Draft WRMP24 Technical Report: Demand Management Preferred Plan' reports.

Our forecast predicts decreasing values from 1,178.06 Ml/d in 2022/23 to 1,126.30 Ml/d in 2029/30, despite forecast increases in population (310,000) and households over this period.

## CW5.39: Distribution input (pre-MLE)

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast distribution input (demand) per MLE has been derived using the average difference seen between SWORPS values and reported end of year DI. Considering the last five years, this gives an average difference of 1.52 percent. This average uplift has been applied to the predicted demand values from our revised draft WRMP24 - Normal Year Annual Average forecast.

**Table 7 Forecast distribution input (demand) per MLE**

| | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | 2022-2023 | average from past 5 years |
|---|---|---|---|---|---|---|
| DI Pre MLE | 1182.40 | 1159.91 | 1197.98 | 1171.11 | 1193.70 | |
| DI post MLE | 1159.154 | 1136.349 | 1186.3 | 1157.31 | 1178.06 | |
| | 102.01% | 102.07% | 100.98% | 101.19% | 101.33% | 101.52% |

# Components of total leakage (post MLE) - Company level Lines 5.58 - 5.67

## CW5.58: Leakage upstream of DMA

2022/23 base-line figures have been aligned to APR out-turn values.

The value for 'Leakage upstream of DMA' has been provided by the Leakage Team and has been maintained as a constant for the plan period, as in the WRMP.

## CW5.59: Distribution main losses

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast Leakage distribution losses are derived from the WRMP24 leakage forecast and are expected to decrease to approximately 113.2Ml/d by 2024/25, once leakage and metering demand management options have been included. Note this figure excludes the 'Leakage upstream of DMA' volume of 7.1Ml/d (giving a total distribution loss of 120.3Ml/d by 2029/30.

## CW5.60: Customer supply pipe losses - measured households excluding void properties

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - measured households excluding void properties' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. This includes the effects of housing growth, smart meter savings and metering policy. Values are expected to decrease from 25.3Ml/d in 2023/24 to 17.1Ml/d by 2029/30.

## CW5.61: Customer supply pipe losses - unmeasured households excluding void properties

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - unmeasured households excluding void properties' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. This includes the effects of housing growth and metering policy. Values are expected to decrease from 12.7Ml/d in 2023/24 to 10.2Ml/d by 2029/30.

## CW5.62: Customer supply pipe losses - measured non-households excluding void properties

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - measured non-households excluding void properties' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. This includes the effects of growth, smart metering policy and non-household demand management. Values are expected to decrease from 0.97Ml/d in 2023/24 to 0.89Ml/d by 2029/30.

## CW5.63: Customer supply pipe losses - unmeasured non-households excluding void properties

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - unmeasured non-households excluding void properties' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast.

## CW5.64: Customer supply pipe losses - void measured households

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - void measured households' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. Void uspl is derived as an aggregate value for WRMP24 and has, consequently been apportioned on know void splits. Forecast values are expected to remain relatively constant at 1.7Ml/d from 2023/24 to 2029/30.

## CW5.65: Customer supply pipe losses - void unmeasured households

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - void measured households' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. Void uspl is derived as an aggregate value for WRMP24 and has, consequently been apportioned on know void splits. Forecast values are expected to increase from 0.86Ml/d from 2023/24 to 1.02M/d by 2029/30.

## CW5.66: Customer supply pipe losses - void measured non-households

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - void measured households' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. Void uspl is derived as an aggregate value for WRMP24 and has, consequently been apportioned on know void splits. Forecast values are expected to increase from 0.07Ml/d from 2023/24 to 0.09M/d by 2029/30.

## CW5.67: Customer supply pipe losses - void unmeasured non-households

2022/23 base-line figures have been aligned to APR out-turn values.

Forecast 'Customer supply pipe losses - void measured households' values have been derived from our revised draft WRMP24 - Normal Year Annual Average forecast. Void uspl is derived as an aggregate value for WRMP24 and has, consequently been apportioned on know void splits. Forecast values are expected to be near zero.

# CW6 Water network+ - Mains, communication pipes and other data

## Treated water distribution - mains analysis Lines 6.1 - 6.8

### CW6.1: Total length of potable mains as of 31 March.

Data for this line for the year 2022/23 has come from the data submitted for the APR.

The projections have taken into account the following new mains projections, that have been added to the line:

estimated water main lengths taken for on-site mains taken from DS04 (for requisitions and SLPs).

Another source of new mains data has come from the planned strategic connectors being laid across the region during the remainder of AMP7 and into AMP8.

Finally a whole host of new mains that have come of our corporate investment software package - C55, which include various schemes related to growth etc.

### CW6.3: Total length of potable mains renewed

This data line is made up of primarily three constituent parts; Capital maintenance mains renewal, enhanced leakage mains renewal, & climate vulnerable mains renewal. The breakdown of which is provided below:

**Table 8 Breakdown of mains renewal (km)**

| Investment Area | FY26 | FY27 | FY28 | FY29 | FY30 |
|---|---|---|---|---|---|
| Base mains renewal | 46.7 | 49.6 | 50.7 | 50.3 | 56.4 |
| Climate Vulnerable Mains | 137.5 | 137.5 | 137.5 | 137.5 | 145.2 |
| Leakage enhanced mains renewal | 17.6 | 26.5 | 0 | 0 | 0 |
| Total Mains Renewal | 201.9 | 213.6 | 188.2 | 187.8 | 201.6 |

As this level of mains renewal is in excess of our aspirations for AMP7, we have profiled the delivery of the three core schemes of work to allow for a combined delivery profile which aligns with both our WRMP demand side requirements, but also the operational challenges of scaling up delivery routes to match this new level of demand.

As part of our climate vulnerable mains suite of investments, there are three specific investments which relate to the above year by year profile. These are set out below:

**Table 9 The three Mains Resilience investments**

| Investment Name | Total length of Climate - Vulnerable main |
|---|---|
| CVM - Climate Vulnerable Mains | 687.5km |
| Wicken Resilience (Ely) | 3.5km |
| Stuntney WR to Haddenham WT (Ely) Resilience | 4.2km |

We are proposing both climate vulnerable mains and Leakage enhanced mains renewal as enhancement expenditure. To support to the argument for additional expenditure we are proposing a proportion of mains renewal from base capital maintenance, equal to our forecasted mains renewal for AMP7. This 253.7km from capital maintenance mains renewal equates to 0.13 percent of our distribution network.

In addition to base, Climate Vulnerable Main enhanced expenditure is directly related to soil types and distribution main material within our region. We have a very high proportion of class 5 and 6 shrink/swell soils which causes increased levels of premature failure in AC, DI and PVC distribution assets during hot & dry

spells which are becoming far more common due to climate change. For more information on climate vulnerable mains, please see our enhancement investment commentary.

Leakage driven enhanced mains renewal is also a key aspect of our proposed WRMP24. This will involve replacing 45km of distribution assets, and around 2,500 communication pipes to drive down leakage within some of our highest leakage areas. This investment is part of our wider demand side WRMP24 strategy which also involves smart metering. Further information can be found in our enhancement investment commentary.

### CW6.4: Total length of new potable mains

Total length of new potable mains has come from a combination of potable connector schemes for both AMP7 and AMP8, plus from a variety of different sources extracted from our main corporate costing software system - C55.

### CW6.5-8: Total length of mains broken down by diameter band

Data for these lines for the year 2022/23 have come from the data submitted for the APR.

The projections have taken into account the following new mains projections, that have been added to these lines and split across the different diameter bands:

estimated water main lengths taken for on-site mains taken from DS04 (for requisitions and SLPs).

Another source of new mains data has come from the planned strategic connectors being laid across the region during the remainder of AMP 7 and into AMP 8.

Finally a whole host of new mains that have come of our corporate investment software package - C55, which include various schemes related to growth etc.

## Treated water distribution - mains age profile Lines 6.09 - 6.17

Data for these lines for the year 2022/23 has come from the data submitted for the APR.

The projections have taken into account the following:

- new mains projections, that have been added to line 17 for total length of mains laid post 2021
- estimated water main lengths taken for on-site mains taken from DS04 (for requisitions and SLPs).

Another source of new mains data has come from the planned strategic connectors being laid across the region during the remainder of AMP7 and into AMP8.

Finally a whole host of new mains that have come of our corporate investment software package - C55, which include various schemes related to growth etc.

Planned schemes for mains refurbishment and replacement (such as those identified as climate vulnerable) have been removed from the relevant age bandings and then re-applied to the the total length of mains post 2021 line.

## Communication and supply pipes Lines 6.18 - 6.27

### CW6.18: Number of lead communication pipes

This has been calculated taking financial year 2022 to 2023 reported APR number of communication pipes, and then subtracting the estimated number planned communication pipes which will or are estimated to be carried out. The estimated number of communication pipes is subject to change as some of these are reactive.

### CW6.19: Number of galvanised iron communication pipes

There are no planned replacements of these pipes.

### CW6.20: Number of other communication pipes

The data for 2022/23 has been taken from the APR. The remaining entries have been calculated using the total planned connections in table SUP1B.

### CW6.21: Number of lead communication pipes replaced or relined for water quality

These are all communication pipe replacements including planned, and reactive following a PCV failure or notification from a customer that they are replacing their lead pipe. As some of these are reactive this number is subject to change. For the financial year 2022 to 2023 13 communication pipes have been replaced funded from the IdoK programme of work. The numbers proposed for AMP8 are dependent on DWI support.

## CW6.22: Number of lead communication pipes replaced for other reasons

As these are opportunistic replacements it is difficult to forecast and historically numbers have been very low, the numbers input reflect the number reported for financial year 2022 to 2023.

## CW6.23: Total length of lead communication pipes replaced or relined

For the financial year 2022 to 2023 the lengths are a mixture of assumed lengths or actual lengths. Where we have been able to get the actual lengths, these have been used, but for a small number of the jobs this data was not recorded so an estimate has been used. Where an estimate has been used, we have used a figure of 3.75 metres, which is the average length in our cost models. Any lead communication pipe replaced by Development Services then an average length has been used for far sides of 8 metres or a near side of 4 metres.

For financial years 2023 to 2024 and 2024 to 2025 and for AMP8 this length has been calculated using the average length in our cost models which is 3.75m.

The volumes of pipe replacement in AMP8 are dependent on DWI support.

## CW6.24: Number of external lead supply pipes replaced or relined

For the financial year 2022 to 2023 this is the actual number of replacements completed. For financial years 2023 to 2024 and 2024 to 2025 this has been estimated. We have undertaken 8 external supply pipe replacements as part of the Idok funded programme in the financial year 2022 to 2023. 268 of these are remaining for completion by the end of AMP7.

The volumes of pipe replacement in AMP8 are dependent on DWI support. Additionally, as supply pipes are not our assets this number is subject to change depending on customer uptake for all forward projections.

## CW6.25: Total length of external lead supply pipes replaced or relined

For financial year 2022 to 2023 this length has been taken from the actual number of replacements completed. We capture the total length of supply pipe replaced; however, our records do not detail this into external and internal supply pipe. For the figures provided we have assumed that where we have replaced internal lead pipe that this has had an average length of 1 metre and this has been subtracted from the external pipe length figure provided.

For financial years 2023 to 2024 and 2024 to 2025, and also AMP8 this number has been estimated from our current cost models, which assumes a length of 10 metres for the external supply pipe for a domestic property and a length of 11 metres for the external supply pipe for a school.

The volumes of pipe replacement in AMP8 are dependent on DWI support. Additionally, as supply pipes are not our assets this number is subject to change depending on customer uptake for all forward projections.

## CW6.26: Number of internal lead supply pipes replaced or relined

For the financial year 2022 to 2023 this length has been taken from the actual number of internal lead supply pipes replaced completed from our point of compliance reactive programme of work.

The volumes of pipe replacement in AMP8 are dependent on DWI support. Additionally, as supply pipes are not our assets this number is subject to change depending on customer uptake for all forward projections.

## CW6.27: Total length of internal lead supply pipes replaced or relined

For year 2022-2023 this length has been taken from the actual number of replacements completed from our point of compliance reactive programme of work. We capture the total length of supply pipe replaced but our records did not break it down into external and internal supply pipe. It has been assumed that of the total supply pipe replacement length the internal pipe length replaced is 1 metre.

For financial years 2023 to 2024 and 2024 to 2025, an estimated length of 1metre for the internal supply pipe length has been used. For the AMP8 length an estimate of 1 metre has been used for domestic properties and a 5 metre length for schools.

The volumes of pipe replacement in AMP8 are dependent on DWI support. Additionally, as supply pipes are not our assets this number is subject to change depending on customer uptake for all forward projections.

Table 10 Confidence grading

| Line ref. | Description | Grade | Comment |
|---|---|---|---|
| CW6.18 | Number of lead communication pipes | B4 | A confidence grading of B4 has been given as these numbers are based on actual confirmed replacements, however the original baseline number from PR09 was based modelling. |
| CW6.21 | Number of lead communication pipes replaced or relined for water quality | A2 | A confidence grading of A2 as we have records of all communication pipe replacements which have been reported. |
| CW6.22 | Number of lead communication pipes replaced for other reasons | BX | A confidence grading of A5 for AMP8 as these are opportunistic replacements and very small volumes. |
| CW6.23 | Total length of lead communication pipes replaced or relined | B3 | A confidence grading of B3 as some of these are actual lengths, others are estimated, as explained on the commentary. |
| CW6.24 | Number of external lead supply pipes replaced or relined | A4 | A confidence grading of A4 as these numbers are dependent on customer uptake and programme phasing. |
| CW6.25 | Total length of external lead supply pipes replaced or relined | B4 | A confidence grading of B4 as these numbers are dependent on customer uptake and DWI support for AMP8. For Schools this number has been an average assumed length. |
| CW6.26 | Number of internal lead supply pipes replaced or relined | A4 | A confidence grading of A4 as these numbers are dependent on customer uptake and programme phasing. |
| CW6.27 | Total length of internal lead supply pipes replaced or relined | B4 | A confidence grading of B4 as these numbers are dependent on customer uptake and DWI support for AMP8. For Schools this number has been an average assumed length. |

# Other Lines 6.28 - 6.30

## CW6.28: Company area

The area reported covers Anglian Water's appointed area, without adjustment for New Appointments and Variations (NAVs). For the avoidance of doubt, the quoted area includes the appointed area for Hartlepool Water.The figure reported does not match that reported in the 2023 Annual Performance Report in July 2023 as the APR figure incorrectly netted off areas lost to NAVs.

# CW6a Transition and accelerated programme

We do not have any transition or accelerated schemes in Water Networks+ planned.
Therefore, table CW6a contains no data.

# CW7 Demand management - Metering activities

## Metering activities - Explanatory variables Lines 7.6 - 7.21

### CW7.6: New optant meters installed for existing customers

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7.

### CW7.7: New selective meters installed for existing customers

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7.

### CW7.8: New business meters installed for existing customers

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7.

### CW7.9: Residential meters renewed

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7. The numbers supplied for all years are a combination of our reactive and proactive meter replacement programmes.

### CW7.10: Business meters renewed

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7. The numbers supplied for all years are a combination of our reactive and proactive meter replacement programmes.

### CW7.11: Replacement of basic meters with smart meters for household customers

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7. The numbers supplied for all years are a combination of our reactive and proactive meter replacement programmes. All of the new smart meters we install are AMI meters.

### CW7.12: Replacement of AMR meters with AMI meters for household customers

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7. The numbers supplied for all years are a combination of our reactive and proactive meter replacement programmes.

### CW7.13: Replacement of basic meters with smart meters for business customers

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7. The numbers supplied for all years are a combination of our reactive and proactive meter replacement programmes. All of the new smart meters we install are AMI meters.

## CW7.14: Replacement of AMR meters with AMI meters for business customers

For the financial year 2022/23 this is the actual number of meters installed. For the financial years 2023/24 and 2024/25 we have provided the forecasted volumes expected to be installed. The numbers proposed for AMP8 are all AMI meters as AMP8 will see us complete the smart meter rollout of our region started in AMP7. The numbers supplied for all years are a combination of our reactive and proactive meter replacement programmes.

## CW7.15: New residential meters installed for existing customers - supply-demand balance benefit

Demand management savings have been derived for the installation of basic meters, AMR meters and AMI meters for both AMP7 (based upon WRMP19 assessment) and AMP8 based upon the revised assessment from WRMP24.

Note that for the purposes of this reporting we have currently derived the savings:

- In alignment with APR reporting and WRMP19 assumptions for AMP7, and,
- In alignment with WRMP24 assumptions for AMP8

**For AMP7 we have assumed savings in alignment with WRMP19:**

- Properties which change from being unmeasured to having a 'visual read' basic meter on average save 15 percent of their unmeasured per property demand (with values used equating to a half yearly value calculated to account for installations throughout the year).
- Properties which change from being unmeasured to having a AMR (drive by read meter) similarly on average save 15 percent of their unmeasured per property demand (with values used equating to a half yearly value calculated to account for installations throughout the year).
- Properties which change from being unmeasured to having an AMI (smart meter with daily read via the network) on average save 21 percent of their unmeasured per property demand (with values used equating to a half yearly value calculated to account for installations throughout the year).

This has been based upon a base-line assessment of 172 l/h/d per person with an occupancy of 2.65, implying a consumption value per property of 455 l /prop/d, with a 15 percent reduction in Per Household Consumption and this value then divided by two for a half year saving.

This equates to a per property saving of 34.18 l/prop/d for the installation of Basic and AMR meters and 47.86 l/prop/d for the installation of AMI smart meters (from no meter).

So this would calculate as:

(((172*2.65)*0.15))/2 = 34.18 (15 percent)

and

(((172*2.65)*0.21))/2 = 47.86 (21 percent)

**For AMP8 we have assumed savings in alignment with WRMP24:**

- Properties which change from being unmeasured to having a 'visual read' basic meter on average save on average 59.16 l/prop/d of their unmeasured per property demand. The half yearly value calculated to account for installations throughout the year is consequently 29.58 l/prop/d.
- Overall savings would equate to 15 percent (59 l/prop/d) of PHC (395 l/prop/d).
- Attributed saving - 59.16 l/prop/d / 2 (half yearly saving = 29.58 l/prop/d).
- Properties which change from being unmeasured to having an AMI (smart meter with daily read via the network) on average save on average 73.28 l/prop/d of their unmeasured per property demand (with a half yearly value calculated to account for installations throughout the year).
- This equals 73.28 l/prop/d due to smart meter install , behaviour change and plumbing loss reduction.
- Overall savings would be 73.3 l/prop/d of PHC 395/prop/d (18 percent).
- Total year saving 73.3 l/prop/d / 2, consequently to account for half year 36.64 l/prop/d attributed.

This has been based upon a average PCC values and occupancy rate from the WRMP24 forecast for AMP9.

## APR Comparison

Note that for our APR submission we did not split out basic and AMR installations, so for the APR submission the 0.15Ml/d saving equates to the 0.08Ml/d saving for basic meter installations and the 0.07Ml/d savings from the AMR installations. (Note both of these installations have the same effect).

**Table 11 APR and PR24 comparison of new residential meter installation for existing customers**

| Line description | Submission | Units | Basic meter | AMR meter | AMI meter |
|---|---|---|---|---|---|
| New residential meters installed for existing customers - supply-demand balance benefit - APR | APR 2023 | Ml/d | 0.15 | 0.00 | 0.10 |
| New residential meters installed for existing customers - supply-demand balance benefit - PR24 | PR24 | Ml/d | 0.08 | 0.07 | 0.10 |

## CW7.16: New business meters installed for existing customers - supply-demand balance benefit

For the purposes of the table outputs and given that new installations (17 per year) are so small we have attributed demand management savings to meter replacement (see below).

Note that currently meter penetration for business customers is 99.5 percent, with only 0.5 percent being unmeasured, so there will be an insignificant number of new business meter installation.

## CW7.17: Replacement of basic meter with smart meters for household customers - supply-demand balance benefit

For the replacement of current customers who already have a basic meter, we have assumed that:

- The replacement of a basic visual read meter with an AMR meter saves no extra water (as the read times are so infrequent).
- The replacement of a basic visual read meter with an AMI smart meter (daily read) enables behavioural change initiatives and plumbing loss reductions.

Note that for the purposes of this reporting we have currently derived the savings:

- In alignment with APR reporting and WRMP19 assumptions for AMP7, and,
- In alignment with WRMP24 assumptions for AMP8

For AMP 7 we have assumed savings in alignment with WRMP19:

- Replacing an AMR with a AMI smart meter saves 6% of consumption, or 8.44l/prop/d for the half year value. Note that for reporting purposes the saving has been divided by 2 (to account for half yearly averaged savings).

For AMP 8 we have assumed savings in alignment with WRMP24:

- Replacing an dumb meter with a AMI smart meter saves 14.12 l/prop/d, which equal a saving of 5.65 l/prop/d as a 2% behaviour change and 8.47 l/prop/d for plumbing loss savings.
- This would equate to 7.06 l/prop/d for the half year value. Note that for reporting purposes the saving has been divided by 2 (to account for half yearly averaged savings).

Note that for reporting purposes these savings will be divided by 2 (to account for half yearly averaged savings)

## CW7.18: Replacement of AMR meter with AMI meter for household customers- supply-demand balance benefit

For the replacement of current customers who already have a AMR meter, we have assumed that:

- The replacement of a AMR meter with an AMI smart meter (daily read) enables behavioural change initiatives and plumbing loss reductions.

Note that for the purposes of this reporting we have currently derived the savings:

- In alignment with APR reporting and WRMP19 assumptions for AMP7, and,
- In alignment with WRMP24 assumptions for AMP8

For AMP7 we have assumed savings in alignment with WRMP19:

- Replacing an AMR with a AMI smart meter saves 6% of consumption, or 8.44l/prop/d for the half year value. Note that for reporting purposes the saving has been divided by 2 (to account for half yearly averaged savings).

For AMP8 we have assumed savings in alignment with WRMP24:

- Replacing an AMR meter with a AMI smart meter saves 14.12 l/prop/d, which equal a saving of 5.65 l/prop/d as a 2 percent behaviour change and 8.47 l/prop/d for plumbing loss savings.
- This would equate to 7.06 l/prop/d for the half year value. Note that for reporting purposes the saving has been divided by 2 (to account for half yearly averaged savings).

## CW7.19: Replacement of basic meter with smart meters for business customers - supply-demand balance benefit

See below.

## CW7.20: Replacement of AMR meter with AMI meter for business customers- supply-demand balance benefit

In line with WRMP19 we have assumed no savings from meter installations for business customers through AMP7, as we are still instituting demand management options with our retailers.

For AMP8 we have used WRMP24 assumptions to determine the overall demand management savings applicable to this sector.

**Table 12 Overall demand management savings**

| Size of customer | Type of visit | Properties per year | Expected saving (per property per day) |
|---|---|---|---|
| **Low** | Delivery of smart meter targeted water saving efficiency packages, similar to household drop20 campaigns. This will be undertaken on a scaled basis (dependent on the size of water consumption). | 3,000 | 86 litres per water efficiency package |
| **Medium** | Specialist water efficiency audits, with find and fix for consumers using approximately 25,000 litres per property per day. | 79 | 2,127 litres |
| **High** | Specialist water efficiency audits with find and fix for larger consumers (approx. 500,000 litres per property per day). | 10 | 43,775 litres |
| **All** | **Retailer incentives for plumbing loss reduction**<br>A £100 incentive to retailers to reduce plumbing losses. | 3,000 | 59 litres |
| **All** | **Smart meter identified plumbing loss fix**<br>Non-household plumbing loss repairs for properties identified, through smart metering, to have continuous flow. These visits will be aligned with water efficiency visits. | 3,000 | 240 litres |
| **All** | **Smart meter identified customer supply pipe leakage (cspl) fix**<br>Non-household repairs for properties identified, through smart metering, to have continuous flow. These visits will be aligned with water efficiency visits. | 3,000 | 9 litres |

Note that these savings are not directly linked to per property installations, but to the number of visits per year.

Consequently, we have divided the volumes saved between the meter volumes being changed from basic to AMI and AMR to AMI proportionately

**Table 13 Apportionment of smart meter savings**

| | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|
| Smart meter savings apportioned to upgrade from basic to AMI (Ml/d) | 1.65 | 1.66 | 1.65 | 1.65 | 1.65 |

| | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|
| Smart meter savings apportioned to upgrade from AMR to AMI (Ml/d) | 0.34 | 0.33 | 0.34 | 0.34 | 0.34 |

### CW7.21: Residential properties - meter penetration

We have calculated the percentage of total residential properties that are measured with a water meter.

This excludes void properties as no-one is present to use water.

Calculated as measured residential properties divided by the sum of measured residential properties (excluding voids) and unmeasured residential properties (excluding voids).

This is equivalent to the calculation of 'total household metering penetration (excl. voids)' in water resource management plans.

We see that for measured/metered penetration this will increase from 85.8 percent in 2022/23 to 90 percent by 2029/30. This value represents metered and 'billed' measured properties.

## Per capita consumption (excluding supply pipe leakage) Lines 7.22 - 7.23

### CW7.22: Per capita consumption (measured)

Measured per capita consumption has been derived in alignment with the revised draft WRMP24 preferred plan, including all impacts from:

- Metering policy,
- Smart meter installation (behaviour change and plumbing loss reduction),
- Water efficiency and other demand management options
- Covid19 impacts
- Effects of government led interventions

Further details regarding WRMP24 modelling and the preferred plan can be found in the 'Revised Draft WRMP24 Preferred Plan: Technical Report' and the 'Revised Draft WRMP24 Demand Forecast: Technical Report'

Note that forecast values are based upon our 2021/22 water balance base-line.

For our preferred plan we expect measured PCC values to decrease from 125.8 l/h/d for 2023/24 to 117.26 l/h/d by 2029/30.

### CW7.23: Per capita consumption (unmeasured)

Unmeasured per capita consumption has been derived in alignment with the revised draft WRMP24 preferred plan, including all impacts from:

- Metering policy,
- Smart meter installation (behaviour change and plumbing loss reduction),
- Water efficiency and other demand management options
- Covid19 impacts
- Effects of government led interventions

Further details regarding WRMP24 modelling and the preferred plan can be found in the 'Revised Draft WRMP24 Preferred Plan: Technical Report' and the 'Revised Draft WRMP24 Demand Forecast: Technical Report'

Note that forecast values are based upon our 2021/22 water balance base-line.

For our preferred plan we expect unmeasured PCC values to decrease from 174.27 l/h/d for 2023/24 to 172.13 l/h/d by 2029/30.

## Average benefits of typical metering activities - new meter installations Lines 7.42 - 7.43

### CW7.42: New meter installation - residential property - benefits per meter installation

For demand management savings, we have assumed that the installation of basic visual read or AMR meters will enable the following savings:

- A reduction in leakage (from the unmeasured cspl value to the measured cspl value) of 31.19l/prop/day
- A 15 percent reduction in per household consumption due to behaviour change (from the unmeasured value) based upon historic evidence. This has been derived using the average unmeasured consumption value for AMP8 to be 59.16 l/prop/d.

We consider that AMR meters would behave similarly to visual read meters, due to the time between meter reads, not allowing customers real time access to their data. Consequently, AMR values match those above for leakage and consumption/wastage.

AMI Smart meters (hourly read) will enable the further reductions in demand (based upon WRMP24 assumptions):

- Average savings for customer supply pipe leakage (cspl) for AMP8 have been assumed to be 4.69 l/prop/d

- Average savings for plumbing losses for AMP8 have been assumed to be 8.47 l/prop/d. Thus, Total savings for continuous flow have been assessed to be 13.16 l/prop/d
- A 2 percent (based upon WRMP24) savings due to behaviour changes, due to the availability of smart meter data and it's impact on behaviour, assessed at 5.65 l/prop/d.
- A reduction in leakage (from the unmeasured cspl value to the measured cspl value) of 35.88 l/prop/d, which equals, 31.19l/prop/day plus the smart meter saving of 4.69 l/prop/d.
- A reduction in consumption of 73.28 l/prop/d, including the 15 percent (59.16 l/prop/d) reduction from unmeasured to measured, an additional 2 percent reduction for the smart meter (5.65 l/prop/d) and the 8.47 l/prop/d from plumbing losses.

These savings have been based upon the revised draft WRMP24 assessments and average values for AMP8.

### CW7.43: New meter installation - business property - benefits per meter installation

We currently assume no savings are attributable to the installation of a visual read or AMR meter.

We have additionally carried out smart meter assessment of leas and run-times from our smart meter data to derive the figures for plumbing loss and cspl savings.

For AMI smart meter installations (hourly read), based upon our current assessments of plumbing loss and customer supply pipe leakage we anticipate:

- An average 9 l/prop/d reduction in customer supply pipe leakage
- An average 240 l/prop/d reduction in plumbing losses (consumption)

We would only anticipate further reductions in business demand based upon demand management options (in addition to smart meter installation).

## Average benefits of typical metering activities - meter replacement Lines 7.44 -7.47

### CW7.44: Replacement of existing basic meter - residential property - benefits per meter installation

We currently assume no savings are attributable to the replacement of basic meters with an AMR meter.

For basic meters that are replaced with a AMI smart meter we anticipate additional savings of:

- 4.7 l/prop/d due to cspl reductions
- 14.12 l/prop/d behavioural change reduction, including a saving of 8.47 l/prop/d due to plumbing loss reduction and a 5.65 l/prop/d reduction due to behaviour change.

### CW7.45: Replacement of existing basic meter - business property - benefits per meter installation

We currently assume no savings are attributable to the installation of a visual read or AMR meter.

For AMI smart meter installations, based upon our current assessments of plumbing loss and customer supply pipe leakage we anticipate:

- An average 9 l/prop/d reduction in customer supply pipe leakage
- An average 240 l/prop/d reduction in plumbing losses (consumption)

### CW7.46: Replacement of existing AMR meter - residential property - benefits per meter installation

For AMR meters that are replaced with an AMI smart meter (hourly read) we anticipate additional savings of:

- 4.7 l/prop/d due to cspl reductions
- 14.12 l/prop/d behavioural change reduction, including a saving of 8.47 l/prop/d due to plumbing loss reduction and a 5.65 l/prop/d reduction due to behaviour change.

### CW7.47: Replacement of existing AMR meter - business property - benefits per meter installation

For AMI smart meter (hourly read) replacement of an AMR meter, based upon our current assessments of plumbing loss and customer supply pipe leakage we anticipate:

- An average 9 l/prop/d reduction in customer supply pipe leakage
- An average 240 l/prop/d reduction in plumbing losses (consumption)

## Average benefits of typical metering activities - meter upgrade Lines 7.48 - 7.51

### CW7.48: Upgrade of existing basic meter - residential property - benefits per meter installation

For the upgrade of a basic visual read meter to an AMR meter we currently attribute no additional saving.

For basic meters that are upgraded to AMI smart meters (hourly read) we anticipate additional savings of:

- 4.7 l/prop/d due to cspl reductions
- 14.12 l/prop/d behavioural change reduction, including a saving of 8.47 l/prop/d due to plumbing loss reduction and a 5.65 l/prop/d reduction due to behaviour change.

### CW7.49: Upgrade of existing basic meter - business property - benefits per meter installation

We currently assume no savings are attributable to the installation of an AMR meter, over a visual read meter.

For AMI smart meter (hourly read) installations, based upon our current assessments of plumbing loss and customer supply pipe leakage we anticipate:

- An average 9 l/prop/d reduction in customer supply pipe leakage
- An average 240 l/prop/d reduction in plumbing losses (consumption)

### CW7.50: Upgrade of existing AMR meter - residential property - benefits per meter installation

For AMR meters that are upgraded to AMI smart meters (hourly read) we anticipate additional savings of:

- 4.7 l/prop/d due to cspl reductions
- 14.12 l/prop/d behavioural change reduction, including a saving of 8.47 l/prop/d due to plumbing loss reduction and a 5.65 l/prop/d reduction due to behaviour change.

### CW7.51: Upgrade of existing AMR meter - business property - benefits per meter installation

For AMI smart meter (hourly read) installations, based upon our current assessments of plumbing loss and customer supply pipe leakage we anticipate:

- An average 9 l/prop/d reduction in customer supply pipe leakage
- An average 240 l/prop/d reduction in plumbing losses (consumption)

# CW7a Transition and accelerated programme

For the financial year 2024/25 this is the forecast number of meters installed for the AID program (Accelerated infrastructure delivery). Note these installations have been subtracted from Table 7, to avoid double counting.

## CW7a.7: New selective meters installed for existing customers

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting.

## CW7a.8: New business meters installed for existing customers

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting.

## CW7a.9: Residential meters renewed

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting. The numbers supplied are a combination of our reactive and proactive meter replacement programmes.

## CW7a.10: Business meters renewed

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting. The numbers supplied are a combination of our reactive and proactive meter replacement programmes.

## CW7a.11: Replacement of basic meters with smart meters for household customers

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting. The numbers supplied are a combination of our reactive and proactive meter replacement programmes. All of the new smart meters we install are AMI meters.

## CW7a.12: Replacement of AMR meters with AMI meters for household customers

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting. The numbers supplied are a combination of our reactive and proactive meter replacement programmes.

## CW7a.13: Replacement of basic meters with smart meters for business customers

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting. The numbers supplied are a combination of our reactive and proactive meter replacement programmes. All of the new smart meters we install are AMI meters.

## CW7a.14: Replacement of AMR meters with AMI meters for business customers

For the financial year 2024/25 this is the number of meters to be installed for the AID program. Note these installations have been subtracted from Table 7, to avoid double counting. The numbers supplied are a combination of our reactive and proactive meter replacement programmes.

## CW7a.15: New residential meters installed for existing customers - supply-demand balance benefit

Meter installations associated with the AID (Accelerated infrastructure deliver program), have been derived and reported for 2024/25.

Demand management savings have been derived for the installation of basic meters, AMR meters and AMI meters for AMP7 (based upon WRMP19 assessment).

For AMP7 we have assumed savings in alignment with WRMP19:

- Properties which change from being unmeasured to having a ‘visual read’ basic meter on average save 15 percent of their unmeasured per property demand (with values used equating to a half yearly value calculated to account for installations throughout the year).

- Properties which change from being unmeasured to having a AMR (drive by read meter) similarly on average save 15 percent of their unmeasured per property demand (with values used equating to a half yearly value calculated to account for installations throughout the year).
- Properties which change from being unmeasured to having an AMI (smart meter with daily read via the network) on average save 21 percent of their unmeasured per property demand (with values used equating to a half yearly value calculated to account for installations throughout the year).

This has been based upon a base-line assessment of 172 l/h/d per person with an occupancy of 2.65, implying a consumption value per property of 455 l /prop/d, with a 15 percent reduction in PHC and this value then divided in 2 for a half year saving.

This equates to a per property saving of 34.18 l/prop/d for the installation of Basic and AMR meters and 47.86 l/prop/d for the installation of AMI smart meters (from no meter).

So this would calculate as:

(((172*2.65)*0.15))/2 = 34.18 (15 percent)

and

(((172*2.65)*0.21))/2 = 47.86 (21 percent)

## CW7a.16: New business meters installed for existing customers - supply-demand balance benefit

For the purposes of the table outputs and given that new installations (17 per year) are so small we have attributed demand management savings to meter replacement (see below).

Note that currently meter penetration for business customers is 99.5 percent, with only 0.5 percent being unmeasured, so there will be an insignificant number of new business meter installation.

CW7a.17: Replacement of basic meter with smart meters for household customers - supply-demand balance benefit

For the replacement of current customers who already have a basic meter, we have assumed that:

The replacement of a basic visual read meter with an AMR meter saves no extra water (as the read times are so infrequent).

The replacement of a basic visual read meter with an AMI smart meter (daily read) enables behavioural change initiatives, and plumbing loss reductions.

Note that for the purposes of this reporting we have currently derived the savings: in alignment with APR reporting and WRMP19 assumptions for AMP7.

For AMP 7 we have assumed savings in alignment with WRMP19:

Replacing a basic meter with a AMI smart meter saves 6 percent of consumption, or 8.44l/prop/d for the half year value. Note that for reporting purposes the saving has been divided by two (to account for half yearly averaged savings).

CW7a.18: Replacement of AMR meter with AMI meter for household customers- supply-demand balance benefit

For the replacement of current customers who already have a AMR meter, we have assumed that:

The replacement of a AMR meter with an AMI smart meter (daily read) enables behavioural change initiatives and plumbing loss reductions.

Note that for the purposes of this reporting we have currently derived the savings in alignment with APR reporting and WRMP19 assumptions for AMP7.

Replacing a basic meter with a AMI smart meter saves 6 percent of consumption, or 8.44l/prop/d for the half year value. Note that for reporting purposes the saving has been divided by two (to account for half yearly averaged savings).

## CW7a.19: Replacement of basic meter with smart meters for business customers - supply-demand balance benefit

In line with WRMP19 we have assumed no savings from meter installations for business customers through AMP7, as we are still instituting demand management options with our retailers.

## CW7a.20: Replacement of AMR meter with AMI meter for business customers- supply-demand balance benefit

In line with WRMP19 we have assumed no savings from meter installations for business customers through AMP7, as we are still instituting demand management options with our retailers.

## CW7a.21: Residential properties - meter penetration

We have calculated the percentage of total residential properties that are measured with a water meter.

This excludes void properties as no-one is present to use water.

Calculated as measured residential properties divided by the sum of measured residential properties (excluding voids) and unmeasured residential properties (excluding voids).

This is equivalent to the calculation of 'total household metering penetration (excl. voids)' in water resource management plans.

## CW7a.22: Per capita consumption (measured)

Measured per capita consumption has been derived in alignment with the revised draft WRMP24 preferred plan, including all impacts from:

- Metering policy,
- Smart meter installation (behaviour change and plumbing loss reduction),
- Water efficiency and other demand management options
- Covid19 impacts
- Effects of government led interventions

Further details regarding WRMP24 modelling and the preferred plan can be found in the ‘Revised Draft WRMP24 Preferred Plan: Technical Report’ and the ‘Revised Draft WRMP24 Demand Forecast: Technical Report’

Note that forecast values are based upon our 2021/22 water balance base-line.

# CW8 WRMP schemes (excluding leakage and metering activities)

The schemes listed in this table are consistent with our revised draft WRMP24, the WRMP scheme reference is included to enable easy comparison between the WRMP24 and PR24. There are a number of schemes where the development of the revised draft WRMP24 overlapped with the completion of the PR24 data tables meaning that we did not have the costs fully finalised, these are detailed below and we intend to correct these to get complete alignment at the Draft Determination.

All costs in table CW8 are taken from our C55 costing system which is based on our library of cost models and is in 2022-23 price base. It should be noted that the draft WRMP costs were based on our previous cost models which were in 2017-18 price base and inflated to 2020-21 using CPIH financial year average, in our revised draft WRMP the costs are taken from the updated cost models which are in 2022-23 price base and then deflated to 2020-21 using CPIH financial year average.

All opex costs are presented as annual operating cost in the relevant year. Opex is assumed to commence in the 12 months prior to the scheme entering use and therefore there are partial year costs in some columns. For all schemes the costs in the after 2029-30 column are the ongoing annual operating costs. For schemes CAM4 and SWC8 which are forecast to be completed in 2030-31 the first year operating costs are £0.265m and £1.002m respectively but the full year costs have been included in the after 2029-30 column.

Costs have been profiled using our current view of delivery timescales which in some cases means that the scheme may be constructed and partially into supply ahead of the benefits date. The benefits have been profiled consistent with our WRMP and represent the full benefit to the supply demand balance, where a phased delivery results in a phased benefit this will be reported via APR Table 6F, this level of detail will emerge as part of the delivery process and is not yet available.

## CW8.1-10: Internal Interconnectors

In line with our revised draft WRMP24 supply demand balance we have assumed that while construction may be earlier, the benefits of these schemes are realised in 2030-31.

We have populated the benefits column with the maximum transfer capacity as these schemes do not have a defined zonal WAFU benefit but are transferring water from one zone to another.

Two schemes are expected to commence in our transition programme, Ruthamford Sth to Cambridge Water (CAM4) and Cambridge Water to Cambs & W Suffolk (SWC8). These are large schemes that will require complex enabling and planning activities and we expect to complete construction in 2031-32, we have therefore included the AMP9 costs in the 'after 2029-30' column and transition costs in the pre 2025-26 column.

Two schemes are impacted by changes in our revised draft WRMP that occurred after the lockdown of our business plan costs are listed below, we intend to correct these at Draft Determination

1. SUE24 - the capacity of this scheme was reduced from 10 MLD to 5 MLD in the revised draft WRMP24 following utilisation modelling, currently costs and benefits in our PR24 plan are for the 10 MLD option

2. We have been notified by the Environment Agency of the likely closure of our Kirby Kane WTW, this will result in an increase to the scope of option NTB10 which is not currently reflected in the PR24 costs

## CW8.11-19: WRMP Supply Side Options

In line with our WRMP24 we have assumed that the benefits of these schemes are realised in 2030-31. The WAFU benefits are consistent with those in our revised draft WRMP24.

The Colchester reuse transfer (EXS19b) has commenced in 2023-24 as part of the Accelerated Infrastructure Delivery (AID) programme. The main will be constructed by 31st March 2028.The benefits for this scheme have been forecast as 'After 2029-30' in line with the revised draft WRMP24 as they will not be fully realised until the main Colchester Re-use Scheme, which we have proposed for DPC delivery, is into supply.

Three further schemes are expected to commence in our transition programme, these are Marham Surface Water Abstraction (FDN22), Suffolk East Groundwater enhancement (SUE23) and Lincolnshire East Groundwater enhancement (LNE11).

Three schemes, LNC30, LNE12 and LNE11 are included in our PR24 business plan as part of the North Lincolnshire Alternative. This is consistent with our previous submission Ofwat in 2022, the schemes were included as unconstrained options in our WRMP24 modelling and were reselected as part of the Best Value Plan. The schemes have been costed for WRMP24 and PR24 using our current cost models.

## CW8.20: WRMP Supply Side Options - Backwash Recovery Schemes

The revised draft WRMP24 includes 13 backwash recovery options (these were new options not in the draft WRMP) they have been included as a single line in the PR24 plan and will be split out at Draft Determination.

Costs have been estimated using our costing system based on draft scopes, the sites are in the process of being surveyed to get bespoke scopes so that the costs can be improved. The WRMP references for these are EXC7, EXS7, FND26, NBR9, NNC5, NNC6, SUE25, SUT6, LNE3, NAY4, NED3 and NHL7. These options will increase the WAFU (Water Available for Use) at these sites by reducing the amount that is returned to the environment or discharged to sewers during the treatment process.

## CW8.21: Adaptive Planning

The costs included here are for the further development of options included in the adaptive plan outlined in our WRMP24 to ensure that these options are available for delivery in AMP9 if selected at WRMP29. We have included for the development of two desalination schemes during AMP8, costs are based on our AMP7 Adaptive Planning programme.

## CW8.22: Colchester Re-use Pilot Plant

This scheme has commenced in 2023-24 as part of the accelerated infrastructure delivery programme.

The Colchester Pilot Plant Scheme does not provide a potable water supply demand benefit but is an enabler for the main Colchester Re-use Scheme. The scheme output will be a 0.5 MLD pilot plant.

## CW8.23: Strategic Interconnector Hydraulic Model

The costs included here are for the extension and enhancement of our Strategic Hydraulic Model to include the new interconnectors and supply side options. There is no WRMP supply demand benefit associated with this investment but it is an enabler for all the schemes.

## CW8.24: East Suffolk WRZ IPZ

The scheme involves improving sub-zonal connectivity within Suffolk East WRZ by creating a connection between the strategic grid (the AMP7 interconnectors programme) and Bramford Tye Reservoir in the north of the zone.

The following factors drive the need for this scheme:

- **The change from capping abstraction licences to recent actual peak to recent actual average.**

The general configuration of Suffolk East WRZ comprises groundwater sources in the north of the zone, with Alton Water supplying the south of the zone, with network interconnectivity between the two. The strategic grid has been planned to connect to the Alton Water system in the south of the WRZ.

WRMP19 was planned on the basis of groundwater licences being capped to recent actual peak in 2024/25. Since WRMP19, following a change in policy from the Environment Agency, we must plan to cap our abstraction licences to recent actual average either on renewal (for time limited licences) or by 2030 for permanent licences; this has been reflected in WRMP24. This creates a further 4.25Ml/d (6.3%) reduction in the Deployable Output of Suffolk East (based on WRMP24 modelling), which is concentrated in the groundwater supplied portion of the WRZ. Our WRMP24 WRZ integrity assessment and problem characterisation were completed in September 2020, before this change occurred, so did not take this factor into account. If this information had been available, it would be likely that the Suffolk East WRZ would have been split into two separate WRZs, making this scheme an inter-zonal interconnector.

In these changed circumstances, we have found that the existing intra-WRZ network within Suffolk East can no longer provide sufficient supporting supply to the northern area. This creates a requirement for additional connectivity from the strategic grid to the north of the WRZ via the proposed connection to Bramford Tye WR.

- **Reduced yield of Belstead WTW following saline intrusion.**

We have reviewed the yield constraints within our groundwater system as part of WRMP24 development. Following this, we have had to reduce the yield of Belstead WTW in the Suffolk East WRZ because of saline intrusion issues. These have been caused by its proximity to the coast, and the only possible mitigation is to reduce abstraction.

Though this issue hasn't reduced average deployable output for the Suffolk East zone, it creates additional pressure within the groundwater system during peak summer operation, and in the management of outage events. The Bramford Tye connection would provide additional resilience to alleviate these issues.

## CW8.25: Colchester Re-use DPC Allowance

The costs included here are for the Direct Procurement for Customers (DPC) process have been built up using the Ofwat PR19 methodology.

## CW8.26: Demand Side Measures - Non House Hold (NHH)

The costs and benefits included here are for our NHH demand side measures (excluding those that are part of leakage and metering) and include our programmes to work with customers to manage demand . These are fully detailed in our revised draft WRMP24 Demand Management Preferred Plan document Section 9 and include water efficiency visits to differing size customers with targeted interventions and incentives to reduce plumbing losses.

## CW8.27: Demand Side Measures - Domestic

The costs and benefits included here are for our domestic demand side measures (excluding those that are part of leakage and metering) and include our programmes to work with customers to reduce their demand. These are fully detailed in our revised draft WRMP24 Demand Management Preferred Plan document Section 7 and includes a range of household water efficiency and behavioural change activities through smart homes, behaviour change, community action and direct interventions. We have excluded the mandatory water labelling benefits from this table as these are government led interventions and independent of our programme.

# CW9 Enhancement expenditure (cumulative) - water resources and water network+

For the completion of this data table, reporting from Copperleaf (C55) was used. This alignment with Copperleaf enhances transparency and accuracy in financial reporting. Copperleaf provides the necessary inputs for populating the PR19 Strategic Regional Water Resources Reconciliation Model. Additionally, it supports the calculation of end-of-period revenue and Regulated Capital Value (RCV) adjustments for PR24, as per the Ofwat guidance.

Where a quality enhancement scheme has more than one cost driver, we have allocated the expenditure to the line of the primary driver. Any additional cost for delivering further drivers have been included in the relevant line.

Expenditure included within third party services in table CW1a are not included in this table. We have reported schemes as completed when they come into beneficial use, as per the guidance.

# CW10 Wholesale water local authority rates

## Rateable value Line 10.1

The 2023 rateable value list will be effective for the period 2023 and 2026 and will then be followed by further revaluations in 2026 and 2029. There is currently no reliable information to project the likely rateable values at the 2026 or 2029 revaluations, or any information on rate poundage or transition relief arrangements, as such we have shown no movement in the rateable value.

## Water wholesale local authority rates Lines 10.2 - 10.9

### CW10.2: Wholesale Water business rates charge for current year before transitional relief

While there is no change in the rateable value from 2022 to 2023, no inflation was applied on business rates in 2023, so the drop in value relates to the deflation of a flat bill.

### CW10.5: Adjustments to wholesale water business rates charge for prior years

In 2022/23, following negotiation with the valuation office, we received a one-off refund as shown in line 5 as adjustments to wholesale water business rates charge for prior years.

### CW10.6: Charges to third party services (Other wholesale water business rates adjustments 1)

Based on the assessed use of our sites, we make a recharge to third party services which is included in the total recharge to third parties. These recharges are assumed to continue in line with the current levels during AMP8.

### CW10.7: Recharges from other business units (Other wholesale water business rates adjustments 2)

We also make a recharge to water services to reflect the occupancy of non-water sites. These recharges are assumed to continue in line with the current levels during AMP8 and are an estimate based on the charges after transition relief.

## Analysis of change in charge before transitional relief Lines 10.10 - 10.17

### CW10.13: Business rate inflation freeze (Change in wholesale water business rates costs due to other 1)

The government announced a business rate inflation freeze as a result of the cost of living crisis. This had the impact of reducing our future rates bill as shown in line 13.

# CW11 Third party costs by business unit for the wholesale water service

## Third party costs ~ operating expenditure Lines 11.1 - 11.15

### CW11.7 and CW11.15: Third party water price control opex excluding developer services and Total third party water service costs ~ non price control (operating expenditure)

As included within the commentary to our March 2023 APR, we have carried out a review of costs allocated to Third Party Services. This has resulted in an increase in the costs allocated to third party, principally relating to ensuring the full cost is accounted for. Non-potable supplies now includes non direct costs including distribution and overheads, rather than solely relating to direct costs of dedicated third party assets

With the exception of bulk supplies, where we are forecasting to see increase in activity, operating expenditure reported costs are based on rolling forward our 2024/25 forecast, as we do not expect costs to change materially during AMP8.

### CW11.8-10: Diversions - Opex

The data in these sections relates to water diversions opex expenditure. The commentary explanation is as per lines CW11.23-25 for Capex.

## Third party costs ~ capital expenditure Lines 11.16 - 11.30

Table 14 CW11.21 Breakdown of recharge rates

| Investment Reference number | Scheme name | Scheme cost (£m) | Recharge rate % | Cost recharged (£m) | Ofwat line reference |
|---|---|---|---|---|---|
| I015072 | Offord intake pound lack of resource | 1.079 | 40.68 | 0.439 | CW11.21 |
| I034398 | Grafham Water grassland creation | 0.662 | 40.68 | 0.271 | CW11.21 |
| I040031 | GAC Virgin Media upgrade - Grafham PFAS | 10.425 | 40.68 | 4.241 | CW11.21 |
| I040047 | GAC virgin media upgrade - Wing PFAS | 8.183 | 8 | 0.655 | CW11.21 |
| | | | TOTAL | 5.606 | |

## CW11.21: Other rechargeable capex

Investments 1-4 in the table above represent assets which provide a bulk supply service to other WASCs. As such, we recharge the costs of these with the above rates. The recharge rates have been agreed between Anglian Water and the WASC utilising / benefiting from our assets.

The first investment (reference number 1 above) is a base maintenance investment and has been removed from CW2 while investments 2-4 are enhancement investments and in line with guidance provided at PR19 we have left these costs in to show the full enhancement costs in CW3 (for more details see table commentary for CW3). We have included the enhancement third party costs in table CW13 for visibility of each line of cost.

## CW11.23, CW11.24 and CW11.25: Diversions - Capex

In table below is a breakdown of the third party charge rates related to diversions with the scheme name and line reference.

Table 15 Diversions - Capex

| Reference number | Investment name | Recharge rate (%) | Line ref. | Price control |
|---|---|---|---|---|
| 1 | S185 Water Diversion AMP8 | 100 | CW11.23 | Water networks+ |
| 2 | Other Water Diversions AMP8 | 82 | CW11.25 | Water networks+ |
| 3 | NRSWA Diversions AMP8 | 82 | CW11.24 | Water networks+ |

For AMP8 we have used two different models to understand this; linear projection, based on prior AMP diversion activity, and AMP7 base level activity model.

Investments in the table are developer services driven diversion investments and are explained in more detail below depending on which legislation applies to the diversion:

## CW11.23: Diversions - s185

For AMP8 we have chosen to use our AMP7 base model as we feel we have better insight for this diversion type and are more confident that the forecast is in line with AMP7 levels.

## CW11.24: Diversions - NRSWRA

For AMP8 we have chosen our linear projection as it gave a slightly higher rate for diversion activity than our AMP7 base model. NSWRA diversions, are harder to predict the level of activity as it is associated with National Highways and Local Authority activity and could be of significant value should we be requested to undertake this service. In AMP7 we are overspending our PR19 FD allowance for National Highways diversions significantly.

## CW11.25: Diversions - Other non-s185

For AMP8 we have chosen to use our AMP7 base model as we feel we have better insight into these diversion types and are more confident that the forecast is in line with AMP7 levels.

# CW12 Transitional expenditure - water resources and water network+

We have included transition expenditure in accordance with the published guidelines in the PR24 Final Methodology.

The programme and projects we have identified allow for achieving early benefit for customers in AMP8, efficient resource profiles and will enable us to meet agreed completion dates with our quality regulators.

Our Board have approved early funding for transition plans including £68.8 million of expenditure across 2023/24 and 2024/25 broken down in the table below. This represents 1.7 percent of our planned enhancement capital expenditure, similar to the 1.9 percent of enhancement expenditure we proposed at PR19.

Table 16 Transition programme

| Transition programme | Water (£m) | Water Recycling (£m) |
|---|---|---|
| AID CW(W) 17 | 12.14 | 18.98 |
| Non-AID CW(W)12 | 15.48 | 22.20 |
| Total | **27.62** | **41.18** |

The PR24 Final Methodology details what type of investments qualify for transition spending. We have aligned the projects proposed to this guidance:

- Companies must provide convincing evidence to justify the early start (such as reducing overall delivery costs, or delivering early environmental benefit)
- Companies must be on track to deliver their PR19 investment programme
- Spend in 2023/24 must only be on investments that are part of AID, WRMP24 or WINEP
- Spend in 2024/25 should relate to early statutory deadlines in the next price control period; or to early design and planning of large, non-routine investments
- It cannot be used to fund deliverables already previously funded, or for base activity
- It cannot be used for bioresources or retail

Through the Accelerated Infrastructure Deliver (AID) programme we have already provided evidence to justify the early start. This table commentary explains further the reasons for inclusion of non-AID spend in transition.

This transition plan will allow more effective use of resources than starting all design work for AMP8 on 1 April 2025, which would risk construction resources being non-productive or being lost from our supply chain which we will rely on for the deliverability of the wider PR24.

The information below sets out the investments included in CW12 along with justification of their inclusion.

## EA/NRW environmental programme (WINEP/NEP) Lines 12.1 - 12.40

### CW12.10: Invasive Non Native Species; (WINEP/NEP)

**Taverham Mill biodiversity compliance (WINEPID:08AW100087)**

Taverham Mill Nature Reserve high priority early biodiversity benefit will be achieved through transition funding, providing continuity with AMP7 delivery.

### CW12.16: Water Framework Directive; (WINEP/NEP)

**Regional Env Destination Investigations**

These extensive investigations are required to inform WRMP29 but are also required to inform EA decisions on Norfolk Groundwater licences therefore must being early.

**Lark Catchment WFD Flow (WINEP ID:08AW100193)**

To enable an efficient extension of delivery from AMP7 into AMP8, we have agreed with the Environment Agency to target early action in the Lark catchment, which is of strategic significance as a priority chalk stream in our region.

# Supply-demand balance Lines 12.41 -12.12.56

## CW12.41: Supply-side improvements delivering benefits in 2025-2030; SDB

**LNE11  Healing & Little London**

This WRMP option is necessary as part of the changes being made to provide water into the new strategic pipeline and therefore must begin before AMP8.

**FND22a Marham WTW - WRMP24 Return to Service**

This solution is dependent on studies requested by Natural England, therefore we have profiled these to start early to inform the design of the main scheme to be complete by 2030.

**SUE23 Raydon WTW Treatment**

This modification is required early in WRMP and is associated with licence capping milestones in the area

## CW12.50: Interconnectors delivering benefits in 2025-2030; SDB

**CAM4 Cambs Water 50MLD Supply**

This is part of the Grafham to Bury St Edmunds scheme that we requested to be included in AID. We have also requested phasing of this major project into AMP9 and are in discussion with the EA and Defra on this subject. The project has many significant challenges including major infrastructure crossings and therefore must start early as well as finishing in the start of AMP9.

**SWC8 Suffolk West 50MLD Supply**

This is part of the Grafham to Bury St. Edmunds scheme as above.

# CW13 Best value analysis enhancement expenditure - water resources and water network+

We have used Copperleaf, our investment management system, to report on the best value analysis of projects starting in AMP8 as per the Ofwat guidance. Present value figures have an appraisal period of 30 years as specified by the table guidance. Our plan contains over 3,500 individual investments, each with multiple alternatives, each alternative with multiple benefits assigned, all recorded in our investment planning system, copperleaf. We have therefore automated table population as far as possible.

In some cases where the least cost alternative would have appeared on a different cost line, we have allocated the least cost alternative to the same line as the preferred alternative to aid comparison. For instance, when comparing two options to solve an environmental target, when comparing a nature based option with a traditional engineering option the table may allocate costs and benefits to separate lines, but we have shown both options on the same line.

Some investments as above have a set of options confined to a single line of cost data where the options are discrete options for a particular site. However, for some investments the set of options span multiple cost categories. For instance, metering investments have options considered with lower volumes of roll out as part of an alternate WRMP strategy that had a different balance of demand side and supply side activity. Therefore comparison of best value and least cost for these lines is not possible on an individual line basis.

In addition it should be noted that although many options are considered and discounted, as explained in the options consideration sections of our enhancement evidence, non-selected options are not subject to the same level of cost assurance and cost benchmarking as those in the core pathway. For this reason, some lines of data in CW14 have identical data to CW13. This does not mean only one option was considered, it means that only one option had sufficiently well developed costs to populate the table. We have investigated with our internal teams some lines of data that appear to show lower cost options available that were better value using Ofwat's marginal benefit valuation approach. In some cases the lower cost alternative was considered infeasible in combination with other investments at the site or in the rest of the asset system.

More detail on how we have populated these tables is available in the table commentary for CW15/16.

# CW14 Best value analysis of alternative option enhancement expenditure - water resources and water network+

## EA/NRW environmental programme (WINEP/NEP) Lines 14.1 - 14.56

We used Copperleaf, our investment management system, to report on the least cost alternatives to populate the CW14 and CWW14 tables, as per the Ofwat guidance.

Out of the 3,611 investments in our PR24 plan (Water and Waste waste), there were 476 that had an alternative that was least cost but not the preferred option.

There are a variety of reasons to explain why the least cost option was not selected as the preferred option, including; The Environment Agency (or other regulator) not permitting the alternative option, a technology not yet being viable or permitted by regulators.

For the CW(W)14 report, these least cost alternatives were changed to be the recommended option in a separate scenario in Copperleaf, named 'PR24 Least Cost Alternative'.

Out of those 476 investments, 159 had a different start date to the preferred alternative and so these were manually changed to reflect the same start date as the main plan. This process has resulted in 52 investments missing their EA Obligation date and in addition some spend being pushed into AMP9 (included in the 10 years of data).

The AID investments were treated in the same way, as some of this spend appears in 2023/24 and 2024/25 it will not appear in the CW(W)14 table.

We have also applied this method to two WRMP investments that had least cost alternatives that were not the preferred option in the main PR24 plan.

# CW15 and CW16 Best value analysis benefits

.Tables CW15 and CWW15 - Best value analysis (benefits) - water and wastewater network+ and bioresources. This is the Recommended option, or Best Value plan.

We welcome the opportunity to provide data on how best value options have been selected in our business plan, taking account of wider environmental and social value, and aligning with Ofwat's Public Value principles.[1]

**Figure 1 Ofwat's Public Value Principles**

| | The Principle |
|---|---|
| **Principle 1** | Companies should seek to create further social and environmental value in the course of delivering their core services, beyond the minimum required to meet statutory obligations. Social and environmental value may be created both in direct service provision and through the supply chain. |
| **Principle 2** | Social and environmental benefits should be measurable, lasting and important to customers and communities. Mechanisms used to guide activity and drive decision-making should support this, for example through setting and using company purpose, wide external engagement and explicit consideration of non-financial benefits. |
| **Principle 3** | Companies should be open with information and insights on operational performance and impacts (both good and bad). This will support stakeholder engagement, facilitate collaboration and help identify opportunities for delivering additional social and environmental value. |
| **Principle 4** | Delivery of social and environmental value outcomes should not come at greater cost to customers without customer support. |
| **Principle 5** | Companies should consider where and how they can collaborate with others to optimise solutions and maximise benefits, seeking to align stakeholder interests where possible, and leveraging a fair share of third-party contributions where needed. Companies' public value activities should not displace other organisations who are better placed to act. |
| **Principle 6** | Companies should take account of their capability, performance and circumstances in considering the scope for delivering greater social and environmental value. |

This is an important part of how we achieve company purpose, and we have taken value-based decision making into the core of our processes for many consecutive price reviews, and were assessed by Ofwat in the 2021 AMMA as 'competent' or 'optimising', indicating high maturity in all questions relating to decision making. Over the last 18 months, we have used these solid foundations to apply best value decision making in PR24. The vast majority of our AMP8 enhancement programme has followed strict guidance on best value decision making and options appraisal set out be the Environment Agency via WRMP and WINEP.[2]These set out the values to be used in option selection as part of a staged process:

Stage 1 - setting the WINEP framework

Stage 2 - collaboratively identifying risks and issues

Stage 3 - proposing solutions

Stage 4 - assess proposals

Stage 5 - price review

Stage 6 - delivery

Over the course of PR24 we have attended Ofwat's cross-industry Outcomes Working Group, often discussing societal values. We took the decision in 2022 to complete a full refresh of our societal valuation programme to inform best value decision making in our business plan. At the June 2023 meeting Ofwat's minutes noted that where companies had not used Ofwat valuation of benefit to inform option selection in the business plan, companies should also present the benefit impacts of the schemes using standardised unit values for comparison. We confirm that the value-based decision making used to select options in our plan was based on our own value updated PR24 framework in combination with the EA's outcome measures, rather than Ofwat's implied marginal benefits, since the implied marginal benefits were not available at the point when those decisions were being made. The EA asked us to complete optioneering of much of our plan by January 2023 with option selection continuing through until May 2023, with implied marginal benefits only published in June 2023.

1 Ofwats-Final-Public-Value-Principles.pdf
2 Water industry national environment programme (WINEP) methodology - GOV.UK (www.gov.uk)

The tables as produced therefore are not an expression of the value data used to make optioneering or optimisation decisions, rather they represent a sensitivity analysis - testing how the value of our investments is affected when we replace our own benefit data with Ofwat's. We've followed the table guidance to provide in a format suitable for industry comparisons to be completed centrally, but it is therefore possible that this data table suggests other options appear better value. As we understand the main purpose of these tables is to express consideration of wider societal and environmental benefits, we have made the decision to populate the tables with societal values only, meaning that any private benefits to Anglian Water such as avoided reactive costs during incidents are not taken into account. For this reason some lines appear to have cost but no value.

## Detailed Notes

Timing of least cost alternatives: We have set the start dates of non-preferred least cost alternatives to match the start dates of the preferred alternatives so that their benefits profiles are more closely aligned. Some of these options have longer implementation periods/project durations and therefore those non-preferred alternatives may appear to miss their obligation dates, or potentially carrying cost over into AMP9. For this reason we recommend costs are compared across the 10 years of cost data in the table rather than only for 2025-2030.

Alignment of units: the units we have used for some of the benefits don't align with performance commitment definitions. Please see comments in column AK for clarity on units of benefit used.

Omissions: Due to the limit of 10 lines of benefit data for each line of cost, we have omitted certain benefits and disbenefits with lower materiality, including temporary benefits and disbenefits such as traffic disruption associated with the construction works. Many of our Water Recycling investments also include minor benefits related to WINEP such as Air Quality, WINEP - Climate Change and WINEP - Volunteering, which have also been omitted as their value is negligible.

A note on Operational carbon increases: all carbon emissions are calculated using a fixed grid emissions factor as of today. Grid electricity in the future will have a much lower carbon intensity than today - but as the methodology fixes the emissions factor the reported emissions are higher than will (almost certainly) be the case in the future. In addition, any 'green' power we buy from the grid is excluded. This means that the table guidance over estimates the levels of carbon which will be the case in reality, making some investments appear less cost benficial.

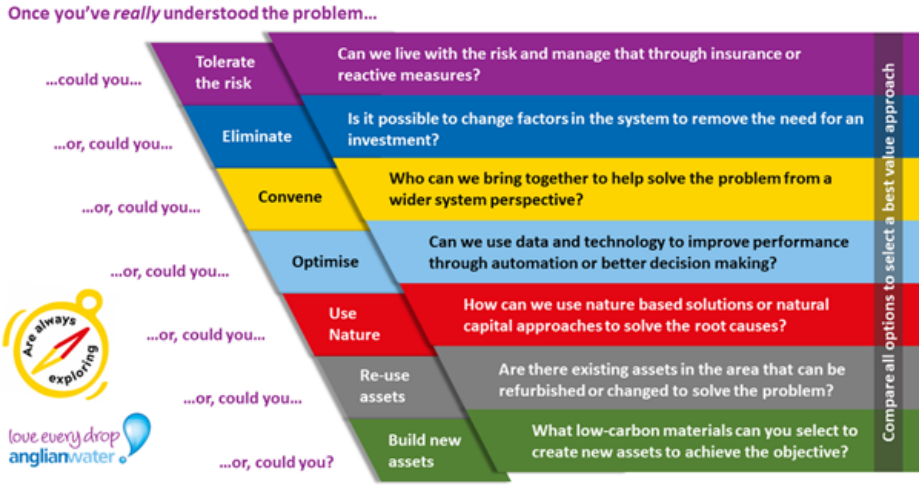
Alignment with table OUT3 'Outcome performance from enhancement expenditure - Performance commitments': The table guidance expects alignment between the best value plan benefits tables CW(W)15 and OUT3. We have reviewed this alignment and in many cases the data correlates, however there are some Performance Commitments with differences, explained by the benefits assessment in the CW(W)15 tables including risk avoidance, meaning that the baseline risk is increasing due to other factors and the benefit only brings the residual risk back to previous levels. This is therefore not a performance improvement and does not flow through to OUT3.

**CW15.134-300** Specifically for the enhancement lines in CW13-16 relating to the WRMP, our Best Value Plan and Least Cost Plans have already been published in the WRMP24, with the least cost plan involving a different mix of investments selected by our EBSD model. WRMP have followed the same approach of defining least cost as lowest whole life cost over a fixed period 2025-2050. We have published a detailed explanation of WRMP decision making hereV3 Decision Making Report (anglianwater.co.uk) Therefore this data table does not seek to contradict the WRMP least cost plan already published - instead it is shown as the table guidance requests, an expression of the difference in value of the alternative options for those specific investments in our PR24 core pathway (an alternative route to a pipeline for instance).

## Our approach to Best Value Planning and Cost Benefit appraisal

Different investment options are considered using the below hierarchy to encourage thinking beyond typical or existing solutions.

Figure 2 Hierarchy




Each option is robustly costed using a library of over 3,000 cost models based on real costs captured from previous investments. This costing process considers Capex, Opex and any Capex repeats to calculate a Whole Life Cost.

Each option is also assessed from a benefits perspective using benefits valuation such as the EA outcomes measures or our own Value Framework.

We have developed a Value Framework, structured by the Six Capitals, which allows us to express benefits and disbenefits in a common language (£) for use in cost-benefit analysis and to inform our investment decisions.

Our Value Framework covers a wide range of categories and incorporates environmental and social measures (such as Biodiversity net gain, carbon, traffic disruption and noise) alongside traditional measures such as flooding, interruptions to supply and pollution. This enables us to consider a broader range of benefits and disbenefits of our investments and their alternatives, leading to investment decisions that more holistically consider value and the impacts our actions may have on the environment, customers and communities.

The impact values within our Value Framework are made up of both private costs (e.g. costs to resolve an incident) and societal costs. Societal costs are derived through a robust Societal Valuation Programme considering a broad range of sources where customers views, preferences and priorities are canvassed, analysed and incorporated into the values through a triangulation process. The values were updated in 2022 using research commissioned for PR24. This ensures that customer preferences are reflected in the cost benefit analysis.

The Value Framework, structured by the Six Capitals, allows us to express benefits and disbenefits in a common language (£) for use in cost-benefit analysis and to inform our investment decisions.

Figure 3 Our Value Framework categorised by six capitals

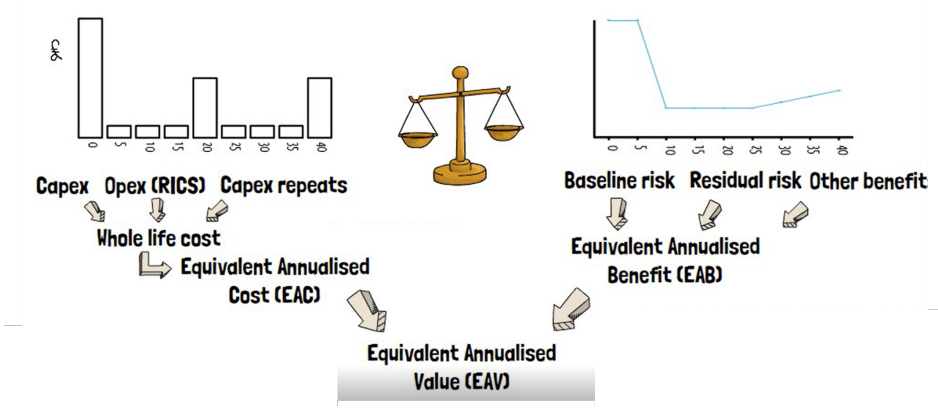
| Natural | Social | Manufactured |
|---|---|---|
| **Pollution** | **Water supply** | **Water efficiency** |
| Category 1-4 | Supply deficit<br>Interruptions to supply<br>Low pressure | Potable water leakage<br>Raw water leakage<br>Consumption reduction |
| **Permit failures and discharges** | **Water quality** | **First time connections** |
| WRC quality compliance<br>WRC volumetric compliance<br>WTW discharge compliance | Notices<br>Health and regulatory impact<br>Aesthetic impact<br>DWI prosecution | Developer request water<br>Developer request<br>water recycling<br>Section 101a request |
| **Water resources** | **Flooding** | **Business enables** |
| Over-abstraction<br>Aquifer protection | Internal<br>External<br>Public Areas<br>Dam failure | Information services |
| **Environmental quality** | **Customer (BAS and construction)** | **Security** |
| Bathing waters<br>River water quality<br>Biodiversity net gain<br>Air quality | PR (only for one off cases)<br>Visual<br>Noise<br>Odour<br>Traffic disruption<br>Amenity access<br>Customer<br>experience | Operational Security<br>Cyber Security |
| **Carbon and emissions** | | **Resilience to climate change** |
| Capital carbon<br>Operational carbon<br>Process emissions | | Resilience to climate change |

| Financial | People | Intellectual |
|---|---|---|
| **Income** | **Health, safety and wellbeing** | **New/different ways of working** |
| Income protection<br>Renewable generation<br>Bioresources<br>Non-domestic income<br>Domestic income | Physical safety (staff and public)<br>Employee wellbeing | Employee<br>productivity<br>Intellectual property<br>utilisation |
| **Opex increase** | | |
| Additional activity<br>indicators | | |

Each candidate investment is appraised to establish a baseline position that captures any current or expected impacts to service, customers, the environment, safety etc (and their respected likelihoods) if no action is taken. (For example no. of properties expected to flood and frequency). This is established using modelling data, incident trends, growth data etc and expert judgement.

Each alternative (i.e. option) is appraised to establish a residual position which updates the baseline post solution, with updated impacts and likelihoods. This residual position also considers any additional benefits and disbenefits that may apply as a result of the intervention. These could be permanent (e.g. visual impact) or temporary (traffic disruption during construction) and consider a range of environmental and social measures including both capital and operational carbon.

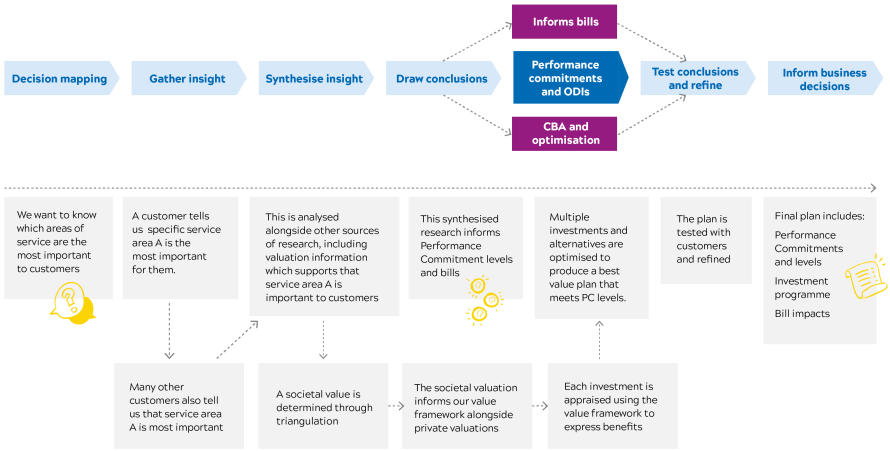
Figure 4 Equivalent Annualised Value




This information is combined with whole life cost information within our investment optimisation system (Copperleaf) to determine which alternative offers best value calculated as Equivalent Annualised Value (EAV), i.e. maximum net benefit for least whole life cost. The Net Present Value (NPV) is calculated as the sum of the discounted values over thirty years. Year 0 is set at 2025 to align with the cost tables (Tables CW(W)13 & 14). As specified by Ofwat, the discounting calculation uses the social rate of time preference as outlined in His Majesty's Treasury (HMT) Green Book. This is a rate of 3.5%.

Investments and alternatives are then optimised to produce an overall best value plan that meets Performance Commitment (PC) levels and other constraints such as obligation dates or resource profiles.

**Figure 5 How customer insight fits into our business planning process**



# CW17 Accelerated programme expenditure - water resources and water network+

As explained in the table commentary for CW12, we have included transition expenditure in accordance with the published guidelines in the PR24 Final Methodology.

The Accelerated Infrastructure Delivery (AID) programme has been run as a separate process to achieve early benefit for customers and provide confidence of Ofwat's support for the early start for this expenditure. Ofwat's Final Decision for AID was published at the end of June: Accelerated Infrastructure Delivery Project - Ofwat

This table commentary provides updated detail on progress of the AID programme.

Since June 2023 we have worked closely with our internal delivery teams and partners in the supply chain to advance these schemes. A summary of progress is provided below for each scheme.

## Supply-demand balance Lines 17.41 - 17.56

### CW17.41: Supply-side improvements delivering benefits in 2025-2030; SDB

Scheme 3: Colchester Reuse

Our delivery teams have completed feasibility work engaging external partners, looking at pipeline routes, planning requirements and held meetings with operational teams to plan the exact location and integration of the new pilot plant into existing assets. As a result of the specification of the PCD that Ofwat provided we have had to accelerate the project more than expected and further increase spend in the period 2023-2025, owing to the interim milestones of detailed design and planning permission complete by 31 March 2025. We are keen to speak with Ofwat teams to understand the rationale for the interim milestone which was not in our original plans, and quantify the penalty associated with delivering these interim milestones later than specified.

The costs for the transfer and pilot plant that we have included in our business plan are shown on lines CW17.41 and 42 and total £23.391m in 2022/23 prices. Our original AID submission included costs for these projects as £15.33m in 2020/21 prices as requested in the template. In addition to high inflation in the period, our cost estimates have increased since October 2022 when the AID was prepared for the following reasons:

Collection of actual costs from projects in AMP7 delivery to update our PR24 cost models for assets used in these estimates

Improved feasibility work for requirements for power supplies, access to land and land purchase, planning requirements (EIA) and ground conditions

Improved feasibility for pipe routes and ecology/archaeology risks

These estimates align with WRMP and therefore we still believe that despite these increases this option is still best value.

## Metering Lines 17.57 - 17.87

### CW17.69: Replacement of existing basic meters with AMI meters for residential customers; metering

Scheme 7: Smart metering

While we continue with our delivery of our major PR19 programme of smart metering, we have recently held procurement events to establish new supply chain capability to deliver this accelerated programme which will begin in April 2024. We have also begun planning the installation of the fixed communications network required to collect data from AMI meters. On line CW17.69 we have shown the latest view of costs included in our PR24 plan for this acceleration as £7.74m in 2024/25. This compares with £9.09m for 2024/25 as per Ofwat's final decisions on AID which were based on our original October 2022 submission. This reduction in costs is entirely due to our work over the last year to re-scope the activities and underlying costs required to achieve the early roll out efficiently.

As per the guidance we have received, smart metering costs are apportioned between enhancement and base in recognition that the new meters are replacing existing dumb meters. We have therefore shown the total spend in this table. The £7.74m required for this programme is broken down as follows:

- £3.560m enhancement capex
- £4.180m base capex

# CW18 Cost adjustment claims - base expenditure: water resources and water network+

For information on our cost adjustment claims, please refer to annex ANH23.

**Leakage (£68m)** - Both Ofwat and the CMA accepted in principle that adjustment should be made to allowances to reflect the higher marginal costs incurred by better performing companies. We submit an updated claim, making use of the richer data which has been provided by companies since PR19. We would withdraw or amend the claim should Ofwat implement a modelling approach which allowed for these higher costs.

**Energy (Water Resources £66m, Water Network+ £211m, Wastewater Network+ £328m) -** In addition to these claims, we have also proposed a cost adjustment claim as way of dealing with the substantial challenge of ensuring cost allowances reflect the costs companies will face for energy purchase in 2025-30.

**Average pumping head (£131m) and large water recycling centres (£109m)** - In accordance with Ofwat's guidance, we have quantified our cost adjustment claim on the assumption that all the consultation water models are used and given equal weight. However, the need for and value of our claim would change should Ofwat use different models or apply different weights.

Although we submitted a Boundary Box cost adjustment claim in June 2023, we would rather this be dealt with as an uncertainty mechanism so have not included it in this data table.

# CW19 Demand management - Leakage expenditure and activities

## CW19.1 - 19.3: Leakage expenditure - company level

Costs are extracted from our SAP system. These costs have been allocated to the various categories by project code for Capex funded work. For Opex funded work, costs have either been allocated by cost centre or for leak repairs by a proportional split based on job volumes of the total repair cost of our IMR alliance.

Overall costs increased in 2022/23 due to additional investment put into leakage management to mitigate the impact of the hot summer and winter freeze/thaw event

Forecasts - maintain expenditure has been forecasted using the average of the last three years cost. During AMP8 the expenditure detailed in our cost adjustment claim for boundary box replacements has been added. 50% of the repairs detailed in this CAC are due to leaks so 50% of the costs have been added

Further details can be found here:https://www.ofwat.gov.uk/wp-content/uploads/2023/06/ANH_CAC_6.1-Boundary-box-replacements.pdf

Reduce expenditure is forecast in line with investments created to reduce leakage levels - these are for the smart metering of shared services and for leakage driven mains renewals

## CW19.13 - CW19.16: Prevent activities and attributes - company level

Pressure Management Areas

An accelerated programme was in place for years 2021/22 and 2022/23 years to deliver a larger number of schemes than is typical. Future pressure management schemes are likely to require a combination of active pump control along with pressure reducing valves.

Changes to PMA dataset

Using ArcGIS, Synergi and GTECH, all new PMA schemes were reviewed. Where required, a new PMA polygon was digitised and added to the existing PMA polygons held in our corporate GIS.

Reviewing the existing polygons identified two PMA's that are no longer active which have been removed from the dataset. Where necessary polygon boundaries have been modified to remove any overlaps or malformed shapes.

## CW19.25 - CW19.28: DMA statistics

The 2022/23 DMA property count data aligns with the property figures reported in the APR

We have no investments planned to alter the size of DMAs so have forecasted 2022/23 data forward. There will be minor changes in the future as the network expands/is reconfigured

## CW19.29: DMA availability

We report leakage at zonal level and therefore focus our meter maintenance activities on ensuring that the zonal availability target is met for compliance with the APR reporting rules. DMAs are used to drive targeting of leak detection activity. The figure reported here is for zonal availability.

We plan to increase our zonal availability to above 95 percent by the end of AMP7 and then maintain this level during AMP8.

## CW19.40: Length of trunk main in flow balances

We don't currently report leakage from trunk mains using flow balances, hence the figure is zero for 2022/23. As we report leakage at the zonal level, we have a relatively small length of trunk mains outside of our leakage reporting areas which are mainly strategic, large diameter mains.

We have started configuring trunk main balances as an alternative way of reporting trunk mains leakage and plan to continue to do this through AMP8.

We are targeting 100 percent coverage by the end of AMP8 but may be unable to achieve this as no specific investment for large diameter meter replacement/new installs is proposed

## CW19.41: Length of trunk main

Since we completed the return for IN22/02 in August 2022 we have completed a full mapping exercise of all our mains upstream of our leakage reporting zones. The figure reported for 2022/23, 1312.684km, is lower that that reported previously of 1701km but represents a more accurate view of our trunk mains network length.

To forecast this line forward we have taken the planned commissioning dates of new upstream mains that are planned to be installed of the new network that will connect the north of Anglian Waters network to the south and east parts of the company

## Smart networks - company level Line 19.49

The 2022/23 figure has been calculated using property counts that align to the year end connected property count in table SUP1B. We feel that for better alignment with the rest of leakage reporting it would be more appropriate to use the average property count in table SUP1a.

We use a threshold of 80 percent of the DMA network being covered by sensors before we start to use the data to deploy leak investigations. We have therefore used the same threshold when preparing the overall property coverage figures.

We have no plans or investment to increase this coverage through the rest of AMP7 or AMP8 and so have carried 2022/23 figures forward

## Active leakage control - company level Line 19.52

This is calculated to be the sum of the total number of hours spent on leakage detection activities during 2022/23.

We have no plans or investment to change the number of detection teams through the rest of AMP7 or AMP8 and so have carried 2022/23 figures forward

## Mains repairs - company level Lines 19.55 - 19.58

Data is extracted from our SAP system. It has been processed to ensure that where multiple jobs are created for the same repair they are only counted once. Repair times show the time from the time the job was moved to our repair partners to the time the repair was completed (but excluding reinstatement). Repair times increased in 2022/23 due to the impact of elevated burst numbers caused by extreme weather.

The number reported here is slightly higher than the figure reported in the APR for the mains repair PCL due to the inclusion of repairs that were recharged to third parties. Burst numbers and runtimes increased this year due to the impact of the hot summer weather and freeze/thaw event in winter

Forecast - the six year average repair numbers and run times have been forecasted forward. The reduction in mains repairs as a consequence of our proposed climate vulnerable mains replacement programme has been included

## Mains repairs - region 1 Lines 19.59 - 19.62

We only report at the company level so no data or commentary in these lines

## Mains fittings repairs - company level Lines 19.67 - 19.70

Data is extracted from our SAP system. It has been processed to ensure that where multiple jobs are created for the same repair they are only counted once. Repair times show the time from the time the job was moved to our repair partners to the time the repair was completed (but excluding reinstatement).

Forecast job volumes and run time are calculated using the average of the previous six years data.

## Communication pipe repairs - company level Lines 19.79 - 19.82

Data is extracted from our SAP system. It has been processed to ensure that where multiple jobs are created for the same repair they are only counted once. Repair times show the time from the time the job was moved to our repair partners to the time the repair was completed (but excluding reinstatement).

Forecast - the job count have been forecast forward from 2022/23 counts. Counts have been increased by the number of additional repairs as described in the related cost adjustment claim. The run times have been forecast as the average of the last six years data

## Supply pipes repairs - company level Lines 19.91 - 19.97

When a customer supply pipe leak is customer reportedwe liaise with the customer to help ensure the leak is repaired in a sensible time and if necessary, by issuing formal waste of water notices. Data about these leaks is stored in a database so counts and runtimes have been extracted from this database

Company detected customer supply pipe leaks can either be found through proactive leak detection or via data from our smart meters. 2022/23 is the first year we have reported the smart meter leaks in this section and makes up the bulk of the leaks

As our smart meter rollout continues through to the end of AMP8 the number of leaks identified by smart meters will increase and is reflected in the forecast, as is the reduction as a consequence to customer reported leaks

## CW19.95: Number of free supply pipe repairs

Since the start of AMP6 we have only offered a free repair service to vulnerable customers so the number reported here is low

Forecast - this is currently forecasted to stay at current levels but we are currently completing trials that may change this in the future

## CW19.96: Number of supply pipe repairs where financial assistance provided

We do not offer financial assistance for supply pipe repairs.

Forecast - currently held flat

## CW19.97: Number of supply pipe repairs where other support provided

All customers with leaks on their supply pipe are provided with details of approved plumbers so the number is equal to the sum of CW19.91 & 92.

## Leakage levels - company level Lines 19.112 - 19.113

## CW19.112 - Historical minimum achieved level of leakage

Historical minimum achieved level of leakage has been calculated using DMA level data and the best achieved targets set as part of our ongoing leakage monitoring processes. The data reported represents the lowest value for each DMA over the last six years. We are unable to analyse data for just 2022/23 at this point. This value has being forecasted forward as a flat line

## CW19.119 - Volume of leakage that needs to be saved to maintain current level

We have assessed this by applying long standing assumptions about leak flow rates to the number of repairs we have completed each year as reported in table LK5. The number is higher this year than previously reported due to a higher burst main count.

The following notional flow rates are assumed for each job type.

**Table 17 Leakage - notional flow-rates**

| Leak type | LK5 category | Flow rate (l/hr) |
|---|---|---|
| Main | Main | 3000 |
| Mains fitting | Mains fitting | 300 |
| Comm pie | Comm pipe | 300 |
| Stop tap | Comm pipe | 30 |
| Customer supply pipe | Customer supply pipe | 300 |

Forecast - same method has been applied to the forecast job counts to derive a volume

# CW20 Water mains asset condition

## Length of potable mains by Condition Grade Lines 20.2-20.2

### CW20.1 - CW20.2: Potable mains condition grades greater than or less than 320mm in diameter

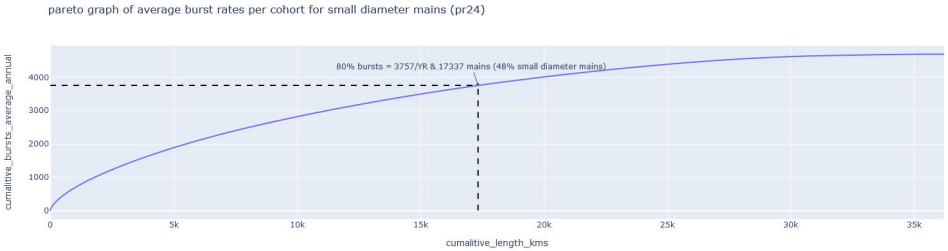
The condition grades for water mains were produced using the suggested Pareto method from Ofwat using python and databricks. As a company we do not use this method of analysis to select mains for replacement or those at highest risk, instead we employ a more advanced regression model in our corporate investment planning system, Copperleaf (C55).

We note that the technical method for preparing data between PR09 and PR24 is largely the same, although to achieve the grouping of mains into cohorts for PR24, an algorithm in python was written to recursively loop through the different primary and secondary attributes (such as the material groupings and diameter bandings) to try and ensure as many cohorts were within the suggested +/-50 percent of the nominal average annual burst number of either 2.5 for mains with a diameter of <=320mm and 1 for a diameter of >320mm. The level of matching for small diameter mains was 95 percent for all cohorts were within this tolerance as a function of length and 99 percent for large diameter mains.

As per Q&A reference 524 we have updated the data used for the analysis (for both small and large diameter mains) to 2022-23.

The following pareto graph shows the 80 percent burst value to be 3,757 bursts per year, which equates to 17,337kms of small diameter mains (48 percent of small diameter mains):

**Figure 6 Pareto graph of average burst rates (small diameter)**




We have compared the results with PR09 which showed the following percentage splits for small diameter mains. This shows a general trend of mild deterioration for condition grades 4 and 5:

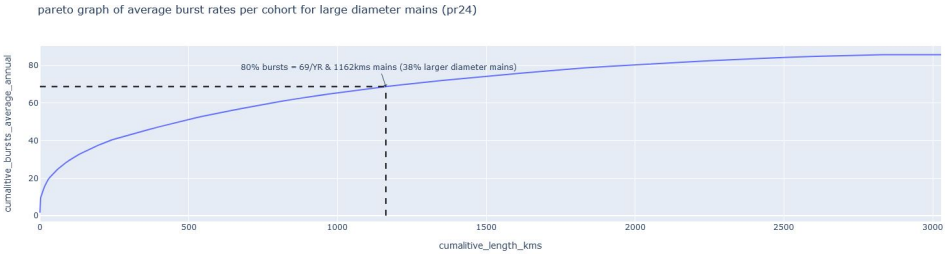
**Table 18 Small diameter mains - percentage splits**

| Grade | PR09 % | PR24 % |
|---|---|---|
| 1 | 55.7 | 61.3 |
| 2 | 31.8 | 27.3 |
| 3 | 10.9 | 9.6 |
| 4 | 1.4 | 1.6 |
| 5 | 0.16 | 0.3 |

The most marked increase is the length of mains for grade 1, this can partly be explained through the addition of many new schemes in 15 years and by the roll out of pressure management and improved operational control.

The following pareto graph shows the 80 percent burst value to be 69 bursts per year, which equates to 1,162kms of small diameter mains (38 percent of small diameter mains):

Figure 7 Pareto graph of avg burst rates (large diameter)




We have compared the results with PR09 which showed the following percentage splits for large diameter mains. This shows a general trend of mild improvement in condition grades. This is mainly explained by the roll out of pressure management and improved operational control, resulting in fewer bursts:

Table 19 Large diameter mains - percentage splits

| Grade | PR09 % | PR24 % |
|---|---|---|
| 1 | 95.5 | 97.6 |
| 2 | 2.9 | 1.6 |
| 3 | 1.2 | 0.6 |
| 4 | 0.3 | 0.2 |
| 5 | 0.4 | 0.04 |

# Analysed burst rate comparison Lines 20.3 - 20.12

## CW20.3 - CW20.12: Analysed burst rate for small diameters

For small diameter mains (<=320mm) an uplift factor was applied to both the length and burst rate in each condition to reflect the increase in length from 2022/23 to 2025/26 (first year of AMP8) reported in the diameter band projected increases in CW6 (lines 6-8).

In comparison to PR09 with the total average annual burst rates per 1000kms for small diameter mains (6W20 - line 5), the PR24 figure has remained largely stable. For the larger diameter mains in table CW20 there has been a noticeable overall reduction (from 65 in PR09 to 28 in PR24), this is explained by the roll out of pressure management and improved operational control, resulting in fewer bursts.

As per Q&A reference 524 we have updated the data used for the analysis (for both small and large diameter mains) to 2022/23. The following table shows how the use of the 2022/23 values as opposed to the 2025/26 values has had a minimal impact on overall burst rates:

Picture 1

CW20
Select company

**Water mains - asset condition**

| Line description | Units | DPs | Grade 1 | Grade 2 | Grade 3 | Grade 4 | Grade 5 | Total (2025-26) | PR24 BP reference | RAG 4 reference |
|---|---|---|---|---|---|---|---|---|---|---|
| Length of potable mains by Condition Grade | | | | | | | | | | |
| Potable mains (up to 320mm) | km | 1 | 22,452.6 | 9,990.8 | 3,501.2 | 591.9 | 99.0 | 36,635.5 | CW20.1 | |
| Potable mains (greater than 320mm) | km | 1 | 3,273.0 | 55.0 | 19.2 | 5.0 | 1.6 | 3,353.8 | CW20.2 | |
| Analysed burst rate comparison | | | | | | | | | | |
| Analysed cohort potable mains (up to 320mm) | km | 2 | 22,452.60 | 9,990.80 | 3,501.20 | 591.90 | 99.00 | 36,635.50 | CW20.3 | |
| Annual average bursts from cohort analysis (5 year average) potable mains (up to 320mm) | nr | 1 | 1,333.7 | 1,717.1 | 1,156.9 | 392.4 | 149.7 | 4,749.8 | CW20.4 | |
| Annual average bursts on analysed cohorts potable mains (up to 320mm) | nr/000km | 2 | 59.40 | 171.87 | 330.43 | 662.95 | 1,512.12 | 129.65 | CW20.5 | |
| Replaced and/or relined mains length | km | 2 | | | | | | 123.20 | CW20.6 | |
| Annual average bursts on replaced potable mains (5 year average) up to 320mm | nr | 1 | | | | | | 0.0 | CW20.7 | |
| Annual average bursts (5 year average) on potable mains up to 320mm | nr | 1 | | | | | | 4,749.8 | CW20.8 | |
| Current annual bursts on potable mains (up to 320mm) | nr | 2 | 1,333.70 | 1,717.10 | 1,156.90 | 392.40 | 149.70 | 4,749.80 | CW20.9 | |
| Current annual bursts on potable mains (up to 320mm) | nr/000km | 1 | 59.4 | 171.9 | 330.4 | 662.9 | 1,512.1 | 129.7 | CW20.10 | |
| Annual bursts on mains (5 year average) greater than 320mm and other mains | nr | 1 | | | | | | 28.0 | CW20.11 | |
| Annual bursts on mains (5 year average) on potable and other mains reported in APR 2019 | nr | 1 | | | | | | 4,777.8 | CW20.12 | |

## CW20.6 - CW20.7: Planned relined and replaced mains and burst rate

The planned relined and replaced mains total for 2025/26 has been taken from table CW6 line 3.

The above was calculated using proportional methods to allocate captured mains lengths across the AMP8 years, so therefore the burst rates would be adversely affected by this and as a consequence the burst rates for line 7 has been set to 0. The bursts have been captured elsewhere in line 4. This is also important to avoid double counting occurring in line 8.

# CW21 Water - net zero enhancement schemes

We do not propose Net Zero enhancement spend at PR24 for water price controls, however, we have included the below feasible option for Photovoltaic (PV).

Operational carbon savings, shown in Columns 21-25, have been calculated using the carbon accounting workbook (CAW) v17 as per Ofwat guidance.

Embedded (Capital) Carbon has been calculated on a cradle to as built basis, as per Ofwat guidance. Within our Copperleaf Investment management system embedded carbon models are back-to-back with cost models. Therefore, when an asset is created, the various cost elements have an embedded carbon value which is generated. Column 26 shows the cumulative operational savings over AMP8 minus the embedded carbon associated with constructing the asset as per Ofwat guidance.

## CW21.1: Feasible option for Photovoltaic (PV)

PV affords a cost-effective way of delivering renewable energy on or adjacent to our sites. Previously in AMP6 and in AMP7 we have worked with external financiers to develop, construct, own and operate solar PV installations across our estate. We then procure this energy. However, we have large numbers of smaller sites which are below the size threshold that has been commercially viable for us and our investment partners. We will develop up to 400 solar installations across our wastewater and water asset base utilising both roof and ground mounted installations to provide renewable energy behind the meter at our sites.

This feasible option for water of a small scale solar investment would target 10 GWh's of installations, equating to circa 1.35% of Anglian Water annual energy demand.

love every drop
anglianwater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