

Growth Cost Change 2026

Growth at Sewage Treatment Works – WwTW capacity for New Homes

UUW26-07

April 2026

Executive Summary

United Utilities Water (UUW) is committed to supporting the Government's objectives for economic growth and housing delivery by taking a long-term, strategic approach to wastewater infrastructure planning across the North West and proactively removing barriers to development. This enhancement case identifies 34 wastewater treatment works (WwTWs) where accelerated investment is required to support forecast population growth in line with the Government's 10-year infrastructure and housing ambitions.

The programme represents an estimated £309.4m of totex investment, delivering additional capacity equivalent to 116,498 population equivalent (PE) by 2050, supporting approximately 49,000 new homes across the region. This includes delivering housing in significant growth pressure areas in and around Greater Manchester, as well as growth in other urban and rural locations across the North West.

UUW proposes to invest ahead of demand, assessing growth risk to 2035 and designing solutions for a 25-year horizon to 2050. This approach recognises the scale and pace of emerging housing and industrial growth, including the Government's ambition to deliver 1.5 million new homes, increased demand from data-intensive industries, and the development of new strategic growth locations. By building for long-term need rather than incrementally responding to short-term pressures, UUW ensures that wastewater treatment capacity does not constrain housing delivery while delivering more efficient outcomes for customers over time.

The proposed investment has been identified through UUW's Drainage and Wastewater Management Plan (DWMP) assessment process, using updated local planning data and population forecasts. All sites have been robustly screened to confirm that the investment is distinct and incremental to funding provided at the PR24 Final Determination, with no duplication of AMP7 or AMP8 allowances. The approach is consistent with methodologies endorsed by Ofwat in its PR24 determinations for forward-looking growth claims and focuses on sites where forecast growth would otherwise materially erode treatment headroom and create future compliance risks.

The programme will ensure that the identified WwTWs can appropriately treat projected flows and loads arising from growth, maintaining compliance with dry weather flow (DWF), flow-to-full-treatment and final effluent permit requirements. Investing early avoids the need for repeated, reactive upgrades across future AMPs, reducing whole-life costs and disruption to customers and communities.

The case demonstrates strong value for money, with the proposed solutions delivering higher whole-life benefits than alternative options. The investment safeguards environmental outcomes by preventing deterioration in receiving water bodies as development comes forward and supports wider economic benefits, including the creation of around 1,200 jobs across the supply chain. Customer research also indicates broad support for proactive efficient investment in wastewater infrastructure to enable growth.

UUW has developed a clear and deliverable programme for AMP8, supported by supply-chain engagement, risk mitigation and proportionate customer protection through scheme-level price control deliverables. Overall, this enhancement case presents a robust, evidence-based and forward-looking investment programme that supports national growth ambitions, protects the environment and delivers a stronger, greener and healthier North West.

Contents

| | | |
|-----------|--|-----------|
| 1. | Guide to evidence | 4 |
| 1.1 | Growth cost change document signposting | 4 |
| 2. | Investment need..... | 5 |
| 2.1 | Supporting growth across the North West | 5 |
| 2.2 | Targeting the investment..... | 6 |
| 2.3 | Why invest now..... | 11 |
| 2.4 | This investment is incremental to the PR24 FD | 12 |
| 2.5 | Accelerating economic activity supports economic growth | 13 |
| 2.6 | Investing now allows us to install capacity ahead of demand..... | 13 |
| 2.7 | Stakeholder Engagement | 14 |
| 3. | Best Option for Customers..... | 16 |
| 3.1 | Alignment with Strategic Optioneering | 16 |
| 3.2 | Optioneering Methodology | 16 |
| 3.3 | Proposed Solutions | 18 |
| 3.4 | Best Value Assessment | 21 |
| 3.5 | Customer research | 23 |
| 4. | Demonstrating cost efficiency..... | 25 |
| 4.1 | Costing Methodology | 25 |
| 4.2 | Aligning to PR24 efficient costs..... | 25 |
| 4.3 | Including updated I_{max} guidance in this submission | 26 |
| 4.4 | Post-modelling adjustments | 29 |
| 4.5 | Expenditure profile | 30 |
| 5. | Customer Protection..... | 31 |
| 5.1 | Price Control Deliverables..... | 31 |
| 5.2 | Performance Commitments..... | 32 |
| 6. | Investment Delivery Plan..... | 34 |
| 6.1 | Deliverability | 34 |
| 6.2 | Managing design and delivery risks | 34 |
| 6.3 | Risks with mitigation plans | 35 |
| 6.4 | A comprehensive delivery programme..... | 36 |
| 7. | Assurance | 39 |

1. Guide to evidence

Table 1 shows where key evidential components of our case are located within the document or its annex. It is to help readers navigate to the supporting information that underpins our assessment and justification and provide clarity on which key evidential requirements our document is focused on. Alphabetic references are to *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex*.

1.1 Growth cost change document signposting

Table 1: Signposting to key sections of the document

| Assessment area | Key requirements | Section reference |
|--|---|-------------------|
| Need for step change in investment | Growth in demand beyond PR24 forecasts. | 2.2, A |
| | Demonstrated there is no overlap with PR24 base or enhancement allowances. | 3.2 |
| | Demonstrated clear evidence of insufficient surplus capacity. | 4.2, 4.3, 4.4, A |
| | Alignment with other regulatory processes (e.g., WRMP annual reviews). | 2.3 |
| | Risks to service arising from increased demand. | 4.2, 4.4, A |
| | Progress update on existing PR24-funded investments. | 5.1 |
| Best option for customers | Summary of customer and stakeholder engagement on needs. | 2.7, 3.5 |
| | Strategic alignment with long-term planning frameworks (WRMP, DWMP etc.). | 2.3 |
| | Consideration of a broad, innovative longlist of options. | 6.1, B |
| | Whole-life assessment of value for customers and the environment. | 3.4, E |
| | Review of opportunities to accelerate planned future schemes. | 3.5 |
| Robust and efficient costs | Quantified customer and environmental benefits. | 3.4, E |
| | Evidence of customer engagement on options. | 3.5 |
| | Use of established costing methodologies. | 3.4, 5.1 |
| | Demonstrate efficiency via benchmarking, including: PR24 benchmarks, historical outturns, external benchmarks, procurement and third-party assurance. | 5.1 |
| | Detailed cost breakdowns showing full cost build-up. | 3.4 |
| | Evidence that costs do not overlap with existing funded PR24 base allowances. | 4.2 |
| Customer protection | Explanation of differences from historical or comparative benchmarks. | 1, 5.1, C |
| | For accelerated AMP9 spend: show early delivery is efficient and in customer interests. | 3.4, 4.2 |
| | Propose a Price Control Deliverable (PCD) for each investment proposal to monitor delivery and protect customers. | 5.1 |
| Investment delivery plans | Confirmation that deliverables cover scope and benefits. | 7 |
| | Identification and management of design and delivery risks, and these are being monitored and mitigated. | 6.2 |
| | Evidence of engagement with relevant stakeholders, including evidence of permissions or consultation (EA, DWI, local authorities). | 2.7, 2.3 |
| | Evidence of supply-chain readiness and resource availability. | 6.2, 6.4 |
| | Demonstrate that our AMP8 commitments are on track, providing confidence in deliverability. | 6 |
| Outline delivery schedule (detailed version available on request). | 6.2 | |

Source: *UUW analysis*

Please note that evidence to support this case can be found in both this case and its respective annex. Therefore, both documents should be read together.

2. Investment need

This section sets out the case for accelerated investment at 34 WwTW due to forecast housing and population growth beyond PR24 assumptions. It explains why investing now—using updated DWMP data and a 25-year planning horizon—avoids future capacity constraints, supports national growth objectives, and is fully incremental to existing allowances.

2.1 Supporting growth across the North West

- 2.1.1 UuW is committed to supporting the Government’s objective¹ of driving economic growth opportunities by taking a long term approach to needs across the North West and actively removing barriers to growth. To this end, these proposals set out our plans for investing at Sewage Treatment Works. In line with Ofwat’s Growth Guidance² we are proposing a totex investment of £309.4m aimed at increasing the capacity of our existing sewage treatment facilities to accommodate rising demand from new housing developments, commercial premises and industrial activities. Through this enhancement we will deliver additional capacity to accommodate the equivalent of 49,000 new homes and 116,498 PE.
- 2.1.2 Since our PR24 business plan submission, significant further demand has emerged including the Government’s ambition to deliver 1.5 million new homes over five years and new industrial growth associated with data centres and third party infrastructure. In particular, the Government’s Plan for Change³ has introduced additional target of approximately 65,000 homes in the North West by 2030 alongside an ambitious industrial strategy⁴. There have also been new designations of greenfield sites through the New Towns Taskforce⁵ and a renewed commitment to growth by the Places for Everyone⁶ programme by the Greater Manchester Combined Authority.
- 2.1.3 UuW plays an important role in enabling and supporting the growth in the North West and we are required to meet statutory obligations by ensuring new developments have sufficient wastewater network capacity, and the resultant flow and load is treated to the required standard to protect watercourses now and for the long-term.
- 2.1.4 Our WwTWs have a broad range of flow and load capacity. In many locations, capacity is gradually being utilised from growth generated by new development, which we monitor and then plan to intervene at the most appropriate and cost-effective time.
- 2.1.5 The choice of catchment solutions to accommodate growth is limited by the discrete sewer drainage systems that do not allow interconnectivity, particularly in urban areas with an extensive network discharging to a single treatment works. In most cases, therefore, investment in infrastructure due to growth is often confined to the receiving WwTW and involves the construction of additional process capacity, either to complement existing process units or replace them entirely with larger assets. Without carefully considered and timely investment, the increased flow and load could result in WwTWs operating beyond their design capacity, causing risk to permit conditions and becoming a barrier to growth and development.

¹ [Budget 2025 factsheet: driving economic growth - GOV.UK](#)

² [Cost-change-process-information-notice.pdf](#)

³ [Plan for Change - GOV.UK](#)

⁴ [Industrial Strategy - GOV.UK](#)

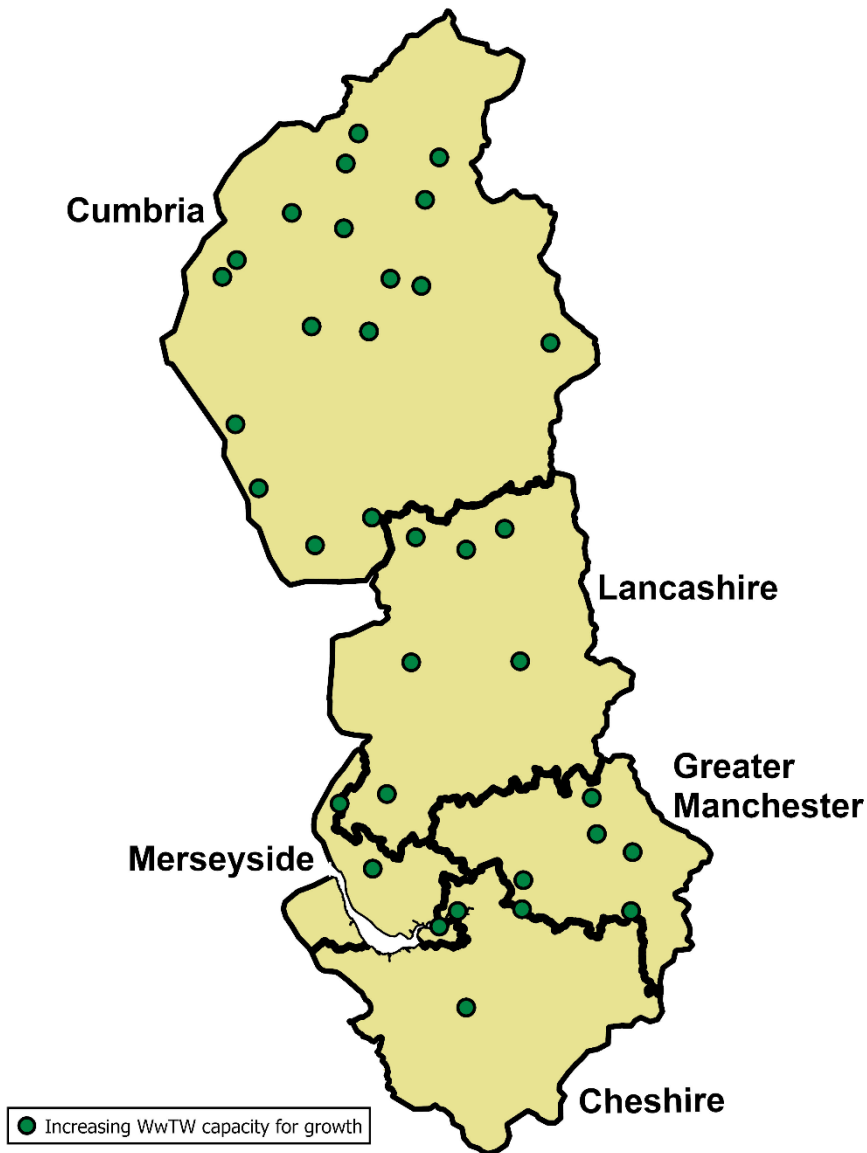
⁵ [The New Towns Taskforce - GOV.UK](#)

⁶ [Places For Everyone - Greater Manchester Combined Authority](#)

2.2 Targeting the investment

- 2.2.1 **This enhancement case proposes accelerated investment across the North West to accommodate forecasted population growth. It will deliver the capacity to treat an additional 116,498 PE at 34 WwTWs. These are outlined by submitted data table 6_1 STW.**
- 2.2.2 To support the Government's housing ambitions and looking beyond the needs of AMP8, we can forecast where capacity will occur. Timely investment can unlock the potential for accelerated house building and prevent treatment capacity being a blocker for delivery of new homes to meet local demand.
- 2.2.3 We have identified additional requirements for 34 WwTWs and 116,498 added capacity in PE through our growth approach, discussed in detail in the following section. We believe these sites present a real need for accelerated infrastructure due to growth forecast up to 2035 and propose to deliver these projects in AMP8. This is in addition to our existing AMP8 allowances that we will continue to utilise wisely using the flexibility of the programme to respond to any changes in growth needs. This enhancement case is supplemented by 6_1 STW data table which provides specific details for each named site.
- 2.2.4 Figure 1 below shows the locations of WwTW where we have identified a need to invest due to projected growth from known or local housing plans.

Figure 1: Map of 34 locations in North West of England included within this business case



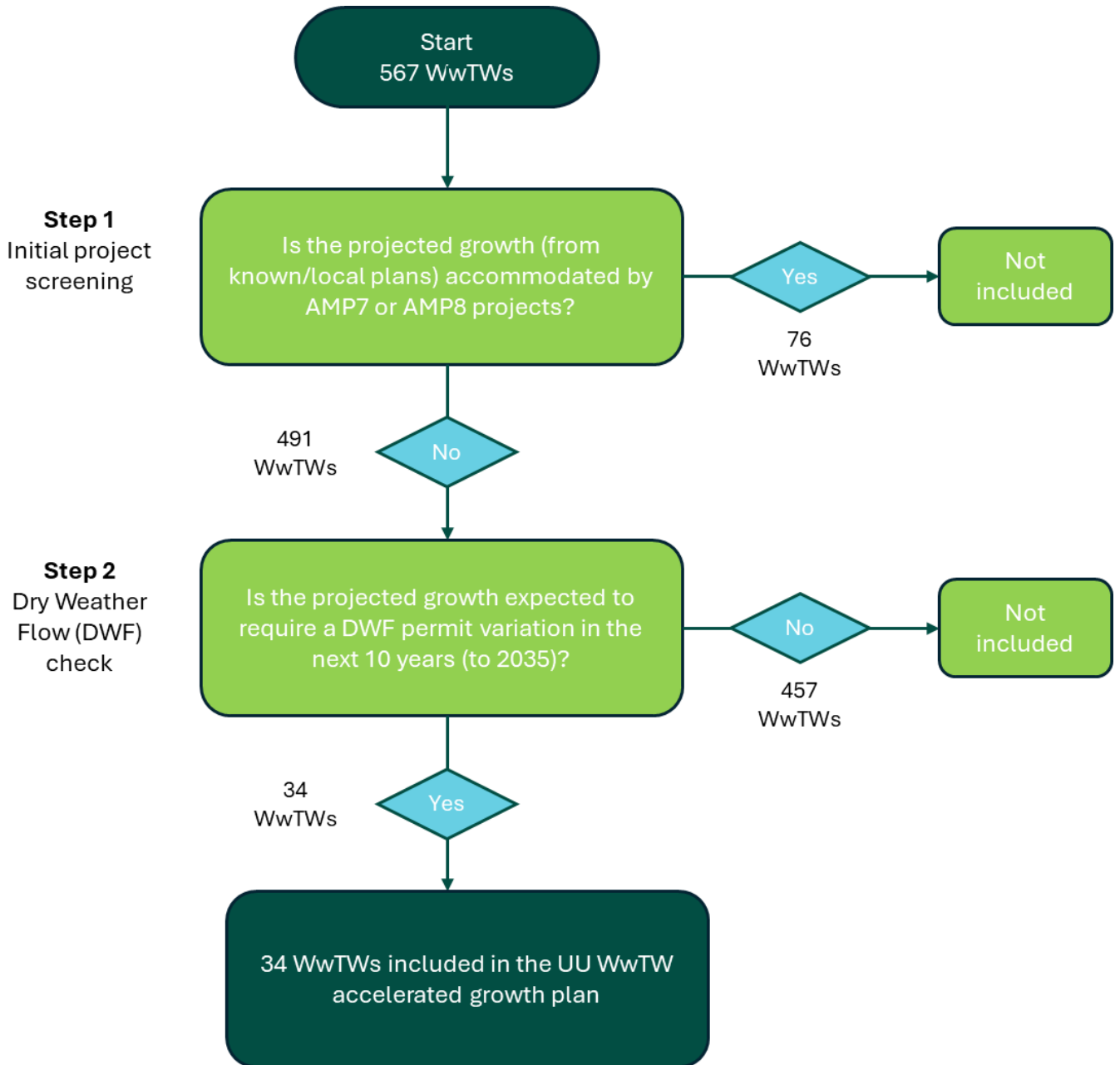
Source: UUW ArcGIS map of 34 sites

- 2.2.5 This enhancement case is centred on the following principles:
- We have assessed investment needed to meet future growth beyond AMP8 (risk being forecast in the period 2025 to 2035) using a methodology implemented by other water companies and endorsed by Ofwat in its Final Determination (FD).
 - The investment set out within this enhancement case is distinct and incremental to that reflected in our PR24 FD. We will evidence that there is no double funding or duplication with our existing AMP8 plans.
 - We are investing our existing AMP8 allowances wisely to minimise the amount of additional investment required.
- 2.2.6 We expect to deliver the accelerated infrastructure due to growth in AMP8, discussed in more detail in section 6 below. We summarise our totex investment per year in section 5.1, Table 5.

Our methodology to accelerate infrastructure due to growth

2.2.7 This section explains how we have identified our proposed investment programme. The approach we have taken is consistent with the approach endorsed by Ofwat when considering forward looking claims in its PR24 final determination (FD). Figure 2 shows our approach, which is further explained below.

Figure 2: Methodology for accelerated infrastructure due to growth



Source: UUW analysis

Step 1 – Is the projected growth (from known/local plans) accommodated by AMP7 or AMP8 projects?

2.2.8 This first step screens out any projects delivered by AMP7 or which are currently in delivery in AMP8 where the growth is already accounted for by the project. This therefore ensures we are excluding any schemes included within our PR24 FD and ensures there is no overlap with existing allowances. This filter removes 76 WwTWs (491 WwTWs remaining). Where we have existing projects on sites in AMP8 that do not deliver the growth needs, we have ensured that there is no duplication in the scope and that costs to deliver the additional requirements to meet the future growth are identified separately.

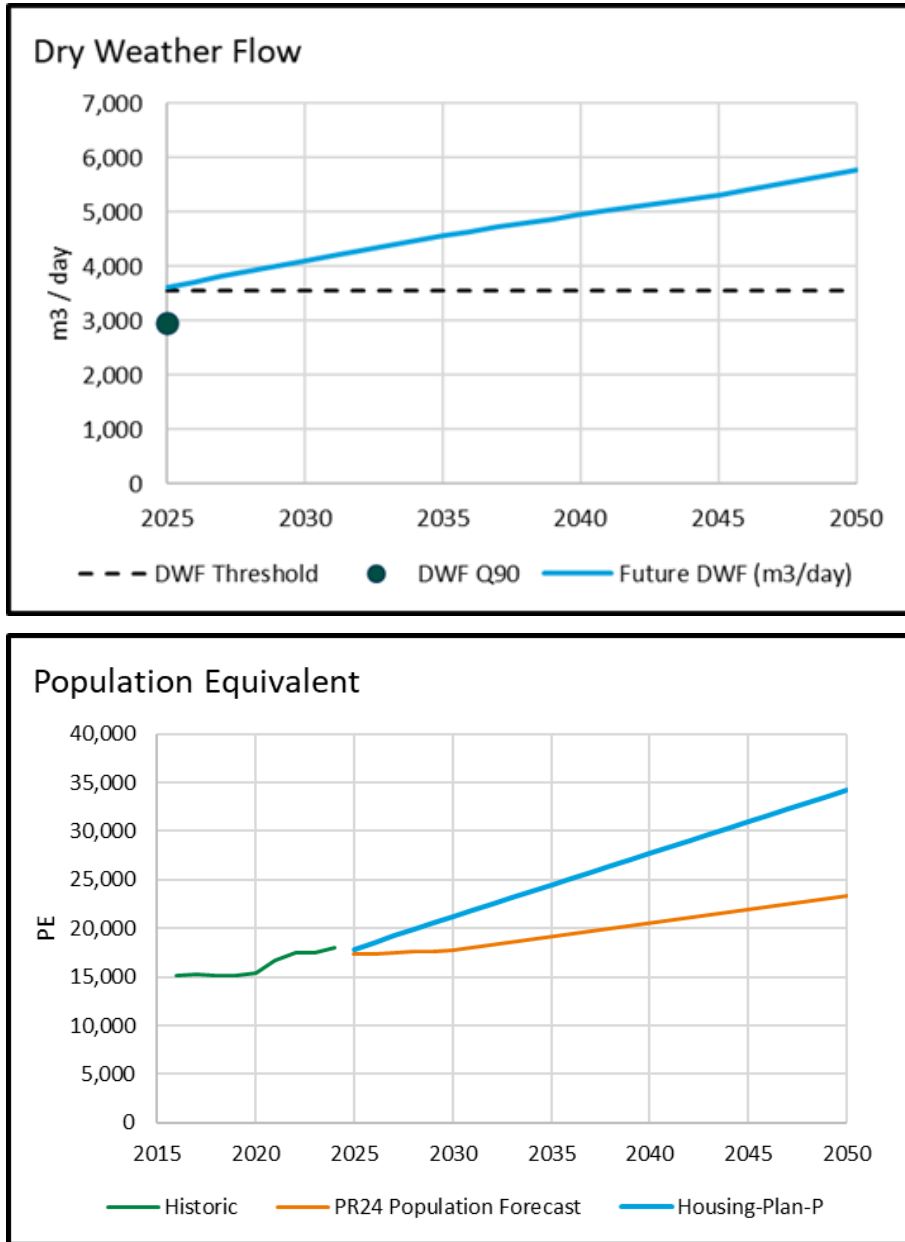
Step 2 – Is the projected growth expected to require a DWF permit variation in the next 10 years (to 2035)?

- 2.2.9 We test whether a site's DWF⁷ forecast is likely to require the DWF permit to be varied within the period 2025 to 2035. We assess this over a ten-year period because this provides the appropriate balance of certainty and investing ahead of need. This approach was endorsed by Ofwat in its PR24 FD⁸. At this stage we filter out sites which do not have regulatory flow measurement for DWF as they are below the threshold for measurement and flows at this level are challenging to accurately measure. In this stage, we also remove any sites where we've identified the need for further investigation regarding the growth forecasts or monitored flows.
- 2.2.10 For each of our sites we have undertaken a demand forecast assessment, using forecast population data to calculate future DWF - see *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex* Appendix A for DWF and PE graphs for each site within this enhancement case. The figure below shows how DWF is expected to change over time. The DWF permit is set at the Q80 or calculated using the DWF formula (i.e. $DWF = PG + I + E$). The DWF compliance is measured at the 10th percentile or 90% of a year's total daily flow; this is known as the Q90.
- 2.2.11 From 2026, all sites with a DWF permit will be assessed against a common methodology. This assessment will review compliance against the DWF permit in the current calendar year, if the Q90 is exceeded then the EA will look back over the previous four years. If a site has exceeded the Q90 in two of four years, then this would be considered non-compliant. This assessment is known as the three in five year assessment. We have assessed all sites against the three out of five year assessment in 2025 and all 34 sites included within this enhancement case are compliant.
- 2.2.12 In addition to a standard assessment being introduced into permits from 2026, the EA intend to include an assessment of DWF within the annual environmental performance assessment (EPA) from 2031 following a period of shadow reporting. This demonstrates how regulators are starting to look differently at our data and demonstrates why it is important to forecast when population growth may result in an exceedance of the DWF permit. The DWF is impacted by factors outside of our control such as annual rainfall, domestic consumption and population growth.
- 2.2.13 Figure 3 demonstrates how growth in population can result in a change in calculated DWF over time. The measured Q90 (dark green dot) is below the permitted DWF (dashed line) which demonstrates that this site has not exceeded the permitted DWF in the year stated. The forecast DWF calculated using the formula $DWF = PG + I + E$ and represented on the graph by the blue line shows an upward trajectory beyond the current permit. This suggests that there is a reduction in headroom at the WwTW due to growth and that the WwTW may be operating beyond the design capacity. Site specific intervention is required to prevent potential compliance risk as a result of population growth.

⁷ <https://www.gov.uk/government/publications/calculating-dry-weather-flow-dwf-at-waste-water-treatment-works/calculating-dry-weather-flow-dwf-at-waste-water-treatment-works>

⁸ <https://www.ofwat.gov.uk/publication/overview-of-severn-trent-water-pr24-final-determination/>

Figure 3: Graphical representation of DWF change over time because of growth in PE



Source: UUW analysis of measured and forecast data (flow, load and PE) for a WwTW

- 2.2.14 Step 2 removes 491 WwTW, leaving 34 WwTW remaining for inclusion within this business case, details of which are set out in data table 6_1 STW. We recognise there are some sites which are indicated not to comply with their DWF permit in 2022; however all sites included within the enhancement case are compliant against the 3 out of 5 year DWF assessment in 2025 and therefore are all compliant WwTWs. This enhancement case is focussed solely on investment for growth.
- 2.2.15 Where a WwTW is expected to require its DWF permit to be varied in the period 2025-2035 due to population growth, we propose to invest in AMP8 ahead of the planned development. The WwTWs will be designed for the growth projected over the 25-year period. This will ensure that our service has the capacity to accommodate future expected economic growth.
- 2.2.16 Adopting a single 25-year design horizon will deliver more cost-effective, long-term solutions and accelerate benefits for customers by upgrading treatment works once in a 25-year period to accommodate growth, rather than making incremental upgrades across multiple AMPs.

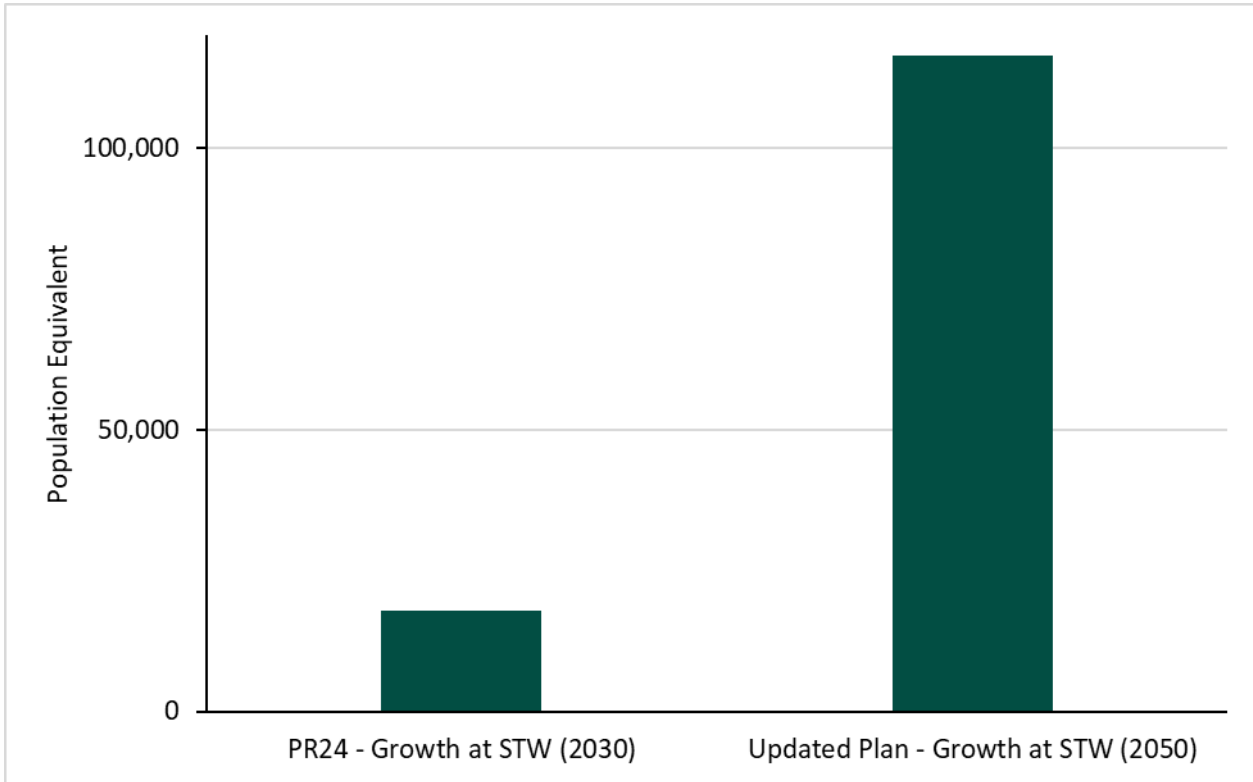
2.3 Why invest now

- 2.3.1 Our growth plans align to our 2023 DWMP23 which assesses the risk of growth across the region and provides a long-term (25-year) view on where and when increased capacity may be needed. The 34 sites named in this enhancement case have been identified from updated DWMP population forecast data, which are based on population data that comes from known/local plans.
- 2.3.2 In compiling this submission, UUW has applied an updated and more forward-looking methodology than that used in our PR24 business plan. In particular, we have reviewed the DWMP data for growth risk from 2030 to 2035. This enables us to support future growth and accommodate housing plans that could be accelerated at the identified locations.
- 2.3.3 Since submission of the PR24 business plan, UUW has seen increased engagement from regulators and government regarding how the sector is preparing for accelerated growth. This enhancement case directly responds to that challenge by demonstrating proactive planning and timely intervention to support future development.
- 2.3.4 As outlined previously, our PR24 business plan provided for housing growth in line with known local plans and addressed risk to WwTWs that was forecast to materialise in the period 2025 to 2030. Since then, the Government has announced plans aimed at accelerating economic growth⁹, building 1.5 million new homes by 2030¹⁰ and introducing a 10-year infrastructure strategy.
- 2.3.5 In light of these policy developments, this proposal extends the assessment horizon to 2035 and makes interventions where material risk is observed to prepare these treatment works for future needs. As set out in section 2.1 above, we have identified 34 WwTWs where accelerated infrastructure investment driven by growth would support the Government's 10-year infrastructure objectives.
- 2.3.6 As a result of applying updated DWMP growth data, UUW has identified a material increase in forecast PE at the 34 sites compared to the assumptions that underpinned the PR24 business plan. This reflects both updated population information and a more forward-looking assessment of growth risk aligned to current government policy.
- 2.3.7 Figure 4 provides a high-level comparison between the growth assumptions included at PR24 and the updated growth outlook now identified for these sites, assessed against the 2025 baseline. The updated assessment indicates substantially greater future growth pressure than was previously assumed, indicating that the scale and timing of risk at these WwTW has increased.
- 2.3.8 This change in the evidence base strengthens the case for bringing forward targeted investment to ensure that wastewater treatment capacity is available when required. Acting now allows UUW to respond proportionately to updated growth expectations, support accelerated housing delivery, and avoid the risk of capacity constraints emerging as growth materialises.

⁹ <https://www.gov.uk/missions/economic-growth>

¹⁰ <https://mhclgmedia.blog.gov.uk/2024/07/31/our-plan-to-get-britain-building-again/>

Figure 4: Increase in PE relative to 2025 for 34 sites included in this growth case



Source: U UW analysis

- 2.3.9 There are some instances where the growth plans are still maturing, such as the development of large garden villages in several locations within the region (examples include Cuerdale garden village near Preston and Blackburn and the Handforth garden village in Cheshire). Places for Everyone is also an example where growth has been developing, and we have been monitoring this as part of our longer-term planning.
- 2.3.10 There are 7 sites, of the 34 included within this enhancement case, that also have an AMP8 project to deliver tighter final effluent limits however do not deliver enhancement for growth. At these sites, we observe an average population increase of 39% over the design horizon, resulting in additional capacity for 25,000 PE compared to that presented at PR24.

2.4 This investment is incremental to the PR24 FD

- 2.4.1 We outline in section 2.2 our methodology to determine a programme of sites for accelerated infrastructure at WwTWs due to growth, the graphs presented in *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex* show how population forecast differ from our the forecasts presented within our PR24 plan and data tables which further supports the need to invest for growth in AMP8 at the 34 sites identified. In our methodology we remove any WwTW where an AMP7 project has delivered, or an AMP8 project will accommodate, the forecasted growth to 2025. This includes removal of the 12 sites identified and funded through our PR24 plan for investment due to growth. We have also ensured there is no overlap with the investment proposed as part of our Asset Health cases.
- 2.4.2 Where sites have an AMP8 project that does not deliver the growth requirements we have investigated how we could deliver all requirements efficiently and effectively to prevent abortive work as a result of multiple drivers on a single site. In addition, we have ensured that there is no duplication of cost and ensured that costs can be attributed to specific drivers to avoid double counting.

2.5 Accelerating economic activity supports economic growth

2.5.1 As set out in Section 5, this enhancement case represents £309.4m of investment for WwTWs growth. This acceleration in economic activity means we could expect in the region of 1,200 additional jobs to be created from this case for accelerated infrastructure to support growth.

2.6 Investing now allows us to install capacity ahead of demand

2.6.1 When deciding how to invest customers' money at our WwTWs for growth, it is paramount that the uncertainty of growth forecasts is carefully balanced with providing wastewater treatment capacity for the future. There are high profile cases in England where concerns about meeting water demand have acted to limit regional capacities for growth¹¹, reinforcing the need to ensure sufficient investment for growth so that it anticipates future needs.

2.6.2 Some of our accelerated growth projects could take several years to design, construct and commission so it is essential that UUW invests ahead of demand to ensure appropriate treatment capacity for when the growth materialises.

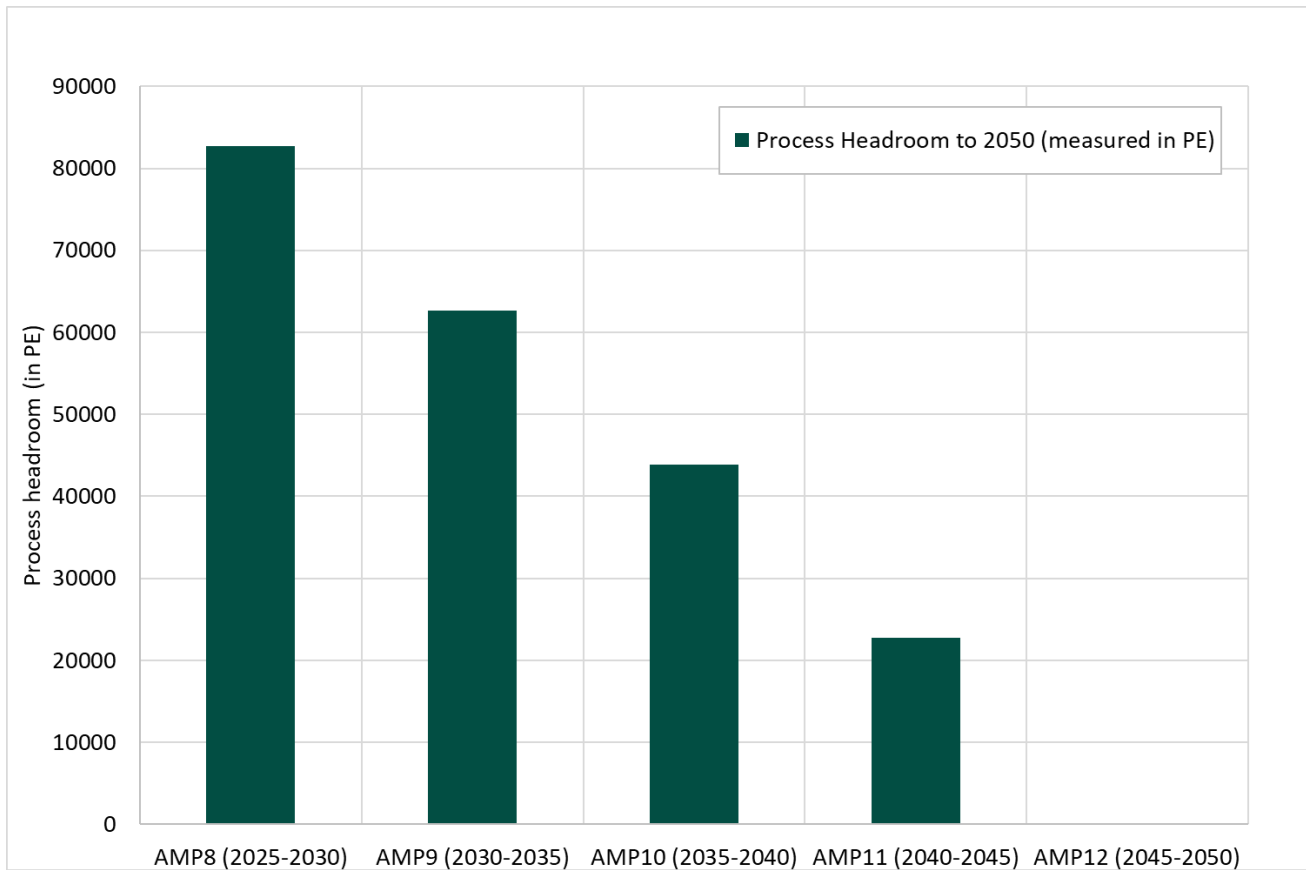
2.6.3 Accelerated investment at WwTWs due to growth will help ensure we meet the expectations of customers, stakeholders and the Government in ensuring there is sufficient capacity at our WwTWs for new development to take place. At a practical level, accelerating infrastructure at our WwTWs through added process capacity will ensure:

- Cost effective intervention and reduced impact to customers through upgrading treatment works once in a 25-year period for growth rather than incrementally over multiple AMPs; and,
- Resilient service to customers for the here and now, and in the future for when the growth materialises.

2.6.4 The WwTWs outlined in this plan will see a peak DWF in the next 10 years which justifies the need for accelerated investment now, to ensure we are able to support growth. Investing now for a 25-year growth period ensures our named WwTWs in this enhancement case have the capacity to treat the growth as it materialises. Figure 5 below shows the process capacity (measured in PE) at the 34 WwTWs included in this enhancement case. The figure shows that installing additional treatment capacity now for the future 2050 population means there is extra treatment capacity (process headroom) at each of the works. This process headroom, which in practical terms provides added flexibility and treatment resilience, gradually diminishes AMP on AMP as the population growth comes online (absorbing the process headroom) until the end of the 25-year design horizon where the 34 WwTWs in this enhancement case would theoretically be at their design capacity with no process headroom remaining. We continue to monitor how Government plans for housing growth develop and the impact of other factors such as water usage and changes in trader discharges may impact wastewater treatment capacity, we will look at adaptive pathways within our DWMP and adjust plans at PR29 where necessary.

¹¹ <https://www.bbc.co.uk/news/articles/c789qvwp4g6o>

Figure 5: Chart showing process headroom (measured in PE) each AMP for 34 WwTWs



Source: UUW analysis of forecast population growth and associated flows on WwTW capacity

2.7 Stakeholder Engagement

- 2.7.1 We held a meeting with the Environment Agency on 17 March to explain our intentions to submit asset health investment cases across a range of water and wastewater assets. We followed this up with a letter setting out our proposals and high-level indications around cost. We received a response on 25 March explaining that the Environment Agency will be working jointly with Ofwat to assess the proposals where those proposals are relevant to the Environment Agency. Due to the collaborative model of business case assessment, the Environment Agency will not provide additional supporting comments ahead of the submission deadline.
- 2.7.2 We have also carried out customer research (see section 3.5) and engaged with YourVoice - the independent challenge group for the North West, which comments on our specific research proposals via a subgroup set up specifically for this purpose. For this growth submission, we engaged with YourVoice at the Customer Engagement Sub Group meeting on the 29th January 2026, in which we provided a high-level overview. We followed up by presenting the customer research materials for review and comment, and a YourVoice representative – Bernice Law, attended both the regional growth and asset health focus groups to ensure the research was high quality and neutral.
- 2.7.3 In addition, we have been engaging with a range of stakeholders to shape our ambition for the DWMP, including local authorities, the North West Regional Flood and Coastal Committee (RFCC), the Environment Agency and Ofwat. These conversations have helped us understand regional priorities and the issues that matter most to the communities in the North-West, and this insight readily transfers across to this submission.
- 2.7.4 At our rural and urban workshops in October and December 2025, held at the Cheshire Mid-Mersey Strategic Flood Partnership meeting and the Irwell Catchment Partnership meeting respectively, attendees emphasised the importance of ensuring our wastewater system can accommodate the

planned growth in the region. They expect us to take steps to ensure our infrastructure remains resilient in the face of population growth and the threats posed by climate change, reflecting the need for investment in treatment capacity at our WwTW. Participants included Lead Local Flood Authorities (LLFA), the Environment Agency, Groundwork, the Forestry Commission, local authorities, Manchester University, the Canal and Rivers Trust and the Mersey Rivers Trust.

3. Best Option for Customers

This section demonstrates that the proposed solutions represent the most cost-effective and appropriate response to the identified growth need, based on structured optioneering and whole-life cost–benefit assessment. It shows that customers support proactive investment and that the selected options provide the best balance of cost, environmental protection and deliverability.

3.1 Alignment with Strategic Optioneering

- 3.1.1 Our strategic optioneering took customer views into account by using findings from our extensive DWMP research programme for AMP8. In our DWMP WRMP Immersive Options Testing (2021)¹² 88% of customers supported the idea of increasing capacity for sewers and wastewater treatment, and our regular customer priorities tracking research highlights the economy as the top concern.
- 3.1.2 The decision tree considers this balance, by optimising existing WwTW processes and ensuring cost effectiveness – both of which align with customer preferences. Effectively managing wastewater is seen as a core UUW responsibility and customers want to know that plans are in place to deal with demand. Broadly, they trust UUW to know what is needed. Many customers believe there has been historic underinvestment in infrastructure and there is some willingness to invest now to avoid ongoing or future problems.

3.2 Optioneering Methodology

Options Selection

- 3.2.1 In developing this enhancement case, we have undertaken a robust engineering assessment to determine the likely modifications to the named WwTW to treat the additional growth flows and loads.
- 3.2.2 We have adopted a decision tree that takes account of the size of the WwTW, watercourse water quality modelling outputs (dictating any potential changes to final effluent permits related to growth), suitability for standardisation and opportunities for optimisation. If a standardised solution or optimisation isn't feasible then a bespoke solution has been deemed to be required.

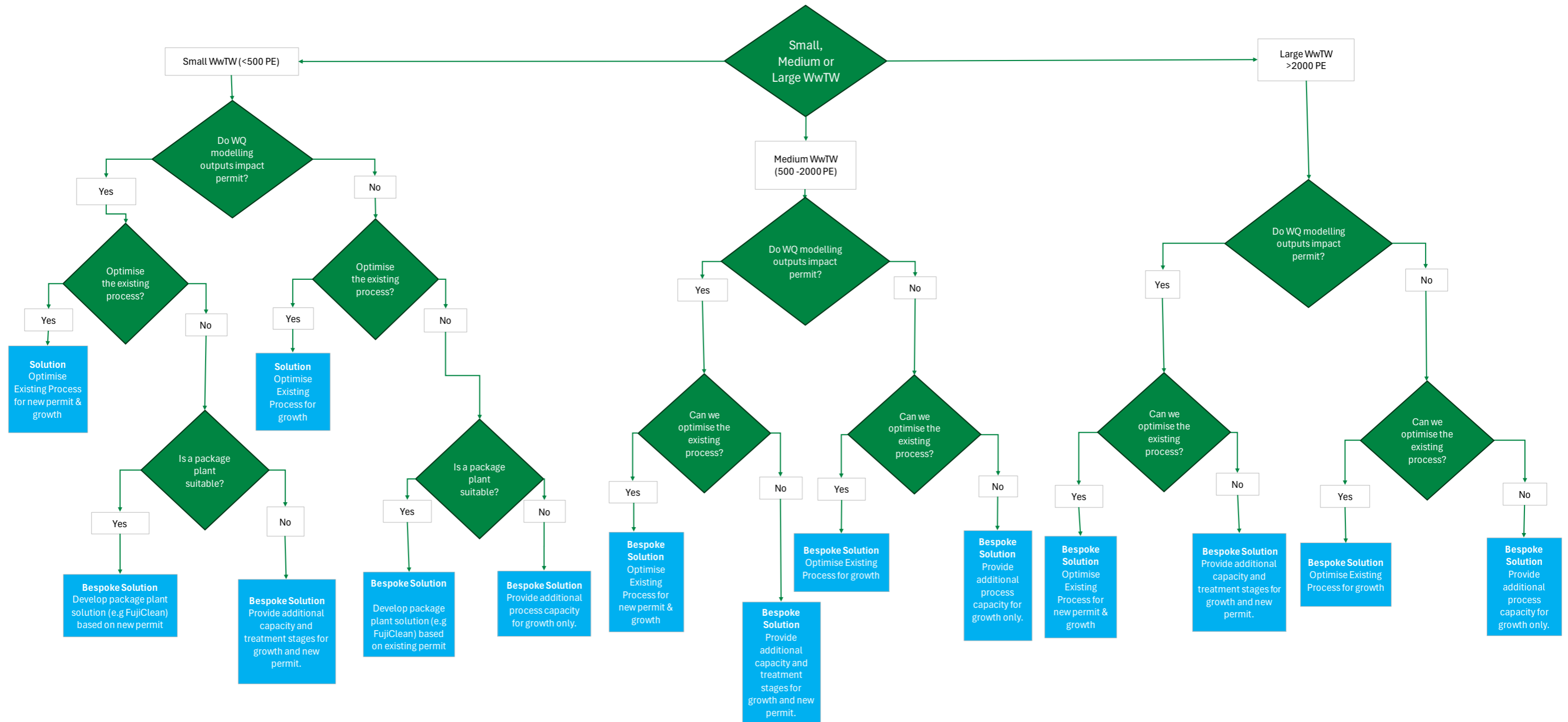
Figure 6: Overview of Options Selection



- 3.2.3 Three case studies have been provided in *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex* Appendix B where a bespoke solution has been chosen. The case studies show consideration of a broad range of options for each of these sites across a pre-determined options hierarchy. The case study options assessments are provided for; Warrington North WwTW; Rochdale WwTW; Garstang WwTW; Fazakerley WwTW; Glenridding WwTW; and, Ingleton WwTW.

¹² InSites Consulting on behalf of United Utilities, WRMP & DWMP Immersive Options Testing, 2021

Figure 7: Options Decision Tree



Source: UUW options development process

- 3.2.4 Figure 7 shows the solution decision tree adopted to develop the required solution to meet the need. The first stage is to determine the size classification of the WwTW (small (<500 PE), medium (500 – 2000 PE), or large (>2000 PE) based on the projected 2050 PE, incorporating all expected growth over the design horizon. Following this, water quality modelling is undertaken to determine whether the forecast growth results in new or tightened final effluent permit limits for BOD, ammonia or phosphorus. The proposed new or tightened final effluent permit can be found in the data table 6_1 STW. Any changes to permit limits will be agreed with the Environment Agency and written into environmental permits following completion of a scheme. Finally, a review of existing processes is undertaken to understand potential optimisation opportunities to meet the future capacity and permit requirements, or whether new assets are required.
- 3.2.5 If the WwTW falls into the ‘small category’ then it is suitable to be considered for a standardised package plant. If the WwTW cannot be optimised or standardised and have a package plant adopted to meet the requirements then a bespoke solution is required.
- 3.2.6 In general, if the site has growth alone with no new permit requirements, the solution is typically additional capacity in the form of settlement and storm storage. If the site has tightening of sanitary permit values then solutions will include for additional capacity and process stages, i.e. chemical dosing, side stream SAF units or tertiary treatment. For any sites that have existing UV disinfection, the solution will account for new UV treatment to meet the updated Flow to Full Treatment (FFT), moving from measured applied dose (MAD) to validated dose.
- 3.2.7 *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex* shows the consideration of bespoke options for three case studies as outlined above.
- 3.2.8 For all sites, an assessment was made to ensure the works would still comply with the Urban Waste Water Treatment Directive (UWWTD) when the predicted population growth was taken into account. In some instances, this has resulted in the need to install additional storm tank capacity to accommodate the population growth. The additional storm storage capacity was sized relative to PE growth based on 68 l/h/day.

3.3 Proposed Solutions

- 3.3.1 Following application of the options decision tree, several WwTWs have been identified as suitable for a standardised package plant solution based on the 2050 PE. Solutions for these sites are based on a system provided by FujiClean. UUW has worked directly with this supplier through innovation trials for several years and have implemented permanent solutions at the following locations during AMP7 and across the AMP8 programme so far, with further solutions being proposed on a number of the AMP8 enhancement projects:
- Calverhall Prees Rd – Commissioned Dec '23;
 - Whitegate WwTW – Commissioned Dec '24;
 - Kingsmill WwTW; and,
 - Troutbeck – Temporary system.
- 3.3.2 Table 2 below outlines the percent growth in each catchment, the permit requirements that the solution addresses and the solutions proposed at each site. A schematic has been produced for each solution outlining the improvements proposed at the site. The table provides a reference to each schematic, located in the separate annex *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex, Appendix D*.

Table 2: Growth in each catchment, the permit requirements and solutions at each site (total expenditure in £m, 2022-23 CPIH prices)

| WwTW Name | Growth % | Permit Changes | Solution Description | Total Value | Schematic in UUW26-08* |
|----------------------|----------|-------------------------------|---|-------------|------------------------|
| Ainsdale | 8 | DWF, BOD | Additional humus tank with ancillary pipework and new distribution chamber. | 5.1 | Figure 36 |
| Armathwaite | 19 | DWF | FujiClean Solution. 3x CRX 30, Formula A for growth | 2.7 | Figure 37 |
| Brough | 26 | DWF, FFT | Side stream SAF unit and additional humus tank. Additional storm tank capacity required to meet the growth | 3.3 | Figure 38 |
| Burscough | 7 | DWF, BOD, Ammonia | Ferric dosing and storage with alkalinity correction | 13.3 | Figure 39 |
| Caldbeck | 44 | DWF | FujiClean Solution. 6x CRX 50 and 68m3 storm storage | 3.5 | Figure 40 |
| Carnforth | 12 | DWF | x2 No PST's, x9 SAF units and x2 new humus tanks, including pipework and distribution chambers. Power upgrade for additional supply capacity | 6.7 | Figure 41 |
| Castle Carrock | 33 | DWF | FujiClean Solution. 3x CRX 50, Formula A for growth | 2.7 | Figure 42 |
| Dovenby | 26 | DWF, Phosphorus | Ferric dosing and chemical storage, additional storm tank capacity and PST de-sludge PS | 2.4 | Figure 43 |
| Dunham Massey | 11 | DWF, FFT | Humus tank with associated pipework and distribution chamber, upsized outfall pipework and outfall structure. Structural upgrade to an existing bridge | 5.4 | Figure 44 |
| Fazakerley | 11 | DWF, BOD, Ammonia | Recirculation on existing filters and refurbishment of existing BAFF and RGF | 25.7 | Figure 45 |
| Fletchertown | 20 | DWF, FFT, Phosphorus | Ferric dosing and storage with alkalinity correction. Additional storm tank volume. Improved access into site | 2.7 | Figure 46 |
| Garstang | 92 | DWF, BOD, Ammonia, Phosphorus | | 20.1 | Figure 47 |
| Glenridding | 73 | DWF, Ammonia, Phosphorus | x3 additional SAF units, 1 roughing and 2 secondary, additional storm storage. Storm storage is proposed to be an online storage solution. Upsized outfall pipework | 4.3 | Figure 48 |
| Grange In Borrowdale | 112 | DWF, Phosphorus | PSTs with feed PS and x2 side stream SAF units. Secondary ferric dosing, additional Humus tank, x2 filter clear units as tertiary solids removal. A new access road | 5.8 | Figure 49 |
| Grange-Over-Sands | 19 | DWF | Additional storm storage volume and improved aeration via a surface aerator for the existing oxidation ditch | 7.3 | Figure 50 |

| WwTW Name | Growth % | Permit Changes | Solution Description | Total Value | Schematic in UUW26-08* |
|-----------------------|----------|-------------------------------|--|-------------|------------------------|
| Great Orton | 25 | DWF, FFT Phosphorus | PST's and distribution chamber, side stream SAF units and feed PS, x2 new humus tanks. Additional storm tank capacity and land purchase | 2.7 | Figure 51 |
| Ingleton | 12 | DWF,FFT | Additional PST and Humus tank with upgrades to distribution chambers and pipework | 4.3 | Figure 52 |
| Little Budworth South | 6 | DWF, Ammonia | Caustic dosing and recirculation after Humus Tanks | 2.2 | N/A |
| Little Clifton | 31 | DWF, FFT | Primary ferric dosing and storage, additional humus tank and additional storm tank capacity. New effluent outfall pipe | 3.3 | Figure 53 |
| Mossley | 6 | DWF | Side stream MBBR with a new feed PS and ancillary pipework | 4.1 | Figure 54 |
| Motherby | 54 | DWF, BOD, Ammonia, Phosphorus | x2 PST's and x2 humus tanks with associated distribution chambers and pipework. Tertiary SAF unit with new feed PS. Land purchase and upgrades to the outfall pipework and outfall structure | 8.0 | Figure 55 |
| Newbiggin | 11 | DWF, FFT | PST and x2 humus tanks with associated pipework and new distribution chambers. New UV plant and upsizing of the outfall pipework | 4.4 | Figure 56 |
| Oldham | 6 | DWF | | 23.1 | Figure 57 |
| Ravenglass | 17 | DWF | FujiClean Solution. 2x CRX 30, Formula A for growth | 2.6 | N/A |
| Rochdale | 9 | DWF, FFT, Phosphorus | x4 new FST's and new RAS PS, additional aeration in ASP. Additional ferric dosing and storage | 40.3 | Figure 58 |
| Rockcliffe | 9 | DWF, FFT | FujiClean Solution. 4x CRX 50, Formula A for growth | 2.9 | Figure 59 |
| Runcorn | 30 | DWF, Ammonia, | Additional storm storage, ferric dosing and storage | 14.7 | Figure 50 |
| Silecroft | 10 | DWF | FujiClean Solution. 3x CRX 30, Formula A for growth | 2.2 | Figure 61 |
| Sockbridge | 29 | DWF | FujiClean Solution. 3x CRX 50, Formula A for growth | 2.9 | Figure 62 |
| Strines | 5 | DWF, FFT | Inlet PS, SAF package plant with feed PS and Lamella plant | 2.5 | Figure 63 |
| Urmston | 13 | DWF, FFT | PST and Humus tank with distribution chambers. Upgrade to the outfall pipework and structure | 15.3 | Figure 64 |
| Waddington | 9 | DWF, FFT Phosphorus | Ferric dosing with alkalinity correction and new access road | 3.0 | Figure 65 |

| WwTW Name | Growth % | Permit Changes | Solution Description | Total Value | Schematic in UUW26-08* |
|------------------|----------|----------------|--|-------------|------------------------|
| Warrington North | 8 | DWF, FFT | Introducing Mobile Organic Biofilm (MOB) into the existing Orbals with an increase in the aeration capacity, additional storm tank capacity and an upgrade to the outfall pipework and structure | 57.4 | Figure 66 |
| Wray | 11 | DWF | FujiClean Solution. 2x CRX 50, Formula A for growth | 2.5 | Figure 67 |

*Schematics in document UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex

Source: UUW analysis

3.4 Best Value Assessment

3.4.1 Across our region, different WwTW have a broad range of flow and load capacities. Over time, capacity is eroded as a result of population growth from new developments. We need to monitor changes in local plans and work closely with local planning authorities to ensure that we plan to invest at the most appropriate time to accommodate growth. Without carefully considered and timely investment, the increased flow and load could result in WwTWs operating beyond their design capacity, causing risk to permit conditions and potentially becoming a barrier to growth and development.

3.4.2 For all of the sites included within this business case we have undertaken statistical analysis to ensure that increased flow and load do not have a local environmental impact on the receiving water body. Where our analysis identified potential deterioration of the WFD water body class or an in-class deterioration, we have proposed tightened final effluent limits to ensure the receiving water body is protected from deterioration as a result of growth. The proposed tightened final effluent limits can be found in table 6_1 STW. This programme of work does not propose any improvement to water bodies but will protect against future permit non-compliance due to growth. Our approach to understanding the value of each scheme is set out below.

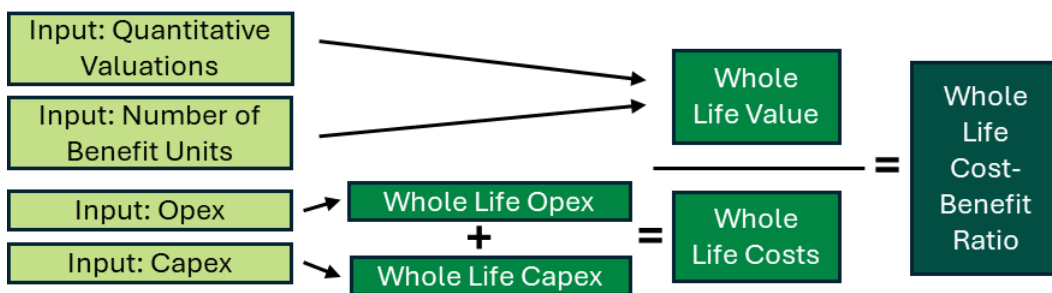
Our 3-step approach

3.4.3 Our approach comprises three key steps as summarised in Figure 8:

- Calculating the whole life value;
- Calculating the whole life cost; and,
- Comparing the whole life cost-benefit ratio across different solutions.

3.4.4 These steps are described in further detail in Figure 8 below.

Figure 8: Cost benefit analysis flow diagram



Source: UUW Cost benefit flow diagram

Whole life value

3.4.5 We calculate whole life value of an investment solution as the present value of the total benefits accrued over a 30-year assessment period. This is derived by:

- Multiplying the number of projected benefit units from the investment solution by the annual quantitative valuation; and,
- Calculating the compounded value over the investment horizon and discounting it using the Social Time Preference Rate, in line with the HM Treasury Green Book.

Whole life cost

3.4.6 We calculate the whole life cost of an investment solution by adding the whole life capital expenditure and the whole life ongoing operating costs. Capital expenditure includes capital overheads but excludes the effect of taxation. Whole life cost has been calculated on a consistent basis to the approach taken for PR24 investment appraisal. The present value of capital expenditure has been converted to a stream of annual costs over a 30-year appraisal period. To calculate the present value of these costs, and associated operating costs, the Social Time Preference Rate was used for discounting, consistent with the HM Treasury Green Book. Costs are in 2022/23 price base, using the CPIH financial year average.

Cost benefit ratio

- 3.4.7 The cost benefit ratio is calculated by dividing whole life value by whole life cost of benefits
- 3.4.8 An optioneering assessment has been undertaken testing alternative options for addressing the identified need. The findings, set out in *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex* Appendix E, demonstrate that while these alternatives can deliver benefits, they are consistently less favourable than those achieved by the solutions proposed in this business case when considered against whole-life costs, deliverability, and environmental outcomes.
- 3.4.9 Table 3 summarises the quantified benefits for the sites included within this business case, alongside whole-life costs, the resulting benefit cost ratios and the unfavourable alternative benefits cost ratio.
- 3.4.10 Across the New Homes programme, whole-life benefits are driven primarily by the programme's ability to maintain compliance with permitting standards and to prevent the deterioration of environmental water quality as development comes forward.
- 3.4.11 These compliance-based outcomes represent the dominant sources of public value, reflecting the programme's essential role in safeguarding statutory environmental obligations.
- 3.4.12 While the programme captures the disbenefits associated with operational and embedded carbon, these are outweighed by the wider environmental benefits identified through the assessment.
- 3.4.13 Taken together, the optioneering evidence and quantified appraisal confirm that the preferred solutions represent the most cost-beneficial and proportionate approach, delivering sustained environmental protection in line with regulatory expectations.

Table 3: Summarised whole life cost, whole life benefit and the benefit cost ratios for the 34 sites included within the growth case. (£m, 2022-23 CPIH prices)

| Site | Whole Life Cost | Whole Life Benefit | Benefits Cost Ratio | Alternative Option Benefits Cost Ratio |
|----------------|-----------------|--------------------|---------------------|--|
| Ainsdale | 7.5 | 18.4 | 2.44 | 1.83 |
| Armathwaite | 4.0 | 7.8 | 1.93 | 0.91 |
| Brough | 4.9 | 9.9 | 2.04 | 1.75 |
| Burscough | 19.7 | 46.9 | 2.38 | 1.86 |
| Caldbeck | 5.1 | 10.7 | 2.07 | 1.52 |
| Carnforth | 9.9 | 28.8 | 2.90 | 2.63 |
| Castle Carrock | 3.9 | 8.3 | 2.10 | 1.48 |
| Dovenby | 3.6 | 7.7 | 2.13 | 1.30 |
| Dunham Massey | 7.9 | 17.2 | 2.17 | 1.13 |
| Fazakerley | 37.9 | 295.9 | 7.80 | 5.84 |

| Site | Whole Life Cost | Whole Life Benefit | Benefits Cost Ratio | Alternative Option Benefits Cost Ratio |
|-----------------------|-----------------|--------------------|---------------------|--|
| Fletchertown | 4.0 | 7.6 | 1.88 | 1.34 |
| Garstang | 29.7 | 213.9 | 7.19 | 5.70 |
| Glenridding | 6.3 | 14.2 | 2.26 | 1.66 |
| Grange In Borrowdale | 8.5 | 21.2 | 2.50 | 2.02 |
| Grange-Over-Sands | 10.8 | 35.2 | 3.27 | 1.39 |
| Great Orton | 3.9 | 6.8 | 1.73 | 1.49 |
| Ingleton | 6.3 | 9.3 | 1.48 | 1.38 |
| Little Budworth South | 3.2 | 7.0 | 2.17 | 0.92 |
| Little Clifton | 4.8 | 9.4 | 1.95 | 1.80 |
| Mossley | 5.8 | 15.7 | 2.69 | 2.44 |
| Motherby | 11.7 | 11.8 | 1.01 | 0.97 |
| Newbiggin | 6.5 | 9.0 | 1.37 | 1.09 |
| Oldham | 34.2 | 211.5 | 6.19 | 1.83 |
| Ravenglass | 3.8 | 7.6 | 2.01 | 0.82 |
| Rochdale | 59.2 | 258.1 | 4.36 | 4.10 |
| Rockcliffe | 4.3 | 8.1 | 1.88 | 1.84 |
| Runcorn | 21.4 | 119.0 | 5.56 | 5.17 |
| Silecroft | 3.2 | 6.7 | 2.08 | 1.79 |
| Sockbridge | 4.3 | 8.5 | 1.98 | 1.61 |
| Strines | 3.7 | 7.6 | 2.02 | 1.68 |
| Urmston | 22.6 | 58.9 | 2.60 | 1.69 |
| Waddington | 4.5 | 8.7 | 1.94 | 1.61 |
| Warrington North | 84.4 | 389.1 | 4.61 | 4.28 |
| Wray | 3.6 | 7.6 | 2.10 | 0.86 |

Source: UUW analysis of whole life cost and whole life benefit of preferred options

3.5 Customer research

- 3.5.1 It is vital we engage with customers and stakeholders across the entire region about their water and wastewater services. We have undertaken an iterative research approach to understanding customers' views on Regional Growth and Asset Health. For this submission, we therefore reviewed recent and relevant research from our established body of customer research, including key projects which informed the PR24 business plan. Building on this existing knowledge base, we then undertook targeted bespoke research using both qualitative and quantitative methods.
- 3.5.2 We have taken steps to ensure our customer research approach is proportionate and comprehensive, with the quantitative survey elements using a robust sample allowing for sub group analysis, and qualitative research using members of our existing research community.
- 3.5.3 As a result of this body of investigative research, our research indicated:
- Customers show support for enhanced investment in WwTW, motivated by regional growth and environmental concerns. A synthesis of our existing research including DWMP23, demonstrates that dealing with wastewater is seen as part of UUW's core responsibilities and therefore any threat to our ability to deal with it is likely to be taken seriously.
 - Generally, customers trust UUW to do what is necessary to ensure these core services run as needed. However, many customers believe there has been an historic underinvestment in water infrastructure leading to high profile problems such as sewage leakages. This causes frustration but

also increases support for action to prevent problems occurring or reoccurring. Thus, the options took into account customer preferences for proactive investment but with best value in mind to consider the impact on customer bills.

We also sought to understand customer views on the final option through our bespoke Regional Growth research (2026)¹³, through a mixed method approach. We undertook a quantitative survey of 1,000 customers representative of the North West, as well as a qualitative deliberative session with customers from our existing research panel “In the Flow.”

Source: Research Report, Explain Research on behalf of United Utilities Water, Regional Growth Research, 2026

- 3.5.4 When discussing impacts on UUW’s business planning, participants generally saw severe weather, flooding, climate change and population growth as highest-impact challenges which meant that UUW would need to adapt and amend our plan. These were not seen as abstract future risks, but as current, visible pressures already affecting communities. In particular, 88% of customers believe ‘Population growth’ would have an impact on our business planning. Participants highlighted concerns if UUW does not act to respond to these, including: environmental degradation, more flooding, public health risks and water shortages. Customers supported how the WwTW enhanced investment would seek to mitigate these through increased capacity to cope with population growth.

Figure 9: Customer quote from Regional Growth research¹⁴

“Too many new houses being built more water needed, more sewage, less land drainage available”

Source: Research Report, Explain Research on behalf of United Utilities Water, Regional Growth Research, 2026

- 3.5.5 Participants expressed strong concerns about the serious consequences that could arise if UUW did not address current challenges. As a result, most felt the company should take a proactive approach to investment, particularly for high impact, long term issues, while still maintaining reactive capability for emergencies when needed. However, with the knowledge that customers are worried about bill increases, these options have been designed with cost in mind as the research demonstrated that while many accept paying more now to future proof the system for future generations, others are concerned about rising bills, particularly in the context of the cost-of-living crisis.

Figure 10: Customer quote from Regional Growth research

“Fix it now so our children and grandchildren aren’t paying even more.”

Source: Research Report, Explain Research on behalf of United Utilities Water, Regional Growth Research, 2026

- 3.5.6 We plan to conduct further customer acceptability research before any application for an in-period revenue adjustment, pending Ofwat’s consultation on the required licence modifications.

¹³ Explain Research on behalf of United Utilities Water, Regional Growth Research, 2026

¹⁴ Explain Research on behalf of United Utilities Water, Regional Growth Research, 2026

4. Demonstrating cost efficiency

This section explains how costs have been developed, benchmarked and challenged against Ofwat’s PR24 econometric models, including transparent treatment of the I_{max} methodology impact. It demonstrates that the £309.4m totex proposal is efficient, evidence-based, and only adjusted where regulatory changes create costs not recognised in the PR24 framework.

4.1 Costing Methodology

- 4.1.1 This section sets out how we have calculated the costs associated with this enhancement case. We have aligned our methodology as closely as possible to the econometric modelling framework established by Ofwat at PR24, and we have actively challenged ourselves to deliver within the benchmark costs implied by those models. For 20 of the 34 sites in this submission, we are proposing to align directly to Ofwat’s PR24 models.
- 4.1.2 For all remaining sites (14 WwTW), we have applied modelling adjustments to reflect the Environment Agency’s revised approach to measuring infiltration. In particular, this relates to the use of maximum dry weather infiltration (I_{max}) in the determination of FFT permit requirements, which results in higher hydraulic capacity needs than those reflected by PR24 benchmarks alone.
- 4.1.3 Table 4 summarises the split of our total enhancement estimate for growth at STW expenditure between the PR24 benchmark allowance and the additional cost associated with incorporating I_{max} within treatment design. A full explanation of the regulatory requirement for I_{max} , why it applies to specific sites, and how it is calculated is provided in section 4.3.

Table 4: Total expenditure for 'Growth at STW' (£m, 2022-23 CPIH prices)

| | PR24 benchmark | I_{max} uplift | Total Value |
|--------------|----------------|------------------|--------------|
| 34 WwTWs | 270.7 | 38.7 | 309.4 |
| Total | 270.7 | 38.7 | 309.4 |

Source: UUW analysis based on modelling approach

- 4.1.4 Our costs do not include any element of base expenditure. All our interventions have been designed to accommodate the population growth either through additional capacity or by avoiding quality deterioration. Items within the scope of base expenditure have been excluded from our cost proposals and will be funded from our existing AMP8 base allowance.

4.2 Aligning to PR24 efficient costs

- 4.2.1 At PR24, Ofwat introduced scheme-level econometric models for selected areas of enhancement expenditure. These models allocate total requested industry expenditure based upon one or more cost drivers. Ofwat’s approach results in scheme-level allowances for each project. Where a scheme is considered an ‘inefficient’ outlier, Ofwat carries out a deep dive assessment that considers whether the company has provided sufficient evidence to support its higher view of cost.

Ofwat’s PR24 benchmark

- 4.2.2 Ofwat’s ‘Growth at STW’ benchmark at PR24 used the following cost drivers¹⁵:
 - **Added Process Capacity in PE.** This reflects the additional capacity added at the WwTWs.

¹⁵ Ofwat (2024) *Expenditure allowances: enhancement cost modelling appendix*. Available here: <https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-final-determinations-Expenditure-allowances-Enhancement-cost-modelling-appendix.pdf>

- **Expected change in DWF permit.** An increased DWF permit will increase costs through the need to invest in additional hydraulic capacity to maintain a suitable ratio between DWF and FFT. It is also associated with a tightening of sanitary/nutrient permits that maintains water quality in the receiving watercourse. This can require investment in additional treatment capacity/processes.
 - **Ammonia permit change dummy.** This variable seeks to capture the step-change in costs that results from the ammonia permit tightening below three mg/l.
- 4.2.3 Ofwat uses both a level model and a log-log model. A level model assumes constant returns to scale, whereas a log-log model assumes economies of scale i.e. unit costs fall as the scale increases. It averages the allowance provided by each model. A log-log model tends to understate cost allowances, which means Ofwat implemented a log bias adjustment to correct for this.
- 4.2.4 Ofwat did not apply a catch-up efficiency challenge to this area of expenditure.
- 4.2.5 For 20 of the 34 sites, we have challenged our plans to match Ofwat’s PR24 efficient costs by applying the same cost drivers and modelling approach. This ensures full consistency between our cost proposals and the benchmark used by Ofwat in PR24.
- 4.2.6 Ofwat’s PR24 benchmark is illustrated in Table 5 below.

Table 5: Ofwat’s PR24 benchmark

| Explanatory variable | GS1 | GS2 |
|--------------------------------------|-------------|------------|
| Added process capacity in PE | 0.000358*** | |
| Ln (Added process capacity in PE) | | 0.376*** |
| Expected change in DWF permit | 0.00525*** | |
| Ln (Expected change in DWF permit) | | 0.00757*** |
| Ammonia permit change dummy (<3mg/l) | 5.147*** | 0.737*** |
| Constant | 3.19*** | -1.337*** |
| Adjusted r-squared | 0.436 | 0.412 |
| Observation | 255 | 255 |

Source: Ofwat’s PR24 econometric model(s) coefficients for Growth at STW

4.3 Including updated I_{\max} guidance in this submission

- 4.3.1 Due to the projected increase in population and the associated increase in flows arriving at the WwTWs included in this submission, we will be required to apply to the Environment Agency for updated DWF permits. Based on our recent experience with DWF permit applications in AMP8 and as confirmed by the Environment Agency in writing, we are required to ensure that FFT used for design purposes for our WwTWs are aligned with latest guidance issued in the document “*Water Companies: environmental permits for storm overflows and emergency overflows*”, as revised in 2018.
- 4.3.2 The revised guidance requires that FFT permits changed from average infiltration values to incorporating maximum infiltration values within the sewer network that occur on a dry day. This value is known as I_{\max} . The I_{\max} value is determined by subtracting values for population and trade from the measured flow arriving at the treatment works on days identified to be ‘dry’ as determined by the Environment Agency’s prescribed methodology. The highest resulting value represents I_{\max} and is incorporated into the following calculation to determine the proposed future FFT permit. We have provided a technical note on I_{\max} in *UUW26-08 Growth at Sewage Treatment Works – WwTW capacity for New Homes annex Appendix C*.

$$\text{FFT} = 3\text{PG} + I_{\max} + 3\text{E}$$

Where:

P = Catchment population (number);

G = per capita domestic flow (l/head/day); and,

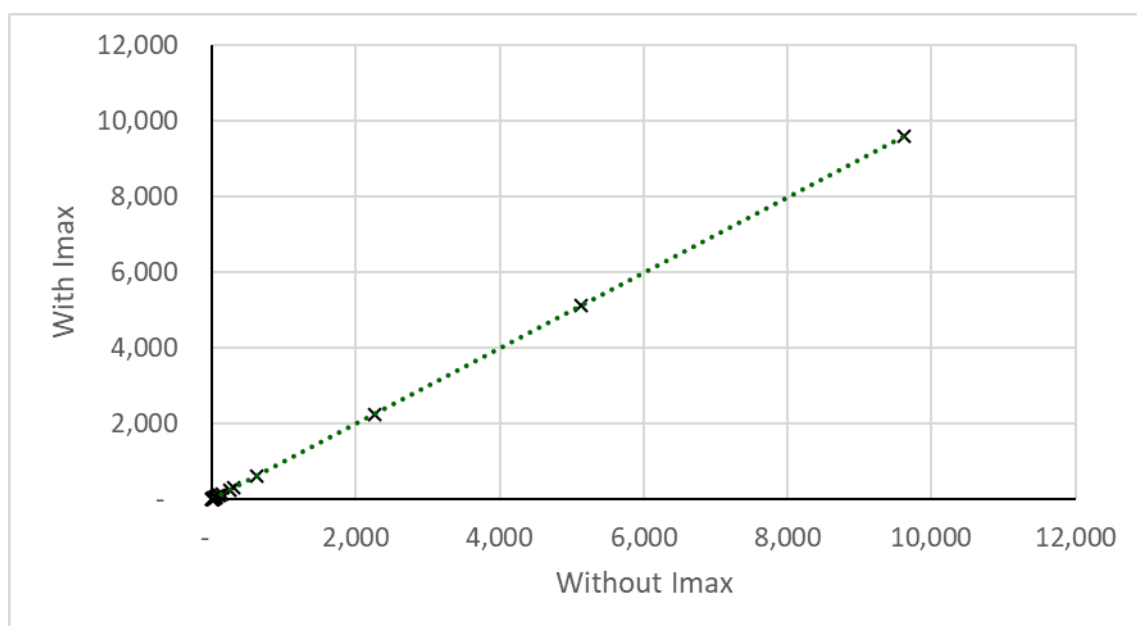
E = Trade effluent flow (l/d).

- 4.3.3 To comply with the Environment Agency's guidance, we have assessed all sites included in this submission and identified those sites which will require an uplift to their current FFT permit in addition to their DWF permit. The developed solutions for these sites include additional treatment assets to provide the appropriate hydraulic capacity required to meet the higher FFT permit values resulting from this revised guidance.

I_{max} affects FFT only, not DWF

- 4.3.4 Crucially, the revised I_{max} methodology affects only the calculation of FFT permit requirements; it does not influence the expected DWF permit, as demonstrated in Figure 11 below.
- 4.3.5 Figure 11 compares DWF values calculated with and without application of the revised I_{max} methodology for the 21 sites impacted by the change. The results show the 1:1 relationship across all sites, confirming that DWF permit values remain unchanged by the revised I_{max} methodology.
- 4.3.6 While several sites with relatively low DWF values cluster in the bottom-left of the figure, these points also lie on the 1:1 relationship exactly.

Figure 11: DWF change at 21 sites impacted by I_{max} , with and without the I_{max} methodology change



Source: UUW analysis

- 4.3.7 Because DWF remains unchanged, the PR24 Growth at STW model—which uses only DWF as the growth cost driver to derive enhancement allowances—does not provide any additional funding for the FFT uplift resulting from I_{max} . A growth in FFT is simply not recognised as part of the PR24 modelling framework.

Why FFT is excluded from the PR24 model

- 4.3.8 In *Ofwat's Expenditure allowances – enhancement cost modelling appendix*, Ofwat notes that expected FFT permit changes were found to be highly correlated with expected DWF permit changes¹⁶. Including both variables in the model would therefore introduce collinearity ultimately invalidating the accuracy

¹⁶ <https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-final-determinations-Expenditure-allowances-Enhancement-cost-modelling-appendix.pdf> p99

of the econometric models. Consequently, Ofwat excluded FFT from the PR24 FD model and retained DWF as the sole growth cost driver.

- 4.3.9 This modelling choice has a direct and material implication for this submission. Because FFT is not recognised as a cost driver in the PR24 “STW growth model”, any additional FFT requirements arising from the revised I_{\max} methodology fall outside the scope of the model’s funding mechanism. We objectively face new FFT obligations that are demonstrably driven by regulatory changes, however the PR24 model provides no route for these costs to be allowed. This results in a funding gap for sites where the I_{\max} revision increases FFT capacity requirements without affecting DWF.

Categorisation of sites

- 4.3.10 For the purpose of assessing our proposed efficient costs for this submission, we have grouped sites into two categories:
- Sites where the application of I_{\max} methodology does not result in a shortfall in the current FFT permit (l/s), and,
 - Sites where the application of I_{\max} methodology does result in a shortfall in the current FFT permit (l/s).
- 4.3.11 For sites in the first category, we have retained Ofwat’s PR24 modelling approach without modification and make no additional claim. This ensures that Ofwat can assess these schemes on a consistent basis aligned to the models used in the PR24 determination. In these cases, UUW is proposing to absorb the risk associated with any reduction in FFT permit headroom arising from the I_{\max} change and is not requesting any uplift beyond the allowances calculated by the “STW Growth model” used by Ofwat in its PR24 FD.
- 4.3.12 For sites in the second category, we consider that no funding is provided under the existing PR24 growth model to address the impact of the I_{\max} change. This involves 14 sites where the revised I_{\max} methodology leads to a material shortfall in FFT (l/s). In these cases, the use of I_{\max} affects only the FFT permit and not the DWF permit; consequently, the PR24 FD STW Growth models do not capture the associated cost impact of addressing this higher FFT permit.
- 4.3.13 In effect, these 14 sites face new, methodology-driven FFT obligations with no additional funding to reflect the more stretching FFT permit requirements. This creates an unavoidable cost gap that cannot be mitigated through the existing modelling framework. An evidence based adjustment is therefore required to ensure the impact of the I_{\max} change is transparently and proportionately reflected.

An efficient adjustment to reflect the impact of I_{\max}

- 4.3.14 Given that FFT is not recognised as a cost driver within the PR24 FD model, and therefore no funding route exists for additional FFT obligations arising solely from the revised I_{\max} methodology, we propose the following approach:
- Apply Ofwat’s PR24 FD model to calculate the baseline cost allowance for each affected scheme; and,
 - Apply an incremental uplift reflecting the increase in FFT attributable solely to the I_{\max} methodology change.
- 4.3.15 To calculate this FFT-related uplift, we have re-specified Ofwat’s FD model by replacing the change in DWF permit with the change in FFT permit as the primary cost driver. This re-specification allows the model to capture the cost impact of the I_{\max} -driven increase in FFT in a way that is structurally aligned with Ofwat’s modelling approach, while providing a robust method for capturing I_{\max} -driven FFT cost impacts not otherwise recognised within the PR24 model.
- 4.3.16 The coefficients from this re-run of Ofwat’s model are presented in Table 6 below.

Table 6: UU FFT version of growth at STW model

| Explanatory variable | FFT1 | FFT2 |
|--------------------------------------|-------------|----------|
| Added process capacity in PE | 0.000369*** | |
| Ln (Added process capacity in PE) | | 0.376*** |
| Expected change in FFT permit | 0.0581*** | |
| Ln (Expected change in FFT permit) | | 0.00340 |
| Ammonia permit change dummy (<3mg/l) | 7.298*** | 0.866*** |
| Constant | 3.55*** | -1.33*** |
| Adjusted r-squared | 0.488 | 0.422 |
| Observation | 255 | 255 |

Source: UUW analysis – UUW revised PR24 econometric model(s) coefficients for Growth at STW (I_{max} version)

4.3.17 Using this revised model, we have calculated allowances for each of the 14 schemes under two scenarios:

- **Scenario A:** with the I_{max} methodology change applied
- **Scenario B:** without the I_{max} methodology change

4.3.18 The difference in allowances between these two scenarios represents the cost impact attributable solely to the I_{max} methodology change. This approach results in a proposed uplift of £39 million, which will be added to the modelled allowance of £271 million under the existing FD model.

4.3.19 Table 7 below shows the breakdown in cost for each of the schemes affected by I_{max} .

Table 7: Modelled costs for I_{max} sites (£m, 2022-23 CPIH prices)

| Site name | PR24 FD model | UUW FFT model (with I_{max}) | UUW FFT model (without I_{max}) | I_{max} uplift | Total modelled cost |
|------------------|---------------|---------------------------------|------------------------------------|------------------|---------------------|
| Warrington North | 40.3 | 31.0 | 13.9 | 17.1 | 57.4 |
| Rochdale | 26.0 | 25.7 | 11.4 | 14.3 | 40.3 |
| Urmston | 12.8 | 8.7 | 6.2 | 2.5 | 15.3 |
| Garstang | 18.2 | 4.7 | 4.2 | 2.0 | 20.1 |
| Dunham Massey | 4.5 | 4.8 | 3.9 | 0.9 | 5.4 |
| Newbiggin | 4.0 | 3.5 | 3.1 | 0.5 | 4.4 |
| Ingleton | 3.8 | 3.5 | 3.1 | 0.4 | 4.3 |
| Brough | 3.3 | 3.5 | 3.4 | 0.0 | 3.3 |
| Waddington | 2.8 | 2.9 | 2.6 | 0.3 | 3.0 |
| Little Clifton | 3.0 | 3.3 | 2.9 | 0.2 | 3.3 |
| Rockcliffe | 2.9 | 2.9 | 2.9 | 0.0 | 2.9 |
| Fletcherstown | 2.6 | 2.8 | 2.6 | 0.2 | 2.7 |
| Great Orton | 2.5 | 2.7 | 2.5 | 0.2 | 2.7 |
| Strines | 2.4 | 2.6 | 2.4 | 0.2 | 2.5 |
| Total | 133.1 | 102.5 | 65.1 | 38.7 | 171.8 |

Source: UUW analysis

4.4 Post-modelling adjustments

4.4.1 Ofwat made three post-modelling adjustments at PR24. However, we do not consider we need to make the same adjustment here in this submission for the following reasons:

- **Remediation of past DWF non-compliance.** This adjustment is not required for this submission as the enhancement costs sought within this document seek to fund the additional growth only.

- **Remediation of past under-delivery.** This adjustment is not required for this submission as past under-delivery was addressed through the adjustment implemented at FD.
- **Allowance for AMP8 expenditure only.** This adjustment is not required for submission as we expect to complete all capital work within AMP8

4.5 Expenditure profile

- 4.5.1 The total expenditure has been calculated using modelled cost allowances as set out in section 4.1. There is £307.0m capital expenditure associated with 34 sites, of which £23.1m is profiled in the first two years of AMP9. The £23.1m capex is required across the seven sites; Glenridding; Grange in Borrowdale; Great Orton; Motherby; Rochdale; Runcorn; and, Warrington North.
- 4.5.2 The project in use dates for these seven sites are currently forecast in AMP9 due to the scale of the solutions and the interface with the existing process. In addition, both Rochdale and Runcorn will require agreement to relocate significant areas of the existing solar farm operation to free up space for the new assets and sufficient working area to construct them safely.
- 4.5.3 Five of the seven solutions also require additional land to be purchased to enable the construction of the new assets, this will also require planning permission and additional ecological surveys prior to construction commencing. As such additional time has been allowed in the programme.
- 4.5.4 There may be opportunities to accelerate the programme for these sites but it will depend on whether the current landowners are amenable to selling the land and any additional conditions required by the local authority planning departments. As a number of these sites are in National Park or greenbelt additional time has been allowed for in the programme to ensure sufficient contingency so the schemes can be delivered safely and compliantly.
- 4.5.5 Operating expenditure is starting from the project in use date, and there are 27 sites with operating expenditure within AMP8.
- 4.5.6 Table 8 shows our proposed expenditure profile for the AMP8 and AMP9 periods, split by capital and operating expenditure.

Table 8: Our proposed total expenditure profile (£m, 2022-23 CPIH prices)

| Expenditure profile | FY26 | FY27 | FY28 | FY29 | FY30 | AMP8 Total | AMP9 Capex | Total Value |
|---------------------|------------|------------|-------------|--------------|-------------|--------------|-------------|--------------|
| Capex | 0.0 | 5.8 | 51.4 | 135.3 | 91.4 | 284.0 | 23.1 | 307.0 |
| Opex | 0.0 | 0.0 | 0.0 | 0.3 | 2.1 | 2.4 | - | 2.4 |
| Total | 0.0 | 5.8 | 51.4 | 135.6 | 93.5 | 286.3 | 23.1 | 309.4 |

Source: Proposed total expenditure associated with programme delivery profile

5. Customer Protection

This section sets out how customers will be protected through scheme-level Price Control Deliverables (PCD)s that link allowed funding directly to delivered growth capacity. It explains how clawback mechanisms will work, including for I_{max}-related costs, and confirms that the proposals will not materially distort PR24 performance commitments.

5.1 Price Control Deliverables

- 5.1.1 Customer protection for the cost allowance is best offered through creation of a new PCD aligned to the FD price control deliverable, “Growth at STWs PCDWW27” in “PR24PCD113 Wastewater Scheme level PCDs”. We therefore propose a new PCD containing one line for each of the sites proposed to be delivered in AMP8 in this enhancement case. This is for the expected increase in PE at the relevant sites identified. Seven of the 34 sites will be delivered in the first two years of AMP9. We propose that these seven sites are included in a PR29 iteration of this PCD. The seven sites, sanitary parameters and proposed totex allowance are shown in lines 48 to 54 of “UUW26-11 Growth Submission PCD”.
- 5.1.2 This new PCD would be aligned to – and build on the approach of – FD PCDWW27 which is a scheme level PCD. A PCD clawback for scheme level PCDs makes use of the econometric model(s) to calculate the associated clawback. For example, if we delivered less PE, we would receive a re-calculated modelled allowance using the FD econometric model, reducing proportionally by the reduction in delivered PE.
- 5.1.3 However, in this submission we are proposing a cost allowance based on two models: 1) the FD model (excluding I_{max}) and 2) a new model that we have developed concerned purely with I_{max}. The PCD we propose will therefore need to use these two models mechanistically to calculate any required claw back in the event of non-delivery against this new PCD.
- 5.1.4 Table 9 shows how the two models contribute to a total site allowance. The modelled allowance for the Urmston site, as per the FD model (excluding I_{max}), is £12.8m. We propose a further £2.5m uplift associated with I_{max}, calculated using the additional model developed in this case. In this example the two models are used to calculate a total allowance of £15.3m.

Table 9: Example scheme Urmston (included in “UUW26-11 Growth submission PCD” Excel document)

| | Added Process Capacity in PE | Expected change in DWF permit | Ammonia permit change dummy (<3 mg/l) | 1) Modelled allowance (exc. I _{max} uplift) | Expected change in FFT permit | 2) I _{max} modelled allowance | Total modelled allowance |
|---------|------------------------------|-------------------------------|---------------------------------------|--|-------------------------------|--|--------------------------|
| units | PE | m3/day | boolean | £m | l/s | £m | £m |
| Urmston | 4,036 | 2,253 | - | 12.8 | 63.1 | 2.5 | 15.3 |

Source: UUW analysis

- 5.1.5 Any clawback will therefore also have to be calculated using these two separate models, otherwise customers would not be fully protected for under-delivery against the cost allowance. Using the FD PCD, only the £12.8m under the original modelling methodology would be clawed back. The £2.5m I_{max} uplift would require a further PCD adjustment to account for a scenario where we either deliver less FFT (a remote scenario) or deliver less PE. This is because PE forms part of the I_{max} model as well as the original FD model, meaning the I_{max} model would also need to be adjusted in the event of a change to PE delivered (in addition to the original model).
- 5.1.6 We consider that this approach provides suitable and robust customer protection for the allowance proposed.

- 5.1.7 This could be easily implemented by updating the PR24 price control deliverable reconciliation models (both scheme level and aggregator models). We would be happy to provide to Ofwat a complete log of changes to the excel reconciliation model to accommodate these changes.
- 5.1.8 It is essential that, consistent with the approach adopted for growth schemes at PR24, the PCD should retain the flexibility to change the scope or substitute a scheme due to changing population growth forecasts, provided that substituted schemes do not:
- have a change in the FFT permit without a corresponding change in the DWF permit; and,
 - use any expenditure funded via the PCD to address previous non-compliance with DWF or FFT permits or reduce storm overflows spills.
- 5.1.9 This will ensure that both customers and the environment continue to be protected at all times. Whilst we have high confidence in the need for this investment, and consider that it is critical that we invest now to ensure we have the available capacity ahead of the forecast growth materialising, we do recognise that population forecasts may change due to factors outside of management control. Retaining the ability to substitute schemes, subject to third-party assurance of the need, ensures that investment continues to be prioritised appropriately.

5.2 Performance Commitments

- 5.2.1 We have considered the impact of these proposals on performance commitment levels (PCLs). We do not consider that the proposed investment will have any measurable change in our ability to meet the PR24 FD PCLs.
- 5.2.2 Any performance improvement will only occur once this investment has completed and the asset is operational. The PR24 performance commitments which could be impacted by this investment are River Water Quality (Phosphorus) and Storm Overflows. These are both measured in calendar years, with 2029 being the performance year for 2029/2030 reporting purposes for example.
- 5.2.3 We propose to complete the investment at the majority of WwTW sites (30 out of 34) at or after 31 December 2028. Therefore for the majority of sites, there will not be a full year's performance against the PR24 FD PCLs.
- 5.2.4 For the 21 sites which complete and become operational by 31 December 2029, there is the potential for the enhancement investment to positively impact performance. Performance is measured across UUW as a whole, rather than specifically on these 21 sites, therefore any investment would have to be of a far more significant magnitude to affect the performance measured by these two PCs, than is proposed in this submission.
- 5.2.5 Performance under the RWQ PC is calculated from the annual measured average flow of the WwTW and the regulatory phosphorus sample results. As we are investing ahead of the population growth, there will be the small potential for performance benefit at these sites, which become operational significantly prior to 31 December 2029. These sites will add process capacity for a PE of 42,965 compared to UUW's customer base of 8 million. Even if the population growth did not result until the end of AMP8, we consider that the performance improvement from this investment in treatment capacity would be significantly diluted.
- 5.2.6 We do not consider that the impact will be significant, i.e. it is not expected to change the performance commitment level values as reported to the number of decimal places measured under the performance commitment definition. We therefore do not propose a revised performance commitment level for this performance commitment.
- 5.2.7 We do not expect any impact on the Storm Overflows performance commitment. By doing these enhancement activities, we do not forecast any measurable change in our performance – either improvement or deterioration – as measured by this performance commitment. There might be a short term reduction in spills for those sites where we are proposing an increase in FFT (8 of the 21 sites only)

or upsize of storm tank volume (97% of which is proposed to be delivered in AMP9, therefore not impacting PR24 FD PCLs), once the investment has completed but before the population growth has happened. This headroom - from the investment capacity - will be caught up quickly once the population growth happens. We therefore do not anticipate that the enhanced capacity will have an impact on reportable performance as measured under the PR24 PC definition, when diluted across UUW's total storm overflow asset base. We therefore do not propose a revised performance commitment level for this performance commitment.

- 5.2.8 We do not anticipate any measurable additional impact on the PR24 Operational GHG (Ww) PC performance as a result of the investment at these sites. It is expected that the 21 sites will have a minimal opex increase in power and chemical use once they are on-line in 2029/30. We propose to absorb this additional impact. However, when the population growth is experienced, there will be a proportional increase in the Operational GHG emissions, but this is not expected until after 2029/30.
- 5.2.9 UUW's two bespoke PCs (both related to specific wastewater activities and/or regions) also do not relate to the activities included in this enhancement case. We therefore do not propose any amendment to the PR24 FD bespoke PC PCLs as stated in "Key Dataset 1: Outcomes data".

6. Investment Delivery Plan

This section provides assurance that the programme is deliverable within AMP8 and early AMP9, supported by supply-chain engagement, risk management and phased programming. It identifies key delivery risks and mitigations, demonstrates alignment with existing AMP8 commitments, and shows that sufficient capacity exists to deliver the works.

6.1 Deliverability

- 6.1.1 Our strategy is to deliver the projects within this enhancement case via the most appropriate delivery "runway" in our newly established AMP8 runway-based delivery model which is described in more detail in *UUW26-02 Growth Unlocked: Water for the New Economy* section 7 "Our capability to Deliver".
- 6.1.2 Assessment of supply chain capacity and supply chain deliverability risk should not be considered in the context of any one case in isolation. Instead we have considered the impact of all cases with our Growth and Asset Health submissions in aggregate on the baseline AMP8 programme. We have engaged with our supply chain partners and undertaken a thorough programmatic assessment of capacity in our new AMP8 supply chain, to assure ourselves that the overall investment proposal is deliverable, and that there is sufficient headroom in capacity and availability of resource within our design consultants and construction & wider supply chain, in addition to our internal programme management capacity, to accommodate the additional investment.
- 6.1.3 Please refer section 7 of *UUW26-02 Growth Unlocked: Water for the New Economy* for the programmatic assessment which considers all projects proposed for investment across all cases within our Growth and Asset Health submissions, with the supporting evidence that all such investments are deliverable.

6.2 Managing design and delivery risks

- 6.2.1 Risks and opportunities have been captured throughout the optioneering and design phase along with site specific constructability and deliverability risks. We have sought to mitigate risks either during the optioneering phase or by having a mitigation plan in place to monitor and manage any residual risk.
- 6.2.2 We understand the overlap with the existing AMP8 programme and have undertaken project by project assessment to establish any change to the current risk profile or impact to in AMP delivery.
- 6.2.3 A constructability and deliverability matrix and scoring system has been established. This is driven by a number of key attributes including the scale of the upgrade required, complexity of the interface with existing asset, any land purchase requirements, likely planning or ecological constraints or other 3rd party constraints such as power or communications upgrades. A more detailed overview can be found in the programme level risk register *UUW26-27 Deliverability risk register*.
- 6.2.4 Risk and opportunities have been scored based on analysis of likelihood and impact. The Probability Impact Diagram (PID), shown below for risks and opportunities illustrates the categorisation for both Risk and Opportunities.

Figure 12: Probability Impact Diagram (PID)

| Risks | | | | | | Opportunities | | | | |
|---------------|--------------|-------------|-------------|--------|-----------------|---------------|-------------|-------------|---------------|-------|
| VL(1) | L(2) | M(3) | H(4) | VH(5) | Likelihood | VH(5) | H(4) | M(3) | L(2) | VL(1) |
| 5 | 10 | 15 | 20 | 25 | >80% | 25 | 20 | 15 | 10 | 5 |
| 4 | 8 | 12 | 16 | 20 | 50-79% | 12 | 16 | 12 | 8 | 4 |
| 3 | 6 | 9 | 12 | 15 | 26-49% | 15 | 12 | 9 | 6 | 3 |
| 2 | 4 | 6 | 8 | 10 | 11-25% | 10 | 8 | 6 | 4 | 2 |
| 1 | 2 | 3 | 4 | 5 | <10% | 5 | 4 | 3 | 2 | 1 |
| <£25k | £25k - £100k | £100k-£200k | £250k-£500k | >£500k | Cost Impact | >£500k | £250k-£500k | £100k-£200k | £25k - £100k | <£25k |
| Insignificant | | Moderate | | Severe | Schedule Impact | Severe | Moderate | | Insignificant | |

Source: UUW risk analysis

6.3 Risks with mitigation plans

- 6.3.1 In addition to scheme level risks, consideration has also been given to wider programmatic risk and considerations. As detailed in later sections a thorough overview of AMP8 supply chain performance and projected capacity has been undertaken.
- 6.3.2 Risks captured during optioneering and design have either been mitigated early or now have active mitigation plans. Programme-level considerations, including supply-chain capacity and long-lead dependencies, have been incorporated into integrated schedule development.
- 6.3.3 **Supply chain constraints** – A robust assessment of AMP8 supply-chain capability has been undertaken, confirming capacity to accommodate the additional growth-related scope. This assessment included partner capacity modelling, specialist resource availability, and logistics capability.
- Materials, Long-Lead Items & Advanced Procurement**
- 6.3.4 Advanced procurement strategies for critical components (pumps, MCC panels, packaged treatment units, controls and telemetry) are in place.
- 6.3.5 Long-lead profiling includes:
- Imported equipment;
 - Electrical connections or temporary power; and,
 - Specialist fabrication and assembly slots.
- 6.3.6 Our procurement forecasts and supplier commitments will be incorporated into an integrated delivery schedule.
- Third-Party Approvals and Enabling Requirements**
- 6.3.7 Growth-driven infrastructure requires extensive external engagement. Early engagement with third parties has begun; however, further approvals are required (planning, highways, landowners, utilities). Programme timescales include mandatory lead-in periods and iterative design development.
- Design and Ground Investigation (GI) Risks**
- 6.3.8 Detailed route assessments require early commencement of ground investigation to remove uncertainty around geotechnical conditions. Early GI mobilisation is planned to reduce design risk and compress downstream approval and construction phases.

Table 10: Key delivery risks

| Risk Description | Risk Type | Mitigation Details and Progress | Risk Impact Score |
|---|-------------|--|-------------------|
| Overlap of growth schemes with existing AMP8 solutions - risk that the additional growth has a detrimental impact on cost and programme by introducing late requirements changes and scope (Extended prelims, resource standing time, abortive design or construction costs) | Threat | Overlaps are known and understood - existing AMP8 design and delivery teams will be engaged to develop a project by project plan in terms of incorporating the additional scope in to the AMP8 project in the most cost and programme efficient manner - sessions to be held during determination phase | 16 |
| Overlap of growth schemes with existing AMP8 solutions - opportunity that the additional growth has a beneficial impact as the growth scope can be delivered more efficiently by a single projects (reduced site mobilisation costs) | Opportunity | Overlaps are known and understood - existing AMP8 design and delivery teams will be engaged to develop a project by project plan in terms of incorporating the additional scope in to the AMP8 project in the most cost and programme efficient manner - sessions to be held during determination phase | 15 |
| Ecological constraints and working windows - there is a risk that due to the high population of sites in rural locations specific projects may encounter delays relating to ecology, this could lead to programme delays and additional costs | Threat | Heavily constrained sites have been identified during the constructability and deliverability review - predominantly due to proximity to environmental designations | 12 |
| There is a risk that the existing outfalls for the WwTW are undersized to accommodate the catchment growth. Whilst an upgrade has been allowed for on a handful of sites there is a risk that the population of sites could increase - this can trigger significant capital works and the requirement for temporary permits such as FRAs and river modelling - both elements would result in an increase to cost and time | Threat | For the majority of the growth sites it has been assumed that the outfall is sufficiently sized for growth - a small number e.g. Dunham Massey have priced in an outfall upgrade due to the scale of the FFT increase. This assessment will be undertaken between Feasibility and Outline Design when a full hydraulic profile is complete. If an upgrade is required, every effort will be made to maintain the discharge point to avoid a new discharge license - all instances where a outfall upgrade is required will likely need a FRAP due to proximity of the Water course working | 12 |
| Interface with existing assets - There is a risk that a number of the projects will require significant modifications to existing live assets - this could result in additional cost and programme impacts relating to temporary treatment or over pumping to enable any modifications or upgrades | Threat | Sites where the interface with existing assets has been identified as a high risk have additional allowances in place to cover temporary treatment and over pumping to mitigate. Initial discussions have commenced with operational teams to ascertain likely requirements and timescales | 9 |

Source: UUW programme delivery risk assessment

6.3.9 Mitigation plans are in place for all key risks identified.

6.4 A comprehensive delivery programme

6.4.1 A full overview of the scope associated with both the growth and asset health submissions has been undertaken and the overlap with AMP8 WINEP schemes has been assessed.

- 6.4.2 In order to provide an accurate overall supply chain capacity it has been assumed that the currently assigned runway and partner allocation will be maintained – unless the scope of the works has increased or changed to the extent that the existing partner may no longer be best for task. In this case i.e. Keswick WwTW an alternative delivery route has been assumed.
- 6.4.3 Projects have been categorised to provide greater granularity in terms of likely supply chain, interface with existing assets and likely programme durations.

Table 11: Description of project categories

| Category | Description |
|------------|---|
| Category 1 | Offline Build - Small # new assets |
| Category 2 | Offline Build - Significant # new assets |
| Category 3 | Significant interface with existing assets - High risk of temporary treatment |
| Category 4 | Moderate-Minor # new assets - manageable interface with existing assets |
| Category 5 | Refurbishment only – High risk of temporary treatment |
| Category 6 | Refurbishment only – Low risk of temporary treatment |

Source: Programme categorisation based on solution type as identified by UUW

- 6.4.4 Each category is then split into 4 further categories to identify whether additional land is required and whether there is an existing live AMP8 project that needs to be considered. This categorisation has allowed more accurate programme development and phasing of the work to align with supply chain availability.

Table 12: Project land requirement categories

| Category | Description |
|----------|---|
| A | No existing AMP8 schemes -Land required |
| B | Existing AMP8 scheme - No Land required |
| C | No existing AMP8 schemes -Land required |
| D | Existing AMP8 scheme - No Land required |

Source: Programme categorisation based on solution type as identified by UUW

- 6.4.5 These standard programmes are based on current AMP8 delivery performance and have been adjusted based on individual project complexity or constraints identified during the optioneering and constructability assessments.

Table 13: Growth submission category allocation

| Category | Growth | |
|------------|--------------------|-------------|
| | Number of Projects | |
| | Wastewater | Clean water |
| Category 1 | 8 | 0 |
| Category 2 | 7 | 0 |
| Category 3 | 5 | 2 |
| Category 4 | 14 | 0 |
| Category 5 | 0 | 0 |
| Category 6 | 0 | 0 |

Source: Programme categorisation based on solution type as identified by UUW

- 6.4.6 Projects have also been scored against a constructability and deliverability matrix that assesses each project based on a number of criteria that have a material impact on project delivery.

Table 14: Constructability and deliverability matrix

| Category | Assessment | Scoring |
|---------------------------------|------------------|------------------|
| Access | Constructability | Range 1-5 |
| Topography | Constructability | Range 1-5 |
| Services | Constructability | Range 1-5 |
| Land Purchase | Constructability | No 0 / Yes 5 |
| Land Rental | Constructability | No 0 / Yes 5 |
| Environmental | Constructability | Range 1-5 |
| Flood Zone | Constructability | Range 1-5 |
| Existing live AMP8 scheme | Deliverability | No 0 / Yes 5 |
| Impact on regulatory commitment | Deliverability | Range 1-5 |
| Complexity of solution | Deliverability | Range 1-5 |
| Likely runway & capacity | Deliverability | Range 1-5 |
| Operational interface | Deliverability | Range 1-5 |
| Programme risk based on above | Deliverability | Range 1-5 |
| Total | | Out of 65 |

Source: UUW constructability and deliverability scoring matrix

- 6.4.7 These key criteria drive differing project durations in order to allow sufficient time for project delivery i.e. extended programmes for land purchase and planning.
- 6.4.8 Time risk allowance (TRA) has been built into riskier activities, such as modifications or tie into existing structures to ensure that programmes have sufficient contingency included in the baseline and are deliverable.
- 6.4.9 High level project programmes have been developed in Primavera (P6) to provide a full programme view, allowing an overall deliverability assessment to be completed.
- 6.4.10 Resource levelling has been applied to the programme to reduce the impact and workload on our design supply chain, this staggering of work ensures that the supply chain is kept productive in year 4 and 5 ready for AMP9 mobilisation.

7. Assurance

This section summarises the independent technical and commercial assurance undertaken on the submission, confirming that the need, solution choice, costs and delivery plans are robust and compliant with Ofwat guidance. It provides confidence that the proposal is evidence-led, efficient, and ready for regulatory consideration.

- 7.1.1 This section summarises U UW’s approach to assuring this submission and the outcomes of the third party assurance. It is supported by *UUW26-09 Growth Submission – Commercial assurance report* and *UUW26-10 Growth Submission – Technical assurance report*
- 7.1.2 Ofwat requires cost changes submissions to include a third-party assurance report in line with the requirements set out in “PR24 final determinations: Expenditure allowances - assurance requirements for delivery of enhancement schemes appendix”¹⁷. This includes technical and commercial assurance across the content of the submission.
- 7.1.3 The Technical Assurance confirms that the proposed investment meets the requirements set out in Ofwat’s guidance for the following areas:
- Need for a step change in investment;
 - Best option for customers; and,
 - Investment delivery plan.
- 7.1.4 The Commercial Assurance provides a view on the robustness of the costs proposed by the company and whether they are efficient and represent industry best practice, this includes an assessment of cost estimation approach.
- 7.1.5 The Commercial assurance confirms that the proposed investment meets the requirements set out in this document for the following areas:
- Robust and efficient costs; and,
 - Customer protection.

¹⁷ [PR24-final-determinations-Expenditure-allowances-Assurance-requirements-for-delivery-of-enhancement-schemes-appendix.pdf](#)

United Utilities Water Limited
Haweswater House
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington
WA5 3LP
unitedutilities.com



Water for the North West