PR24

NORTHUMBRIAN WATER living water | ESSEX&SUFFOLK WATER living water

A3-02 WRMP DEMAND MANAGEMENT

NES15

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1. INTRODUCTION

We have two **Water Resource Management Plans** (WRMP), for each of Northumbrian Water (in the North East), and Essex & Suffolk Water (in the East of England). These plans are very different, because the North East has had large water supply surpluses in the past (mostly due to Kielder and other reservoirs), but Essex and Suffolk are classified as water stressed areas. As a result, Essex and Suffolk has very low levels of leakage and a higher proportion of smart water meters compared to the North East.

Through our statutory Water Resources Management Planning process, we have identified a material water supply deficit in our Suffolk region and therefore a need to improve our water supply resilience in our Essex and Suffolk Water (ESW) area. The key factors driving this need are reductions in the amount of water we are permitted to abstract from rivers (as recently applied by the Environment Agency) and the impact of climate change on levels of rainfall and groundwater recharge – both of which mean substantial changes from our WRMP that we set in 2019. Our WRMP modelling shows that we do not expect there to be a water supply deficit in our Northumbrian region (NW), but we remain vigilant and therefore committed to ensuring water supply resilience across this region.

This Demand Management business case covers one half of our 2025-30 WRMP programme and includes three key components: Leakage, Demand Management and Water Efficiency interventions. In combination with our Supply Options programme, covered in our **WRMP Supplies enhancement business case** (NES14), these components deliver our overall WRMP24 objectives for AMP8.

We remain committed to delivering our leakage reduction target of 50%, compared to 2017/18 levels, across our supply area by 2050, and aim to do so by targeting 40% in our Essex and Suffolk area and 55% in our North East area. As such, during 2025-30 we are focused on achieving further leakage reductions in our Essex and Suffolk area to continue to achieve anticipated industry upper quartile levels, and to move closer to industry upper quartile performance in our North East area.

We also remain committed to our long-term objective to reduce per capita consumption (PCC) within our supply areas to 110 litres/person/day by 2050. Therefore, our 2025-30 target is to reduce household PCC by 9.7% by 2029/30, compared to 2019/20 levels – which is consistent with achieving this long-term objective. We plan to achieve this through improving the collection of water consumption data with targeted and effective metering and through implementing initiatives to encourage our customers to use water more efficiently.

We are also mindful of a new long-term water demand target proposed by the UK Government, that underwent consultation in 2022, and will shape our future demand management efforts alongside our 2050 leakage and PCC targets. The Government has proposed a new target for a 20% reduction in distribution input per head of population by 2037 from a 2019/20 baseline which our WRMP also seeks to address.

1.1. BEST VALUE PLAN FOR DEMAND MANAGEMENT

We worked with regional stakeholders and neighbouring water companies to identify the best options to include in our WRMP24. We considered what risk could be offset by using demand management, before seeking to develop supply-side options. Our planning approach used least-cost optimisation as well as broader 'best value' decision making criteria to develop a 'Best Value Plan' for WRMP24, including:

- Cost to build and operate the plan.
- Adaptability and flexibility of the plan to cope with uncertain future needs.
- Alignment to the Water Resources North and Water Resources East regional strategies.
- Resilience of the plan to severe and extreme drought and other hazards, and the residual risks.
- Deliverability of the plan with timescales needed to manage risks.
- Alignment to customer preferences.
- Environmental and social impacts of the plan, including net environmental benefit.

The preferred plan from our WRMP is our Best Value Plan for demand options in the North East and Essex and Suffolk areas, as shown in Table 1. This does not include NHH water efficiency, which is covered in a separate enhancement case (NES36).

TABLE 1: OUR PREFERRED PLAN FOR NW AND ESW AREAS

	Essex and Suffolk area	Northumbrian *area*
Leakage	40% reduction by 2050.	Active Leakage Control to reduce leakage by 55% by 2050.
Metering	High impact optant and compulsory metering programme. Fully smart by 2035.	Replacement of existing meters with smart meters by 2035 and Enhanced Optant Smart Metering.
Water Efficiency Programme	Using in home interventions and digital engagement to reduce PCC to 110/head/day by 2050.	In home interventions, digital engagement and activity related to smart metering, to reduce PCC to 110l/head/day by 2050.

1.2. RELATED CASES

In addition to our case for WRMP Supply Options, there are two other cases we are submitting as part of our PR24 plan that are relevant to our Demand Management case. These are:

- **Mains Renewal Enhancement Claim** – this case has been developed in parallel to our Demand Management case, ensuring there is no overlap or duplication of scope or cost. The investment proposed in our Mains Renewal case is expected to deliver a benefit in terms of a reduction of 15 mains bursts per year in our Essex & Suffolk Water area. We have factored this into the planning of our Demand Management case, and the costs and benefits included in our Mains Renewal case are excluded from this document.
- **Non-Household Metering Enhancement Case** – our case for NHH metering enhancement will be submitted as part of our Draft Business Plan submission in October. We have drafted our NHH case separately to our Demand

Management case as it relates to a different investment driver. Therefore, all costs described in our Demand Management case relate to our Household metering programme only.

1.3. SUMMARY OF COSTS

We will deliver our demand management programme through a combination of base maintenance and enhancement investment. This is different from our water supply options, which are entirely enhancement expenditure as these deliver new supplies and capacity to increase resilience.

This case sets out our enhancement programme for leakage, metering and water efficiency within the overall context of our WRMP and base investment plans. We summarise the costs in Table 2 below, broken down by base and enhancement, type of high-level intervention, and region.

TABLE 2: COST BREAKDOWN BY BASE AND ENHANCEMENT (TOTEX)

Region and Intervention Type	Base (£M)	Enhancement (£M)	Total (£M)
Leakage			
North (Northumbrian)	111.490	7.570	119.060
South (Essex and Suffolk)	142.980	17.500	160.480
Total	**254.470**	**25.070**	**279.540**
Metering – new smart meters			
North (Northumbrian)	-	41.647	41.647
South (Essex and Suffolk)	-	47.011	47.011
Total	-	**88.658**	**88.658**
Metering – replacement			
North (Northumbrian)	28.097	7.098	35.195
South (Essex and Suffolk)	36.261	7.255	43.516
Total	**64.358**	**14.353**	**78.711**
Metering – smart indirect costs			
North (Northumbrian)	-	5.783	5.783
South (Essex and Suffolk)	-	11.511	11.511
Total	-	**17.294**	**17.294**
Water Efficiency			
North (Northumbrian)	8.228	3.732	11.960
South (Essex and Suffolk)	5.660	3.862	9.522
Totals	**13.888**	**7.594**	**21.482**

The WRMP process is not yet complete, and so our plans may need to change to reflect our final WRMP. The costs presented in Table 2 are slightly different to those in our WRMP, because the guidance for WRMP requires us to use historical unit costs whereas our enhancement costs use more efficient, forward-looking unit costs based on market testing and benchmarking. Some differences may also be due to rounding.

2. NEED FOR ENHANCEMENT INVESTMENT

In this section, we describe the need for enhancement investment and present our evidence. We describe our evidence against each of the enhancement assessment criteria that Ofwat set out in A1.1 of **Appendix 9 – Setting Expenditure Allowances** with their PR24 methodology.

2.1. ALIGNMENT WITH STATUTORY PLANNING FRAMEWORKS

a) *Is there evidence that the proposed enhancement investment is required? (includes alignment with agreed strategic planning framework or environmental programme where relevant)*
b) *Is the scale and timing of the investment fully justified, and for statutory deliverables is this validated by appropriate sources (for example, in an agreed strategic planning framework)?*

We are required by sections 37A to 37D of the **Water Industry Act 1991** to prepare and maintain a WRMP. The Government's **Water Resources Planning Guideline (WRPG)** (July 2022) then provides further guidance on how we should meet our obligation to prepare and maintain a WRMP, which must set out how we intend to achieve a secure supply of water for our customers and a protected and enhanced environment. We must prepare a WRMP every five years, review this annually, and this should forecast supply and demand over a minimum period of 25 years. They are expected to reflect regional plans to ensure a cohesive set of plans, unless there is clear justification for not doing so.

The WRPG states that in developing a WRMP in England and Wales, we should screen for a Strategic Environmental Assessment (SEA) or carry out a full SEA depending on the absence or presence of a supply demand deficit respectively. Schedule 2 (6) confirms the following list of topics to be considered: biodiversity, flora and fauna, population and human health, soil, water, air, climatic factors, material assets, cultural heritage, and landscape. The SEA also considers the inter-relationship between these topics.

Our WRMP provides the evidence that our investments in leakage, metering, and water efficiency are required to achieve a secure supply of water for our customers and a protected and enhanced environment. The pace and scale of investments described in this enhancement case matches the preferred plan from our WRMP. These are statutory deliverables. Our WRMP provides the detailed evidence of how we have forecast the supply demand deficit and how much of this will need be addressed through demand management.

The Government has set targets to reduce household demand to 110 l/p/d; reduce leakage by 50% compared to 2017/18 levels; and reduce non-household water demand by 15% by 2050. The Government has set targets to reduce household demand to 110 l/p/d; reduce leakage by 50%; and reduce non-household water demand by 15% by 2050. Our investments in leakage, metering, and water efficiency – including the scale and timing of these investments – are needed to support the delivery of these long-term targets for Northumbrian Water.

2.2. OUR PROGRESS DURING AMP7 (2020-25)

2.2.1 Leakage

The new Ofwat reporting guidelines, published in March 2018, set out a consistent methodology for calculating leakage across all companies. In WRMP19, we committed to a 15% reduction in the North East and a 17.5% reduction in Essex and Suffolk, compared to the 2019/20 baseline, by 2025. We also committed to a 10% leakage reduction per AMP across our North East and Essex and Suffolk areas until 2045. We describe our progress in our North East and Essex and Suffolk areas in the sections below (as well as reporting this annually in our Annual Performance Report).

Our leakage performance compares favourably with other water companies. In our Essex and Suffolk area, we have one of the lowest levels of leakage (76 l/p/d in 2021/22, compared to an industry average of 113 l/p/d). In our North East area, our leakage is better than the sector average (at 108 l/p/d in 2021/22).

Northumbrian Water

After a challenging first year due to a bad winter in 2020/21, our leakage levels have reduced by 9.5Ml/d in 2021/22 compared to 2020/21. This meant that although we did not meet our targets in 2020/21 or 2021/22, based on a three-year rolling average, our annual performance was the best it has ever been.

We have further reduced leakage from 130.5Ml/d in 2021/22 to 118.8Ml/d in 2022/23 (an 8% year on year improvement). This gives a three-year average of 129.8Ml/d against a performance commitment (PC) equivalent of 126.7Ml/d – which in turn, equates to a reduction of 3.7% against a PC of 6%.

Although we haven't delivered the three-year rolling PC, our annual performance is now very close to the 2024/25 target of 118.6Ml/d, and we are on track to achieve our PC by 2024/25.

Our **Annual Performance Report 2022/23** provides more detail about how we are tackling leakage and the actions we are taking to improve performance. These are also set out in our performance action plans, which we publish each quarter on our website.

Essex & Suffolk Water

At PR19, we committed to reduce leakage by 17.5% over five years – which was beyond the requirement set by Ofwat for companies to reduce leakage by 15%. After a difficult first year in 2020/21, due to a bad winter and the disruption caused by the Covid-19 pandemic, we delivered a leakage reduction of 6.7Ml/d in 2021/22 compared to 2020/21.

This means that although we did not meet our targets in the first two years of AMP7, based on a three-year rolling average, our annual performance was below the PC level of 62.8Ml/d in 2021/22.

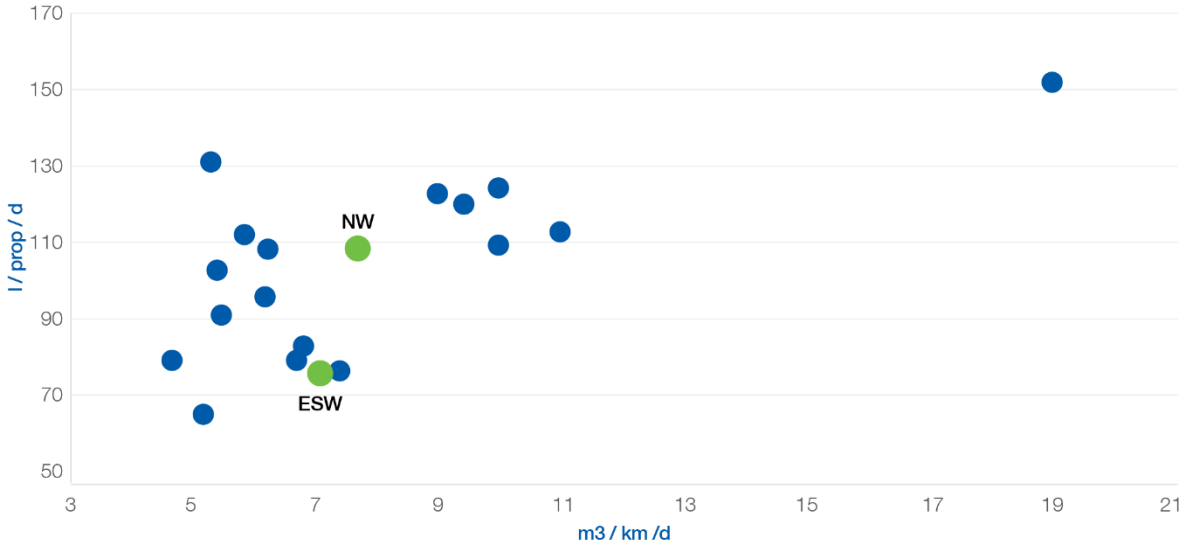
In 2022/23, we further reduced leakage from 59.3Ml/d in 2021/22 to 55.6Ml/d in 2022/23 (a 6% year on year improvement). This gives a three-year average of 60.3Ml/d against a PC of 60.5Ml/d. This equates to a reduction of 7.6% against a PC of 7.2%, and so we achieved the PC target in 2022/23.

During 2022/23, we achieved some of the lowest levels of leakage ever recorded in Essex and Suffolk. By July 2023 we had driven down the visible leak repair time in Essex and Suffolk to an average of 4.3 days in comparison to 7.9 days during the corresponding period in 2022. We achieved this by increasing our operational resources and implementing a number of additional initiatives, as outlined below.

In both of our areas, we are applying several new and exciting technologies and techniques to help us achieve our leakage goals. We are collaborating with industry experts to develop Digital Twins for four of our District Metered Areas, which enables us to identify leaks in our network. We have implemented new AI sensor technology which makes our leakage detection survey process more efficient. We also use our annual Innovation Festival to explore new concepts across the industry such as ‘no-dig’ repair techniques and emerging alternative sources of data that may improve our internal best practice leakage prevention and management. In addition, we are leading on industry collaboration, as we develop the new National Leakage Research and Test Centre. This is a five km buried water pipe network purpose built for developing and testing leakage interventions without disrupting customers’ supplies or affecting water quality. We continue to evaluate and optimise how we use Smart Meter data, as we build on the penetration of meters already deployed.

As a result of our vulnerable water resource position in the South East, we have developed a robust leakage management approach that has led to us becoming a frontier company in leakage performance over several years. This is demonstrated by our position alongside other English and Welsh water companies when considering the l/property/d metric as shown in Figure 1.

FIGURE 1: OUR 2021-22 LEAKAGE PERFORMANCE



Source: Discover Water, August 2023

2.2.2 Metering

Table 3 below summarises our 2020-25 metering programme.

TABLE 3: 2020-25 METERING PROGRAMME ACROSS BOTH OUR AREAS

Household Metering	NW meter count	ESW meter count	Total Base (£m)	Total Enhancement (£m)
New installation - Optants	87,500	25,594	0	32.1
New installations – wide area metering	0	50,000	0	3.3
Replacement	154,916	154,916	22.5	7.8
Total	**242,416**	**230,510**	**22.5**	**43.2**

For 2020-25, we prioritised installation of new smart meters rather than upgrading existing analogue meters. This was because targeted installation of new meters in areas where we had limited data on usage and demand patterns was the most effective and cost beneficial way of improving our understanding of leakage – and so targeting improvements. We also used our optimisation model to identify proactive meter replacements based on factors including meter location, scope to impact leakage and consumption, coverage of smart meter communication network and meter age. This supports efficient targeting by making sure we selected the most cost-beneficial investments first.

Our approach to new meter installations was based on a combination of optants and a Whole Area Metering (WAM) programme (in our Essex & Suffolk Water region only). However, because optant metering is customer led, demand for meters was severely impacted between 2020 and 2022 by the Covid pandemic. We are also working to overcome ongoing challenges, including a shortage of electronic components which has impacted the supply chain and limited the

number of smart meters we can procure and is anticipated to continue into 2024. Therefore, delivery of our metering programme in 2020-25 has fallen significantly behind our PR19 plan.

We have taken action to accelerate our metering programme and close the gap between our PR19 plan programme and AMP7 delivery, including:

- Increasing our metering team resource by 9 additional FTE in Essex and Suffolk.
- Engaging tactical partners to deliver up to an additional 11,000 installs in 2023-24
- Commenced procurement for a new install partner in Essex and Suffolk and the North East which will materially increase our install capacity in 2024-25 and ensure capacity to deliver against AMP8 volumes.
- Completed procurement for a communication infrastructure partner in Essex and Suffolk and additional meter suppliers. These will come online in November 2023. The same procurement activity is also underway in the North East and is due to come online in March 2024.

Table 4 below shows how we are delivering our 2020-25 metering enhancement programme, showing the actual volume of meters delivered for the first three years and forecast figures for remaining years. While the action we have taken will allow us to significantly increase install volumes in years four and five, we are forecasting that we will only be able to achieve 75% of our AMP7 ODI target by the end of the period, resulting in a £5m ODI penalty (in 2017/18 prices).

TABLE 4: FORECAST 2020-25 METERING ENHANCEMENT PROGRAMME

Installation type	2020/21	2021/22	2022/23	2023/24	2024/25	Total
New Meter Installs	0	22,824	29,065	37,339	50,000	139,228
Meter upgrades	0	5,069	17,345	23,866	34,406	80,686

However, while we have installed fewer meters in 2020-25 than we forecast in our WRMP19, we have still maintained a supply demand balance index of 100 for all our water resource zones. We aim to deliver our programme in full in the water stressed Suffolk region and exceed our programme by achieving close to 100% meter-penetration in the worst affected areas (such as the Hartismere Water Resources Zone) by the end of AMP7. Our focus remains on ramping-up our install capacity in AMP7 and ensuring sufficient capability is in place to support delivery of our AMP8 programme.

Our appendix **A6 – Deliverability** (NES07) explains our progress on our transformation programme. This includes how we are increasing our capacity to install new meters and address our supply chain challenges with new capacity to provide early infrastructure and extra supplies of new meters.

2.2.3 Water Efficiency

In our PR19 business plan, we committed to reduce per capita consumption (PCC) by 5.3% across our supply areas by 2024/25. This is equivalent to reducing by 7.7 litres per property per day (l/p/d) in the North East, and 9.2 l/p/d in Essex and Suffolk. We set this objective to support progress towards reaching our long-term objective to reach 118 l/p/d by 2040 (as set in our **long-term strategy at PR19**). This objective aligns to the national objective to reach a PCC of 110 l/p/d by 2050, as recommended by the National Infrastructure Commission.

To deliver this in 2020/25, we are focused on the following four water-saving initiatives:

1. **Water and Energy Saving Home Retrofits**: During our visits, we offer personalised water saving products and tailored information to enhance the opportunity to change user behaviour. This is informed by our ongoing work with academic experts to understand water use behaviours and to enhance our engagement with customers to encourage water savings. At metered households, we focused our water saving visits on our top 5% highest water users. We expect each visit to achieve approximately 60 l/p/d water savings, based on our data from past home visit projects.
2. **Leaky Loos**: During 2020-25, we are focused on repairing leaking toilets. We rely on our customers (through education) to identify leaking toilets and raise this with us to fix, at no cost to them.
3. **Education:** During 2020-25, we are focused on offering Key Stage 2 educational resources to school students. We are now contributing to 'The Ripple Effect', a behaviour change tool designed to estimate savings from soft measures and provides guidance for determining the level of engagement for school-based activities.
4. **Home Flow Restrictions**: During AMP7, we have been trialling a device to reduce the regulated water flow through the water flow restrictor in homes from 14 l/min to 10 l/min. We expect this to save around 34 l/p/d without compromising pressure or the function of appliances within the property.

During 2020/21 and 2021/22, the Covid-19 pandemic meant that we had to change our water efficiency strategy to make sure we could continue to engage with our customers - and to mitigate the impact of the Covid-19 pandemic on household consumption as much as possible. This meant that we have not seen the progress we expected in 2020/21 and 2021/22 due to the unexpected changes, in quantity and time of use, in household consumption compared to the three-year average. This is because we saw substantial changes in behaviour during this period – for example, from Covid-19 lockdowns and customers subsequently changing their home-working patterns.

As we summarise in TABLE 5, despite our efforts PCC has not reduced sufficiently in the first two years of AMP7. The shortfall against our original target increased to 12.8 l/p/d in 2022/23. However, we forecast this will begin to reduce over the coming year and towards the end of AMP. We remain committed to our AMP7 objectives and have focused our efforts to recover from this period, using our learning from our experience to inform our AMP8 options.

TABLE 5: OUR 2020-25 PROGRESS WITH REDUCING PER CAPITA CONSUMPTION

Per Capital Consumption (l/p/d)	Baseline	AMP7				
	2019/20	Year 1 2020-21	Year 2 2021-22	Year 3 2022-23	Year 4 2023-24	Year 5 2024-25
Three-year average	150.6	156.3	157.7	159.1	153.9	150.9
PC		149.4	147.9	146.3	144.5	142.7
Difference		**-6.9**	**-9.8**	**-12.8**	**-9.4**	**-8.2**

2.3. NEED FOR ENHANCEMENT EXPENDITURE IN AMP8

Our WRMP shows that we need to meet two demand management needs:

- Deliver **50% leakage reduction** across our supply areas by 2050 (compared to a 2017/18 baseline). As set out in our WRMP, we will split this by reducing leakage by 40% in Essex and Suffolk and 55% in the North East.
- Reduce **household per capita consumption** by 9.7% by 2030 compared to a 2019/20 baseline, to an average of 136.0 lpd. This is consistent with meeting our long-term target to reduce PCC to 110 lpd by 2050.

Table 6 sets out these needs in more detail. For this enhancement case, we focus on how this will be delivered in practice.

TABLE 6: THE NEED FOR IMPROVED DEMAND MANAGEMENT IN 2025-30

	Risk / Issue	Root Cause	Need
1	Water Supply Deficit in Essex & Suffolk Water region. Both our Essex and Suffolk areas have a forecast water supply deficit and are classed as 'seriously water stressed'.	• The EA has reduced the amount of water we are permitted to abstract for drinking from rivers in the region, and • A changing climate in the south-east of England has resulted in reduced rainfall and subsequent reduced groundwater recharge.	• Reduce leakage by 50%, compared to 2017/18 baseline, by 2050 across our supply area (achieved by 40% ESW, 55% NW). • Reduce household PCC by 9.7%, compared to 2019/20 baseline, by 2030.
2	Compliance with targets and customer expectations in Northumbrian Water region. While we are not forecasting a water supply deficit in our Northumbrian region, we must continue to deliver improvements to increase resilience and provide value to our customers.	• We have made a commitment to achieve the industry set 50% leakage reduction by 2050. • A changing climate in the north-east of England is forecast to result in reduced rainfall and subsequent reduced groundwater recharge.	

Note: our evidence for the changing climate is set out in our PR24 Climate Resilience Assessment Phase A and PR24 Climate Resilience Assessment Phase B reports (documents NES52 and NES53).

2.3.2 Our Assumptions for Base and Enhancement Investment in AMP8

c) *Does the proposed enhancement investment or any part of it overlap with activities to be delivered through base, and where applicable does the company identify the scale of any implicit allowance?*
d) *Does the need and/or proposed enhancement investment overlap with or duplicate activities already funded at previous price reviews?*
e) *Is the investment driven by factors outside of management control? Is it clear that steps been taken to control costs and have potential cost savings (for example, spend to save) been accounted for?*

Table 7 sets out the assumptions we have made to allocate investment to base or enhancement cases for AMP8. This investment does not overlap with or duplicate activities already funded at previous price reviews.

For leakage, we assume that investment to maintain the current rate of leakage improvements from 2020-25 are funded by base. Based on the precedent set by the Competition and Markets Authority (CMA) at the **PR19 determinations**, we assume that the cost of further reducing leakage to meet new targets more quickly would be an enhancement cost. We describe this in more detail in Section 2.3.3.

For metering, we have allocated all costs of new meters to enhancement. We have allocated most of the cost of meter replacements to base, but we have allocated costs to enhancement for the incremental additional cost of a smart reader as part of the replacement activity (that is, replacement of non-smart meters with smart meters). This is consistent with the PR19 approach and the PR24 methodology and we describe this in more detail in Section 2.3.4.

In addition, we have identified some indirect costs associated with smart metering that meet the criteria for enhancement but are not included in the meter unit rate. These are needed as part of our compulsory metering programme to help maximise the benefits of smart metering for affordability, leakage, and water efficiency. We describe these in more detail in Section 0.

We assume that most of our investment in our core household water efficiency activities and other interventions to reduce PCC to 110 l/p/d by 2050 would be covered under base – which will deliver a reduction of 12.33 Ml/d in the North East and 8.49 Ml/d in Essex and Suffolk. However, there is an opportunity to deliver additional water efficiency interventions alongside our smart metering programmes to meet the increased pace of demand reduction needed to meet the 2050 target. We have included this as enhancement expenditure alongside our smart metering programmes. We describe this in more detail in Section 2.3.5.

These investments are driven by factors outside our control, as we are required to meet targets for reducing leakage and household demand.

TABLE 7: OUR ASSUMPTIONS FOR BASE AND ENHANCEMENT INVESTMENT

Base	Enhancement
Leakage	
Maintain current rate of improvement from 2020-25.	Enhancement cost based on CMA precedent to achieve profile to deliver long-term targets of 40% ESW and 55% NW.
Metering	
Household meter replacement (like-for-like).	New smart metering. Incremental upgrade to smart metering for replacements.
Water Efficiency	
• Core household water efficiency activity to reduce PCC to 110 l/p/d by 2050. • Other metering interventions including government-required activities. • Items funded at previous price reviews.	Water efficiency interventions delivered as part of the Smart metering programme roll-out to maximise PCC reduction.

2.3.3 Leakage

As we describe in Section 2.2.1, for WRMP19 we committed to a 10% leakage reduction for each price review period until 2045 across our North East and Essex and Suffolk areas (compared to the 2019/20 base position).

For WRMP24, we have used a different approach – based on the reductions we need to achieve a 55% reduction in the North East and 40% reduction in Essex and Suffolk (compared to the 2017/18 baseline) to achieve our overall 50% leakage reduction commitment by 2050. This means reducing leakage by 8.2% in the North East and 5.0% in Essex and Suffolk by 2030, and so moving towards industry upper quartile performance in the North East and maintaining our industry upper quartile performance in Essex and Suffolk.

Although this level and pace of leakage reduction in the North East is not strictly necessary to meet customer demand, this is consistent with the requirement for all water companies to meet a 50% overall leakage reduction by 2050. Our customer insight summary shows that customers strongly support investments to reduce leakage (this was the most supported option, at 84% of participants, in WRMP options research). We also know that regulators expect us to set and achieve ambitious targets for leakage reduction, including aiming for industry upper quartile performance.

In Essex and Suffolk, we have set a lower long-term target for leakage reduction (40% by 2050). This is because further leakage reductions are more difficult and more expensive to achieve in these areas, as leakage is already very low compared to the rest of the water industry. Customers in Essex and Suffolk were also more divided about the appropriate long-term target to set in these areas, with some considering that this target should be lower than 50% because of the current high performance (see enhancements and other service area summaries, NES43).

The sections below describe how we intend to use base and enhancement investment to achieve the leakage reductions in the North East and Essex and Suffolk over the 2025-30 period.

Leakage - Base Investment

Table 8 to Table 11 below summarise our base investment in leakage during 2020-25 and our planned 2025-30 base programme for both the Northumbrian Water and Essex & Suffolk Water areas.

TABLE 8: NORTHUMBRIAN WATER (NORTH EAST) TOTAL LEAKAGE BASE INVESTMENT – 2020-25

NW 2020-25 Base Expenditure	Opex (£m)	Capex (£m)	Totex (£m)
Prevent (rehab)- direct costs	-	25.1	25.1
Prevent (pressure management) - direct costs	-	1.7	1.7
Prevent (calm networks)- direct costs	-	-	-
Aware- direct costs	5.7	-	5.7
Locate- direct costs	5.2	-	5.2
Mend - direct costs	23.8	23.8	47.5
Indirect costs	7.6	-	7.6
Headwinds	12.0	-	12.0
Total	**54.2**	**50.5**	**104.7**

TABLE 9: NORTHUMBRIAN WATER (NORTH EAST) TOTAL LEAKAGE BASE INVESTMENT – 2025-30

NW 2025-30 Base Expenditure (3.56Ml/d Reduction)	Opex (£m)	Capex (£m)	Totex (£m)
Prevent (rehab)- direct costs	-	25.1	25.1
Prevent (pressure management) - direct costs	-	-	-
Prevent (calm networks)- direct costs	-	-	-
Aware- direct costs	5.7	-	5.7
Locate- direct costs	7.3	2.6	9.9
Mend - direct costs	32.3	19.0	51.3
Indirect costs	7.6	-	7.6
Headwinds	12.0	-	12.0
Total	**64.9**	**46.6**	**111.5**

For the North East, this base plan will deliver a 3.56 Ml/d reduction in leakage from base expenditure by 2030. For Essex and Suffolk, this base plan will deliver a 1.37 Ml/d reduction in leakage from base expenditure by 2030.

These costs are shown without any adjustment for RPEs or efficiency, to show the comparison between the two periods.

TABLE 10: ESSEX & SUFFOLK WATER TOTAL BASE LEAKAGE INVESTMENT – 2020-25

ESW 2020-25 Base Expenditure	Opex (£m)	Capex (£m)	Totex (£m)
Prevent (rehab) - direct costs	-	18.1	18.1
Prevent (pressure management) - direct costs	-	0.9	0.9
Prevent (calm networks)- direct costs	-	-	-
Aware- direct costs	7.1	-	7.1
Locate- direct costs	5.5	-	5.5
Mend - direct costs	42.6	42.6	85.2
Indirect costs	13.5	-	13.5
Total	**68.6**	**61.5**	**130.1**

TABLE 11: ESSEX & SUFFOLK WATER TOTAL BASE LEAKAGE INVESTMENT – 2025-30

ESW 2025-30 Leakage Base Expenditure (1.37Ml/d Reduction)	Opex (£m)	Capex (£m)	Totex (£m)
Prevent (rehab) - direct costs	-	26.3	26.3
Prevent (pressure management) - direct costs	-	-	-
Prevent (calm networks)- direct costs	-	-	-
Aware- direct costs	7.1	-	7.1
Locate- direct costs	7.3	2.0	9.3
Mend - direct costs	52.8	34.0	86.8
Indirect costs	13.5	-	13.5
Total	**80.7**	**62.3**	**143.0**

Base expenditure will not be sufficient to meet the reductions required to meet our long-term objective to reduce leakage by 50% by 2050.

Leakage – Enhancement Investment

To meet our long-term targets to reduce leakage by 50% by 2050, we have included enhancement expenditure in our business plan. This is based on the PR19 determinations made by the Competition and Markets Authority (CMA), which concluded that "[companies] which demonstrated that further enhancement allowances were needed to meet the ambitious leakage PCs should be allocated an allowance for the efficient costs of these enhancements". The CMA recognised the important principle that "a commitment to improve outcomes across the whole sector may require companies to spend more than in the past".

The CMA noted that before PR19, levels of leakage had remained relatively flat and so the base allowance for PR19 did not fund the 15% improvements targeted by Ofwat. In light of this, the CMA allowed enhancement expenditure to fund the costs of leakage reduction. The CMA allowed an adjustment based on an estimate of efficient costs for each company according to performance (higher unit costs for companies with lower levels of leakage).

We have applied the principles of this decision to calculate our requirement for enhancement expenditure in 2025-30. However, the CMA assumption of relatively flat leakage levels before 2020-25 will not apply in PR24 because the industry has made significant progress on leakage performance during 2020-25. So, we have adjusted our calculations to account for our 2020-25 leakage reductions to determine an appropriate starting point for 2025-30.

This calculation of the 'implicit allowance' in base funding shows that the enhancement costs to achieve our targets on leakage reduction are as set out below in Table 12. We describe the rationale and costing method for this in Section 4.1.1.

TABLE 12: CALCULATED 2025-30 ENHANCEMENT COSTS FOR LEAKAGE REDUCTIONS

Region	2025-30 Totex (£m)
Essex & Suffolk Water	17.50
Northumbrian Water	7.57
Total	**25.07**

Section 3.1.1 sets out more details about our assessment of options for leakage, and Section 4.1.1 sets out our approach to calculating costs.

Leakage – potential cost adjustment claim

As part of our leakage analysis, we considered if there should be a 'cost adjustment' to base models to take account of the higher costs of maintaining industry-leading leakage performance. This is different to enhancement investment which would reflect the cost of increased expectations of service levels across the whole industry (compared to historic allowances) – instead, a cost adjustment claim would reflect higher costs for specific water companies.

We concluded that although there is evidence for such a cost adjustment claim, the costs for Northumbrian Water would not meet the materiality threshold set by Ofwat – and so this is not part of our PR24 business plan. However, we summarise the rationale and the allowance we calculated to illustrate the additional cost pressure of maintaining leakage levels below the upper quartile in our Essex and Suffolk areas, where performance is at fronter levels.

The **CMA approach** can be summarised as:

- The CMA stated that (a) the high performing companies should be allowed a share of their stated base expenditure to achieve leakage targets, on the basis that much but not all of this expenditure will already be included in an efficient level of base costs; and (b) that the share to be allowed should correspond to the percentage by which each company outperformed the upper quartile (UQ) in 2019/20 and is projected to in 2024/25, which accounts for the relative levels of stretch in AMP7.
- The CMA therefore assumed that a) the base models only funded maintaining leakage at upper quartile levels; and that b) it is more costly to maintain leakage at levels below the UQ.
- The CMA calculated an adjustment by multiplying the spend the company had identified over the AMP to **maintain leakage** at current levels by the percentage outperformance of the upper quartile over the AMP.
- To identify the UQ level of leakage, they normalised on the basis of both properties and length of main by taking the geometric average.

In our analysis, we adopted the same principles, with the following adjustments:

- We included a symmetrical adjustment where our leakage levels are less than the UQ level in our North East area.
- We assessed the industry UQ based on the last 5 years of data (the basis used by Ofwat to set efficiency scores) as this is what is funded by base models. The CMA simply used 2019/20 data as leakage was relatively flat during AMP6.

We generated a combined measure of leakage using the geometric mean of the l/person/d and m3/km values (as shown on **Discover Water**, there are several methods that can be used to compare leakage performance). We used this to calculate the UQ over the last five years. In 2025-30 we will need to maintain the 2020-25 performance commitment, which we converted into the geometric mean value. We then compared this with UQ performance to derive the percentage difference in both our North East and Essex and Suffolk regions, to measure our performance beyond or below the UQ level.

From this, we derived an average cost, based on the last five years of APR data, for both maintaining and reducing leakage in each region. We than multiplied the maintenance costs by the percentage difference from UQ to calculate the required adjustments in funding - as per the CMA approach.

As shown in Table 13, this calculates an £18.38m uplift in the Essex and Suffolk area which is partially offset by a -£4.97m cost in our North East area, due to the lower level of leakage reduction performance. The 2025-30 total cost, derived in line with the CMA approach, is therefore £13.42m.

TABLE 13: CALCULATED 2025-30 COST ADJUSTMENT VALUE (NOT IN OUR BUSINESS PLAN)

Region	Annual Maintain Cost	AMP8 annual cost	AMP8 Cost (£m)
Essex & Suffolk Water	25.58	3.68	18.38
Northumbrian Water	18.09	0.99	-4.97
Total			**13.42**

In line with Ofwat's PR24 Methodology, Anglian Water **submitted a cost adjustment claim** to Ofwat reflecting its industry leading leakage position compared to other companies and referencing the additional costs incurred in maintaining leakage levels (that is, before any enhancement investment is applied).

Anglian Water's case, published on Ofwat's website in June 23, is also supported by the CMA's conclusions documented in the PR19 business planning process. In **its determinations**, the CMA says "*Since we conclude that there is a link between current performance on leakage and the costs to achieve that level of leakage, then those companies currently performing better than upper quartile are likely to be incurring more cost than will be reflected in the base cost models. To maintain their current level of performance, these high performing companies would be expected to incur costs that exceed the implicit allowance for leakage costs that is included in the base cost allowance*".

While both Anglian and our cost adjustment claim calculations apply the same principles and align with the PR19 CMA conclusions, Anglian Water's claim exceeds the cost adjustment materiality threshold, where ours does not.

2.3.4 Metering

We remain committed to achieving our long-term objective to reduce PCC within our supply areas to 110 l/person/d by 2050. During 2025-30, we need to reduce household PCC by 9.7% to work towards this long-term objective. In this section, we describe how we intend to use base and enhancement investment to achieve household PCC reductions in our North East and Essex and Suffolk areas during 2025-30.

Our metering programme includes the different types of metering activities shown in Table 14 below.

TABLE 14: RANGE OF METER INSTALLATION SCHEMES

Scheme	Description
Optant	Installation is on customer application only or where promotional activity is carried out to promote meters and increase customer applications. Some options also include a targeted approach to promoting meters to customers for example, areas of water poverty.
Replacement	Meters are replaced at point of failure or replaced proactively when financially viable to do so; where the customer is in the top 10% for PCC where a smart meter may support water consumption interventions; or in our leakiest DMAs where a high density of smart metering will provide valuable data insight.
Whole Area Metering (Street by street metering)	Meters are installed in existing boundary boxes at unmeasured customer properties, the boxes have been previously installed under other schemes for example, mains renewals. Customers are given comparison bill information to encourage switching to a measured tariff.
Compulsory Metering	All unmeasured customer properties have a meter compulsorily installed, where a meter installation is possible.

Household Metering - Base Investment

Our 2025-30 base investment is focused on household meter replacement. We aim to replace around 480,000 water meters across our customer base by 2030, including just over 245,000 in the North East and almost 236,000 in Essex and Suffolk as outlined in Table 15. Replacing around 480,000 water meters between 2025 and 2030 will improve our water consumption data, increase our understanding of customer side leakage, improve our understanding of our customers' water use behaviour, and enable us to inform more targeted water efficiency measures in future that effectively reduce PCC.

This volume of household meter replacement delivered through base investment will cover 45% of our 2025-30 metering programme and will require just under £65m of base investment (Table 15).

TABLE 15: BASE HOUSEHOLD METER REPLACEMENT IN NW AND ESW AREAS, 2025-30

Household Meter Replacement	Meter count	Cost (£m)
NW	245,128	28.097
ESW	235,869	36.261
Total	**480,997**	**64.358**

Section 4.1.2 explains the costs for metering in more detail.

The remainder of our 2025-30 metering programme will be covered by enhancement, as outlined below. This includes the incremental cost of replacing existing (non-smart) meters with smart meters, as shown in Table 15.

Household Metering – Enhancement Investment

The enhancement element of our 2025-30 metering programme covers the installation of new smart meters, and smart readers on replacement meters. We propose to continue to install only smart meters on all household premises through 2025-30. This is because with smart metering, we increase the volume of consumption data collected, from six monthly to 24 readings per day. This higher frequency of data collection brings many benefits, particularly a greater insight into consumption (particularly for currently unmeasured properties) and the ability to identify leaks earlier. The total volume of new smart meters we aim to install during 2025-30 makes up the remaining 55% of our 2025-30 programme.

Smart meters are either: smart active or smart capable. A smart active meter is connected to the network, and we are receiving up to 24 readings per day. Smart capable meters can be connected to the network at a later date but are not currently activated. In the short-term, meter readings are collected by driving or walking by. By 2030 we aim to link all installed smart capable meters to a wide area network. While metering for new-build properties (installed by developers) are not included in our WRMP options, these do also contribute to a large number of meter installations throughout the AMP.

Table 16 summarises our metering programme in our North East and Essex and Suffolk areas (with only enhancement costs shown – base costs for replacement meters is shown in Table 14). This shows the number of meters and costs for each type of installation, with compulsory metering only in our Essex and Suffolk areas and whole area metering only in our North East area.

TABLE 16: 2025-30 ENHANCEMENT HOUSEHOLD SMART METER INSTALLATIONS IN NW AND ESW AREAS

Household Metering	NW		ESW	
	Meter count	Cost (£m)	Meter count	Cost (£m)
New installation - Optants	79,968	39.755	1,300	0.425
New installations – whole area metering	18,750	1.892	-	-
New installation - Compulsory	-	-	83,795	46.586
Replacement	229,595	7.098	224,619	7.255
Total	**328,313**	**48.745**	**309,714**	**54.266**

Our **Northumbrian Water** (North East) region is not classified as seriously water stressed and has a water supply surplus. This means that we cannot consider compulsory metering. Instead, we intend to achieve almost 80,000 smart installations through engaging with our customers and encouraging households to switch to a smart water meter (that is, optant metering) and just under 19,000 through whole area metering (or WAM). Whole area metering means that we install smart meters for all properties in a given local area, allowing us to benefit from increased information about consumption and leakage, and provide information to households about the benefits of opting for a meter (these households would continue on their current unmetered tariffs unless they choose to switch to metered charging).

In our Northumbrian Water (North East) area, our business plan includes **£48.7 million** of enhancement investment for installation of new smart meters and addition of smart units as part of our replacement programme.

Our **Essex and Suffolk** areas are classified as seriously water stressed and have a forecast water supply deficit. In our WRMP, we considered compulsory metering within our metering options – and as a result, we will introduce compulsory metering in these areas with the installation of almost 88,000 smart meters for households (which are currently unmetered). Our customer engagement showed that although many customers supported compulsory metering as they understood the benefits and considered this to be a fair way of charging, many customers will be reluctant to accept a water meter if they do not already have one as this can increase water bills for households with high consumption. In our appendix A1 – customer affordability (NES02), we explain the measures we will take to support customers with this transition, including targeting customers for additional water efficiency and social tariff support.

In our Essex & Suffolk area our business plan includes **£54.3 million** of enhancement investment for installation of new smart meters and addition of smart units as part of our replacement programme.

2.3.5 Water Efficiency

To address our need to reduce household PCC by 9.7%, compared to 2019/20 3-year average, by 2030, we intend to deliver a range of water efficiency activities across AMP8 that will be funded by a combination of base and enhancement, as outlined below.

Household Water Efficiency – Base Investment

Our 2025-30 base investment is focused on household water efficiency activities and, alongside our metering efforts, will reduce PCC by 6.9% by 2030, compared to the 2019/20 three-year average. This is equivalent to 138.6 l/p/d (three-year average 140.2 l/p/d) by 2030.

Tables 17 and 18 provide a summary of the activities we intend to complete to achieve this in each region, some of which are a continuation of our 2020-25 programmes (as we described in Section 2.2.1), along with the expected water savings for each activity. We will carry out these activities alongside our continued input into the national campaign to increase awareness of water saving behaviours alongside Waterwise and other water companies. We will continue to enlist the input of behavioural science expertise to embed strong behaviour change principles in all water efficiency activities. Our PR24 Water Efficiency Strategy includes further detail on our 2025-30 base activities.

TABLE 17: AMP8 BASE HOUSEHOLD WATER EFFICIENCY ACTIVITIES (NORTH EAST)

Water Efficiency Activities	Quantity in AMP	Water Saving (Ml/d)	Water Saving (l/property/d)
Home Water and Energy Saving Retrofit Visits	28,580	1.71	60
Unmeasured Property Engagement – Retrofits	20,296	1.22	60
Leaky Loo Repairs via Education and Visits	22,217	4.78	215
Leaky Loo Repairs via Find and Fix (Bulk Supply)	7,406	1.59	215
Education	74,056	1.11	15
Digital Engagement	118,489	0.89	8
Toilet Rebates	7,406	0.38	52
Home Flow Restrictions	19,254	0.65	34
TOTAL		**12.33**	

TABLE 18: AMP8 BASE HOUSEHOLD WATER EFFICIENCY ACTIVITIES (ESSEX AND SUFFOLK)

Water Efficiency Activities	Quantity in AMP	Water Saving (Ml/d)	Water Saving (l/property/d)
Home Water and Energy Saving Retrofit Visits	19,660	1.18	60
Unmeasured Property Engagement - Retrofits	13,962	0.84	60
Leaky Loo Repairs via Education and Visits	15,283	3.29	215
Leaky Loo Repairs via Find and Fix (Bulk Supply)	5,094	1.1	215
Education	50,944	0.76	15
Digital Engagement	81,511	0.61	8
Toilet Rebates	5,094	0.26	52
Home Flow Restrictions	13,246	0.45	34
TOTAL		**8.49**	

Our base household water efficiency programme for 2025-30 will cost **£13.9m**, equivalent to £2.8m per year from base operational activity, an increase in base expenditure from 2020-25. A summary of the cost of each water efficiency activity in the Northumbrian and Essex and Suffolk regions are summarised in Table 19 below. We intend to spend £8.2m in the North East and £5.7m in Essex and Suffolk to deliver our base water efficiency programme.

TABLE 19: TOTAL WATER EFFICIENCY BASE INVESTMENT, 2025-30

Water Efficiency Activities	Northumbrian Water Opex (£m)	Essex & Suffolk Opex (£m)	Totex (£m)
Home Water and Energy Saving Retrofit Visits	3.11	2.14	5.25
Unmeasured Property Engagement - Retrofits	2.21	1.52	3.73
Leaky Loo Repairs via Education and Visits	0.25	0.17	0.42
Leaky Loo Repairs via Find and Fix (Bulk Supply)	1.21	0.83	2.04
Education	0.28	0.19	0.48
Digital Engagement	0.19	0.13	0.33
Toilet Rebates	0.44	0.30	0.75
Home Flow Restrictions	0.53	0.37	0.90
TOTAL	**8.23**	**5.66**	**13.89**

Household Water Efficiency – Enhancement Investment

To achieve our long-term targets to reduce household demand, we will need to reduce PCC by an additional 2.8% by 2030, compared to the 2019/20 three-year average. This means our enhancement investment will build on our base efforts and reduce PCC further from 138.6 l/p/d to 133.7 l/p/d by 2030, compared to the 2019/20 three-year average. This is equivalent to a reduction of 4.9 l/p/d. This will be funded by enhancement expenditure, reflecting the increase in statutory requirements from 2025 to meet the long-term demand reduction. The implicit allowance is zero, as our base expenditure on water efficiency will be higher in 2025-30 than historic levels.

Following a thorough and fully costed options appraisal in line with the **Water Resources Planning Guideline**, we identified six interventions to improve water efficiency and reduce PCC in households across our regions. Our six water efficiency options are outlined in Table 20 and Table 21 for Northumbrian Water and Essex and Suffolk respectively, along with the quantity and respective expected water savings. We describe the process in more detail in Section 3.1.3.

We will roll out our six water efficiency intervention options as part of our Smart Meter installation in each region, as it is efficient to deliver these options at the same time as our “metering visit” to customers. Smart meters are important for PCC reduction for two key reasons. Firstly, customers will have access to their consumption information and can make informed decisions on water use. Secondly, the smart meter acts as an enabler for us to target water efficiency interventions. For example, we intend to explore tariff options during 2025-30 following the roll out of our smart meters programme.

TABLE 20: ENHANCEMENT HOUSEHOLD WATER EFFICIENCY ACTIVITIES IN NORTHUMBRIAN WATER, 2025-30

Water Efficiency Activities	Quantity in AMP	Water Saving (Ml/d)	Water Saving (l/property/d)
Home Flow Restrictors	18,386	0.625	34
Home Doorstep Education - information	328,313	0.164	1
Home Doorstep Education - engagement	94,141	0.071	2.5
Leak Check and Repair	15,099	2.253	215
Water Saving Products Installation and Point of Install	70,605	0.353	10
Home Water and Energy Saving Visits	5,465	0.328	60
TOTAL		**3.79**	

TABLE 21: ENHANCEMENT HOUSEHOLD WATER EFFICIENCY ACTIVITIES IN ESSEX AND SUFFOLK, 2025-30

Water Efficiency Activities	Quantity in AMP	Water Saving (Ml/d)	Water Saving (l/property/d)
Home Flow Restrictors	17,985	0.611	34
Home Doorstep Education - information	321,159	0.161	1
Home Doorstep Education - engagement	100,111	0.075	2.5
Leak Check and Repair	15,795	2.357	215
Water Saving Products Installation and Point of Install	75,083	0.375	10
Home Water and Energy Saving Visits	5,528	0.332	60
TOTAL		**3.91**	

Our enhancement household wastewater efficiency strategy for 2025-30 will cost £7.6m, equivalent to approximately £1.48m per year. Table 22 summarises the costs of each water efficiency activity in the Northumbrian Water supply area and Essex and Suffolk supply areas. Any differences are due to rounding.

TABLE 22: TOTAL WATER EFFICIENCY ENHANCEMENT INVESTMENT, 2025-30

Water Efficiency Activities	Northumbrian Water opex (£m)	Essex & Suffolk opex (£m)	Totex (£m)
Home Flow Restrictors	0.43	0.42	0.86
Home Doorstep Education - information	0.07	0.07	0.14
Home Doorstep Education - engagement	0.92	0.98	1.90
Leak Check and Repair	1.34	1.40	2.74
Water Saving Products Installation and Point of Install	0.32	0.34	0.65
Home Water and Energy Saving Visits	0.65	0.65	1.30
TOTAL	**3.73**	**3.86**	**7.60**

Non-Household Water Efficiency – Enhancement Investment

Over 2025-30, we will extend our water efficiency activities to reduce non-household (business) demand. We intend to reduce non-household demand by 1.8%, compared to 2019/20, by 2030 (excluding growth) to work towards a 9% reduction by 2038. Details of our non-household water efficiency objectives are included in our **NHH water efficiency enhancement case** (NES36).

2.3.6 Link to long term delivery strategy

e) Is the need clearly identified in the context of a robust long-term delivery strategy within a defined adaptive pathway?

This investment is needed as part of the 'ensuring sustainable water supplies' investment area under our **Long-Term Strategy** (LTDS) core pathway. We have identified the need for this investment through the regional and company level water resource management planning process.

Demand management through reducing leakage, increasing metering and supporting greater water efficiency is a necessary and efficient part of our long-term plan to ensure we can continue to balance water supply and demand over the long-term.

This investment is needed to deliver our long-term targets from the **25-Year Environment Plan** and the rates of improvement supported by this case will allow us to follow the right trajectory to meeting the long-term targets that we set out in our long-term delivery strategy (NES_LTDS). That is, to:

- Reduce household water consumption (per capita consumption to 122 l/p/d by 2038 and 110 l/p/d by 2050).
- Reduce non-household water demand by 9% by 2038 excluding growth (from 2019/20 levels).
- Reduce leakage by 55% by 2050 in the North East (to 61.1Ml/d) and 40% in Essex and Suffolk (to 40.1Ml/d) so that we achieve the national target of 50% companywide (from 2017/18).

This investment is also needed to deliver the long-term target from the WRMP to:

- Make sure all household customers continue to have a sufficient and secure supply of water ("plan to be resilient to 1 in 500-year drought").

We consider this is low / no regret investment because it is needed:

- to meet statutory requirements in 2025-30, and
- to meet Ofwat's high common reference scenario for water demand.

We therefore consider this investment is necessary in 2025-30 to deliver our long-term delivery strategy. This investment represents a step along the path towards delivering our long-term targets and so we expect further investment to be required at least between 2030 and 2050 to continue to reduce leakage, increase metering and promote water efficiency. This would be required under any future scenario and so is included in our core pathway in our WRMPs and our long-term delivery strategy.

2.4. CUSTOMER SUPPORT FOR THE NEED

f) Where appropriate, is there evidence that customers support the need for investment (including both the scale and timing)?

Our **customer insight summary** (NES43) summarises customer views on smart metering, optant metering, compulsory metering, water efficiency and leakage.

Leakage reduction is a high priority for customers (**prioritisation of common PCs**, NES44), with evidence that customers wanted us to be more ambitious in this area compared to our PR19 long-term target. We do not have strong evidence that customers are willing for their bills to increase to fund reductions in leakage, with some willingness to pay recorded in our WRMP research but the majority of customers were not willing to pay anything towards improved performance when asked about other priorities at the same time.

Reducing per capita consumption is a low priority for customers (**prioritisation of common PCs**, NES44). They are unwilling to fund water efficiency initiatives in homes or businesses, and many want a long-term target in line with our previous long-term target (**118 l/p/d by 2040**).

When metering is presented as part of an overall water efficiency package (such as in our pre-acceptability research in 2023), customers consider this a high priority – but when tested in isolation, customer support is lower. Customers recognise the benefits of monitoring water usage and consider compulsory metering fair, but some feel that individuals should have freedom of choice. Customers suggested that educating customers on the benefits of reducing water demand and communicating in a transparent, positive way may help customers become more accepting of this change. Most customers support optant metering.

WaterWise research showed that there is an encouraging level of public receptivity towards smart water metering when people are aware of its benefits (we include this research in our triangulation in our **customer insight summary**, NES43). Some customers are concerned about technology and accessibility issues.

In July 2022 we carried out customer research into demand management in our North East and Essex and Suffolk areas through online and face-to-face surveys. In the North East, we reached 1740 household customers, including 428 considered vulnerable (for this purpose, customers who are on the Priority Services Register or eligible for it; who struggle to pay bills; or who are unemployed with state benefits only), and 118 future customers.

In Essex and Suffolk, we reached 1,095 household customers, including 271 considered vulnerable, and 117 future customers. The majority of respondents (65%) in the North East were not aware that the North East of England may have water stressed areas in the future. However, our more vulnerable customers were most aware of this. Similarly, the majority of respondents (68%) were not aware that the Essex and Suffolk areas are water stressed; our customers in Suffolk appeared more aware than those in Essex.

In our pre-acceptability testing, customers ranked 'metering, encouraging water efficiency and tackling leakage to ensure we have enough water in the future' as one of the most important areas. Reducing leakage also had strong support from non-households and retailers (though not water efficiency). In our WRMP research, companies preferred reducing company-side leakage to other options (84% and 86% of participants). Customers wanted us to be more ambitious on leakage, but we do not have strong evidence that customers are willing for their bills to increase to fund reductions in leakage (**enhancements and other service area summaries**, NES43).

In our Affordability and Acceptability qualitative research, customers thought that this was an important area of investment, and particularly focused on leakage. In Essex and Suffolk, there was some scepticism about metering. Customers supported our medium phasing option (used in our business plan) and did not want to go further to reduce leakage or install more meters. We explained that our 'low' investment would mean increased risk of being forced to take more water from rivers to supply customers or needing new water supplies. We also presented a 'high' option to go further, either by accelerating our leakage programme or installing more meters to get ahead of our targets. Customers supported the medium option because they expected us to remain compliant with Government targets, but did not see the need for higher water efficiency (especially in the North East). Customers also said that the medium option did not 'go beyond and burden people unnecessarily'.

Customers considered this 'an important area of investment, both in terms of metering and leakage reduction' (**A&A qualitative research report**, NES49). Respondents across both regions also talked about customer education regarding water efficiency as an important aspect of the introduction of universal metering. Some customers, particularly in Essex and Suffolk, considered that we should invest more now to reduce investment in future. Customers challenged us to further increase our leakage performance without increasing bills.

Our WRMP sets out our rationale for choosing a mixture of supply and demand solutions, based on our customer research throughout the development of our WRMP. With separate statutory targets for leakage reduction and per capita consumption, there is limited scope for trade-off between these – so metering and water efficiency activities are still needed, alongside reducing leakage in both company networks and customer supply pipes.

In response to stakeholder and customer feedback, we increased our long-term leakage commitment in the North East from 50% to 55% (with 40% in Essex and Suffolk). Customers supported our plan for both water supply and demand options in the Affordability and Acceptability Testing qualitative research, and so we have included this in our WRMP and business plan. We had already tested our leakage reduction target with customers **in December 2022**, where Essex and

Suffolk customers had mixed views but were slightly in favour of using a 40% rather than a 50% reduction target in this area (due to Essex & Suffolk Water outperforming the current target).

We have developed our compulsory metering programme further in response to customer feedback, allowing for increased customer engagement and activities such as water efficiency and customer supply-side leakage reduction built in – to support a more complete package of leakage, water efficiency, and metering together.

Our customer evidence and rationale are set out in more detail in our **line-of-sight document** (NES45) and customer engagement summaries.

3. BEST OPTION FOR CUSTOMERS

a) Has the company considered an appropriate range of options to meet the identified need?

Our WRMP considered the options in detail (see our **revised draft WRMP for the North East** and our revised draft WRMP for Essex and Suffolk). We assessed these options using our WRMP24 planning objectives:

- Achieve a secure, resilient and sustainable supply of water for our customers, moving to a 1 in 500 level of resilience by 2049/50.
- Protect and enhance the environment, making sure our abstractions are sustainable both in the short and long term.
- Reduce leakage from our network and from customer's homes, contributing to a national target of 50% reduction from 2017/18 levels by 2049/50.
- Reduce household customer demand to 110 l/head/day by 2049/50.
- Reduce non-household customer demand by 9% by 2037/38 (excluding growth); and
- For all our meters to be smart meters by 2035.

Our WRMP explains how we developed and aligned these objectives with our own purpose, vision and values; our current performance commitments and ODIs; the **Water Resources North** regional plan objectives; Government expectations for WRMP24; and the overall requirements of the PR24 Water Resources Planning Guideline.

The feedback we have received on our WRMP from regulators and stakeholders underlines the significant investment in behaviour change needed for all water users for demand management to be successful. Comments received highlight that the roll out of smart meters may help to identify where efforts need to be targeted, but behaviour change takes time and considerable resource. It needs dedicated teams to be out working in communities and support individuals to understand why making changes to their water use is so important. We have included these engagement costs as part of our overall smart metering programme (see Table 44).

Section 3.1 below summarises the options we considered for each of leakage, metering and water efficiency as part of our WRMP. Section 3.2 goes on to explain how we estimated costs and benefits and how we selected our preferred option.

3.1. DEMAND MANAGEMENT OPTIONS

3.1.1 Leakage

Our long-term leakage aspirations were informed by the **Preparing for a Drier Future** report from the National Infrastructure Commission (NIC), which was endorsed by Defra and a key component of the WRMP guidelines. This includes the industry commitment to reduce leakage by 50% by 2050, from 2017-18 levels. For 2020-25, we also

implemented the new Ofwat reporting guidelines, published in March 2018, which set out a consistent methodology for calculating leakage across all companies.

In line with the work done by the regional water resource groups, we modelled three leakage scenarios as a percentage reduction from the 2017/18 performance, as shown in Table 23. For our draft WRMP, we looked at 50% leakage reduction in the North East, but following feedback from customers, stakeholders, and the Water Forum we increased this to 55% for our revised WRMP.

TABLE 23: THE THREE LEAKAGE SCENARIO OPTIONS

Scenario Options		Description
1	High demand	30% reduction in leakage by 2050
2	Medium demand	40% reduction in leakage by 2050
3	Low Demand	50 or 55% reduction in leakage by 2050

Leakage which occurs on customer supply pipes is included within the total leakage figure but is reported separately within the WRMP tables. We estimated this volume based on the leakage allowances we apply to customer bills, and it currently accounts for about 20% of the reported leakage. For the WRMP forecast we have applied an equivalent percentage reduction in household supply pipe leakage to each of the three leakage scenarios (see our WRMP for more details of this analysis).

For each water resource zone, we compared the different forecasted leakage scenarios against an estimate of the Unavoidable Annual Real Losses (UARL). Any leakage up to this UARL point can be found and repaired through a combination of fixed network acoustic logging and the deployment of smart meters. We then analysed the data for each DMA to compare the current average leakage values against the minimum level that can be achieved, to prioritise where the loggers should be deployed first. We then costed this based on: the number of loggers required per AMP to monitor the DMAs; the number of additional technicians required to respond to these alarms; and the number of additional repairs to deliver the leakage reduction in each scenario.

In every new AMP the costs accumulate because all the investment to reduce leakage in the previous AMP will need to continue just to maintain leakage at the lower level. For example, acoustic loggers have an expected battery life of five years and will need to be replaced to keep the smart network operational. We would then need additional funding on top of this to make the next step reduction in leakage.

To get beyond the UARL, the only other available option is to replace a proportion of the distribution network with new pipes – that is, leakage-focused mains replacement. This is much more expensive but has longer term benefits including for asset health. Our **asset health case** (NES35) looks at this in more detail and explains why mains replacement to tackle leakage is not necessarily the same as to address asset health – and also shows how mains replacement in 2025-30 is funded through base expenditure, leakage enhancement investments in Suffolk, and our **enhancement case for asset health** (NES35).

Northumbrian Water – North East Leakage Planning Scenarios

In WRMP24 there are some minor changes to the leakage figures in WRMP19 due to the final impact of moving to the consistent reporting guidelines in 2020/21. There is also a small change to the baseline position that was previously applied, moving from the 2019/20 PC to the three-year average performance between 2017/18 and 2019/20.

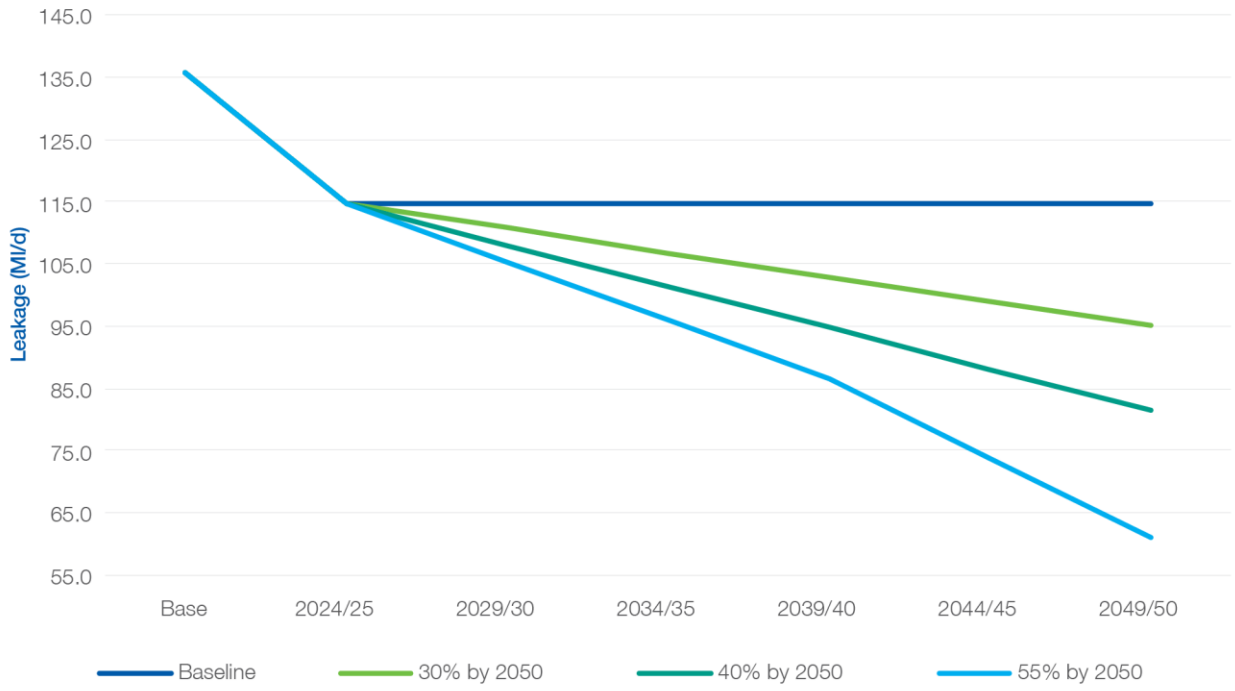
In WRMP19 we committed to a 10% reduction per AMP up to 2045. If we had extended this approach by a further AMP, then the 50% reduction would have been achieved by 2050 – so the new industry targets are consistent with our WRMP19 assumptions for reducing leakage. In WRMP24 we have replaced this with a glidepath to hit the different percentage reductions in 2050 from the 2019/20 base position.

We calculated the leakage figures for our WRMP24 by applying the different percentage reductions in 2050 to the baseline position (which is the three-year average between 2017/18 and 2019/20) as shown in Table 24 and FIGURE 2.

TABLE 24: NORTHUMBRIAN WATER LEAKAGE SCENARIO FIGURES TO 2050

NW Leakage (Ml/d)	Base	2024/25	2029/30	2034/35	2039/40	2044/45	2049/50
Baseline	135.8	114.6	114.6	114.6	114.6	114.6	114.6
30% by 2050	135.8	114.6	110.7	106.8	102.9	99.0	95.1
40% by 2050	135.8	114.6	108.0	101.3	94.7	88.1	81.5
55% by 2050	135.8	114.6	105.2	95.9	86.6	73.8	61.1

FIGURE 2: NORTHUMBRIAN WATER LEAKAGE SCENARIO FIGURES TO 2050



Source: Northumbrian Water WRMP24

For our draft WRMP24 we selected the 50% reduction by 2050 for our preferred plan for our North East area to align with the national commitment. We have reviewed this as part of our final WRMP submission and now plan a 55% commitment for the North East area to move us closer to the industry upper quartile and to remain on track to achieve the 50% reduction target across our company area (both North East and Essex and Suffolk areas combined) in support of the industry 50% leakage reduction by 2050 commitment. Our customers and Water Forum challenged us to go further than 50% reduction in leakage in the North East, and so this increased long-term target is supported by our customer engagement (see our **line-of-sight document**, NES45).

In our **revised WRMP**, we considered how this would be delivered in practice. We considered a 'straight-line' profile to the 55% reduction, or a 'glidepath' that would mean an increased pace of improvement from 2040. We selected the glidepath profile because:

- Current rates of leakage reduction are very challenging to meet, and further reductions will become more difficult and more expensive to deliver in future (as we try to reduce leakage below the UARL). There are constraints around deliverability of increased targets in 2025-30.
- It would be more expensive to reduce leakage more quickly and then maintain this for the remaining planning period. The whole life costs of doing this would be higher, with minimal additional benefits of achieving this target earlier.
- There is some uncertainty about how the long-term targets can be achieved beyond the UARL. Our long-term delivery strategy shows that capital maintenance will need to increase over time, which will have an impact on leakage reduction too. An iterative approach will help us to learn an improve our assumptions over time.

Our WRMP also looked at an increased pace of leakage reduction to hit interim targets for 2032. Our WRMP concluded that this was not feasible because it would require double the volume of leakage reduction, with a rate of reduction higher than has ever been achieved. This would have meant almost £200m of extra lifetime totex to achieve the same end-point of 55% leakage reduction, including an additional £24.5m of totex in 2025-30 (in 2021/22 prices; see Table 35 of our North East WRMP).

Essex and Suffolk Leakage Planning Scenarios

For 2020-25 we went beyond the Ofwat requirement to reduce leakage by 15% in 2024/25 from our base position and committed to a 17.5% reduction. This means that 2019/20 was the last year that we used the Sustainable Economic Level of Leakage (SELL) as a target.

Our baseline performance for WRMP24 is to maintain this lower level of leakage for the whole of the planning period. Future base funding will need to be sufficient to prevent deterioration of our existing network and to account for the additional growth in the network. We used the 2017/18 leakage figure as the baseline for our WRMP24, in line with the WRMP24 guidelines. The 2017/18 value is higher than the three-year average so the 2050 target will increase slightly.

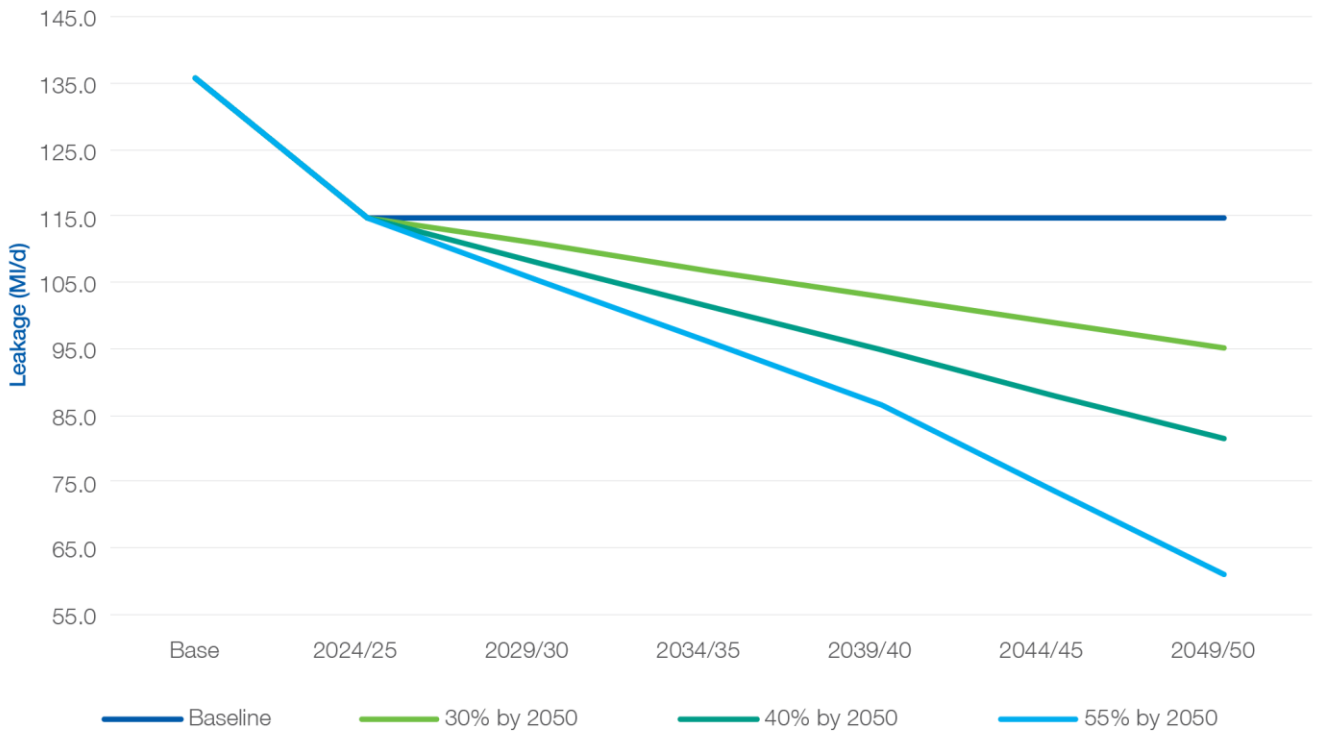
In WRMP19 we committed to a 10% reduction per AMP up to 2045 (across both areas together). If we had extended this approach by a further AMP, then the 50% reduction would have been achieved by 2050 – so the new industry targets are consistent with our WRMP19 assumptions for reducing leakage. In WRMP24 we have replaced this with a glidepath to hit the different percentage reductions in 2050 from the base position.

We have calculated the leakage figures by applying the different percentage reductions in 2050 to the baseline position which is based on the three-year average between 2017/18 and 2019/20, as shown in Table 25 and FIGURE 3.

TABLE 25: ESSEX & SUFFOLK WATER LEAKAGE SCENARIO FIGURES TO 2050

NW Leakage (Ml/d)	Base	2024/25	2029/30	2034/35	2039/40	2044/45	2049/50
Baseline	66.9	53.8	53.8	53.8	53.8	53.8	53.8
30% by 2050	66.9	53.8	52.4	51.0	49.6	48.2	46.8
40% by 2050	66.9	53.8	51.1	48.3	45.6	42.9	40.1
50% by 2050	66.9	53.8	49.7	45.7	41.6	37.5	33.5

FIGURE 3: ESSEX AND SUFFOLK WATER LEAKAGE SCENARIO FIGURES TO 2050



Source: Essex & Suffolk Water WRMP24

A 50% reduction in leakage in Essex and Suffolk is more difficult – and more expensive – to achieve than the industry average. This is because Essex & Suffolk Water performs in the top quartile in leakage performance (see Figure 1 in section 2.2.1) and is closer to the Unavoidable Annual Real Losses (UARL) threshold. This means that under both the 40% and 50% reduction scenarios, we would need to replace mains to reduce leakage further.

Our preferred plan is to aim for a 40% reduction by 2050 but we will continue to review the options to achieve a 50% reduction within our adaptive plan. A 40% reduction in Essex and Suffolk will deliver a leakage performance below the national 50% target, but delivering 55% in the North East will ensure we deliver the 50% target across our combined area.

How can we achieve leakage reductions?

There are five activities we can carry out to reduce leakage:

- **Additional find-and-fix resources**. We can increase our capacity to find and fix smaller volume leaks. This requires additional leakage technicians to pinpoint these leaks, and more maintenance teams to carry out the repairs.
- **Investment in smart networks / innovation**. We can take advantage of new and evolving technology to support find-and-fix activities. For example, satellites, digital twins, and acoustic loggers all aim to reduce the time spent locating leaks to maximise the output from our leakage technicians. We are also working in partnership to develop a 'no dig' repair solution which will enable pipe repairs to be carried out without any excavation.
- **Deployment of smart meters**. Our smart metering programme is a key tool in the battle against leakage. Not only do they identify customer side leaks very quickly, but they also improve our understanding of customer consumption and customer side leakage which will improve the accuracy of our calculations. This, in turn, improves the efficiency of our targeting process and influences our future strategy for reducing leakage in the most cost-effective way.
- **Creation of upstream flow balances**. Similar to the benefit of smart metering for customer-side leakage, upstream flow balances help us to better understand leakage on the strategic network. This is primarily about quantifying the amount of leakage we have on our trunk mains, and then we can prioritise the areas that need further leak detection or leak repairs.
- **Mains renewal**. As the network gets older and the condition of pipes deteriorate, then more failures will occur. The highest risk pipes, according to our deterioration models, need to be replaced at an appropriate rate to maintain performance. Severe weather events like hot dry summers, or a freeze/thaw in winter, can significantly affect certain pipes in certain soils.

Our base expenditure on leakage currently includes all of these options except mains renewal (which is not specifically targeted at reducing leakage, but instead at improving asset health).

The need for mains renewal to tackle leakage – determining the UARL threshold

Leakage can be reduced through increased investment or efficiency in existing activities. In 2.3.3, we explained our expectations for increasing our base investment in 2025-30, and the requirement for enhancement expenditure to fund activities beyond the level implied by base allowances (that is, the implicit allowance).

Leakage reduction activities are approximately linear in driving performance – that is, increased activity for find-and-fix and monitoring the network means a linear increase in costs. However, this is only the case to a theoretical minimum level of avoidable leakage – the Unavoidable Annual Real Losses (UARL) threshold. Beyond this point, there are no additional benefits to increasing find-and-fix activities and so mains replacement is required to reduce leakage further.

The UARL calculation is an internationally recognised methodology, used across Europe as part of the LEAKS software to calculate water balances and leakage performance indicators. This uses estimates of distribution and supply pipe losses, as well as information about mains length and billed properties, to estimate the minimum leakage that can be achieved in each of our water resource zones.

This analysis shows that one of our water resource zones, North Central (in Suffolk), already has leakage below the UARL (the UARL for North Suffolk is 4.12 Ml/d). Our other water resource zones across both the North East and Essex and Suffolk will not meet this target until 2040, based on our glidepath to our long-term leakage targets.

This means that in North Central, where we are targeting a 0.15 Ml/d leakage reduction by 2030 as part of our overall leakage reduction target (or a 5.4% reduction), we will need to spend £13.2m to replace 65.8km of mains in this area.

This is a much higher unit rate than in other areas, where find-and-fix activities can drive leakage reductions for now at a cheaper rate. However, to meet long-term leakage reduction targets we will need to replace a proportion of mains across all of our areas eventually.

This analysis shows why a lower long-term target of 40% for leakage reduction in Essex and Suffolk is appropriate, as further mains replacement is not necessarily good value for customers (at least, for the purpose of reducing leakage alone). We could choose not to reduce leakage further in the North Central water resources zone and increase find-and-fix elsewhere, but we decided to include this investment in our leakage plan because:

- The North Central water resources zone is one of the areas where we have a supply deficit, with requirements to reduce abstraction and pressures from increased demand from food processing and cosmetics businesses (see our revised WRMP for details). In particular, abstraction in this area can place pressure on the River Waveney and the Ormesby Broad. Most of our groundwater sustainability reductions for 2030 are required from this area.
- This zone is also where we anticipate that future sustainable abstraction reductions could have the most impact. Although our water supplies investment (NES14) includes connectors to provide resilience across our Suffolk zones, significant future investment is likely to be needed in this zone (including leakage reduction).
- We know that mains replacement for leakage reduction will be needed in future across the sector – but this has not been significantly tested (as this is not the main approach for reducing leakage). Including this investment in our 2025-30 business plan can support us and other water companies in understanding and improving the effectiveness of mains replacement for leakage reduction in future. As we describe in 2.2.1, we are among the sector leaders in

collaboration and innovation on leakage, and the North Suffolk zone is one of very few areas where the UARL has already been reached.

This analysis also informs our decision to move to an 'external first' policy for new smart meter installations from 2025 (see 3.1.2). This means we can deliver some leakage reductions from customer supply pipes in 2025-30, which would not otherwise be detectable with an internal installation. But as we approach the UARL for other water resource zones, customer supply pipe leakage will become an increasingly important and more efficient method for reducing leakage further. If we installed meters internally, we would have to reposition these meters in future to be able to tackle customer supply pipe leakage – so incurring more whole-life costs.

3.1.2 Metering

To reduce water demand, we must increase the coverage of water meters within our areas. This is widely recognised as an effective measure for reducing water demand – for example, the National Metering Trials in the 1980s and 1990s found that this reduced demand by 12%; and more recent research based on Southern Water's metering programme shows that this could be as much as 22%.

Accelerating the roll-out of meters is an essential part of our overall water efficiency strategy to reduce PCC, and to achieve the industry target of 110 l/p/d by 2050.

Our strategy recognises and embraces the benefits of smart meters. We plan to make all new meters smart and accelerate the conversion of existing meters by 2035 to provide customers with ready access to consumption data to enable more informed water consumption decisions in line with the energy sector and regulatory expectations.

Since 2020, we have only installed smart meters at household premises – and we plan to continue this through 2025-30. Although every household meter now installed is smart, these are split into two categories: smart capable, and smart active. A smart active meter is connected to the network and provides hourly data; smart capable meters have the ability to be connected to the network at a later date but are not currently activated. This is because the meter is located in an area where the supporting infrastructure has not yet been installed. From 2025, all newly installed meters will be smart capable (and so none will be basic/AMR).

Estimated benefits of metering

Our WRMP technical reports estimate the benefits of metering on reducing demand. The National Infrastructure Commission 2018 review of drought resilience states that standard 'dumb' meters can reduce average consumption by 15% and smart meters by 17%. Our neighbouring companies to our Essex and Suffolk area, Thames Water and Anglian Water, have attributed an average saving of 3% specifically to the extra insights into consumption that is received

from smart meters compared to dumb meters (see link above). We have used an estimate of 3% saving on consumption for smart meters compared to dumb meters to align with the experiences of neighbouring water companies (TABLE 26).

As smart meters are a relatively new introduction the longevity of smart meter behavioural change, savings has yet to be confirmed. Therefore, we assume this percentage saving of 3% will remain constant to at least 2030.

TABLE 26: ESTIMATED PERCENTAGE SAVINGS FROM METERS

Meter installation	North East %, (lpd)	Essex %, (lpd)	Suffolk %, (lpd)
Optants	15.1% (28.3)	20.8% (38.3)	17.6% (28.8)
Compulsory	7.1% (11.7)	10.0% (17.1)	10.0% (14.7)
Smart upgrade	3.0% (4.9)	3.0% (5.1)	3.0% (4.4)

Northumbrian Water – North East Metering Scenarios

In our revised WRMP, we looked at five different options for household metering demand management, which combine together the metering schemes we described in Table 13 above. These are summarised in Table 27, in order of increasing impact on water demand reduction. We describe the impact each scenario has on water demand reduction in the North East in **our WRMP24** technical report.

TABLE 27: THE FIVE METERING SCENARIO OPTIONS FOR OUR NW AREA

Option name	Option
Option 1:	In Option 1 we will only have in place optant and reactive replacement schemes. This scenario assumes that there is no longer an ambition for all meters to be smart 'enabled' and as such there is no proactive replacement scheme. There is no promotional activity regarding meters and no selective installation schemes.
Option 2 (preferred option)	Option 2 includes an enhanced optant scheme with campaigns to promote meters. There would also be a 'whole area metering' programme in place, where we would install meters in existing boundary boxes, however, the customer will not automatically be charged by the meter. These customers would be given comparison bills to enable them to decide whether a measured tariff would be beneficial to them. If a customer opts to switch to a measured tariff, they will have the same rights to revert to an unmeasured tariff within two years of them switching, as a customer applying for a meter would. Any change in occupation on these premises that have not switched to the measured tariff, will be automatically charged by the meter when a new occupier moves in. As well as the reactive replacement programme, Option 2 also includes a proactive replacement programme to replace all existing basic/AMR meters with smart 'enabled' meters i.e., meters which send hourly readings via a communications network. Meters under this scheme are replaced when financially viable to do so over AMP 8 and AMP 9 to reach the stated ambition of all meters being smart 'enabled' by 2035.
Option 3:	Option 3 is identical to Option 2, other than the proactive replacement programme is accelerated to achieve a fully smart meter portfolio by 2030. This is to achieve the demand reduction benefits of smart enabled meters sooner.
Option 4:	Option 4 includes a targeted enhanced optant scheme, whereby customers who would benefit financially from a switch to measured billing, will be proactively contacted to encourage sign up, as well as targeted campaigns to DMAs where the supply demand situation would benefit from a higher percentage of meter penetration. As well as the reactive replacement programme, Option 4 also includes a proactive replacement scheme to replace existing meters with smart 'enabled' meters i.e., meters which send hourly readings via a communications network. Meters under this scheme are replaced when financially viable to do so over AMP 8 and AMP 9 to reach the stated ambition of all meters being smart 'enabled' by 2035.
Option 5:	Option 5 is identical to Option 4, other than the proactive replacement programme is accelerated to achieve a fully smart meter portfolio by 2030. This is to achieve the demand reduction benefits of smart enabled meters sooner.

Source: Our **revised WRMP**, Table 36

Our revised WRMP modelling showed that our preferred household metering option for the North East area is option 2. This would support us delivering the national targets for demand reduction at the lowest cost. Although our forecast meter penetration in the North East remains lower than other companies, the North East is not classified as seriously water stressed and has a surplus of water provided by Kielder reservoir and the Tyne Tees Transfer. There is no need to consider higher levels of enhancement expenditure to deliver compulsory metering (and we could not do this in any case).

However, optant numbers have started to decline. This means that Option 1 would not be sufficient to deliver the national targets for demand reduction, so we will introduce enhanced optant and whole area metering schemes to increase meter penetration.

We are selected an 'external first location policy for our Optant Metering scheme, to maximise the benefits of having smart meters installed, particularly identifying supply pipe leakage earlier than with basic/AMR meters. We include more information about our External First policy below.

Essex and Suffolk Metering Scenarios

In our revised WRMP, we looked at six different options for household metering demand management, which combine together the metering schemes we described in Table 27 above. These are summarised in Table 28, in order of increasing impact on water demand reduction. We describe the impact each scenario has on water demand reduction in Essex and Suffolk in our WRMP24 technical report.

These scenarios are similar to those for our North East area, with the addition of compulsory metering.

TABLE 28: THE SIX METERING SCENARIO OPTIONS FOR OUR ESW AREA

Option name	Option description
Option 1:	Optant and reactive replacement schemes are in place. This scenario assumes that there is no longer an ambition for all meters to be smart 'enabled' and as such there is no proactive replacement scheme. There is no promotional activity regarding meters and no selective installation schemes. The whole area metering scheme currently in place in AMP 7 is not continued, however, there will still be customers who have had a meter installed as part of this scheme who choose to switch to measured billing, as well as customers moving into a property with a whole area meter installed who will automatically switch to measured billing at point of moving. The figures assume 50% of customers with a whole area meter installed in 2024/25 will switch to measured. Any change in occupation on these premises that have not switched to the measured tariff, will be automatically charged by the meter when a new occupier moves in.
Option 2:	This scenario is the same as Low impact with the addition of the whole area metering scheme and a proactive meter replacement scheme split over AMP 8 and AMP 9 to achieve the ambition for all meters to be smart enabled by 2035.
Option 3:	This scenario is identical to Medium Impact 1 in terms of schemes other than the proactive replacement programme is accelerated to achieve a fully smart meter portfolio by 2030. This is to achieve demand reduction benefits of smart enabled meters sooner.
Option 4:	This scenario is identical to Medium Impact 2 in terms of schemes and timescales to fully smart enabled meter portfolio. Medium Impact 3 includes an enhanced meter optant programme which will use promotional campaigns to encourage customer applications and increase meter penetration.
Option 5: (preferred option)	High impact scenarios include the addition of a compulsory metering scheme whereby all meterable properties will be selectively metered. There is therefore no standalone 'whole area metering' scheme, however, any customer who has previously had a meter installed as part of this programme and has chosen not to switch to measured bills will be automatically moved onto a measured tariff. Both the compulsory installation scheme and the proactive replacement scheme will be spread across AMP 8 and AMP 9 to achieve the ambition of all meters being smart 'enabled' by 2035. There will still be an element of promotional activity in an enhanced optant scheme to encourage customer sign up to meter installation.
Option 6:	This scenario is identical to high impact 1 other than the compulsory installation and proactive replacement schemes are accelerated to achieve a fully measured and fully smart portfolio by 2030 so that demand reduction benefits can be achieved sooner. Also, in this scenario there is no enhanced optant programme as by 2030 all properties will have a meter anyway as part of the compulsory installation programme. In Essex and Suffolk separate metering strategies have been run since 2003/04.

Our preferred option for our Essex and Suffolk areas of supply is option 5. This is because we forecast a supply deficit in both areas by 2030 and have had slower progress with optant metering during 2020-25. We discounted Option 6 during our WRMP process because this pace of metering is undeliverable from a supply chain and resource position.

Meter Penetration

Our WRMP assessed the meter penetration in each of our Water Resource Zones under each of the scenarios listed in tables 27 and 28.

In our North East area, our preferred option means that we would have 71% of our households metered by 2050. We summarise the meter penetration for each of our options in Table 29 below. Our WRMP24 includes more information about this.

TABLE 29: THE GLIDEPATH TO FULL METER PENETRATION IN NW AREA BY 2050

Metering Scenario	Water Supply Zone	AMP6 2020/21	AMP7 2024/25	AMP8 2029/30	AMP9 2034/35	AMP10 2039/40	AMP11 2044/45	AMP12 2049/50
1	Berwick	38%	44%	54%	59%	63%	66%	68%
2		**38%**	**44%**	**55%**	**62%**	**66%**	**69%**	**70%**
3		38%	44%	56%	61%	65%	68%	70%
4		38%	44%	57%	64%	68%	71%	72%
5		38%	44%	58%	64%	68%	71%	73%
1	Kielder	41%	47%	54%	60%	64%	67%	68%
2		**41%**	**47%**	**55%**	**63%**	**67%**	**70%**	**71%**
3		41%	47%	56%	61%	65%	68%	70%
4		41%	47%	57%	64%	69%	72%	73%
5		41%	47%	58%	65%	69%	72%	73%

In our Essex and Suffolk areas, we will be much closer to all households having a water meter by 2030. There will still be some properties in our supply area that are unable to be metered due to the high cost (for example, associated with their remote location). We summarise the meter penetration for each of our options in Table 30 below. Our WRMP24 includes more information about this.

TABLE 30: THE GLIDEPATH TO FULL METER PENETRATION IN ESW AREA BY 2050

Metering Scenario	Water Supply Zone	AMP6 2020/21	AMP7 2024/25	AMP8 2029/30	AMP9 2034/35	AMP10 2039/40	AMP11 2044/45	AMP12 2049/50
1	Essex	63%	71%	79%	81%	83%	84%	85%
2		63%	71%	79%	82%	84%	86%	87%
3		63%	71%	80%	82%	84%	85%	86%
4		63%	71%	80%	83%	85%	86%	88%
5		**63%**	**71%**	**85%**	**96%**	**97%**	**97%**	**97%**
6		63%	71%	94%	96%	97%	97%	97%
1	Blyth	69%	74%	78%	79%	80%	80%	81%
2		69%	74%	81%	89%	90%	91%	91%
3		69%	74%	84%	86%	87%	87%	88%
4		69%	74%	85%	90%	91%	92%	92%
5		**69%**	**74%**	**84%**	**95%**	**96%**	**96%**	**96%**
6		69%	74%	94%	96%	96%	96%	96%
1	Hartismere	67%	71%	75%	76%	77%	78%	79%
2		67%	71%	78%	87%	89%	89%	90%
3		67%	71%	82%	84%	85%	85%	86%
4		67%	71%	83%	88%	90%	90%	90%
5		**67%**	**71%**	**83%**	**94%**	**96%**	**96%**	**96%**
6		67%	71%	93%	96%	96%	96%	96%
1	Northern Central	70%	73%	77%	78%	79%	80%	80%
2		70%	73%	80%	88%	90%	91%	91%
3		70%	73%	84%	85%	86%	87%	87%
4		70%	73%	84%	90%	90%	91%	91%
5		**70%**	**73%**	**84%**	**95%**	**96%**	**97%**	**97%**
6		70%	73%	94%	96%	96%	97%	97%

Change to an External First Metering Policy for 2025-30

From 2020, we changed our meter location policy to favour internal installs instead of external street digs. This decision was largely driven by cost and was adopted for all new domestic optant installations.

The cost of installing a new meter varies considerably across install locations – from £165 for meters installed inside customer properties (internal install) to more than £650 for meters installed outside the property at the boundary (see section 4.1.2 for more details on costs).

However, external installations have more benefits. This includes:

- **Reductions to leakage.** Our WRMP shows that external meter installations would mean a reduction in supply pipe leakage of 2.33 Ml/d in the North East, and 1.96 Ml/d in Essex and Suffolk. This is because we can use smart metering data to identify both plumbing losses and supply pipe leakage (whereas if this is internal, we can only detect plumbing losses). We estimate that customer supply pipe leakage is about 10% of all water input into our network.
- **Least disruption to customers**. This means that we do not need an appointment to fit a meter, and we do not need customers to be at home. This would remove an estimated 605,000 outbound contacts needed to arrange property access to install a meter, as well as the equivalent volume of contact in 15 years' time when the meter needs replacing. It also reduces the likelihood of additional customer complaints as it removes the need to work within a customer's property.
- **Easy access to the assets in future**. We know that smart technology is not infallible and there may be instances post installation where we need to return to the meter for investigation or remedial activity such as meter alarm or loss of smart connectivity.

We have decided to amend our meter location policy so that where a property does not have an existing boundary box, we are able to take an 'external first' approach. This is critical to delivery of our 2025-30 compulsory metering programme in Essex and Suffolk, because these meters would be difficult to deliver at this pace with internal installations alone. We have decided to adopt the same policy for our optant metering programmes in both our areas too, to provide the additional benefits above. This also supports consistency between our meter installations, allowing for a more coherent conversation with customers.

In Section 3.1.1, we explain the need for increased reliance on reducing customer supply pipe leakage in future as each of our WRZs approaches the UARL limit to find-and-fix activities. An external first policy means that we would not have to relocate meters in future to allow us to tackle customer supply-pipe leakage, and so has lower whole-life costs.

Once we reach the UARL for each WRZ, the only other alternative is mains replacement for leakage reduction. Based on our costs in the North Suffolk WRZ, we estimate this would cost around ten times per Ml/d as much as moving to external meter installations now (£80m per Ml/d reduction, compared to £8.1m).

3.1.3 Water Efficiency

We identified a range of feasible options to improve water efficiency with reference to UKWIR's WR27 Project Document[1] (2002), Artesia's Long-Term Reduction of PCC[2], and by considering options that we identified during development of our

[1] UKWIR,2002, The Economics of Balancing Supply and Demand (EBSD) Guidelines, Report Ref 02/WR/27/4, Table 3.1
[2] Artesia, 2019, Water UK. Pathways to long-term PCC reduction, Report Ref AR1286

WRMP24 (as outlined in Section 2.3.5). Our range of options, therefore, fall into the following broad categories as listed in the Generic List of Water Efficiency Options from WR27:

- Water use audit and inspection (and identification of household water efficiency opportunities),
- Targeted water conservation information (advice on application water usage),
- Advice and information on leakage detection and fixing techniques,
- Promotion of water saving devices, and
- Water efficiency enabling activities.

Our WRMP describes these options in more detail, including our preferred plan for water efficiency.

We considered these water efficiency options and combined them to establish three water efficiency scenarios with an increasing impact on water demand reduction. We followed the WRMP guidelines and methodologies provided by the Environment Agency to select these interventions, and we explain the anticipated benefit from each option in our WRMP technical reports.

Our three water efficiency scenarios (Low, Medium and High Impact) are summarised in Table 31. Behavioural change engagement, incentivisation, flow regulation and a leap into the digital space for water efficiency support our option scenarios for our revised WRMP. These options allow us to make sure we can achieve sustainable high levels of water savings, increase the effectiveness of our water efficiency retrofit projects, put stronger emphasis on the measurement of water savings, develop interest in the sustainability of savings, and create determined focus on the delivery of sustained behaviour change across the industry.

We selected the ‘medium’ option as part of our WRMP options appraisal. This is because the additional water saving impact from the ‘high’ option is not required either to meet the long-term target of 110 l/p/d, or to avoid water supply options. Our water supply options are required to meet abstraction reductions from 2032, and higher water efficiency activity would not reduce the scope of these activities. So, the ‘high’ option is not good value for customers. Our overall programme of water efficiency is still much higher than for 2020-25, including a much larger programme funded from base.

TABLE 31: THE THREE WATER EFFICIENCY SCENARIO OPTIONS

Scenario		Annual Water Saving Impact (l/p/d)	Categories	Feasible Options
1	Low	0.49	Water use and audit and inspection	Top 5% highest user visits
				Unmeasured property engagement
			Advice and information on leakage detection and fixing techniques	Internal leakage repair – visits
				Find and fix terms – bulk supply
			Targeted water conservation information (advice on appliance water usage)	New homes – flow restrictions
				Older homes – flow restrictions
2	Medium	0.97	Water use and audit and inspection	Top 5% highest user visits
				Unmeasured property engagement
			Advice and information on leakage detection and fixing techniques	Internal leakage repair – education and visits
				Find and fix terms – bulk supply
			Water efficiency enabling activities	Educational interactions (digital)
				Digital engagement
			Promotion of water saving devices	National campaign
			Targeted water conservation information (advice on appliance water usage)	Toilet rebates (replace old toilet to improve efficiency)
				Home flow restrictions
3	High	1.08	Water use and audit and inspection	Top 5% highest user visits
				Unmeasured property engagement
			Advice and information on leakage detection and fixing techniques	Internal leakage repair – education and visits
				Find and fix terms – bulk supply
			Water efficiency enabling activities	Educational interactions (digital)
				Digital engagement
			Promotion of water saving devices	National campaign
			Targeted water conservation information (advice on appliance water usage)	Toilet rebates
				Home flow restrictions

3.2. DETERMINING OUR PREFERRED PLAN

b) Has a robust cost–benefit appraisal been undertaken to select the proposed option? There should be evidence that the proposed solution represents best value for customers, communities and the environment over the long term. Is third-party technical assurance of the analysis provided?

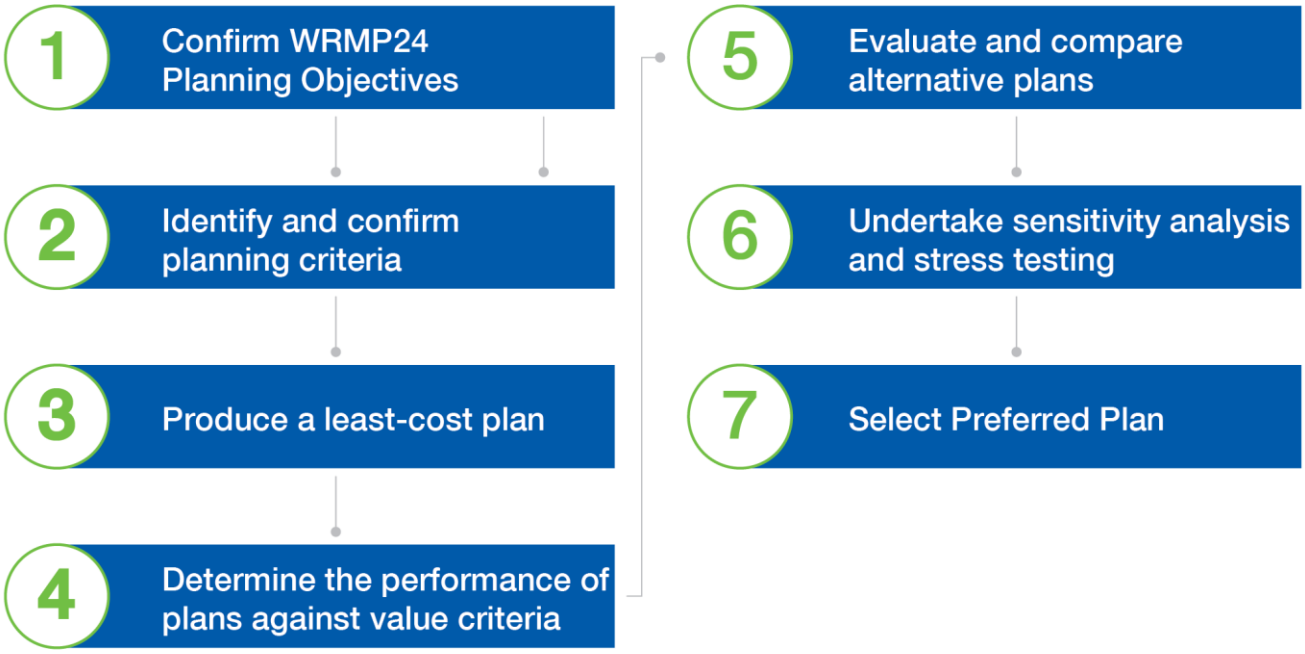
c) In the best value analysis, has the company fully considered the carbon impact (operational and embedded), natural capital and other benefits that the options can deliver? Has it relied on robustly calculated and trackable benefits when proposing a best value option over a least cost one?

d) Is the impact (incremental improvement) of the proposed option on the identified need been quantified, including the impact on performance commitments where applicable?

In this section, we explain the cost-benefit appraisal that we undertook as part of our WRMP to select the options we present here.

The steps we carried out to determine the preferred plan in the North East and Essex and Suffolk areas align with the Water Resources Planning Guideline 2021 and have been informed by UKWIR's 2020 guidance '**Deriving a best value water resources management plan**'. We outline the steps in FIGURE 4.

FIGURE 4: OVERVIEW OF THE BEST PLANNING APPROACH



In each area, we investigated the 'Least Cost Plan' and three alternative plans to determine our preferred plan that would ensure a secure supply of wholesome drinking water for customers and protect and enhance the environment. The three alternative plans are:

- Ofwat Core Plan;
- Best Value Plan; and
- Best Environment Plan.

We determined our '**Least Cost Plan'** using only economic cost information. This is therefore the plan with the lowest cost to restore a supply surplus in all years of the planning period (if there were a baseline supply deficit forecast). Our Least Cost Plan includes options needed to meet national targets for leakage reduction, PCC and reductions in non-household demand[3].

Our "**Ofwat Core Plan**" includes "no or low regret" options required to maintain a water supply surplus in all years of the planning period. As with our Least Cost Plan, our Ofwat Core Plan therefore includes options needed to meet our statutory obligations including national targets for leakage reduction, PCC and reductions in non-household demand[4].

Our "**Best Value Plan**" builds on the Least Cost Plan through the inclusion of monetised and non-monetised criteria and the impact they would have on a plan to address supply and demand. The Best Value Plan therefore delivers the best value defined by the **Water Resources Planning Guideline** as 'one that considers factors alongside economic cost and seeks to achieve an outcome that increases the overall benefit to customers, the wider environment and overall society'. We explain the criteria used in Section 3.2.2 below.

The "**Best Environment Plan**" presents a plan with the lowest level of abstraction from existing sources as well as the lowest level of leakage and PCC. Therefore, each plan provided an alternative approach to restoring an area to a water supply surplus.

In our North East area, our WRMP showed that our Least Cost, Best Value, and Best Environment plans were all identical. This is because we forecast a water supply surplus in the North East area, and so our decisions were driven by the need to meet statutory long-term targets for leakage and demand reduction, rather than the need to restore a water supply surplus.

As we forecast a water supply deficit in our Essex and Suffolk areas, and therefore we need to restore a surplus, the Least Cost and Best Value Plans are not the same. We explain how we made this choice in Section 3.2.3 below.

Our North East Revised WRMP24 and Essex and Suffolk Revised WRMP24 describe all of our plans and our assessment in more detail.

[3] Details of our Non-household demand reductions can be found in our **WRMP Non-Household Demand Management Enhancement Business Case** (NES36).
[4] Details of our Non-household demand reductions can be found in our **WRMP Non-Household Demand Management Enhancement Business Case** (NES36).

3.2.1 Least Cost Plan

We used an **Economics of Balancing Supply and Demand** (EBSD) optimiser model to develop our Best Value and alternative plans for WRMP24 where we have a supply deficit (that is, for Essex and Suffolk). The EBSD model considers the supply-demand balance for each water resource zone annually and identifies options to address deficits based on cost per Ml/d, and the earliest available date of supply.

As such, the model results represent a least-cost plan with no optimisation, as it does not consider other monetised criteria such as carbon or other societal and environmental impacts. This includes supply and demand options.

In the North East WRMP, we explain that we did not need to use this model for the North East. This is because we had no requirement for supply options, and so this would select the same demand options to meet statutory targets.

3.2.2 Determining the Best Value Plan

Best Value Plan for the Essex and Suffolk Area

We developed a list of best value assessment criteria, as set out in Table 32 below. These criteria align with our planning objectives from WRMP and wider benefits to customers – including taking into account customer preferences and deliverability of different options. We scored each option in the Essex and Suffolk area against these criteria to determine which would deliver the best value for customers. Our list of best value criteria is in TABLE 32. This includes benefits which do not necessarily apply to demand management options (as included in this case) as it considers supply options too.

TABLE 32: SUMMARY OF BEST VALUE ASSESSMENT CRITERIA

BEST VALUE CRITERIA DESCRIPTION	DESCRIPTION	UNITS
Cost of the plan	Total cost (TOTEX) of the programme	£
PWS Drought resilience	Number of years over the planning period the PWS drought resilience to 1 in 500 is achieved	Years
Biodiversity Net Gain (BNG)	Additional Biodiversity Habitat Units required to achieve Biodiversity Net Gain	Habitats Units (total restoration)
Natural Capital (NC)	Monetised (£NPV) impact of the option on natural capital e.g. changes to land use.	£
Leakage reduction	The volume of leakage reduction achieved over the planning period (Ml/d)	Ml/d
PCC reduction	The volume of PCC reduction achieved over the planning period (litres/head/day).	l/h/d
Flood risk management (non-drought resilience)	Qualitative assessment based on SEA objective to reduce and manage flood risk	Score
Multi-abstractor benefit	Qualitative assessment based on SEA objectives to maintain or improve the quality of waterbodies and to avoid adverse impacts on surface and groundwater levels and flows	Score
Carbon	Capital/embedded and operational total tCO2e of programme	tCO2e , £
Customer preferred option type	Options to be ranked based on customer preference survey data	% Preference
Human and social well-being	SEA objectives associated with human and social well-being	Score.
Option deliverability	Options scored for deliverability / cost confidence	% Optimism Bias
The impact on designated sites	SEA objectives associated with impact upon statutory environmental designated sites	Score

Best Value Plan for the North East Area

We did not need to carry out the same “best value” process for the North East, because the same demand management options would be selected to meet statutory targets on leakage and demand reduction. This means that the Least Cost Plan and Best Value Plan are identical in the North East.

However, we assessed our proposed demand management options against the same best value criteria, to assess the Least Cost Plan against environmental criteria.

We assessed the performance of our Best Value Plan for our North East area by assessing each option against our Strategic Environmental Assessment (SEA) objectives, which use defined effect assessment and evaluation criteria based on relevant spatial datasets. The assessment focused on high-level issues related to the SEA objectives, sub-objectives, and key receptors and assets. The assessment indicated whether the option would help or hinder us achieving our SEA objectives. We completed a separate assessment for construction effects and operational effects. Details of our assessments are included in our **North East WRMP24**.

The Best Value Planning approach for the North East area incorporates the best value assessment criteria. The metrics enabled us to assess environmental considerations and select portfolios/programmes of options at an early stage in the planning process. For incorporation of the environmental assessments into Best Value Planning, we assumed that recommended mitigation measures would be applied.

In conjunction with Mott MacDonald (our SEA Consultants), we developed an integrated approach to programme modelling for our WRMP. It incorporates SEA into our decision-making process for WRMP24, in line with the WRMP guidance. We then used the SEA results to create metrics to support the Best Value Planning modelling. The environmental assessment metrics are outlined in our WRMP24.

3.2.3 Benefits of our Preferred Plan

Our WRMP presents our preferred plan for each of our North East and Essex and Suffolk areas – which is the Best Value Plan. We explain how we selected this option in more detail in our revised WRMPs.

This will ensure a secure supply of wholesome drinking water for customers and will protect and enhance the environment. Our preferred plans for our North East and Essex and Suffolk areas therefore include the demand management options outlined in Table 33 below.

Our preferred plan has been developed to:

- Address any forecast baseline supply deficits.
- Make sure we meet government expectations and national targets for:
    - Leakage reduction: 50% reduction compared to 2017/18 levels by 2050.
    - PCC: 122 l/person/day by 2038 and 110 l/person/day by 2050.
    - Non-household demand reduction[5]: 9% reduction by 2038.

[5] Details of our Non-household demand reductions can be found in our WRMP Non-Household Demand Management Enhancement Business Case.

- Distribution input reduction: 20% reduction by 2038.

- Support other water companies through exports of water to address their supply deficits.

TABLE 33: OUR PREFERRED PLAN FOR NW AND ESW AREAS

	Essex and Suffolk area	Northumbrian area
Leakage	40% reduction by 2050	55% reduction by 2050
Metering	High Impact optant and compulsory metering programme. Fully smart by 2035	Replacement of existing meters with smart meters by 2035 and Enhanced Optant Smart Metering
Water Efficiency Programme	Interventions to reduce PCC to 110l/head/day by 2050	Interventions to reduce PCC to 110l/head/day by 2050

In practice, our preferred plan for demand management matches Government targets for leakage and demand reduction in the long-term.

3.2.4 Impact on Performance Commitments

Our WRMP process assesses the benefits of our demand management measures, including the impacts on performance commitments, specifically our performance against leakage and PCC reduction, as set out in Table 32. The tables below show our forecast performance for per capita consumption (Table 34) and leakage (Table 35 and Table 36), with the performance we expect from base expenditure and then the incremental improvements we expect from our enhancement expenditure.

TABLE 34: IMPACT OF BASE AND ENHANCEMENT ON PER CAPITA CONSUMPTION

Per capita consumption (3-year average)	2025/26	2026/27	2027/28	2028/29	2029/30
Base expenditure	149.10	146.40	143.90	141.90	140.20
Base expenditure + metering	148.70	146.00	143.80	142.20	141.00
Base expenditure + metering + water efficiency enhancement	148.30	144.80	141.40	138.50	136.00

TABLE 35: IMPACT OF BASE AND ENHANCEMENT ON LEAKAGE (NORTH EAST)

Leakage (3-year average)	2025/26	2026/27	2027/28	2028/29	2029/30
Base expenditure	118.08	117.05	115.52	114.01	112.52
Base expenditure + enhancement	116.64	114.05	110.85	108.98	107.11

TABLE 36: IMPACT OF BASE AND ENHANCEMENT ON LEAKAGE (ESSEX AND SUFFOLK)

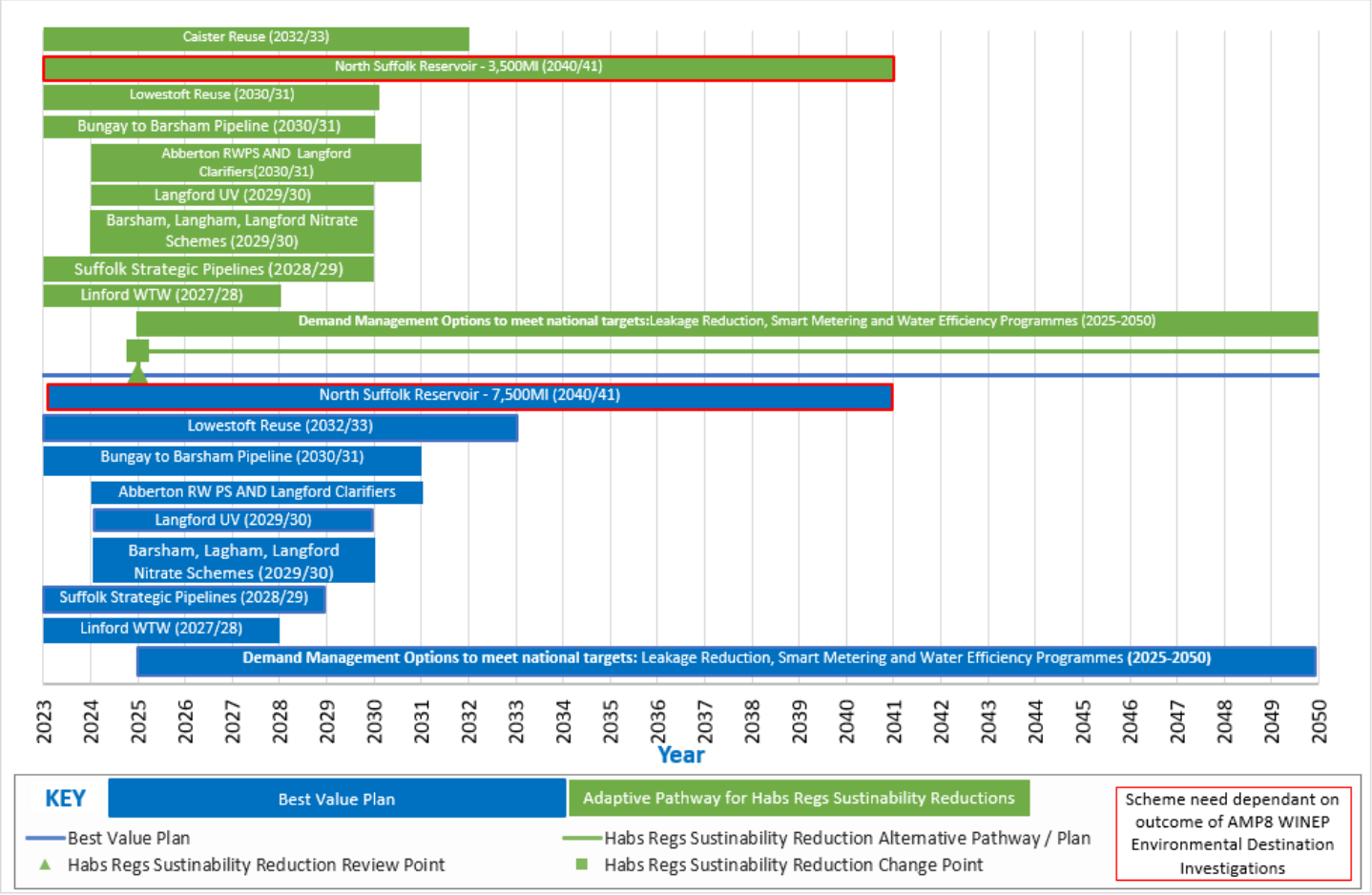
Leakage (3-year average)	2025/26	2026/27	2027/28	2028/29	2029/30
Base expenditure	55.76	55.27	54.55	53.83	53.13
Base expenditure + enhancement	55.08	53.98	52.7	52.15	51.61

3.2.5 Adaptive Plan

We developed our demand management options as part of our WRMP24 process, and these are critical to delivery of our WRMP objectives, addressing the water supply deficit in our Essex and Suffolk area and achieving commitments for leakage and PCC reduction. Our WRMP process has defined a range of adaptive pathways which are detailed in our WRMP24 submission.

Adaptive pathways provide alternative programmes for a range of scenarios including high, medium and low demand and impacts of abstraction sustainability reductions. FIGURE 5 shows a summary of our central preferred plan and the adaptive pathway for new abstraction sustainability reductions. Our demand management options underpin each of the scenarios by providing a baseline of leakage reduction and PCC savings against which supply options can be programmed and optimised to deliver supply resilience and value for customers.

FIGURE 5: ADAPTIVE PATHWAY FROM WRMP24



Like our WRMP, our long-term delivery strategy shows that these demand reductions would be required under any of the common reference scenarios.

3.3. UNCERTAINTY, THIRD PARTY FUNDING AND DPC

e) Have the uncertainties relating to costs and benefit delivery been explored and mitigated? Have flexible, lower risk and modular solutions been assessed – including where forecast option utilisation will be low?
f) Where appropriate, has the company secured appropriate third-party funding (proportionate to the third-party benefits) to deliver the project?
g) Has the company appropriately considered the scheme to be delivered as Direct Procurement for Customers (DPC) where applicable?

Our WRMP examines the uncertainty around costs and benefit delivery, including examining different scenarios for supply/demand deficits, abstraction reduction scenarios, and population and demand growth. These scenarios match our **long-term strategy** (NES_LTDS). We have also improved our certainty about costs, including market testing for meter installations and benchmarking (see section 4 on cost efficiency).

Our estimates of benefits are based on established industry and international good practice. There are no flexible, lower risk or modular solutions in this case.

There is no third-party funding for this case, as this is not appropriate for metering or leakage. For water efficiency, our enhancement funding relates only to activities around compulsory metering, so third-party funding is not appropriate for this either. However, delivering water efficiency targets will need to be a shared responsibility, with our part in this largely coming from base expenditure.

The Water Efficiency Strategy will support delivery of our long-term targets to reduce PCC to 110 l/p/d by 2050. However, water companies alone cannot deliver the deep reductions in household consumption and business demand. A range of key stakeholders need to play their part. The Government has a particularly important role in delivering its own targets. We welcome the Government's Roadmap to Water Efficiency, in particular its commitment to deliver the mandatory water efficiency labelling scheme by 2025, the review of the Building Regulations 2010 and the desire to work across government to integrate water efficiency into energy efficiency advice and retrofit programmes. It is important to emphasise that such committed actions are crucial in delivering the goal of reducing PCC to 110 litres per person per day by 2050. Indeed, the impact (water savings) of such government interventions are built into the demand forecasts (lower estimate). Such policy change will support delivery of the deep demand reductions required.

We fully support the **Waterwise Water Efficiency Strategy 2030** (published in September 2022) and played an active role in its creation. The national strategy clearly outlines the need for demand management and the important roles of various stakeholders including wholesale water companies, retail water companies, Government, regulators, environmental charities and other sectors. Our household and non-household water efficiency strategies align to the national strategy across several of the strategic objectives. We lead the working group for Strategic Objective 7 (water efficiency measures are included in building retrofit programmes) and are actively involved in working groups supporting delivery of other strategic objectives.

We assessed our metering programme against the DPC guidance (see our **assessment report**, NES38). We noted that this would pass under the 'size' test, with a whole life totex estimated as £244.1m for the AMP8 and AMP9 programme (note, this assessment was based on an estimate of metering costs from the WRMP, before we applied efficiencies from forward market testing and benchmarking). We discussed our initial proposal to use DPC for our smart metering programme with Ofwat in May 2023, as we considered that this could also pass the scalability, construction risk and operations and maintenance tests too.

Ofwat's **updated technical discreteness guidance on DPC**, published on 3 July 2023, means that metering is excluded from DPC under the programme scalability test. Therefore, our smart metering programme is not eligible for DPC. We discuss this assessment further in **A6 – deliverability** (NES07).

We did not consider leakage or water efficiency elements in more detail, as these are significantly below the whole life totex threshold (and so fail the size test). These are also a core part of our ongoing activity and not separable or 'discrete'.

Our **assessment report** (NES38) summarises our initial and final assessment of smart metering for DPC.

3.4. CUSTOMER SUPPORT FOR THE PREFERRED OPTIONS

h) Where appropriate, have customer views informed the selection of the proposed solution, and have customers been provided sufficient information (including alternatives and its contribution to addressing the need) to have informed views?

Our customer insight summary on enhancements and other service areas (NES43) describes our findings on smart metering, optant metering, compulsory metering, water efficiency, and leakage reduction (for both company-side and customer-side).

Customer views on smart metering are mixed. When metering is presented as part of an overall water efficiency package it is considered a high priority, but when tested in isolation support drops (enhancements and other service areas summaries). Customers have mixed support for compulsory metering in Essex and Suffolk, with some recognising the benefits of monitoring and saying that this was fair, and others saying that individuals should be able to choose (**enhancements and other service area summaries**, NES43).

In July 2022 we carried out customer research into demand management in our North East and Essex and Suffolk areas through online and face-to-face surveys (as part of our WRMP consultation). This research also explored our customers' thoughts and opinions on demand management options. We determined that:

- 73% of our household customers in our North East area support opt-in metering. Opt-in metering was the most supported metering option amongst respondents as they felt it gave them more flexibility and puts them in control. It also enables people to save money and be conscious of their usage. However, some respondents think this will not result in high water saving because those who use more water than others will not opt-in.

- 58% of our household customers in our North East area support smart metering. Although, smart metering was the least supported option of the demand side options, respondents like the idea that smart metering can help spot any possible leaks in their property and customers appreciated how progressive the measure is. Our younger customers tend to find 'smart' technology appealing, however, some respondents felt smart metering will not be reliable for the elderly or those with weak phone/Wi-Fi signal.
- 67% of our household customers in our Essex and Suffolk area support opt-in metering.
- 58% of our household customers in our Essex and Suffolk area support compulsory metering. Respondents felt that if every household had a meter, then behaviours and attitudes to water would change and wastage would be reduced due to people 'paying for what they use'. Future customers showed lower levels of support for compulsory metering, which was also divisive in the focus groups as its dependent on individual circumstances and respondents expressed empathy and concern towards those who have larger families and are on a low income and would therefore end up paying more if this solution was implemented.
- 78% of our customers in our Essex and Suffolk area who support compulsory metering would like to see this implemented by 2030.

Customers supported reducing leaks as a high priority – with leakage being among the top priorities for customers both individually and combined with water efficiency and metering. Customers preferred reducing leakage from the network (see our **enhancements and other service areas summary**, NES43). In affordability research, such as carried out by Ofwat in their cost-of-living research, customers were less willing to pay for improvements. However, customers wanted us to be more ambitious in this area than our previous long-term targets at PR19.

As part of our planning process, we carried out customer research to gain a better understanding of our customer's thoughts and opinions about the Low, Medium and High demand management options included within our draft WRMP consultation. Customers were given the opportunity to comment on which option scenario they favoured, and the medium option (4.5 litre saving over 2025-30) was favoured by the majority (56%) of the 1,314 customers surveyed by social research company, Emotional Logic.

Customers preferred investments in leakage reduction, with limited support for investments in demand reduction. However, customers said that they would support investments in education campaigns to reduce water use.

Our **line-of-sight document** (NES45) explains that in our pre-acceptability testing, customers ranked "metering, encouraging water efficiency and tackling leakage to ensure we have enough water in the future" as one of the most important areas. Reducing leakage also had strong support from non-households and retailers (though not water efficiency). In our WRMP research, companies preferred reducing company-side leakage to other options (84% and 86% of participants). Customers wanted us to be more ambitious on leakage, but we do not have strong evidence that customers are willing for their bills to increase to fund reductions in leakage (enhancements and other service area summaries).

In our **Affordability and Acceptability Testing qualitative research** (NES49), customers thought that demand management was an important area of investment, and particularly focused on leakage. In Essex and Suffolk, there was some scepticism about metering. Customers supported our medium phasing option (used in our business plan) and did not want to go further to reduce leakage or install more meters. We explained that our “low” investment would mean increased risk of being forced to take more water from rivers to supply customers or needing new water supplies.

Customers challenged us to further increase our leakage performance without increasing bills. In response, we increased our long-term target in the North East to 55%.

In our **Affordability and Acceptability Testing qualitative research** (NES49), customers thought investment in water supplies and demand was an important priority to ensure reliable supplies in the future. Many felt the medium option (used in our business plan) was appropriate as it allowed the necessary work to be carried out.

4. COST EFFICIENCY

a) Is it clear how the company has arrived at its option costs? Is there supporting evidence on the calculations and key assumptions used and why these are appropriate?
b) Is there evidence that the cost estimates are efficient (for example using similar scheme outturn data, industry and/or external cost benchmarking)?
c) Does the company provide third party assurance for the robustness of the cost estimates?
d) Is there compelling evidence that the additional costs identified are not included in our enhancement model approach?
e) Is there compelling evidence that the allowances would, in the round, be insufficient to account for evidenced special factors without an enhancement model adjustment?
f) Is there compelling econometric or engineering evidence that the factor(s) identified would be a material driver of costs?

In this section, we describe our cost methodology for each of leakage, metering, and water efficiency. We provide our supporting evidence on the calculations and assumptions we have used (see 4.1) and show how we have developed and then benchmarked these costs (see 4.2). We have clearly defined what is included in base and enhancement costs and estimated implicit allowances in base costs where appropriate. Finally, we explain our third-party assurance on costs.

Ofwat's methodology only requires points d) to f) above for enhancement model adjustments. There are no published enhancement models for demand management, and so we cannot show whether or not this investment is included. However, this type of model could likely be done for both metering and leakage. To support this modelling, we have provided separate costs for different types of metering installations (external and internal), which should be taken into account to compare water companies. This is a very significant driver of costs.

All the costs in this section are before any frontier efficiency and RPEs are applied, and so are consistent with Table CW3. We assume that Ofwat will consider how frontier efficiencies and RPEs as proposed in our Table CW1 are taken into account in their cost assessment process when comparing individual enhancements.

We have had third party assurance on our cost estimates from our provider Mott MacDonald. In their cost assurance note provided to our Board, they confirm that the expenditure forecasts included in the plan are robust and efficient. We explain our overall approach in **A3 – Costs** (NES04).

4.1. Cost methodology

a) Is it clear how the company has arrived at its option costs? Is there supporting evidence on the calculations and key assumptions used and why these are appropriate?

In this section, we explain how we have arrived at our option costs for each of leakage, metering, and water efficiency.

4.1.1 Leakage

As stated in Section 2.3.3, we defined a proportion of our 2025-30 plan as enhancement, based on a precedent set by the Competition and Markets Authority (CMA) at the PR19 redetermination, where the CMA allowed for enhancement adjustments for leakage.

We applied the principles of the CMA ruling, but with an adjustment to account for the leakage reductions forecast to be delivered in 2020-25 to work out the appropriate starting point for 2025-30. We summarise our method to calculate the appropriate level of enhancement is shown in the steps that follow:

1. Based on the APR submission data, we calculated the average annual leakage reduction across the UK water industry over the six most recent reporting years to 2022/23 to derive an annual average reduction of 1.31% (Table 37). Our calculations assume that this annual average rate of reduction would be funded via base in 2025-30 – that is, this could be considered to be 'what base buys'.

TABLE 37: FIVE-YEAR AVERAGE ANNUAL LEAKAGE REDUCTION ACROSS THE INDUSTRY

Measure	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	Average
Total leakage (Ml/d)	3,305.8	3,308.3	3,121.4	3,047.6	2,923.9	3,083.33	
Annual leakage reduction (Ml/d)	180.5	2.5	-186.9	-73.8	-123.7	159.43	
Annual leakage reduction (%)	5.8%	0.1%	-5.6%	-2.4%	-4.1%	5.5%	-1.31%

2. We then calculated the difference between our proposed 2025-30 targets for each region and the applied 1.31% reduction to determine the additional leakage reduction required beyond that funded by base allocation. This also allowed us to determine an annual average difference for each region; an average reduction of 1.69% in Essex and Suffolk (Table 38), and 5.05% in the North East (

3. Table 39).

TABLE 38: ESSEX & SUFFOLK WATER - ADDITIONAL LEAKAGE REDUCTION BEYOND BASE

Measure	2025-26	2026-27	2027-28	2028-29	2029-30	Average
ESW reduction (1.4%)	55.27	54.54	53.83	53.13	52.43	
ESW leakage target (annual)	53.24	52.70	52.15	51.61	51.06	
Difference	-2.02	-1.85	-1.68	-1.52	-1.37	-1.69

TABLE 39: NORTHUMBRIAN WATER - ADDITIONAL LEAKAGE REDUCTION BEYOND BASE

Measure	2025-26	2026-27	2027-28	2028-29	2029-30	Average
NW reduction (1.4%)	117.05	115.52	114.00	112.51	111.04	
NW leakage target (annual)	112.71	110.85	108.98	107.11	105.24	
Difference	-4.33	-4.67	-5.03	-5.40	-5.79	-5.05

4. By applying our unit rates for delivering 1 Ml/d of leakage reduction, based on the leakage strategy set out in our draft WRMP24, we have estimated the total enhancement funding required in each region (Table 40). We have then compared the leakage targets against Unavoidable Annual Real Losses (UARL) for each Water Resource Zone (WRZ). Anything down to the UARL can be delivered through fixed network acoustic logging, and therefore costs include technology, maintenance, analysts, leakage technicians and repairs. Below the UARL, benefits can only be delivered through mains renewal, and therefore costs to deliver leakage reduction reflect mains replacement. However, this is only applicable in one WRZ in 2025-30 (North Suffolk, as explained in 3.1.1). The total additional cost has then been divided by the leakage reduction to get the unit cost per Ml/d.

The higher unit rate for Essex and Suffolk (£10.37m), shown in Table 40, is driven by a higher proportion of mains renewal in recognition of the need to address background leakage through asset replacement to sustainably achieve and maintain the frontier leakage levels in this water stressed area over the longer term. This is a 'blended' rate, with mains renewal being only a small part of the plan in Essex and Suffolk at 0.15 Ml/d in total (but significantly more expensive).

TABLE 40: CALCULATED 2025-30 ENHANCEMENT COSTS

Measure	Unit Cost per Ml/d reduction (£m)	AMP8 Cost (£m)
ESW	10.37	17.50
NW	1.50	7.57
Total		**25.07**

TABLE 41: 2025-30 ENHANCEMENT CAPEX & OPEX SPLIT

Measure	Capex	Opex	AMP8 Cost (£m)
ESW	12.67	4.83	17.50
NW	2.84	4.73	7.57
Total	**15.51**	**9.56**	**25.07**

This calculates a total enhancement claim of £25.07m to achieve our leakage reduction targets and commitments for 2025-30 based on current data (Table 41). We recognise that this claim may change as further 2020-25 industry leakage performance data becomes available, as this may alter the calculated annual average leakage reduction % used in our assessment. We also note that a significant part of the increase in 2022/23 APR figures is due to Welsh Water. While our

calculated annual figures for leakage reduction will change if Welsh Water update its figures for 2020/21 and 2021/22, there would be no material impact on our calculated average.

Our enhancement costs also assume that our metering programme is fully funded, including both our "external first" policy on meter installations and an additional £3.3m (opex) to support identification of more leaks with smart meters. These investments for smart meters do not contribute directly to reducing leakage, with improvements focused on internal leakage, but will support us in identifying leaks and so avoid further costs.

4.1.2 Metering

The costing methodology for enhancement funding associated with our metering programme is summarised below and includes the following components:

- New meter programme: 100% enhancement, expanding our meter coverage.
- Replacement meter programme: enhancement claim only for the incremental addition of a smart reader.
- Indirect costs: enhancement costs linked to expansion of meter coverage but not included in unit cost rate for metering.

New Meter Programme – estimating costs

We calculated metering unit cost rates for new installations for our WRMP using our actual installation costs for different install locations, based on an average of actual costs from the previous 5-year period. This is consistent with the WRMP guidance for tables.

However, for our PR24 submission we also carried out a preliminary contract tender exercise in June 2023 for our smart metering programme. We have used the information from this to derive lower cost rates, as shown in Table 42. These costs are more efficient than the historic costs used for WRMP (also shown in Table 42).

Our unit costs for 'Drop-in' (£100.88) and 'External Installations' (Private £657.10 and Public £781.10) are based on the average of the two tendered prices; as this is not a final contract cost, only an initial test. The exception is 'Internal installation' costs (£165.51), which were not covered in the tender process, and we have calculated this based on historic actual costs (this was our preferred method at PR19, where our costs were assessed as efficient).

TABLE 42: NEW METER INSTALLATION UNIT COSTS

Location	Historic costs (ESW/NE)	Tender A	Tender B	Unit Cost (£)
Drop in	117.57 / 126.46	114.59	87.18	100.88
Internal installation	165.51 / 199.76	N/A	N/A	165.51
External installation (Private)	988.03 / 1,033.58	733.81	580.39	657.10
External installation (Public)	1,072.20 / 1,123.58	857.81	704.39	781.10

Section 3.1.2 explains our 'external first' policy, and why this is the best value option (primarily, this allows for benefits from reducing supply side leakage, which will be required to meet future leakage targets).

We estimated the split between different installation types in each of our areas using the % split observed during AMP7 (when we last had an 'external first' policy). We have assumed that the proportion of future optant installations in AMP8 will be consistent with the average in AMP6 for each area, rather than the average for AMP7 (when we pursued an 'internal first' policy).

For compulsory metering, we have assumed that 65% of installations would be done externally (public); 20% would be done internally; and 15% would be 'drop in'. This reflects the nature of compulsory metering. We show the proportional allocation in each area in Table 43 to Table 45 below.

The % allocations to each meter location type are different in the Essex and Suffolk and North East areas for a number of reasons. For example:

- In our Essex and Suffolk area we are adopting a compulsory metering approach to support addressing the water supply deficit, recognising that some of our customers may be resistant to internal installation.
- We have also already exhausted the potential to install meters in existing boundary boxes in Essex and Suffolk.
- In our North East area, there is no compulsory metering element to our programme and we are targeting use of existing boundary boxes via our Whole Area Metering (WAM) approach.

TABLE 43: OPTANT % ALLOCATION TO DIFFERENT METER INSTALLATION TYPES

Location	Essex % split	Suffolk % split	NW % split
Drop in	37.41%	33.33%	28.49%
Internal installation	32.43%	26.06%	12.29%
External installation (Private)	12.31%	12.98%	11.70%
External installation (Public)	17.84%	27.63%	47.52%
Total	**100.00%**	**100.00%**	**100.00%**

TABLE 44: COMPULSORY % ALLOCATION TO DIFFERENT METER INSTALLATION TYPES

Location	Essex % split	Suffolk % split	NW % split
Drop in	15.00%	15.00%	-
Internal installation	20.00%	20.00%	-
External installation (Private)	00.00%	00.00%	-
External installation (Public)	65.00%	65.00%	-
Total	**100.00%**	**100.00%**	**-**

TABLE 45: WHOLE AREA METERING (WAM) % ALLOCATION TO DIFFERENT METER INSTALLATION TYPES

Location	Essex % split	Suffolk % split	NW % split
Drop in	-	-	100.00%
Internal installation	-	-	0.00%
External installation (Private)	-	-	0.00%
External installation (Public)	-	-	0.00%
Total	**-**	**-**	**100.00%**

We used these % allocations to define the number of new meters in each installation category and region required to deliver our new meter programme. Table 46 below shows the number of new meters by installation type and region, with unit costs applied to the total count to calculate a total cost of **£88.66m**. This comprises £47.01m in Essex and Suffolk and £41.65m in our North East area.

TABLE 46: NEW METER COSTS BY REGION AND INSTALLATION TYPE

Location	Unit Cost (£)	ESW optants	ESW compulsory	NW optants	NW WAM	Total count	ESW cost (£m)	NW cost (£m)	Total cost (£m)
Drop in	100.88	474	12,569	22,783	18,750	54,576	1.316	4.190	5.506
Internal installation	165.51	402	16,759	9,828	0	26,990	2.840	1.627	4.467
External installation (Private)	657.10	162	0	9,356	0	9,518	0.106	6.148	6.254
External installation (Public)	781.10	261	54,467	38,001	0	92,729	42.748	29.682	72.430
Total		**1,300**	**83,795**	**79,968**	**18,750**	**183,813**	**47.011**	**41.647**	**88.658**

'Drop in' meters are possible where there is already a meter chamber at the property, and so installation costs are much lower. We installed these meter chambers when we have previously carried out work including replacement or repair of mains and communication pipes.

Meter Replacement Programme

We have calculated enhancement costs associated with our meter replacement programme based on the unit cost of a smart reader unit. The majority of our 3meter replacement programme is allocated to base maintenance: only the cost of adding the smart unit as part of the replacement is included in our enhancement case. Our smart unit cost is £31.60, based on the current procurement cost from our existing supplier. We have applied these rates to the number of replacement meters in each region in Table 47 below. The enhancement element of our metering replacement programme is therefore £14.353m. This comprises £7.255m in Essex and Suffolk and £7.098m in our North East area.

TABLE 47: ENHANCEMENT FUNDING FOR METER REPLACEMENT PROGRAMME

Region	Smart unit cost per meter (£)	No of replacement meters	Meter replacement Base (£m)	Meter replacement enhancement (£m)
Northumbrian Water	31.60	224,619	28.097	7.098
Essex & Suffolk Water	31.60	229,595	36.261	7.255
Total		**454,214**	**64.358**	**14.353**

Metering Indirect costs

There are some additional costs that are necessary to establish our smart metering programme, particularly around customer experience and maximising the leakage reduction benefits of smart meters. We include these in our enhancement case as these are not included in historic base expenditure. Other water companies have included these additional costs in their business plans as enhancement at previous price reviews. For example, Thames and Anglian were granted **enhancement funding at PR19** (of approximately £14m and £40m respectively) for expansion of infrastructure related to building Smart Networks, including costs for masts and connections, and development of Smart Portals and Smart Metering Centres[6].

We seek to learn from others who have undertaken smart metering programmes across the sector, including Thames Water. They noted in our discussions with them that smart metering requires additional area of operation and investment, compared to 'dumb' metering, and explained their framework for allocating some costs to meter unit rate calculations – and for allocating some costs to 'indirect' metering costs. We have used this framework as our guide, and Table 48 sets out our indirect smart metering costs which are not included in metering unit rates.

We have used this framework to help drive consistency between smart metering unit rates and allow for benchmarking between companies. In Table 48, we have set out the capex and opex for each item excluded from smart metering unit

[6] Green Economy recovery: Final Decisions, 29th July 2021 (http://www.ofwat.gov.uk/wp-content/uploads/2021/07/green-economic-recovery-final-decisions.pdf)

rates where we consider this to be enhancement expenditure (we have allocated any categories missing from Table 48 to base expenditure). We explain our approach to additional water efficiency in 4.1.3, rather than in Table 48.

The sections below describe how we estimated these costs.

FIGURE 6: FRAMEWORK FOR ALLOCATING SMART METERING COSTS (MARCH 2023)

Cost categories	Sub-categories
Meter device	Meter device
	Local comms equipment (LCE)
Meter installation (in-house or contractor + fixed costs)	Digs
	Internals
	OSV installation
	Unmeterable property survey
Internal fixed-costs	Internal fixed-costs
Field investigations	Stale meters, tech issues
Smart meter comms (fixed network,phone network)	Installation / set-up
	Annual maintenance / licence
Smart meter operational centre (SMOC)	Staff and IT
Meter data management system (MDMS)	Build and set-up
	Annual licence / upgrades
Additional customer-side leakage	Getting customers into account
	Maximising demand reduction benefit
Additional water efficiency / wastage	Water efficiency home visits
	Separate wastage fix visits
Digital engagement portal (app, online account, email platform)	Build and integration
	Annual maintenance / licence
Customer journey	Literature and customer comms associated with compulsory installs

Cost categories suggested to be included in meter unit-rate calculation

Cost categories suggested to be excluded from meter unit-rate calculation

These costs can be included in Enhancement Cases or other Botex budgets, as they are likely to be needed for a smart metering programme

TABLE 48: SUMMARY OF INDIRECT METERING ENHANCEMENT COSTS

Category	Sub Category	Capex (£m)	Opex (£m)	Opex (annual) (£m)	Rationale
Field Investigations	Stale meters, technical issues	-	£0.90	£0.18	Investigation and resolution of issues with smart meters not communicating. Based on current failure rate data, we have assumed that 2% of the meters installed in AMP8 will require a field visit to resolve issues and 7% will require a desktop check.
Smart Meter Comms (fixed network, phone network)	Annual maintenance / licence	-	£2.62	£0.52	The smart comms market now tends to operate an Opex model which charges an annual per-meter fee for data services. We have assumed an annual £1.35 cost per smart end point cost based on the AMP8 programme profile. This is for HH new meters and meter replacements only
Smart Meter Operational Centre (SMOC)	Staff & IT	-	£2.55	£0.51	Management roles, training staff, and developing Customer Experience management processes to maximise the benefits of smart metering.
Additional Customer-side Leakage	Maximising demand reduction benefit	-	£3.34	£0.67	Investigating leaks on the customer-side and visits to advise and fix where appropriate. Additional FTE roles required in both regions (leakage technicians and plumbers) profiled over the AMP. At peak (2028), 9 in Northumbrian Water and 11 in Essex & Suffolk region.
Digital Engagement Portal (App, Online Account, Email Platform)	Build and integration	£0.44	-	-	Creating new content and capabilities for the customer website and app.
	Annual maintenance / licence	£2.10	£0.20	£0.04	Project team to facilitate 2-year change-programme managing the technology and data changes required to make smart deployment successful.
Customer Journey	Literature and customer comms associated with compulsory installs	£5.15	-	-	Marketing and community engagement campaign at the same time as smart meters are being installed. The community presence will move area by area with the smart roll-out.
Total (£m)		**£7.69**	**£9.61**	**£1.92**	

We summarise our indirect costs of £17.29m (Totex) in Table 48 and explain this further in the sections below. This is split into £11.51m in Essex and Suffolk, and £5.78m in the North East. We considered and removed some costs relating to smart metering – including setting up our meter data management systems and setting up our smart metering communications – as these can be delivered using base expenditure.

Field Investigations

As we deploy smart meters, a proportion will be subject to early failure and connection issues resulting in a loss of the smart meter data. This will require an initial desktop assessment followed by a field visit to resolve in some cases. Based on current failure data, we have assumed that 2% of new meters installed in AMP8 will have communication/network issues requiring a field visit to resolve and 7% will require a desktop check. It is assumed that 8 field visits can be per field staff, and 30 desktop checks per advisor, can be completed per day. We have calculated a requirement for additional FTE field technician, supervisor roles, and office-based advisors profiled across AMP8 and peaking at 14 FTE in year 5. Costs are based on the average salaries for the roles required.

Smart Meter Comms

Advances in technology are driving changes in the smart network communication infrastructure market, which – like many IT services - now tends to operate on an opex basis rather than the previous front-end capex-heavy model. This model charges an end-point fee (per meter per year) for providing a data service. Some of the smart communications solutions we are considering have a low infrastructure cost because they operate open standards (for example in the case of LawRaWan, anyone can use the infrastructure once installed in an area). In addition, we expect to have delivered a large proportion of our core infrastructure roll-out by the end of AMP7, thus lowering the cost impact on AMP8.

Our licencing and maintenance costs are based on an annual cost per smart-point (on new and replacement meters) of £1.35. We have calculated the overall cost for the AMP based on the profile of the AMP8 metering programme, that is, meters installed in year 1 will incur five years of annual cost while meters installed in year 5 will incur only one annual cost.

Smart Meter Operational Centre (SMOC)

Our Smart programme will require new processes to ensure we can realise the maximum benefit and to manage customer expectations and satisfaction positively. We have identified activities and costs for key activities, including conducting research to gain better customer insight, enhancing our customer-facing processes and educating and upskilling our employees to deliver the target experience. A cost-breakdown is shown below:

- £0.21 - 1 x Analyst to conduct analysis of letters and data linked to Compulsory Metering in Essex and Suffolk
- £0.61 – 4 x Trainers to conduct training of all employees/contractors supporting our Smart programme to ensure the appropriate level of knowledge and skill. This will include Field, and office-based employees, and will focus on smart process and addressing the key challenges of Compulsory Metering.
- £0.30 - 1 x Performance Advocate to ensure efficiencies and process improvements are delivered.

- £0.18 - 2 x Customer Advocates to redesign Customer Journeys and scoping out communication requirements - two-year fixed term contract.
- £0.28 - 1 x Insights Analyst to complete analysis of customer feedback and complaints to drive learning and insights through Smart.
- £0.08 - Consultancy support for Customer Research to maximise Smart benefits.
- £0.23 - Consultancy budget required for letter writing.
- £0.13 - 0.5 Internal Comms to manage communications of processes and procedures within the business.
- £0.38 - 1 x Experience Manager to coordinate the overall customer experience.
- £0.16 - 1 x Quality Analysis to assess the quality of customer responses to drive quality standards.
- £0.02 - Costs to purchase training kits for the floor - dummy meters, kits etc.

Additional Customer Side Leakage

We have assumed that 10% of new meter installations will result in an opportunity to identify customer side leakage issues. We have included costs to investigate and resolve or advise customers, as appropriate. This supports the delivery of a leakage reduction benefit as outlined in our WRMP24 of 2.23Ml/d in our North East area and 1.96Ml/d in our Essex and Suffolk area (interventions to deliver this for supply pipes are included within our leakage programme).

We have calculated the requirement for additional FTE roles in both areas, including leakage technicians and plumbers. The FTE requirement has been profiled over AMP8 in line with the number of meters installed each year, and peaks in year 4, with a requirement for 9 FTE in the Northumbrian Water area and 11 FTE in Essex & Suffolk.

Digital Engagement Portal

New smart-specific content and materials are needed to engage, inform, and educate customers. We have identified specific activities required to create new content and functionality within our customer website and app to engage customers and maximise the benefits of our smart programme. The following costs cover the build and integration of enhanced functionality and content:

- £0.11 - content creation for web and app plus all iterations of digital contact needed to move smart journeys online and reflect new ways/timings of communication for smart engagement. Also updating content on websites for local events, creation of digital experience content and being on hand to support contact centre on increased volume of queries for digital contact (@ £55k for two years).
- £0.10 - Funding digital consultancy budget - digital consultancy resource to support Smart Digital development (@ £100k for 1 year).
- £0.05 - Video creation budget - for Customer Experience, letter training, journey training etc (@ £25k for two years).
- £0.08 - Development of Rant and Rave and feedback processes (@ £80k for one year).

- £0.20 - Resource to scan/input customer letters into corporate systems (@ £40k for five years).
- £0.10 - Part-time resource to deliver website and mobile app requirements (@ £20k for five years).

In addition, Smart Metering will require significant technical change across our IT estate. As we move into AMP8 the install mix for smart metering becomes more complex and this will inherently mean more system change as we continually learn and evolve our approach. We therefore propose to implement a change project 'programme bridge' to coordinate and drive the Technology and Data change required to make our smart deployment successful.

To oversee 'programme bridge' we will appoint a new smart business partner to act as the interface between operational teams, the industry and the IT directorate. This role will be accountable for delivery of the change project outcomes.

Costs of £1.05m per year for two years comprise the following elements:

- 1 x Smart Business Partner @ £80k
- 1 x Project Lead @ £132k
- 3 x Business Analysts @ £121k
- 1 x Solutions Architect @ £60k
- 1 x PMO Lead @ £60k
- Various internal resources for Dev, Test, Prop testing @ £100k
- 1 x Data Analyst @ £120k
- Ad-hoc digital developments @ £25k

Customer Journey

To support the rollout of smart and compulsory metering, we need to be having holistic conversations with customers covering the practicalities, affordability, water efficiency, and how to use and make the most of our digital services. These conversations need to take place before, during, and after the installation and we need to be available in person, in communities, and online.

We need to mitigate the impact of activities on C-MeX, complaints, our wider reputation, and provide support to circa 40% customers who, without intervention, are expected to be worse off with a meter. Customers need to understand what's changing, how it affects them, what they can do to save money and what financial support is available. These costs will provide marketing and community engagement aligned to the smart meters installation programme. The community presence will move area by area with the smart roll-out, providing information and affordability support for customers.

The level of AMP8 enhancement funding is based on:

- £1m for a comprehensive marketing campaign to support compulsory metering
- £1.62m for two community customer engagement vehicles, staffing, training, and materials
- £0.13m to engage with local authorities, community groups, and charities
- £0.35m for hire of venues and materials for local community events
- £0.45m for affordability support
- £1.61m to manage customer complaints specifically relating to compulsory metering

4.1.3 Water Efficiency

As we explain in Section 2.3.5, we have defined a proportion of our AMP8 water efficiency plan as enhancement. This portion of our water efficiency plan is about providing water efficiency measures while engaging with our customers during delivery of our smart meter installation commitments. We have linked this to smart metering engagement and visits as it is more efficient to do this together.

We provide a cost breakdown for each water efficiency measure in the North East and Essex and Suffolk areas in Table 49 and Table 50 respectively. The costs per activity have been informed either through our understanding of costs from our delivery of AMP7 water efficiency measures or through our project work to explore water efficiency measures for AMP8 (where these are missing in AMP7 or are more efficient). Where there is a slight difference in unit price between the areas, this is due to variation in labour rates. Slight differences in total can also be due to rounding. Further details of the costing methodology are provided below.

TABLE 49: NORTHUMBRIAN - COST BREAKDOWN FOR ENHANCEMENT WATER EFFICIENCY MEASURES

NW Water Efficiency activity	Volume	Cost (per activity)	Total Cost
Home Flow Restrictors	18,386	£23.65	£434,810
Home Doorstep Education - information	328,313	£0.21	£69,880
Home Doorstep Education - engagement	94,141	£9.81	£923,948
Leak check and repair	15,099	£88.76	£1,340,202
Water Saving Products - installation and point of install	70,605	£4.49	£317,259
Home Water and Energy Saving Visits	5,465	£118.25	£646,210
Total			**£3,732,310**

TABLE 50: ESSEX & SUFFOLK - COST BREAKDOWN FOR ENHANCEMENT WATER EFFICIENCY MEASURES

ESW Water Efficiency activity	Volume	Cost (per activity)	Total Cost
Home Flow Restrictors	17,985	£23.61	£424,570
Home Doorstep Education - information	321,159	£0.21	£68,235
Home Doorstep Education - engagement	100,111	£9.80	£980,775
Leak check and repair	15,795	£88.60	£1,399,513
Water Saving Products - installation and point of install	75,083	£4.49	£336,772
Home Water and Energy Saving Visits	5,528	£118.04	£652,481
Total			**£3,862,345**

We provide a summary of the total water efficiency measures we intend to deliver across our customer base in AMP8 with enhancement investment in Table 51. We explain these lines in more detail in the sections below.

TABLE 51: TOTAL COST OF ENHANCEMENT WATER EFFICIENCY MEASURES (NW & ESW)

Water Efficiency activity	Volume	Cost (per activity)	Total Cost
Home Flow Restrictors	36,370	£23.62	£859,380
Home Doorstep Education - information	649,472	£0.21	£138,115
Home Doorstep Education - engagement	194,251	£9.81	£1,904,723
Leak Check and Repair	30,894	£88.68	£2,739,715
Water Saving Products - installation and point of install	145,688	£4.49	£654,031
Home Water and Energy Saving Visits	10,993	£118.14	£1,298,690
Total			**£7,594,655**

Home Flow Restrictors

We estimated the volume of home flow restrictors for delivery in our North East and Essex and Suffolk areas by considering the volume of smart meter installations as part of our 2025-30 metering enhancement activity (see section 4.1.2). which includes the 80% of compulsory metering in Essex and Suffolk only that are ‘drop in’ or ‘external’ installations (see 4.1.2. When factoring in targeting of properties, customer buy in and logistical considerations, we estimated that 8% of these installations could be potentially targeted. We applied a 75% confidence rating for successful installs, to factor in aborted installs such as customer refusal or no access. This left us with the expected installation total volume of 36,370 (Table 51) split by 18,386 in the North East (Table 49) and 17,985 in Essex and Suffolk (Table 50). We determined the cost per home flow restrictor (£23.65 in North East and £23.61 in Essex and Suffolk) was from the retail cost of the device, factoring in a discount due to bulk purchase, and the resource cost (hourly rate) for a technician to install.

Home Doorstep Education – Information and Engagement

We have used our current costs to deliver a small volume of Home Doorstep Education – Information (c. 62,000) and Engagement (c.1,000) during AMP7 to inform our costs to deliver a much larger scale in AMP8. To determine the volume of customers we would engage, we considered the following proportions of installation campaigns: 40% Compulsory Metering, 40% WAM, 30% Reactive Metering and 40% Enhanced Optant. We assumed 86% customers would be willing to engage, consistent with our current observed engagement. This led to our estimated volumes of 328,313 for information and 94,141 for engagement in the North East area (Table 49), and 321,159 for information and 100,111 for engagement in the Essex and Suffolk area (Table 50).

Leak Check and Repair

We have used our 2020-25 costs to estimate the costs for Leak Check and Repair. The total volume of 30,894 (Table 51), split by 15,099 in the North East (Table 49) and 15,795 in Essex and Suffolk (Table 50), assumes that 5% of toilets are leaking, less than 1.6% of taps/boilers/ overflows are leaking, and assumes that 10% of all those that are leaking are repaired during 2025-30. These repairs inside customer properties count towards demand reduction, not leakage reduction.

Water Saving Products Installation and Point of Install

To determine the costs for installing water saving products across 2025-30, we used our information about the current costs of water saving products and typical install times. To determine the volume of properties we expect to engage and provide/install products, we considered the following proportions of installation campaigns: 40% Compulsory Metering, 40% WAM, 30% Reactive Metering and 40% Enhanced Optant; this is the same as for Home Doorstep Education above. We assumed that 75% of customers would accept a water saving product and determined the volume as 145,688 properties in total (Table 51), split by 70,605 in the North East (Table 49) and 75,083 properties in Essex and Suffolk (Table 50). To determine the cost per property, £4.49 in the North East and Essex and Suffolk (Table 49 and Table 50 respectively), we assumed an average of two products would be fitted per property with a fitting time of 6 mins per product.

Home Water and Energy Saving Visits

To determine the costs for implementing home water and energy saving visits during AMP8, we used our information about the current costs to deliver the same measure per household in AMP7 - £118.25 in the North East (Table 49) and £118.04 in Essex and Suffolk (Table 50). The volume of visits was determined by considering the number of customers in our Top 5% of water users group and then applying a 10% customer take up rate. This led us to determine 5,465 properties in the North East (Table 49) and 5,528 properties in Essex and Suffolk (Table 50).

4.2. Cost benchmarking

b) Is there evidence that the cost estimates are efficient (for example using similar scheme outturn data, industry and/or external cost benchmarking)?

We described some of our evidence that the cost estimates are efficient in section 4.1 (for example, describing the use of similar scheme outturn data, current contractor costs, and forward-looking market testing where possible). We have also carried out some external cost benchmarking to test if these costs are efficient compared to the rest of the sector.

We explain this in each section below.

4.2.1 Leakage

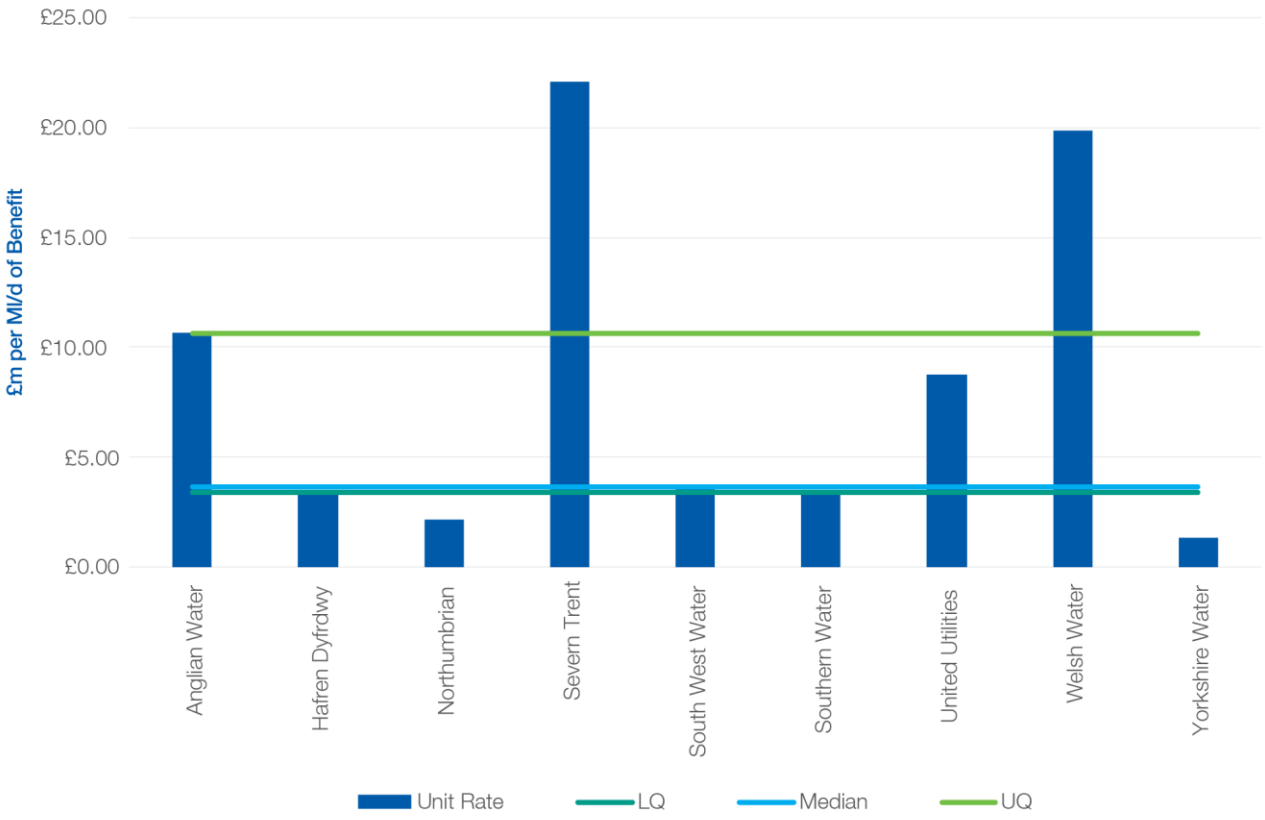
We have reviewed our cost methodology and carried out benchmarking using the data currently available from the Ofwat leakage data request, APR tables and draft WRMP24 publications.

The APR tables provide data for leakage expenditure and benefit under Table 6D: Demand Management – Metering and Leakage Activities. We analysed the data series 6D.16 ‘Totex expenditure’, and 6D.17 ‘Benefit’ for the first two years of AMP7. FIGURE 6 below plots the unit rates per Ml/d of leakage reduction from the APR tables for all companies that provided both expenditure and benefit data.

The APR data illustrates two notable points. Firstly, there is a significant range in unit costs which indicates that any model or median unit rate could prove to be polarising. Secondly, it shows our unit rate as reported in the APR is efficient in comparison to the industry range.

In line with the approach taken by Ofwat in previous price reviews, we attempted to create both linear and logarithmic models based on the APR data. However, the models do not produce strong R^2 values and using them to model Totex values produces significant variances from the actual APR totals reported. This data set may produce more robust models once the entirety of AMP7 is included in the reporting.

FIGURE 6: APR LEAKAGE UNIT RATES AS PUBLISHED IN APR TABLE 6D



We also assessed data from OFWAT Leakage Data Requests, taken from the following tables:

- Costs – Pro forma LK1 – Leakage: Expenditure
- Number of properties covered by PMAs – Pro forma LK2: Leakage: Prevent activities
- Length of Trunk Mains – Pro forma LK3: Leakage: Aware activities and attributes

We produced multi-variable models using the data in various combinations but failed to produce a meaningful statistical relationship.

Benchmarking Mains Renewal Rates

Leakage interventions involving mains renewal only apply to our Essex and Suffolk area. To benchmark mains renewal costs, we assessed the proportional breakdown of the existing pipe diameters and materials in Essex and Suffolk. These are summarised in Table 52.

TABLE 52: ESSEX & SUFFOLK PIPE ATTRIBUTE PROPORTIONS

Material	Diameter					
	Unknown	<75	75-150	150-300	300-600	>600
Plastic	0.00%	2.83%	18.99%	10.21%	2.06%	0.10%
Metallic	0.00%	0.15%	19.98%	8.17%	4.31%	3.20%
Other	0.32%	0.13%	17.39%	9.22%	2.40%	0.55%
Total	0.33%	3.10%	56.37%	27.60%	8.77%	3.84%

We have used the above proportions to calculate our 2025-30 programme and assumed that the same likelihood of replacement will apply to pipes of all diameters.

To produce an industry benchmark rate, Mott MacDonald obtained PR24 rates from three peer organisations (UK Water and Wastewater companies of comparable scale and with comparable operating models). We developed benchmark rates based on the following assumptions:

- All mains replaced with PE pipe
- Pipes laid at 1.0m depth
- Ground types of 20% grass 40% tarmac, 40% road.
- Applying the proportions of pipe laying methods for Essex and Suffolk
- Rate is inclusive of standard pipe fittings and wrap
- Costs stated at PR24 price base
- Unit rate is exclusive of contractor and client overheads

We normalised the cost data for the two regions to calculate a rate for each. Table 53 shows these rates in comparison to the benchmark and the upper and lower quartiles.

TABLE 53: ESSEX & SUFFOLK MAINS RENEWAL BENCHMARKING

	Our cost rate (£/m)	Benchmark (£/m)
Essex & Suffolk	£205.13	£227.02
Variance		-9%

The results show that our calculated mains renewal costs in our Essex and Suffolk area are 9% more efficient than our industry benchmark of £227.02.

We have added indirect costs of 30.7% to our unit cost rate, based on the level of overhead in our 2022/23 mains renewal programme. We have not applied our standard 67% overhead rate as the scale and complexity of mains renewal activities is different to other areas of our programme. Overheads include design, supervision, planning and administration.

We have based our unit rate on the industry benchmark of £227.02. Applying the 30.7% overhead to this rate produces a total cost rate of **£296.72.**

4.2.2 Metering

Metering costs are not readily available separately for internal, external, and drop-in installations. At PR19, Ofwat's models used a single unit rate for metering, which incentivised companies to move to internal meter locations if this was cost-beneficial in the short-term, rather than thinking about the long-term benefits.

Our unit cost for new meters at PR19 was £256.01, compared to Ofwat's benchmark unit cost of £286.74 and the industry average unit cost of £279.11 (all costs inflated to 2022/23 prices). Ofwat allowed for a higher unit cost for London installations, and (in the Green Recovery determinations) allowed an additional £33 per meter reflecting additional costs linked to compulsory metering.

We explained in 3.1.2 and 4.1.2 that the location of meter installations can make a big difference to the costs. So, we set out to benchmark an 'internal first' and an 'external first' option against industry data, comparing each to adjusted PR19 unit rates and AMP7 APR data. Our costs for both options are based on the same unit rates derived for four location categories:

- Drop In
- Internal Installation
- External Installation (Private)
- External Installation (Public)

The difference in cost between the internal first and external first options is driven by a different percentage split of the location categories. The external first programme includes a much higher percentage of external installations, which carry a higher cost than internal installations. The percentage splits applied throughout the programme are based on actuals that have been collated for over two years and are representative of our likely PR24 implementation (see 4.1.2 for details).

We derived unit costs for the Drop In and External Installation (Public) categories from the averages of two contract tender costs (as described in 4.1.2). External Installation (Private) costs are derived from the External Installation (Public) breakdown, with the removal of the street works, sample inspections and two-way light costs. Finally, the Internal Installation unit cost has been taken as the lowest value from bottom-up estimates across different regions.

We have applied the PR19 methodology, which does not differentiate between different installation locations, and have updated to reflect the frontier shift driven by an annual 1.10% efficiency challenge. This requires an inflation forecast between 2025 and 2030, for which we have used CPIH. The resulting frontier shift is 4.05%.

The econometric position for both our Internal First and External First options is shown below, alongside our calculated industry benchmarks.

Benchmarking analysis is based on a programme of 183,813 meters, equivalent to the number of new installations included in both our Internal First and External First options. Table 54 shows our option costs alongside the econometric benchmarks. All costs are in line with 2022/23 price base.

TABLE 54: NEW METER INSTALLATION BENCHMARKING

	Cost (£m)
External First option	88.66
PR19 Econometric	52.28
APR Installations only	69.37

Our new meter unit rate required to deliver our External First Policy is calculated at £482.34 per meter. While this is shown to be higher than the benchmarks, this is primarily due to the higher proportion of more expensive external installations required by our compulsory metering programme in Essex and Suffolk which will deliver the benefits outlined in Section 2. While an Internal First approach would be more in line with the benchmark, this is only because it relies on a significantly higher proportion of cheaper internal installations.

Benchmarking for replacement smart metering costs

At PR19, our cost for smart readers for replacement meters was the **lowest industry benchmark cost** (£24.85 in 2017/18 prices). Other companies included additional costs at PR19 relating to field visits and network/system connection costs, which were partly allowed – including comms, abortive visits, un-meterable properties and support costs. In the Green Recovery determinations, Ofwat set a “replacement meters” benchmark at £40 in 2018/18 prices – our unit cost for replacement metering is efficient at **£31.60** in 2022/23 prices, and is likely to remain the industry benchmark (lower than our PR19 costs, in real terms).

This is partly because we have not included masts or infrastructure costs, or field and connectivity costs within our unit rates.

Benchmarking for indirect metering costs

At PR19, other companies were funded for some indirect costs, including for example for Thames Water:

- £11m to build smart networks, including masts and infrastructure.
- £3.3m for developing a smart portal and smart operations centre.

Anglian Water was funded for £40m of indirect cost to build smart networks, and Thames was funded £14m. While a direct cost comparison is not possible, due to the range, proportion and varied cost of different activities, we have carried out a high-level benchmarking exercise to broadly demonstrate the relative cost-per-meter associated with metering indirect costs. Table 55 below shows the indirect costs divided by the size of Smart Meter programme for Anglian and Thames, compared to our claim (Thames and Anglian PR19 costs have been adjusted to 2022/23 price base).

TABLE 55: METERING INDIRECT COST BENCHMARKING

	Metering Indirect cost (£m)	Smart Programme (no. of new meters)	Cost per meter (£)
Thames Water	14.282	203,000	70.35
Anglian Water	40.573	538,904	75.29
Northumbrian Water	17.290	664,810	26.02

The figures show that our indirect metering costs, when presented as a cost per new smart meter, are significantly lower than other companies granted funding for similar activities at PR19.

Indirect metering costs for individual activities are more difficult to benchmark with the sector, and we have been unable to derive unit costs across the sector. Instead, we have estimated our costs based on known market rates (such as salaries) and market testing with our supplies (see section 4.1.2). We have compared the individual items to previous smart metering programmes and have provided the details of these costs and how we have estimated them.

4.2.3 Water Efficiency

As described in Section 4.1.3 our water efficiency costs are comprised of multiple elements and based on our existing AMP7 run rates for each activity (such as installation of Home Flow Restrictors, leak investigation and repair etc). While we believe our costs to be efficient, there is no industry data available at sufficient granularity to support cost comparison for these individual components.

However, as with our metering indirect costs, we have carried out a high-level benchmarking exercise based on funding for similar activities granted to companies at PR19 Final Determination. At PR19, Anglian was funded £20.1m for its water efficiency programme related to smart metering. Table 56 below shows a cost-per-meter comparison, based on the scale of investment and the relative size of Smart Metering programme. The figures show that our indirect metering costs, when presented as a cost per new smart meter, are significantly lower than those funded at PR19 for similar water efficiency activities.

TABLE 56: WATER EFFICIENCY LINKED TO SMART METERING COST BENCHMARKING

	Water Efficiency cost (£m)	Smart Programme (no. of new meters)	Cost per meter (£)
Anglian Water	20.100	538,904	37.30
Northumbrian Water	7.594	664,810	11.42

5. CUSTOMER PROTECTION

a) Are customers protected (via a price control deliverable or performance commitment) if the investment is cancelled, delayed, or reduced in scope?
b) Does the protection cover all the benefits proposed to be delivered and funded (e.g., primary, and wider benefits)?
c) Does the company provide an explanation for how third-party funding or delivery arrangements will work for relevant investments, including how customers are protected against third-party funding risks?

Customers are protected through performance commitments and ODIs on leakage and demand reduction. These performance commitments, which reflect the additional performance from enhancement cases as well as the performance achieved from base expenditure, protect customers if our investments do not deliver.

Although metering does contribute considerably to demand reduction, this ODI is not sufficiently large to protect customers. Ofwat has proposed an ODI rate of £1.72m per lpd, which implies a rate of around £27.40 per meter compared to an average cost of £164 per meter, including the smart element of replacement meters. So, we propose a PCD on metering delivery.

5.1. PERFORMANCE COMMITMENTS

Effective demand management measures can reduce the volume of water lost as leakage from our water supply systems and reduce the volume of water consumed by our customers. We are incentivised to reduce leakage through the leakage[7] performance commitment (PC), and to reduce customer consumption through the per capita consumption[8] (PCC) (l/person/d) PC. In turn, protection for customers is provided through these PCs. The leakage and PCC PCs, along with the business demand PC for non-household water consumption[9], span our AMP8 demand management commitments. A summary of our AMP8 PCs is included in Table 57.

TABLE 57: SUMMARY OF AMP8 DEMAND MANAGEMENT PERFORMANCE COMMITMENTS

Performance Commitment	AMP8 (2029/30) target compared to 2019/20 baseline	AMP7 (2024/25) target compared to 2019/20 baseline
Leakage	21% in each area (in line with 50% by 2050)	15% in NW, 17.5% in ESW
Per Capita Consumption	9.7%	5.3%

[7] Ofwat, 2023, PR24 Common Performance Commitments, Leakage, Version 0.2.
[8] Ofwat, 2023, PR24 Common Performance Commitments, Per capita consumption (PCC), Version 0.2.
[9] Non-household demand management is covered in our WRMP Non-Household Enhancement Business Case.

We will continue to report on our progress reducing leakage and PCC in AMP8 through our Annual Performance Reports, and for reducing PCC in AMP8 through our WRMP annual reviews to the EA.

For leakage, Table 35 and Table 36 show that our proposed enhancement expenditure has a total impact of 26.57 Ml/d on our leakage PCs – as taken across all five years, as Ofwat's proposed ODI would apply annually. This implies a penalty of £9.6m if we did not deliver any leakage enhancement at all. This is 46% of the average cost of the investment; less than the 60% threshold set by Ofwat for ODIs to protect the investment. However, our leakage enhancement investment is 0.9% of our water totex, and therefore fails the materiality test.

For water efficiency, our enhancement expenditure of £7m will deliver a reduction in PCC of 2.7 l/p/d by 2030. The Ofwat ODI of £1.72m per l/p/d would imply a penalty of £5.25m if this is not delivered at all, which is more than the 60% threshold (at 75% of the total enhancement expenditure). Therefore, no PCD is required. In addition to this, our water efficiency enhancement investment is 0.3% of water totex and so this fails the materiality test.

5.2. PRICE CONTROL DELIVERABLES

Our approach to determining Price Control Deliverables (PCD) is outlined in section 12.3 of **A3 – costs** (NES04). Our assessment has highlighted that the benefits we expect to deliver through our 2025-30 demand management enhancement programme will mostly be measured through the leakage and PCC PCs, providing protection for customers.

In addition, given the scale of our 2025-30 smart metering programme, we have included a PCD related to delivery of our 2025-30 metering plan, to make sure our customers are protected. In Table 58 below, we assess these enhancements to test if the benefits are linked to PCs; against Ofwat's materiality of 1%; and to understand if there are outcome measures that can be used. We group together metering lines.

TABLE 58: ASSESSMENT OF BENEFITS AGAINST THE PCD CRITERIA

Enhancement scheme	Benefits linked to PC?	Materiality	Possible outcomes?
Water resources – leakage (NES15)	Fail – benefits to leakage	Fail – 0.9%	Outcome covered by leakage performance commitment
Water resources – metering (NES15)	• Partial fail – benefits of metering to PCC • Partial fail – benefits of metering to leakage	Pass – 4.3%	Partial link to PCC. Number of meters installed
Water resources – PCC (NES15)	Fail – benefits to PCC	Fail – 0.3%	Outcome covered by PCC performance commitment

Ofwat's guidance on PCDs suggests that for metering PCDs, the number of meters should be identified as the deliverable. This should be split by type of work (new installation or upgrade) and technology (basic, AMR, AMI). Ofwat will then consider whether to aggregate deliverables across meter types and technology in the determination process, depending on the extent to which these factors affect costs.

As we set out through this enhancement case, we have split our metering costs into new installations and upgrades, with **only** fully smart (AMI) meters installed during 2025-30. However, we have demonstrated that different installation options have quite different costs – and so we propose that our PCD should be split by installation location. This protects customers in the event that, for example, we decided to complete only internal installations to avoid costs.

Table 59 shows the mix of installations and the implied PCD rate for each. This is the same as the unit costs from Table 42 and Table 47 for meter replacement above.

TABLE 59: NEW METER COSTS BY INSTALLATION TYPE

Location	Unit Cost (£)	Total count	Total cost (£m)
Drop in	100.88	58,178	5.918
Internal installation	165.51	37,959	6.321
External installation (Private)	657.10	10,555	6.943
External installation (Public)	781.10	77,122	60.332
Total		**183,813**	**79.514**
Meter replacements (enhancement only)	31.60	**480,997**	**15,200**

Ofwat's guidance is not clear on how PCDs should be adjusted for ODIs: these are included when assessing if ODIs would recover at least 60% of the investment in Section 1 of the guidance; but not when considering these in Section 4. Ofwat says that it will consider the extent to which they will net off ODI payments from PCD payments once they see business plans, and that companies should submit evidence in business plans where they consider that net-offs or other adjustments should be applied.

We consider that these *should* be reduced by the expected impact on ODIs for metering, as it could be appropriate to switch between different demand management options if the costs of these change in-period (for example, there should be no barrier to delivering fewer meters if these are not needed due to higher performance through cheaper water efficiency measures – such as, for example, national action on reducing water demand). This PCD should not expose us to additional risks beyond the assessment of RORE in the PR24 methodology.

These are calculated as shown in Table 60.

TABLE 60: ODI PENALTIES FROM NON-DELIVERY OF METERING

Location	ODI PENALTY PER METER (£)	Total count	Total penalty (£m)
Drop in	54.64	58,178	3.179
Internal installation	54.64	37,959	2.074
External installation (Private)	54.64	10,555	0.577
External installation (Public)	54.64	77,122	4.214
Total		**183,813**	**10.044**
Meter replacements (enhancement only)	12.09	**480,997**	**5.815**

The total penalty shown in this table can be derived from Table 34 in Section 3.2.4, which shows that the ODI penalty from not delivering metering at all would be £15.858m. From this analysis, we can show that ODIs cover less than 60% of the costs of metering, and therefore a PCD should apply.

These PCDs should be set at the following rates (with calibration shown at different cost sharing rates). This is calculated as the unit cost minus the impact on ODIs per meter as shown in Table 61.

TABLE 61 : PROPOSED PCD RATES, METERING

Location	PCD rate (no calibration)	50% cost sharing	45% cost sharing	40% cost sharing	Baseline expected
Drop in	£46.24	£23.12	£25.43	£27.74	58,178
Internal installation	£110.87	£55.44	£60.98	£66.52	37,959
External installation (Private)	£602.46	£301.23	£331.35	£361.48	10,555
External installation (Public)	£726.46	£363.23	£399.55	£435.88	77,122
Meter replacements (enhancement only)	£19.51	£9.76	£10.73	£11.71	480,997

The delivery of our metering programme is set out by year in our business plan tables, and so Ofwat will be able to use this to monitor our progress throughout the PR24 period. We estimate that ODIs would provide around annualised protection to customers of around 3.3% of the total forecast expenditure, and so no additional time incentive is required under the Ofwat guidance. Delays in delivering meters would lead to higher ODI penalties overall. A summary of our PCD for metering is outlined in Table 62.

TABLE 62: SUMMARY OF THE PRICE CONTROL DELIVERABLE FOR METERING TO PROTECT CUSTOMERS

Description of price control deliverable	We will return money to customers in the PR29 final determinations based on a unit rate for meters delivered, split by drop-in; internal; external (private); external (public); and replacements with a smart meter module (as in Table 61 above). This will be calculated by multiplying the PCD rate by the actual number of meters installed in AMP8 for each type of installation, and then adding these results to calculate an "actual allowance". The total "PCD baseline allowance" is calculated by multiplying each PCD rate by the baseline expected numbers in Table 61 above. For example, using the "no calibration" PCD rates used above, this would be £78.668m. We would then return money to customers equal to the "PCD baseline allowance" minus "actual allowance", or zero if the "actual allowance" is greater than the "PCD baseline allowance".
Measurement and reporting	We will report the number of meters installed in our APR (for new meters and replacement meters, this is currently reported in APR Table 6D), and we will track the types of installations as one of our metering programme KPIs. Ofwat does not currently collect information on internal and external installations, but we recommend that they consider doing so from 2025/26.
Conditions on allowance	No additional conditions – this should include the final baseline numbers and "PCD baseline allowance" after calibration.
Assurances	We will provide external assurance with our PR29 business plan on the number of actual and projected installs of each type, and a calculation of the amount of money returned to customers. PCDs cannot currently be included within in-period determinations of ODIs, so Ofwat will need to set out how this would be reconciled for the "blind year" in 2029/30.
Price control deliverable payment rate	Variable, as per Table 61 and the description of calculation
Impact on performance in relation to performance commitments	The impact of this enhancement expenditure on PCC is set out in this business case and in our business plan tables.