WSX50 - Costs wholesale waste water tables commentary

Business plan
2025-2030

Wessex Water
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WSX50 - Costs wholesale waste water tables commentary

CONTENTS

This supporting document is part of Wessex Water's business plan for 2025-2030.

More information can be found at wessexwater.co.uk

1. CWW1

Costs in Table CW1 reflect opex and capex post frontier shift and real price effects. They therefore include the net impact of efficiencies / productivity gains and above inflationary increases in the price of inputs. Further information can be found in the commentary for SUP11.

1.1. Operating Expenditure – Line CWW1.1-6

1.1.1. Operating expenditure 2022-23 – 2024-25 (Early submission AMP7)

1. Sewage collection

The base operating expenditure for Sewage Collection has increased by £1.0m. This is driven by an increase of £2.5m for asset renewal between the two years, which is partially offset by a £1.4m decrease in other opex.

Third-party services have reduced by £0.5m from 2022-23 to 2023-24 and 2024-25 as no damages have been forecast in income or cost. 2023-24 and 2024-25 then remain consistent for third-party costs.

2. Sewage treatment

The base operating expenditure for Sewage treatment has reduced by £2m between 2022-23 and 2023-24 due to a £0.9m reduction in energy costs and a £3.0m reduction in other operating expenditure which is driven by targeting reduced hire / contract and employment costs in our budget setting exercise. These increases are offset by a £1.8m increase in business rates as rateable values at multiple sites are being reassessed, resulting in increased costs. Costs between 2023-24 and 2024-25 remain consistent with no material variances.

Principal Use recharges have reduced opex by £2.0m in 2022-23 compared to £1.1m in 2023-24 and only £1.0m in 2024-25 as the value of the assets on which the recharges are based also reduces due to depreciation. Please note this is a deviation from the APR 2022-23 table 4E.

3. Bioresources

Energy costs have reduced by £0.3m and income has also decreased by £0.4m. Both are as a result of an expected fall in energy prices. However, base operating expenditure has increased by £4.5m between 2022-23 and 2023-24 due to an increase in Other operating expenditure.

Rates have increased by £0.3m for the same reasons as noted for Sewage Treatment costs. Other operating expenditure has increased by £4.0m, driven by increasing costs of employment and hire / contract support for this area of the business.

Principal Use recharges have increased opex, specifically in sludge treatment, by £0.4m in 2022-23 compared to £0.2m in both 2023-24 and 2024-25 as the value of the assets on which the recharges are based also reduces due to depreciation. Please note this is a deviation from the APR 2022-23 table 4E.

4. Equity Issuance costs

There are no equity issuance costs included in CWW1 for the years 2022-23, 2023-24 or 2024-25.

5. Atypical expenditure

There is no atypical expenditure.

1.1.2. Operating expenditure 2025-26 to 2029-30

1. Sewage Collection

Base operating expenditure for Sewage collection is forecast to increase by £1.0m across the 5 years in AMP8. This has been driven by a forecast reduction in other operational expenditure as a result of efficiencies expected to be achieved across the AMP. Power costs are forecast to increase from £6.5m to £6.6m across the period as a result of expected increases in real price effects. Other operating costs have decreased by £1.1m. There are no Principal Usage recharges included in Sewage collection.

Third party and developer service costs remain consistent and low value throughout AMP8.

2. Sewage Treatment

Sewage treatment base opex is forecast to increase £15m between 24-25 and 25-26 as a result of enhancement expenditure from AMP7 being base in AMP8 and an additional £4.6m increase in base opex relating to increased pollutions mitigation activity and health and safety expenditure, presented in other operating expenditure.

Base operating expenditure is forecast to increase by £8.9m across AMP8 from £64.0m to £72.9m in Sewage treatment. Expected increases in business rates are a key driver of this increase, increasing from £6.1m up to £15m, the impact of our extensive capital schemes but also the continued assessments of existing sites. Power costs are also forecast to increase by £0.5m across AMP8 as a result of real price effects.

Other operating costs are expected to increase by £2.2m across AMP8, mainly as a result of additional expenditure for addressing pollutions and improved health and safety approaches. This increase, £2.3m by 2029-30, is added to by reducing Principal Usage recharges, which decrease from £1m credit in 25-26 to only £0.3m credit in 2029-30. These increases are offset by assumed levels of efficiencies across the 5 years and real price effects relating to labour and materials consumed.

Third party and developer service costs remain consistent and low value throughout AMP8.

3. Bioresources

There is a step change in Bioresources base opex of £9.1m from 24-25 to 25-26 due to new obligations to comply with the implementation of the Industrial Emissions Directive (IED) in the water sector.

Base operating expenditure is forecast to increase by £1.7m across AMP8 in bioresources with Sludge Treatment being the largest area of growth, £2.3m, compared to a £0.5m decrease in Sludge Transport and a £0.1m decrease in Sludge Disposal.

As with Sludge Treatment, business rates are forecast to increase steadily across AMP8 from £2m to £3.3m. The other increases are in Other operating costs and relate to RPE movements and increases relating to health and safety and IED requirements, which are offset by efficiencies expected to be achieved. Power costs are forecast to increase by less than £0.1m across all areas of Bioresources combined. Principal Usage recharges only affect Sludge Treatment and decrease across AMP8 from £0.1m down to just £35k by the end of the AMP as a result of the decreasing value of the assets being recharged.

There are not expected to be any developer services or third-party operating costs in AMP8.

4. Equity Issuance costs

There are no equity issuance costs included in CWW1 for AMP8

5. Atypical expenditure

There is no atypical expenditure forecast in AMP8.

1.2. Capital Expenditure – Line CWW1.8-1.13

1.2.1. Capital expenditure 2022-23 – 2024-25 (Early submission AMP7)

1. Base capital expenditure

Our programme of planned annual maintenance to operational assets, strategic projects, proactive sewer renewal and reactive repairs to address leaking sewers makes up this expenditure.

Expenditure in 2023-24 is forecast to be greater than the previous year, mainly due to increasing expenditure on Bioresources assets. We are forecasting reduced expenditure in this area in 2024-25 mainly due to refurbishment of Poole sludge treatment centre completing in 2023-24.

Expenditure on sewage treatment is expected to reduce in 2024-25 compared to the previous 2 years due to completion of 2 large projects at Lytchett Minster and Saltford water recycling centres.

Investment in sewage collection assets remains constant through the 3-year period.

2. Enhancement capital expenditure

Expenditure is forecast to increase significantly in 2023-24 and 2024-25 due to the completion of schemes associated with AMP7 WINEP outputs and the impacts of a restrictive supply chain and real price effects.

3. Developer services expenditure

Accounting for accrued costs related to asset payments to developers for legacy agreements means that negative expenditure is forecast for 2023-24. Expenditure in 2024-25 is then forecast to be higher than 2022-23 as a number of network reinforcement projects will be completed.

4. Atypical capital expenditure

Planning work to relocate four operational depots and sell the land is on hold. These were previously reported as we thought they would be material, so we are continuing to report the projects for consistency. These costs are included in the base capital expenditure line.

5. Principle use recharges

PU recharges are for opex only.

1.2.2. Capital expenditure 2025-26 to 2029-30

6. Base capital expenditure

We are proposing a significant uplift in investment from our AMP7 position with most of the increase identified at our Water Recycling Centres. This investment is needed as many of our Water Recycling assets have reached or will reach the end of life by 2030. To maintain our current levels of environmental performance we need to increase our programme of proactive asset replacement and refurbishment, and this is due to continuing deterioration in asset condition and performance. Year 1 of AMP8 is significant spend due to need to replace unsupported assets at a high-risk bathing water site.

Bioresources will also have a significant increase in investment compared to previous AMPs as we are facing increased regulatory demands and risks associated with the processing of increasing quantities of chemically dosed

sludge being generated from our Water Recycling Centres. We will also be increasing our focus in tackling operational risks such as the likelihood of reduced access to landbanks. Following improvements in health & safety capabilities we have identified areas of improvement across all our Bioresources sites which have added £110m to our existing replacement and refurbishment plans.

7. Enhancement capital expenditure

We are proposing a very significant uplift in enhancement expenditure in AMP8 which is a consequence of a number of drivers:

a. Sewage Collection

- Storm overflows – driven by the Government's Storm overflow discharge reduction plan (SODRP), we are investigating and improving 128 storm overflows, prioritising wetland treatment and rainwater separation at source.
- Pollutions – We have set ourselves a target to halve the impact of flooding by 2050 and achieve zero pollutions in the same timescale. This will involve further development of our smart network (in-sewer monitoring) and Pollution Incident Reduction Plan (PIRP)

b. Sewage Treatment

- WRC capacity – we have an aim to achieve 100% discharge permit compliance in every year of PR24, in line with regulator expectations. This compliance target is a level which no company has ever consistently achieved before; sufficient expenditure to increase WRC capacity in our region is integral to achieving and sustaining ahigh level of discharge permit compliance.
- Nutrient removal – driven by a number of legislative requirements including the upcoming Levelling Up and Regeneration Bill (LURB), a doubling of expenditure focussing on phosphorus and nitrogen removal. The main driver for phosphorus is to achieve Technically Achievable Limits (TAL) at the majority of WRCs proposed by 2030; while significant expenditure is proposed for a number of sites that discharge to Poole Harbour to reduce nitrogen with the aim being that Poole Harbour obtains favourable status.
- Chemicals – the EA and Defra are developing a strategy for managing chemicals in surface waters, which is likely to suggest a balance between source control for widespread, accumulating chemicals and end of pipe treatment for chemicals with more localised impacts. 10 WRCs have been identified for proposed permits for chemicals following industry-wide investigations have been established to inform the strategy.
- Flow - the scheme at Avonmouth (our largest WRC) to increase capacity is spanning AMP7 & 8.

c. Bioresources

- Growth investment in AMP8 will provide 10,950 tds per year of additional capacity to accommodate increasing sludge volumes and provide 30% headroom to ensure resilience to plant outtages
- Implementation of the IED means that five of our anaerobic digestion sites will be permitted under IED and will need to comply with the Best Available Techniques (BAT) and Appropriate Measures for biological treatment (AM) guidance.
- We have allowed for the upgrade of all our lime treatment centres due to the move of sewage sludge into the Environmental Permitting Regulations (EPR).

For further details see WSX16 and WSX18.

8. Developer services capital expenditure

Our CAPEX forecast considers costs of requisitions which are influenced by a shift in market preference for Developer Delivered Requisitions and penetration of NAVs into the market. We are forecasting substantial capital network reinforcement being required due to emerging planned developments.

9. Third party services

No costs are reported against this line.

10. Principle use recharges

PU recharges are for opex only.

1.3. Developer Services revenue – Line CWW1.7 & 14

For wastewater services, a refund in 2022- 23 for receipts for on-site work meant the total revenue for this activity was low in 2022-23. There is a significant increase in revenue in the following two years which is mainly due to an expected increase from infrastructure charges as charges were raised in 2023-24. The forecast assumes revenue will be reflective of the costs incurred in 2023-24 and 2024-25.

In AMP8 CAPEX revenue is forecast to follow ONS population projections which show that while population in our region is growing, the rate of growth is slowing. This reduces the demand and year on year build rate. The growing penetration of NAV service providers in the development market is offset by infrastructure charge income increasing in line with capital network reinforcement commitments.

1.4. Cash expenditure

The pension deficit costs are expected to cease after 2024-25. The payments in the final two years of the AMP align to statutory disclosures. There are not expected to be any other cash items.

1.5. Atypical Expenditure

The atypical expenditure in AMP 7 relates to the relocation of depots. However, this process in on hold and there are currently no forecast costs. There is no forecast for any atypical expenditure in AMP8.

1.6. Principal Use Recharges

Principal use recharges have been applied for as noted in the commentary for CWW2.

1.7. Cash expenditure – Line CW1.16 & 18

The pension deficit recovery payments are only forecast in 2023-24 and 2024-25 but as the recovery plan is due to end in 2024-25 there are no further payments subsequently forecast in AMP8. There are no ‘Other cash items’ forecast.

2. CWW1a

2.1.1. Base operating expenditure

Please see the commentary for CWW2, later in this document, for the detail supporting the variances in line 1.

2.1.2. Enhancement operating expenditure

Enhancement opex is expected to increase significantly in AMP8 due to a number of drivers of investment:

- Reducing internal flooding and number of pollutions
- Growth to cater for forecast development rates
- Nutrient removal - phosphorus and nitrogen
- Habitat restoration
- Resilience
- Increase in sludge treatment capacity

2.1.3. Developer services operating expenditure

We are expecting a slight reduction in developer services operating expenditure due to the reductions in new connections overall. This is based on ONS population projections showing that while population in our region is growing, the rate of growth is slowing, reducing the demand and year on year build rate each year. Market penetration by NAVs is also reducing operating expenditure to a minor degree, the added complexity and duplication of effort evidenced in AMP 7 required to serve NAVs is offsetting reduction in expenditure.

2.1.4. Third party services

The third-party costs remain materially consistent throughout AMP7 and AMP8, ranging between £1.22m and £1.35m.

2.2. Developer services revenue - opex

We are expecting a slight reduction in developer services revenue due to the reductions in new connections overall. This is based on ONS population projections showing that while population in our region is growing, the rate of growth is slowing, reducing the demand and year on year build rate each year

2.3. Capital Expenditure

2.3.1. Base capital expenditure

We are proposing a significant uplift in investment from our AMP7 position with most of the increase identified at our Water Recycling Centres. This investment is needed as many of our Water Recycling assets have reached or will reach the end of life by 2030. To maintain our current levels of environmental performance we need to increase our programme of proactive asset replacement and refurbishment, and this is due to continuing deterioration in asset condition and performance. Year 1 of AMP8 is significant spend due to need to replace unsupported assets at a high-risk bathing water site.

Bioresources will also have a significant increase in investment compared to previous AMPs as we are facing increased regulatory demands and risks associated with the processing of increasing quantities of chemically dosed sludge being generated from our Water Recycling Centres. We will also be increasing our focus in tackling operational risks such as the likelihood of reduced access to landbanks. Following improvements in health & safety capabilities we have identified areas of improvement across all our Bioresources sites which have added £110m to our existing replacement and refurbishment plans.

2.3.2. Enhancement capital expenditure

We are proposing a very significant uplift in enhancement expenditure in AMP8 which is a consequence of a number of drivers:

a. Sewage Collection

- Storm overflows – driven by the Government's Storm overflow discharge reduction plan (SODRP), we are investigating and improving 128 storm overflows, prioritising wetland treatment and rainwater separation at source.
- Pollutions – We have set ourselves a target to halve the impact of flooding by 2050 and achieve zero pollutions in the same timescale. This will involve further development of our smart network (in-sewer monitoring) and Pollution Incident Reduction Plan (PIRP)

b. Sewage Treatment

- WRC capacity – we have an aim to achieve 100% discharge permit compliance in every year of PR24, in line with regulator expectations. This compliance target is a level which no company has ever consistently achieved before; sufficient expenditure to increase WRC capacity in our region is integral to achieving and sustaining ahigh level of discharge permit compliance.
- Nutrient removal – driven by a number of legislative requirements including the upcoming Levelling Up and Regeneration Bill (LURB), a doubling of expenditure focussing on phosphorus and nitrogen removal. The main driver for phosphorus is to achieve Technically Achievable Limits (TAL) at the majority of WRCs proposed by 2030; while significant expenditure is proposed for a number of sites that discharge to Poole Harbour to reduce nitrogen with the aim being that Poole Harbour obtains favourable status.
- Chemicals – the EA and Defra are developing a strategy for managing chemicals in surface waters, which is likely to suggest a balance between source control for widespread, accumulating chemicals and end of pipe treatment for chemicals with more localised impacts. 10 WRCs have been identified for proposed permits for chemicals following industry-wide investigations have been established to inform the strategy.
- Flow - the scheme at Avonmouth (our largest WRC) to increase capacity is spanning AMP7 & 8.

c. Bioresources

- Growth investment in AMP8 will provide 10,950 tds per year of additional capacity to accommodate increasing sludge volumes and provide 30% headroom to ensure resilience to plant outtages
- Implementation of the IED means that five of our anaerobic digestion sites will be permitted under IED and will need to comply with the Best Available Techniques (BAT) and Appropriate Measures for biological treatment (AM) guidance.
- We have allowed for the upgrade of all our lime treatment centres due to the move of sewage sludge into the Environmental Permitting Regulations (EPR).

For further details see WSX16 and WSX18.

2.3.3. Developer services capital expenditure

Our CAPEX forecast considers costs of requisitions which are influenced by a shift in market preference for Developer Delivered Requisitions and penetration of NAVs into the market. We are forecasting substantial capital network reinforcement being required due to emerging planned developments.

2.3.4. Third party services

No costs are reported against this line.

2.3.5. Principle use recharges

PU recharges are for opex only.

2.4. Developer services revenue – capex

CAPEX revenue forecast to follow ONS population projections showing that while population in our region is growing, the rate of growth is slowing, reducing the demand and year on year build rate each year and the growing penetration of NAV service providers in the development market; offset by infrastructure charge income in creasing in line with capital reinforcement commitments.

2.5. Cash expenditure

The pension deficit costs are expected to cease after 2024-25. The payments in the final two years of the AMP align to statutory disclosures. There are not expected to be any other cash items.

2.6. Atypical Expenditure

The atypical expenditure in AMP 7 relates to the relocation of depots, however this process in on hold and there are currently no forecast costs. There is no forecast for any atypical expenditure in AMP8.

2.7. Principal Use Recharges

Principal use recharges have been applied for as noted in the commentary for CWW2.

3. CWW2

3.1. Lines 1-3, 6-13

The OPEX is consistent year on year throughout AMP8 with the only variance arising from principal usage recharges which reduce across the course of the AMP.

Power has reduced by £0.8m between 2022-23 and 2023-24 and then reduced by £5.8m between 2023-24 and 2024-25 as a result of the expected reduction and then stabilisation of power costs.

A further increase of circa £1.3m as a result of the transition of enhanced opex in AMP7 into base opex in AMP8.

Business rates are forecast to increase between 2022-23 and 2023-24 by £2.2m as a result of changing status of a number of sites which will result in a higher rates charge.

Other operating expenditure is increasing marginally year on year as a result of the reduction of the principal use recharge which is a recharged cost. Between 2024-25 and 25-26 there is a further £19.9m increase in other operating expenditure relating to additional costs in the Sewage Treatment and Sludge treatment price controls for additional costs relating to increased monitoring and health and safety initiatives. These continue to add additional costs throughout AMP8 with a further £3.8m added by the end of the AMP.

Principal Use of Asset recharges have been applied here on the same basis as the APR and result in an decrease in OPEX of an average of £0.7m per annum, although this decreases over time as the assets useful economic lives expire. Principal Use of Asset recharges are all included in Other operating expenditure.

No equity issuance costs are included in the forecasts presented.

3.2. Lines 2.4 and 2.15-2.17

AMP7

Infrastructure renewal opex and maintenance infrastructure capex is forecast to be slightly greater in the remaining years of AMP7 compared with 2022/23. The variation in expenditure is due to some larger strategic projects in Poole and Portland in Dorset which will be in construction phase over the latter 2 years of AMP7.

Non infrastructure capital maintenance is forecasting to be greater in 2023/24 than 2022/23 and 2024/25 because of investment in Sludge Treatments. Continuation of significant investment to make improvements to Poole Bioresources Centre, due to complete in 2025/26, and construction of other strategic improvements at Avonmouth and West Huntspill explain the increase in costs over the previous year. The expenditure is expected to be lower in 2024/25 mainly due to lower costs to be incurred at Poole as the project nears completion.

AMP8

Renewals expensed in year infrastructure and capital maintenance infrastructure costs are consistent each year in AMP8 and are similar to latter years of AMP7. We plan to replace 23km of rising mains, continue our programme of re-lining of our sewer network to reduce infiltration, and increase the proactive sewer rehabilitation programme to reduce sewer collapses.

There are no Non-Infrastructure renewals as non-infrastructure maintenance is fully capitalised.

Non Infrastructure capital maintenance costs are expected to increase significantly in AMP8 compared with AMP7. The main reason for the increase is investment in Bioresources. This is significantly higher than AMP7 and expected to peak in 2026 to 2028 due to improvements in capability in health and safety and upgrading existing assets to comply with IED regulations. The value of investment in Wastewater Network Plus is consistent with expenditure from AMP7.

4. CWW3

The enhancement expenditure reported in this table exclude the impact of the real price effect and frontier shift assumptions. More details on this can be found in the commentary for table SUP11.

4.1. EA/NRW environmental programme wastewater (WINEP/NEP) – Line CWW3.1-130

Scheme completions have been profiled to meet PR24 Water Industry National Environment Programme (WINEP) regulatory dates, with delivery phasing throughout the AMP taking into consideration resources and other priorities across the whole PR24 business plan. Programme optimisation has considered best value, particularly advancing those with greater benefit-cost ratios.

4.1.1. CWW3.1-3.3 Event duration monitoring at intermittent discharges

Expenditure on schemes listed in WINEP/NEP to provide new discharge operation monitoring at sewage treatment works storm tanks (driver code U_MON 3). This line should also be used for any event duration monitoring required under the Storm Overflow drivercodes.

Refer to commentary for CWW20.52-55 (Number of event duration monitors installed (to include at STWs and in network)) for details.

Costs include completion of AMP7 schemes and delivery or PR24 schemes, taking into the type of delivery (e.g. permit/meter/civils) and include appropriate permitting and certification costs.

Costs for CWW3.4-3.6 have been included against 3.1-3.3. They include completion of AMP7 schemes and delivery or PR24 schemes, taking into the type of delivery (e.g. permit/meter/civils) and include appropriate permitting and certification costs. In recognition and full support of the need for accurate flow monitoring, we are proposing to deliver many of our PR24 schemes before 2025. This does include £1.5m of costs already spent in AMP7 year 3 2022/23, which is ineligible for PR24 transition funding and thus falls outside of our PR24 business plan ask and not included in any tables.

The below table provides a breakdown of costs included against CWW3.1-3.2, to allow distinguishing between any AMP7 costs already funded through PR19.

Table 1 - Breakdown of costs included against CWW3.1-3.2.

		2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
AMP7 Event Duration Monitoring								
CWW3.1	Event duration monitoring at intermittent discharges (WINEP/NEP) wastewater capex	1.411	0.770	-	-	-	-	-
CWW3.2	Event duration monitoring at intermittent discharges (WINEP/NEP) wastewater opex	0.153	0.237	base				
PR24 Event Duration Monitoring								
CWW3.1	Event duration monitoring at intermittent discharges (WINEP/NEP) wastewater capex	0.000	0.000	0.243	1.790	0.000	0.000	0.000
CWW3.2	Event duration monitoring at intermittent discharges (WINEP/NEP) wastewater opex	0.000	0.000	0.000	0.000	0.091	0.091	0.092
PR24 Flow Monitoring								
CWW3.4	Flow monitoring at sewage treatment works; (WINEP/NEP) wastewater capex	9.330	6.255	1.893	1.089	0.000	0.000	0.000
CWW3.5	Flow monitoring at sewage treatment works; (WINEP/NEP) wastewater opex	0.000	0.101	0.406	0.510	0.607	0.610	0.613

4.1.2. CWW3.4-3.6 Flow monitoring at sewage treatment works

Expenditure on schemes listed in WINEP/NEP to provide MCERTs flow monitoring at sewage treatment works or last in line sewage pumping stations (under driver codes including U_MON3 to 4 / W_U_MON3 to 4, and EPR_MON1 etc).

Refer to commentary for CWW20.32-35 Number of STW flow monitors installed for details.

Costs for PR24 for CWW3.4-3.6 have been captured against CWW3.1-3.3.

4.1.3. CWW3.7-3.9 Continuous river water quality monitoring

Expenditure on schemes listed in the WINEP/NEP to provide continuous river water quality monitoring (under driver codes EnvAct_MON1 to MON5).

The Environment Act includes a new duty on WaSCs to monitor the quality of water potentially affected by discharges from storm overflows and sewage disposal works (WRCs).

This is referenced in the SODRP as “The Environment Act 2021 requires the water industry to measure the water quality both up and downstream of these assets. This monitoring framework will give clear evidence to the public on whether improvement schemes are achieving the required outcomes, and where further upgrades may be required.”

Defra issued draft CWQM guidance in July 2022 and following consultation, issued final guidance on 9 August 2023. Due to the scale of the requirements specified in the draft guidance, the final guidance scales down the requirements required by 2030. The reduced scope requires 25% of the monitors installed by 2030 (prioritised at

high priority environments) and also extended the range of clustering and exclusions, so requires fewer monitors in the medium term. It still remains a very challenging and expensive programme to deliver (Capex) and operate (Opex).

It requires us to install permanent monitoring kiosks on private land, with all the issues of access and health and safety on installing sondes in rivers. Significant uncertainty about how this programme will be implemented remains.

Using the latest guidance we estimate that c450 monitors are required to achieve the 25% installation by 2030. This is only an indicative level of installation as more detailed analysis is required, but we have made assumptions in the short time available to include within the PR24 plan. This line contains the costs. Line CWW20.49 is an indicative delivery profile.

Costs in early years are required to gear up for this undertaking, including building/buying facilities to be able to maintain the large number of monitors that need maintaining regularly. Transitional funding is likely to also be needed.

4.1.4. CWW3.10-12 MCERTs monitoring at emergency sewage pumping station overflows

Expenditure on schemes listed in the WINEP/NEP to provide MCERTs monitoring at emergency sewage pumping station overflows (under driver code U_MON6 / W_U_MON6).

Refer to commentary for CWW20.50 (Number of new MCERTs event duration monitors installed at SPS emergency overflows) for details.

There is no enhancement investment in AMP7 (although we did ensure all EOs have a ‘overflow’ operating telemetry signal through base expenditure).

The AMP8 enhancement programme is on the WINEP (U_MON6 driver) . We originally had an EA target to deliver all EO monitoring requirements by 2030. However, in response to the phasing letter form the EA (5th July), we have scaled down the AMP8 installations to 25% of the sites.

This programme requires EDM installed at all EOs, to an MCERT standard (2 minutes). We have about 200 of these that may need upgrading. In AMP8 49 will need checking / upgrading.

Where an EO at a pumping station is also associated with a storm overflow, then the pass forward flow of the pumping station needs to be monitored (again MCERT standard 2 minutes). We have c400 of these EO/SIO sites, so in AMP8 we will need to install 102 new monitors.

4.1.5. CWW3.13-15 Increase flow to full treatment

Expenditure on schemes listed in the WINEP/NEP to increase the flow to full treatment (under driver code U_IMP5 / W_U_IMP5).

This is for the completion of the AMP7 U_IMP5 FFT Increase schemes. Some 2025/26 spend relates to the completion of AMP7 schemes with outputs claimed in the prior 2024/25 year, with funding through PR19, such as Halstock and, with ongoing spend against Saltford for which the EA have agreed a completion date extension to December 2026 due to third party issues.

Included is the additional cost to deliver Avonmouth WRC, related to the increase in design FFT from that included our PR19 business plan. For all other schemes we have absorbed any similar cost increases however the magnitude of Avonmouth means this is not possible. More details are in Supporting Document WSX16 Waste water

networks plus strategy and investment. Only FFT-associated costs for Avonmouth are included here. Any DWF/growth related costs are against CWW3.153-155.

We otherwise have no PR24 schemes under these categories.

4.1.6. CWW3.16-18 Increase storm tank capacity at STWs – grey solution

Expenditure on grey (conventional) schemes listed in the WINEP/NEP to increase the storm tank capacity to required standards to address Environment Act drivers relating to the reduction in storm overflow spills (EnvAct_IMP2 to EnvAct_IMP4), and/or to provide adequate settlement and detention for deferred PR19 U_IMP6 / W_U_IMP6 schemes, and/ or for other WINEP/NEP drivers, including BW / W_BW, SW / W_WFD_Shell etc.

This is for the completion of the AMP7 U_IMP6 storm storage schemes, such as Bourton or Yeovil Pen Mill, as well as storm storage at Holdenhurst under the BW_IMP3 driver.

The Network lines (CWW3.22 to CWW3.45) included a range of solution categories including source separation, whereas the WRC lines (CWW3.16 to CWW3.21) only had types of solution. So to include all storm overflow investment, we put all the PR24 storm overflow investment against the Network lines (CWW3.22 to CWW3.45).

This slightly differs in our approach to CWW20. For the PR24 grey and green solutions at WRCs the details were split into the WRC lines (CWW20.14 to CWW20.18), but for 'other' solutions we followed the same approach of applying both WRC and Network details to the Network lines (CWW20.36 to CWW20.47).

4.1.7. CWW3.19-48 Storm overflow improvements – general commentary

The costs in lines CWW3.22 to CWW3.48 are for delivering hydraulic improvements and screening at storm overflows.

A small number of hydraulic Storm overflow improvements are being undertaken in AMP7. A much larger programme of 128 WINEP improvements in AMP8 to achieve the targets of the Storm overflow reduction plan enhancement investment.

AMP7 schemes include those related to the Frequent spilling overflow improvements (under the Storm Overflow Assessment Framework) included on the WINEP with drivers U_IMP4. It also includes costs from upgrading sewage pumping stations which we are estimating will generate cost savings in opex incurred by the sites once the works are completed.

AMP8 values are for the WINEP (August 2023 proposal of 128 total improvements at WRCs and Networks in AMP8) storm overflow reduction plan improvements.

The volumes are taken from recent investigations for PR24 or based on hydraulic computer modelled predictions from the DWMP. Extrapolation has been undertaken where appraisals have not been undertaken. The target of no ecological harm is not known at each site, so we have generally used either 5 spills or 10 spills per year depending on the sensitivity of the environment (5 discharges RNAG and Chalk stream) .

Note: The final WINEP may be smaller or larger due to deferrals proposed for affordability and deliverability or the EA/Defra may insist on the draft WINEP (June23) which contained 148 improvements at WRCS and network storm overflows.

Storm overflows have a low confidence grade for AMP8 because they have not all been investigated and we don't know the level of improvements need so they don't cause harm. We will have more confidence following the EnvAct_INV4 investigations which will be completed by 2027. This will also promote separation schemes rather than attenuation scheme. The attenuation storage costs is the best value option compared with the separation option so have been used if unknown.

The optioneering undertaken to date has recommended three types of solutions. Below list the options and where we have populated the data table:

- 84 attenuation solutions = Storage delivered through Grey solutions (CWW3.24)
- 36 wetlands to treat groundwater inundated storm overflow discharges = Storage delivered through green solutions (CWW3.27).
- 8 separation schemes = Separation at source (CWW3.39).

Due to the low confidence and stage where we are at in undertaking investigations, we have therefore not provided the requested level of accuracy. Many lines in this table request 3 decimal places, which if we provided would suggest an accurate number – which some lines are not.

Proving attenuation or storage is the traditional, tried and tested method of improving storm overflow performance. These costs are for the delivery of 84 attenuation solutions in AMP8, and includes some schemes being delivered in AMP7.

4.1.8. CWW3.19-21 Increase storm system attenuation / treatment on a STW – green solution

Expenditure on green / nature-based solutions (e.g. non-conventional or nature-based, which may include wetlands, SUDs, and catchment management) listed in WINEP/NEP to increase storm storage or reduce the need for conventional storm tanks on a STW site (under drivers including EnvAct_IMP2 to 4 and W_U_O_IMP1 to 2). We have included EnvAt drivers in this line too.

See 1.1.7 for general commentary for storm overflows.

This line contains the costs of constructing some wetlands to treat storm overflow discharges. We are anticipating there to be 36 on the WINEP (WRC and Network) to deliver between 2025 and 2030.

4.1.9. CWW3.22-24 Storage schemes to reduce spill frequency at CSOs – grey solution

See 4.1.7 for general commentary for storm overflows.

Proving attenuation or storage is the traditional, tried and tested method of improving storm overflow performance. These costs are for the delivery of 84 attenuation solutions in AMP8, and includes some schemes being delivered in AMP7.

4.1.10. CWW3.25-27 Storage to reduce spill frequency at CSOs – green solution

See 4.1.7 for general commentary for storm overflows.

This line contains the costs of constructing wetlands to treat storm overflow discharges. We are anticipating there to be 36 on the WINEP to deliver between 2025 and 2030.

4.1.11. CWW3.28-30 Storm overflow – discharge relocation

See 4.1.7 for general commentary for storm overflows.

This type of solution has not been used for AMP8.

4.1.12. CWW3.31-33 Storm overflow – increase in combined sewer / trunk sewer capacity

See 4.1.7 for general commentary for storm overflows.

This type of solution has not been used for AMP8.

4.1.13. CWW3.34-36 Storm overflow – sustainable drainage – attenuation in the network

See 4.1.7 for general commentary for storm overflows.

This type of solution is similar to the source separation line CWW3.37. We have assigned costs to CWW3.37, as sustainable drainage is a sub-set of keeping water at source in line CWW3.37.

4.1.14. CWW3.37-39 Storm overflow – source surface water separation

See 4.1.7 for general commentary for storm overflows.

We have used these lines for all storm overflow separation schemes. We have allocated the costs to the Foul network, as we are improving the performance of the foul/combined network. However, some of the solutions will involve building new surface water assets.

4.1.15. CWW3.40-42 Storm overflow – infiltration management

See 4.1.7 for general commentary for storm overflows.

This line is zero, as we included infiltration management on our base+ costs. If wetlands are not considered an appropriate solution, then this enhancement line would includes a significant amount of costs for infiltration sealing of public and private assets.

4.1.16. CWW3.43-45 Storm overflow – sewer flow management and control

See 4.1.7 for general commentary for storm overflows.

This type of solution has not been used for AMP8.

4.1.17. CWW3.46-48 Storm overflow – new / upgraded screens

See 4.1.7 for general commentary for storm overflows.

We are not planning any screen only installations in AMP7 or AMP8.

Where we are making storm overflow improvements (eg attenuation or wetland) the scheme will include ensuring a fine screen is provided. The costs for this are included in the above lines.

4.1.18. CWW3.49-51 Treatment for chemical removal

Expenditure on improvements listed in the WINEP/NEP to achieve good chemical status or to prevent deterioration in chemical status or to achieve standstill limits for chemicals (under driver codes including WFD_IMP_CHEM, WFD_NDLS_CHEM1 to 2, WFD_ND_CHEM3 to 4, W_WFD_CHEM_ND2, BW / W_BW, SW / W_WFD_Shell etc).

The table below is an amalgamation of tables within that document, summarising treatment solutions and permitting changes, along with capex included in CWW3.49. Costings align with our latest view on EA permitting and sampling requirements, and are subject to change following any update arising from subsequent regulator discussions. More details are in Supporting Document WSX16 Waste water networks plus strategy and investment.

Table 2 – Summary of treatment solutions and permitting changes

WRC	Parameter	Permit drivers	Permitting Approach (EA Definition)	Investment AMP8?	AMP8 installation by Mar 2030	Capex in CWW3.49 (£m)
Castle Cary	Sol. Copper	WFD_NDLS	Approach 2 (NDLS)	N	Flexible permitting, working with traders, continued monitoring	0.042
Crewkerne	Cypermethrin	WFD_NDLS WFD_ND WFD_IMP	Approach 2 (NDLS, ND) Approach 4 (IMP)	N	Flexible permitting	0.043
Devizes	Cypermethrin	WFD_NDLS	Approach 2 (NDLS)	N	Flexible permitting and continued monitoring (see also Dissolved Metals section for other metals permits requirements at Devizes)	0.042
Devizes	Sol. Nickel	WFD_NDLS	Approach 2 (NDLS)	N	Flexible permitting, working with traders, continued monitoring	
Devizes	Sol Zinc.	WFD_NDLS	Approach 2 (NDLS)	N	Flexible permitting, working with traders, continued monitoring	
Merriott	Cypermethrin	WFD_NDLS WFD_IMP	Approach 2 (NDLS) Approach 4 (IMP)	N	Flexible permitting and continued monitoring	0.027
Shepton Mallet	Sol Zinc.	WFD_IMP	Approach 4 maximising benefits	N	Work with traders, maximising benefits of AMP7 installations	0.027
Somerton	Cypermethrin	WFD_NDLS WFD_IMP	Approach 2 (NDLS) Approach 4 (IMP)	N	Flexible permitting and continued monitoring	0.043
Sparkford	Cypermethrin	WFD_NDLS	Approach 2 (NDLS)	Y	Mixed Media Filter for AMP8 and continued monitoring	0.043
Tetbury	Cypermethrin	WFD_NDLS WFD_ND	Approach 2 (NDLS, ND)	Y	Mixed Media Filter (to supplement/replace cloth filter) in AMP8 and continued monitoring	3.192
Thingley	PFOS	WFD_NDLS	PFOS Approach 2	N	PFOS source control investigation, with a trial regulation through an OTA	*

Royal Wootton Bassett	Cypermethrin	WFD_NDLS	Approach 2 (NDLS)	Y	Mixed Media Filter (to supplement/replace TASF) for AMP8 and continued monitoring	0.042

*Whilst identified in the WINEP as a WFD_NDLS permit, we have included costs for Thingley against CWW3.52-54 as the proposal is a catchment investigation, as per PFOS Approach 2.

Excluded are any costs proportioned to phosphorus removal schemes.

4.1.19. CWW3.52-54 Chemicals and emerging contaminants monitoring, investigations, options appraisals

Expenditure on the monitoring, investigation and options appraisal of chemicals and emerging contaminants (including microplastics and other Chemical investigation Programme 4 contaminants) listed in the WINEP/NEP (under driver codes WFD_INV_CHEM, WFD_INV_MP and W_WFD_CHEM_INV1).

More details are in Supporting Document WSX16 Waste water networks plus strategy and investment.

We have included our chemical monitoring costs under WFD_INV_CHEM and WFD_INV_MP drivers against CWW3.103-105,106-108&109-111 in error. The table below sets out the expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers that should have been assigned to lines CWW3.52-54.

Table 3 - Expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers assigned to lines CWW3.52-54

Table and line reference	Number of WINEP actions	Totex (£m)
CWW3.103-105 Investigations – desk-based studies only	1	0.370
CWW3.106-108 Investigations – survey, monitoring or simple modelling	15	4.362
CWW3.109-111 Investigations – multiple surveys, and/or monitoring locations, and/or complex modelling	5*	5.307

* Includes 2 outputs under WFD_INV_MP drivers. All other outputs are under WFD_INV_CHEM drivers.

4.1.20. CWW3.55-57 Treatment for total nitrogen removal (chemical) & CWW3.58-60 Treatment for total nitrogen removal (biological)

Expenditure on schemes listed in the WINEP/NEP where the primary objective is to meet new or tightened permit conditions for total nitrogen using chemical/biological treatment (under driver codes including U_IMP1 to 3 / W_U_IMP1 to 3, WFD_IMP, WFD_ND, BW / W_BW, SW / W_WFD_Shell, and HD_IMP_NN etc).

Through PR24 planning we have undertaken a design and cost comparison between various chemical and/or biological treatment processes, which has built on prior evaluations for PR19 and earlier. Whilst all sites have natural biological nutrient removal, we are not proposing any new enhanced biological nutrient removal (EBNR) processes without any form of chemical dosing. The dominance and reliance on chemical dosing has led to others being categorised as 'Chemical treatment only'.

We envisage Dorchester to be designed as an EBNR process, however it will still have chemical dosing for both phosphorus and nitrogen, likely to be ferric sulphate and methanol respectively, and has been categorised as 'Combined chemical and biological'. A proportion of the costs for the Dorchester scheme has been allocated to both the chemical (12%) and biological (88%) lines.

Not included is spend beyond 2030 to complete schemes started during PR24. For more details and individual scheme cost profiles refer to CWW19.

4.1.21. CWW3.61-63 Nitrogen technically achievable limit monitoring, investigation or options appraisal

Expenditure on nitrogen technically achievable limit (TAL) monitoring, investigation and options appraisal (under driver code WFD_INV_N-TAL / W_WFD_NTal_INV1).

More details are in Supporting Document WSX16 Waste water networks plus strategy and investment. The costs cover a single WINEP line with various components.

Table 4 – Nitrogen TAL monitoring, proposed sites and technology

WINEP Action ID	Action Component	Site	Proposed Technology
08WW100216	a	N/A - Project Management	-
08WW100216	b	Wareham WRC Optimisation	Optimisation of existing sand filters
08WW100216	c	Studland WRC	iPhyc
08WW100216	d	Milborne Port WRC	Microvi

4.1.22. CWW3.64-66 Treatment for phosphorus removal (chemical) & CWW3.67-69 Treatment for phosphorus removal (biological)

Expenditure on schemes listed in the WINEP/NEP to deliver solutions to meet new or tightened permit conditions for phosphorus using chemical/biological treatment (under driver codes including U_IMP1 to 3 / W_U_IMP1 to 3, WFD_IMP / W_HR_IMP, WFD_ND / W_HR_NDIMP, HD_IMP_NN, BW / W_BW, SW / W_WFD_Shell, EnvAct_IMP1 / W_HR_P_IMP, W_HR_P_NDIMP, WFDGW_ND / W_WFDGW_NDIMP, WFDGW_IMP / W_WFDGW_IMP1_ etc).

Through PR24 planning we have undertaken a design and cost comparison between various chemical and/or biological treatment processes, which has built on prior evaluations for PR19 and earlier. Whilst all sites have natural biological nutrient removal, we are not proposing any new enhanced biological nutrient removal (EBNR) processes without any form of chemical dosing. The dominance and reliance on chemical dosing has led to others being categorised as ‘Chemical treatment only’.

We envisage Dorchester to be designed as an EBNR process, however it will still have chemical dosing for both phosphorus and nitrogen, likely to be ferric sulphate and methanol respectively, and has been categorised as ‘Combined chemical and biological’. A proportion of the costs for the Dorchester scheme has been allocated to both the chemical (12%) and biological (88%) lines.

Not included is spend beyond 2030 to complete schemes started during PR24. For more details and individual scheme cost profiles refer to CWW19.

4.1.23. CWW3.70-72 Treatment for nutrients (N or P) and / or sanitary determinands, nature based solution

Expenditure on green solutions (e.g. nonconventional or nature-based schemes including wetlands, reactive media, algae treatment, catchment nutrient balancing, etc) listed in the WINEP/NEP to meet new or tightened permit conditions for phosphorus, nitrogen or sanitary determinands (under driver codes including U_IMP1 to 3 / W_U_IMP1 to 3, WFD_IMP / W_HR_IMP, WFD_ND / W_HR_NDIMP, HD_IMP_NN, BW / W_BW, SW / W_WFD_Shell, EnvAct_IMP1 / W_HR_P_IMP, W_HR_P_NDIMP, WFDGW_ND / W_WFDGW_NDIMP, WFDGW_IMP / W_WFDGW_IMP1_ etc).

This covers three schemes: South Perrott (Sanitary), Cromhall (P, but no costs, as wetland already built) and East Harptree (P). For more details and individual scheme cost profiles for the P schemes refer to CWW19.

We are proposing other wetlands, such as at Maiden Bradley and Collingbourne Ducis for N removal, however these are likely to be supported by chemical dosing and as such are captured in costs for CWW3.55-57.

4.1.24. CWW3.73-75 Treatment for tightening of sanitary parameters

Expenditure on grey (conventional) solutions listed in the WINEP/NEP to meet tightened permit conditions for one or more of the sanitary parameters (under driver codes including WFD_IMP, WFD_ND, WFD_IMP_MOD, W_WFD_AMM/BOD/PG/Minor, W_HR_AMM/BOD/SS, BW / W_BW, SW / W_WFD_Shell etc), unless the objective is associated with a specific cost driver code for which there is a dedicated line elsewhere in this table. In such cases costs should be excluded from this line and entered in the line for the relevant cost driver code.

More details are in Supporting Document WSX16 Waste water networks plus strategy and investment.

4.1.25. CWW3.76-78 Catchment management – chemicals source control

Expenditure on schemes listed in the WINEP/NEP for the source control of chemicals in catchments (under driver codes including WFD_IMP_CHEM, WFD_NDLS_CHEM1 to 2, WFD_ND_CHEM3 to 4, W_WFD_CHEM_ND2, DrWPA / W_DrWPA, BW / W_BW, SW / W_WFD_Shell etc).

We are not proposing any new solutions of this type in PR24.

4.1.26. CWW3.79-81 Catchment management – nutrient balancing

Expenditure on schemes listed in the WINEP/NEP for nutrient balancing in catchments (under driver codes including WFD_IMP / W_HR_IMP, WFD_ND / W_HR_NDIMP, DrWPA / W_DrWPA, BW / W_BW, SW / W_WFD_Shell, WFDGW /W_WFD_GW etc).

We are not currently proposing any new solutions of this type in PR24, although we are continuing our offsetting requirements through base to meet AMP7 WFD objectives and have ongoing dialogue with the Environment Agency regarding solution types to meet our PR24 nutrient reduction targets.

4.1.27. CWW3.82-84 Catchment management – catchment permitting

Expenditure on schemes listed in the WINEP/NEP to provide catchment-scale permitting (under driver codes including NERC_IMP and W_BIOD_IMP1 etc).

For table CWW19, we have aligned schemes to the ‘Solution Type’ (Cost driver 10) as per the dropdown. CWW19 also contains data to align to indicate catchment-based solutions (catchment permitting) under Cost driver 5. To avoid confusion, we have only used the cost lines (available to use in CWW3, CWW14, CWW15, CWW16) that align to the “solution type” cost driver, hence this line is not used.

4.1.28. CWW3.85-87 Catchment management – habitat restoration

Expenditure on schemes listed in the WINEP/NEP for the restoration of habitats in catchments (under driver codes including HD / W_HR, SSSI / W_SSSI, NERC / W_BIOD, INNS / W_INNS, MCZ / W_HR_MWQ, WFDGW /W_WFD_GW etc).

Expenditure in this area covers three WINEP schemes:

Table 5 – Catchment management schemes

WINEP Action ID	Driver Codes	Action Name	Action Description
08WW101007	HD_INV SSSI_INV	West Parley Common investigation	West Parley Common investigation on WW assets impacting on the mire. Whilst listed as an investigation, should WW assets be found to be adversely impacting the mire, then any remaining funds from the investigation will be used to begin improvements, with the potential to continue into AMP9.
08MU100851a	HD_IMP	Hampshire Avon Partnership Project (Resilient Avon)	Resilient Avon Programme: Catchment Partnership Project led by third party with WW support (financial and in-kind) - working with South West Water and others.
08MU100852	HD_IMP 25YEP_IMP	Chew Valley Partnership	Catchment Partnership Project led by third party with WW support (financial and in-kind) - with Bristol Water and others (08MU100151).

This line should also contain a scheme at Ebblake.

4.1.29. CWW3.88-90 Microbiological treatment – bathing waters, coastal and inland

Expenditure for coastal or inland bathing water schemes listed in the WINEP/NEP to meet new or tightened permit conditions for microbiological parameters (under driver codes BW / W_BW or SW / W_WFD_SHELL). Solutions may include UV, nano filtration, ozonation and other chemical treatments. Please provide explanation in your commentary on the type of treatment.

There is no enhancement investment identified against this line for PR24.

4.1.30. CWW3.91-93 Septic tank replacements – treatment solution

Expenditure under WINEP/NEP to replace septic tanks with a treatment solution or drainage field (under driver code U_IMP7 / W_U_IMP7). Septic tank replacements – flow diversion.

This covers three WINEP schemes:

Table 6 – Septic tank replacement schemes

WINEP Action ID	Driver Codes	Action Name	Action Description

08WW100210	U_IMP7	Ashwicke (Oakford Lane) WRC - Upgrade of septic tank	Upgrading WRC to secondary treatment standard as septic tank discharges to surface water.
08WW100212	U_IMP7	Dunwear WRC - Upgrade of septic tank	Upgrading WRC to secondary treatment standard as septic tank discharges to surface water.
08WW100213	U_IMP7	Lottisham (Fir Cottages) WRC - Upgrade of septic tank	Upgrading WRC to secondary treatment standard as septic tank discharges to surface water.

4.1.31. CWW3.94-96 Septic tank replacements – flow diversion

Expenditure under WINEP/NEP to divert flows from a septic tank site to another sewage treatment works and for any additional storm treatment (under driver code U_IMP7 / W_U_IMP7).

We are not proposing any new solutions of this type in PR24.

4.1.32. CWW3.97-99 Fish outfall screens

Expenditure under WINEP/NEP to install outfall screens at sewage treatment works to prevent fish entrainment (under driver codes SAFFA_IMP / W_FISH_IMP1, W_FISH_MON1, and WFD_IMP_PHYS HAB).

There is no enhancement investment identified against this line for PR24.

4.1.33. CWW3.100-102 25 Year Environment Plan

Expenditure under WINEP/NEP on locally significant environmental measures (driver code 25YEP_IMP) not eligible under any other driver, and with clear evidence of customer support.

Expenditure includes two partnership projects included in the WINEP with 25YEP_IMP as the primary driver. Cam and Wellow Brook Partnership Project and the Frome Headwaters Flagship Chalk Stream Project.

The Cam and Wellow Brook Partnership Project concerns the effect of our wastewater assets (and third party influences) on water quality in this catchment and therefore all expenditure is assigned to the Wastewater Network Plus price control.

The Frome Headwaters Flagship Chalk Stream Project concerns the operation of our wastewater and water supply assets on chalk stream health in Frome Headwaters, Dorset. For this reason, 50% of expenditure has been assigned to the Water Resources Price Control (Table CW3, lines CW3.25-CW3.27) and 50% to the Wastewater Networks Plus Price Control.

Table 7 – 25 year environmental plan schemes

WINEP Action ID	Driver Codes	Action Name	Action Description
08WW100036	25YEP_IMP	Cam and Wellow Brook Partnership Project	Partnership project in Midford Brook catchment / under CIP4. Working with Local Authorities, academics and others

In the development of PR24, Wessex Water commissioned consultants to estimate customers' Willingness to Pay (WTP) for improvements in service. This research did not ask specific questions about the proposed PR24 investigations and actions included in the WINEP, however it did assess household and non-household customers' WTP regarding key themes of services or improvements provided by Wessex Water. This included their willingness to pay to improve river and coastal water quality and to support nature and wildlife, and the results showed that customers exhibit willingness to pay for incremental improvements in service in both of these areas.

The partnership projects included within the WINEP under 25YEP_IMP drivers have been developed to deliver water quality and habitat improvements within the catchments concerned (Dorset Stour, Cam and Wellow Brooks and Frome Headwaters) and therefore the findings of our WTP studies evidence customer support for these actions. Further information is provided in WSX04 - A summary of our customer research.

4.1.34. CWW3.103-105 Investigations – desk-based studies only

Expenditure under WINEP/NEP on investigations requiring desk-based studies only to confirm / identify actions / determine impacts or the costs and technical feasibility of meeting required targets (under driver codes containing _INV and _NDINV).

These lines refer to expenditure associated with six WINEP investigations. Three are driven by SW_INV drivers (Shellfish waters improvement or prevent deterioration investigation), two by nutrient reduction investigations, and the sixth by WFD_INV_CHEM (Investigations [chemical investigations]). The latter includes some of Wessex Water's financial obligations to the project management costs of the National Chemical Investigations Programme Phase 4 (CIP4), managed on behalf of the industry by UK Water Industry Research. All these investigations are desk based and to be delivered by 30/04/2027.

The expenditure included in these lines includes that under WFD_INV_CHEM and WFD_INV_MP drivers. This has been included in error and should have been included against lines *CWW3.52-54 Chemicals and emerging contaminants monitoring, investigations, options appraisals*. The table below sets out the expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers, with the expenditure incorrectly assigned to this line highlighted bold.

Table 8 - Expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers

Table and line reference	Number of WINEP actions	Totex (£m)
CWW3.103-105 Investigations – desk-based studies only	**1**	**0.370**
CWW3.106-108 Investigations – survey, monitoring or simple modelling	15	4.362
CWW3.109-111 Investigations – multiple surveys, and/or monitoring locations, and/or complex modelling	5*	5.307

* Includes 2 outputs under WFD_INV_MP drivers. All other outputs are under WFD_INV_CHEM drivers.

Excluding the chemical investigation costs, the WINEP actions associated with the other five lines are shown in the table below.

Table 9 – WINEP investigations – desk based studies

Complexity	WINEP ID	Investigation	Description	Driver Code	Completion Date

Desk study	08WW100020a	Weymouth Shellfish Water Investigation	Desk based investigation to understand if Wessex Water assets are impacting shellfish water compliance	SW_INV	30/04/2027
Desk study	08WW100020b	Lyme Bay Shellfish Water Investigation	Desk based investigation to understand if Wessex Water assets are impacting shellfish water compliance	SW_INV	30/04/2027
Desk study	08WW100020c	Porlock Bay shellfish water investigation	Desk based investigation to understand if Wessex Water assets are impacting shellfish water compliance	SW_INV	30/04/2027
Desk study	08WW102204	Fleet Lagoon - Nutrient Reduction Investigation & Options Appraisal	Investigation and options appraisal to reduce nutrient load entering the Fleet Lagoon from Wessex Water assets (namely Abbotsbury and Langton Herring WRCs) - to include an investigation of misconnections in the catchment.	HD_INV, SSSI_INV, WFD_IN	30/04/2027
Desk study	08WW102205	Halstock WRC - Nutrient Reduction Investigation	Investigation into options to reduce nutrient load entering Sutton Bingham Reservoir (linked with Halstock WRC).	WFD_INV	30/04/2027

4.1.35. CWW3.106-108 Investigations – survey, monitoring or simple modelling

Expenditure under WINEP/NEP on investigations requiring a survey, monitoring or simple modelling to confirm / identify actions / determine impacts or the costs and technical feasibility of meeting required targets (under driver codes _INV and _NDINV).

These lines refer to expenditure associated with delivering 174 WINEP/NEP investigations.

Twenty six of these are WINEP investigations under the six primary drivers listed below. This includes most of the investment under the national CIP4 (15 outputs) and a further 11 investigations into the contribution and effects of nutrient discharges from our wastewater assets on designated sites. These investigations require some basic environmental monitoring and/or limited modelling.

- HD_INV - Four WINEP outputs. Investigation and/or options appraisal to determine impacts of Water Company activities, or permit/licence conditions/standards on a European Site or Ramsar site or to determine the costs and technical feasibility of meeting targets
- NERC_INV – One WINEP output - Investigations and/or options appraisal for changes to permits or licences, and/or other action that contributes towards biodiversity duties, requirements and priorities.
- SSSI_INV – One WINEP output - Investigation and/or options appraisal to determine impacts of water company activities, or permit or licence conditions/standards on a SSSI or to determine the costs and technical feasibility of meeting targets
- WFD_INV – One WINEP output - Investigations of actions to improve water quality in terms of relevant WFDR status objectives
- WFD_INV_CHEM – 15 WINEP outputs - Investigations [chemical investigations]

- WFDGW_INV – four WINEP outputs - Groundwater good status investigation relating to water resource or water quality

All expenditure is under the Wastewater Networks Plus Price Control (regulatory purpose: ENW PR24 NEW Investigations, WINEP/NEP survey, monitoring or simple modelling wastewater Non Infra). All to be delivered by 30/04/2027.

Also included in this line are 148 WINEP investigation outputs under an EnvAct_INV4 driver; Investigations to reduce storm overflow spills to protect the environment so that they have no local adverse ecological impact. These have been classified under the following Action_Categorisation_Type in the WINEP (sic) *"Investigation - mostly desktop (water quality modelling/dilution impact) as advised by Phil Hulme at Intermittents T&F group, but some Investigaitions will include water quality sampling"*. All have a 30/04/2027 completion date. The investigations need completing by April 2027, so the majority of investment is either transitional or in 2025/26 or 20256/27. Following discussions with regulators around reprioritising and delivery phasing of the WINEP, the 148 investigations does not align with the 370 currently stated in the WINEP, with more details in the commentary for CWW20.

The expenditure included in these lines includes that under WFD_INV_CHEM and WFD_INV_MP drivers. This has been included in error and should have been included against lines *CWW3.52-54 Chemicals and emerging contaminants monitoring, investigations, options appraisals*. The table below sets out the expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers, with the expenditure incorrectly assigned to this line highlighted bold.

Table 10 - Expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers

Table and line reference	Number of WINEP actions	Totex (£m)
CWW3.103-105 Investigations – desk-based studies only	1	0.370
CWW3.106-108 Investigations – survey, monitoring or simple modelling	**15**	**4.362**
CWW3.109-111 Investigations – multiple surveys, and/or monitoring locations, and/or complex modelling	5*	5.307

* Includes 2 outputs under WFD_INV_MP drivers. All other outputs are under WFD_INV_CHEM drivers.

The WINEP actions associated with these lines are shown in the table below.

Table 11 – WINEP investigations – survey, monitoring or simple modelling

Complexity	WINEP ID	Investigation	Description	Driver Code	Completion Date
Medium complexity	08WW100018a	Sustainable nutrient management to land investigation	Sustainable nutrient management to land investigation	NERC_INV	30/04/2027
Medium complexity	08WW100019a	Nutrient legacy and cycling in the Somerset Levels and Moors Partnership Project	Investigate the behaviour of legacy P pollution in the Somerset Levels and Moors Ramsar and options for increasing	HD_INV	30/04/2027

Complexity	WINEP ID	Investigation	Description	Driver Code	Completion Date
			the rate of nutrient export from the site.		
Medium complexity	08WW100021a	Somerton WRC dissolved oxygen investigation	Investigation to determine the causes on low dissolved oxygen downstream of Somerton WRC	WFD_INV	30/04/2027
Medium complexity	08WW100034a	WRC nitrogen to groundwater investigations - Dundry WRC	Investigation of contribution of WRC discharge to failure of nitrogen standards in groundwater.	WFDGW_INV	30/04/2027
Medium complexity	08WW100034b	WRC nitrogen to groundwater investigations - Lulsgate Downside WRC	Investigation of contribution of WRC discharge to failure of nitrogen standards in groundwater.	WFDGW_INV	30/04/2027
Medium complexity	08WW100034c	WRC nitrogen to groundwater investigations - Everleigh WRC	Investigation of contribution of WRC discharge to failure of nitrogen standards in groundwater.	WFDGW_INV	30/04/2027
Medium complexity	08WW100034d	WRC nitrogen to groundwater investigations - Milborne St Andrew WRC	Investigation of contribution of WRC discharge to failure of nitrogen standards in groundwater.	WFDGW_INV	30/04/2027
Medium complexity	08WW100120a	Partnership investigation into opportunities for minimising floating plant dominance in the Somerset Levels and Moors Ramsar driven by nutrient enrichment and climate change.	Funding contribution towards collaborative investigation of mitigation options to minimise floating plant dominance in the Somerset Levels and Moors (e.g. floating plant harvesting, increasing flow and surface ripple through existing features, creating 'new' open water habitats). Likely to be delivered via Somerset Catchment Partnership.	HD_INV	30/04/2027

Complexity	WINEP ID	Investigation	Description	Driver Code	Completion Date
Medium complexity	08WW102220a	Partnership investigation into sea grass and saltmarsh restoration	Investigation to look at options for protection and restoration of saltmarsh and seagrass in Poole Harbour to include holes bay and other areas identified. Look at partnership approach to restore these habitats and reduce pressures to enable them to thrive (e.g. reducing anchoring in the sea grass beds, reducing erosion of saltmarsh). These habitats contribute to WQ improvements and provide ecosytem services which will further improve the WQ in the harbour. Saltmarshes also improve coastal resience and sequester carbon. Include information on how nutrients are impacting on saltmarsh and seas grass habitat (where there are gaps in knowledge).	HD_INV	30/04/2027
Medium complexity	08WW103155a	Impacts of groundwater discharges from water recycling centres on surface water phosphorus concentrations	Investigation into the impact of groundwater discharges from water recycling centres on phosphorus concentrations in meeting objectives for surface waters	HD_INV	30/04/2027
Medium complexity	08WW103156a	Cranborne and Edmondsham surface water sewers nutrient investigation	Understand the sources of nutrient inputs from surface water sewers to the Moors River (Crane) SSSI	SSSI_INV	30/04/2027

4.1.36. CWW3.109-111 Investigations – multiple surveys, and/or monitoring locations, and/or complex modelling

Expenditure under WINEP/NEP on investigations requiring multiple surveys and/or monitoring locations, and/or complex modelling to confirm / identify actions / determine impacts or the costs and technical feasibility of meeting required targets (under driver codes _INV and _NDINV).

These lines refer to expenditure associated with 14 WINEP investigations under five primary WINEP drivers listed below. These include our inland bathing waters and benefits of wetlands investigations, coastal nutrient and chemical investigations and microplastics and chemicals investigation as part of the national CIP4. These investigations require significant environmental monitoring and/or more detailed and complex modelling.

- BW_INV5 - One WINEP output. Investigations at non-designated waters where there is evidence of customer support.
- 25YEP_INV - One WINEP output. Investigations into a locally significant environmental issue not eligible under any other driver, but with clear evidence of customer support.
- HD_INV - Seven WINEP outputs. Investigation and/or options appraisal to determine impacts of Water Company activities, or permit/licence conditions/standards on a European Site or Ramsar site or to determine the costs and technical feasibility of meeting targets
- WFD_INV_CHEM – Three WINEP outputs - Investigations [chemical investigations]
- FD_INV_MP – Two WINEP outputs - Investigations into micro-plastics

All expenditure is under the Wastewater Network Plus Price Control (regulatory purpose: ENW PR24 NEW Investigations, WINEP/NEP multiple surveys, and/or monitoring locations, and/or complex modelling wastewater Non Infra). All to be delivered by 30/04/2027.

The expenditure included in these lines includes that under WFD_INV_CHEM and WFD_INV_MP drivers. This has been included in error and should have been included against lines *CWW3.52-54 Chemicals and emerging contaminants monitoring, investigations, options appraisals*. The table below sets out the expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers, with the expenditure incorrectly assigned to this line highlighted bold.

Table 12 - Expenditure under WFD_INV_CHEM driver and WFD_INV_MP drivers

Table and line reference	Number of WINEP actions	Totex (£m)
CWW3.103-105 Investigations – desk-based studies only	1	0.370
CWW3.106-108 Investigations – survey, monitoring or simple modelling	15	4.362
CWW3.109-111 Investigations – multiple surveys, and/or monitoring locations, and/or complex modelling	**5***	**5.307**

* Includes 2 outputs under WFD_INV_MP drivers. All other outputs are under WFD_INV_CHEM drivers.

In the development of PR24, Wessex Water commissioned consultants to estimate customers' Willingness to Pay (WTP) for improvements in service. This research did not ask specific questions about the proposed PR24 investigations and actions included in the WINEP, however it did assess household and non-household customers' WTP regarding key themes of services or improvements provided by Wessex Water. This included their willingness to pay to improve river and coastal water quality and to support nature and wildlife, and the results showed that customers exhibit willingness to pay for incremental improvements in service in both of these areas.

The investigations included within the WINEP under 25YEP_INV and BW_INV5 drivers have been developed to understand the water quality and natural capital benefits that wetlands can deliver and the impact of our wastewater discharges on inland amenity waters and therefore the findings of our WTP studies evidence customer support for these actions. Further information is provided in WSX04 - A summary of our customer research.

The WINEP actions associated with these lines are shown in the table below.

Table 13 – WINEP Investigations - multiple surveys, and/or monitoring locations, and/or complex modelling

Complexity	WINEP ID	Investigation	Description	Driver Code	Completion Date
High complexity	08WW100012a	Benefits of wetlands investigation	Investigation to quantify the benefit of wetlands through Wessex Water activity (including catchment nutrient balancing) created in PR19 and provide a recommendation of an appropriate long-term monitoring programme for wetlands. The investigation will assess performance in terms of water quality, biodiversity net gain, ecosystem service change and carbon accounting (for the construction phase).	25YEP_INV	30/04/2027
High complexity	08WW100014a	Realtime water quality monitoring of amenity waters	Investigation of inland and amenity bacterial qulaity	BW_INV5	30/04/2027
High complexity	08WW100016a	Poole Harbour surface water sewers nutrient investigation	Understand the sources of nutrient inputs from surface water sewers to Poole Harbour	HD_INV	30/04/2027
High complexity	08WW100016b	Coastal nutrient and chemical investigation - Poole Harbour chemicals monitoring	Investigation monitoring of WRCs discharging to TraC waters to identify chemical contributions of PAHs (Benzo(a)pyrene, Benzo(g,h,i)-perylene), Tributyltin, Imidacloprid, Fipronil to the Poole Harbour waterbody.	HD_INV	30/04/2027

Complexity	WINEP ID	Investigation	Description	Driver Code	Completion Date
High complexity	08WW100016c	Coastal nutrient and chemical investigation - Christchurch Harbour nutrient modelling	Investigation modelling Chistchurch Harbour TraC waters to identify the sources contributing to nutrient (Nitrogen and Phosphorus) non-compliance in SPA and SAC.	HD_INV	30/04/2027
High complexity	08WW100016d	Coastal nutrient and chemical investigation - The Fleet nutrient modelling	Investigation modelling Fleet Lagoon TraC waters to identify the sources contributing to nutrient (Nitrogen and Phosphorus) non-compliance in SPA and SAC.	HD_INV	30/04/2027
High complexity	08WW100016e	Coastal nutrient and chemical investigation - Severn Estuary chemical monitoring	Investigation monitoring of WRCs discharging to TraC waters to identify chemical contributions of Cypermethrin, PAH (Benzo(g-h-i)perylene) to the Severn Estuary waterbody.	HD_INV	30/04/2027
High complexity	08WW100016f	Coastal nutrient and chemical investigation - Poole Harbour nutrient modelling	Investigation modelling Poole Harbour TraC waters to identify the sources contributing to nutrient (Nitrogen and Phosphorus) non-compliance in SPA and SAC.	HD_INV	30/04/2027
High complexity	08WW100019b	Somerset Levels and Moors Seasonal Nutrient Investigation	Investigation to better understand the proportionate load of nutrients from WRCs and intermittent discharges to the Somerset Levels and Moors Ramsar, to include assessment of seasonality of nutrient load and the potential for seasonal permitting in the Somerset Levels and Moors catchment.	HD_INV	30/04/2027

4.1.37. CWW3.115-117 Contributions to third party schemes under WINEP/NEP

Expenditure under WINEP/NEP only for water company contribution(s) to third party schemes.

There is no enhancement investment identified against this line for PR24.

4.1.38. CWW3.118-120 River connectivity (e.g. for fish passage)

Expenditure under WINEP/NEP for river connectivity schemes such as fish passages (under driver codes SAFFA_IMP / W_FISH_IMP and WFD_IMP_PHYS HAB).

There is no enhancement investment identified against this line for PR24.

4.1.39. CWW3.121-123 Restoration management (marine conservation zones etc)

Expenditure under WINEP/NEP for restoration management schemes such as marine conservation zones etc (under driver codes including MCZ / W_MWQ, HD / W_HR, SSSI / W_SSSI, NERC / W_BIOD, and INNS / W_INNS etc, WFDGW /W_WFD_GW).

We include two lines here that we otherwise are unable to find a more appropriate line for. More details are in Supporting Document WSX16 Waste water network plus strategy and investment.

Table 14 - Expenditure under WINEP/NEP for restoration management schemes

WINEP Action ID	Driver Codes	Action Name	Action Description
08WW100214	HD_IMP	Ratfyn WRC - Discharge Relocation	Discharge relocation from WRC, to upstream in river, to improve river flow upstream of abstraction.
08WW100215	HD_IMP SSSI_IMP NERC_IMP	Shrewton WRC - Discharge Relocation	Discharge relocation from WRC to improve river water quality in winterbourne stretch.

4.1.40. CWW3.124-126 Access and amenity for WINEP/NEP

Expenditure for access and amenity schemes for WINEP/NEP only that is not covered by any other enhancement line.

There is no enhancement investment identified against this line for PR24.

4.1.41. CWW3.127-129 Advanced WINEP (not covered elsewhere)

Expenditure for advanced WINEP schemes that is not covered by any other enhancement line.

There is no enhancement investment identified against this line for PR24.

Whilst we submitted proposals for an Advanced WINEP it was not accepted by the Environment Agency.

4.2. EA/NRW environmental programme bioresources (WINEP/NEP)– Line CWW3.131-152

4.2.1. CWW3.131-133 Sludge storage -Tanks (pre-thickening, pre-dewatering or untreated) (WINEP/NEP)

Expenditure for new / additional storage tanks to accommodate pre-thickened, pre-dewatered or untreated sludge (under driver codes SUiAR_IMP / W_SUiAR_IMP1 and SUiAR_ND / W_SUiAR_NDIMP1).

There is no enhancement investment identified against this line for PR24.

4.2.2. CWW3.134-36 Sludge storage -Tanks (thickened/dewatered or treated); (WINEP/NEP)

Expenditure under WINEP/NEP for storage tanks for thickened, dewatered or treated sludge (under driver codes SUiAR_IMP / W_SUiAR_IMP1 and SUiAR_ND / W_SUiAR_NDIMP1).

There is no enhancement investment identified against this line for PR24.

4.2.3. CWW3.137-139 Sludge storage - Cake pads / bays / other

Expenditure under WINEP/NEP for storage of sludge in cake pads, bays or other storage facilities (under driver codes SUiAR_IMP / W_SUiAR_IMP1 and SUiAR_ND / W_SUiAR_NDIMP1).

The nine new sludge storage barns will provide additional resilience to our sludge disposal activity. This includes six sludge barns in Malmesbury by 2029, two sludge barns in Trowbridge by 2028 and one sludge barn in Avonmouth, which will also be providing short term storage, by 2026. These barns have been agreed by the EA for inclusion in the WINEP.

4.2.4. CWW3.140-142 Sludge treatment - Anaerobic digestion and/or advanced anaerobic digestion

Expenditure under WINEP/NEP for the treatment of sludge using anaerobic digestion and/or advanced anaerobic digestion (under driver codes SUiAR_IMP / W_SUiAR_IMP1 and SUiAR_ND / W_SUiAR_NDIMP1).

The enhancement opex in this area is for additional resources to undertake the additional responsibilities at our anaerobic digestion sites (e.g., additional inspections, monitoring, and reporting) when the sites operate under the Industrial Emissions Directive (IED). This expenditure proposal has not been included in the WINEP, therefore it has not been reported in Table BIO6.24.

The proposed enhancement for this area includes additional FTEs to deliver additional operation and maintenance tasks on new IED assets, and a portion of this is to perform increased operational and maintenance tasks on existing equipment, which we report in CWW2.

4.2.5. CWW3.143-145 Sludge treatment -Thickening and/or dewatering

Expenditure under WINEP/NEP for treatment processes to thicken and/or dewater sludge (under driver codes SUiAR_IMP / W_SuiAR_IMP1 and SuiAR_ND / W_SuiAR_NDIMP1).

There is no enhancement investment identified against this line for PR24.

4.2.6. CWW3.146-148 Sludge treatment – Other

Expenditure under WINEP/NEP for other sludge treatment processes not covered by other lines in the table (under driver codes SuiAR_IMP / W_SuiAR_IMP1 and SuiAR_ND / W_SuiAR_NDIMP1).

The enhancement investment in this area is the improvement to the control and monitoring of the eight mesophilic digesters at Avonmouth for compliance with the Industrial Emissions Directive (IED). This expenditure proposal has not been included in the WINEP, therefore it has not been reported in Table BIO6.38.

As the proposed improvements would require the digesters to be taken offline, we have planned for this work to be carried out within the capital maintenance programme for Avonmouth. As such, the total cost of the programme will be split between enhancement and base. The costs associated with the IED improvements have been allocated as

enhancement expenditure and reported in this section, while the costs associated with the maintenance of the digesters have been allocated as base expenditure and reported in CWW2.

4.3. Other Enhancement – Line CWW3.153-180

Refer to Supporting Document WSX16 Wastewater networks plus strategy and investment, unless other documents are referenced.

4.3.1. CWW3.153-155 Growth at sewage treatment works (excluding sludge treatment)

Investment in WRC growth will provide additional treatment capacity for a population equivalent (PE) of approx. 85,000 by 2050.

Forecasts are based on the best information available at the time, making use of adopted Local Plans produced by the relevant planning authorities. Most are undertaking Local Plan Reviews to carry forward a 15-year planning horizon to 2036.

The progress of housebuilding completions across the Wessex Water region against the housing targets provided from Local Plans between 2011 – 2025 indicate increasing market capacity beyond 2022. However, the most recent trends reported by national housebuilders indicate a downturn in site reservations and completions, reflecting the current economic climate with rising interest rates and inflationary pressures on household income. Housing delivery will suffer from these conditions and the supply deficit will grow further with recovery likely to occur beyond 2025. We have therefore assumed a low build rate that has informed our growth forecasts.

4.3.2. CWW3.156-158 Reduce flooding risk for properties

This line contains the enhancement costs for reducing the risk of property flooding (internally and externally) and surface water management through partnership working. It does not contain base expenditure.

Enhancement investment is needed to have a step change towards halving number of flooding incidents by 2050. Please see WSX16, Out5 table commentary and the common performance commitment commentary for more details. There is a small hydraulic improvement programme, some infiltration sealing and a large focus on avoiding blockages (eg wet wipe camping to prevent blockages) and other causes which make up the majority of flooding incidents.

An allowance for surface water management through partnership working (c£6.9m Capex and c£4.8m Opex) has also been included in these lines. The capex is for improving WSX assets and the Opex is contributions to or working on third party assets (eg sustainable drainage pond).

4.3.3. CWW3.159-161 First time sewerage

We have a duty to undertake first time sewerage schemes under section 101a.

In AMP7 we have had a small number of improvements schemes and we are completing 2 schemes by 2024.

The number of viability studies is low, and we are currently undertaking only one FST appraisal. It is likely to be viable. We have assumed a cost to allow for that and another newly arising scheme, along with the costs of undertaking the viability studies.

4.3.4. CWW3.162-164 Sludge enhancement (growth)

Our assessment of capacity provision against our forecast sludge production concluded that we need to provide c. 11,000 tds per year of additional capacity through growth enhancement investment in AMP8. Our proposed investments are:

- To build two new digesters at Avonmouth to provide 7,300 tds per year of new digestion capacity, and
- To install a larger lime treatment plant at West Huntspill to provide 3,650 tds per year of new lime treatment capacity for contingency.

For further details on our sludge production forecast and capacity provision strategy, please refer to the supporting document WSX18 – Bioresources strategy and investment.

We are also proposing to install additional sludge thickening of 5,475 tds per year at Avonmouth due to the deterioration in the quality (dry solids) of the imported sludges from satellite sites that have increased chemical dosing for achieving tighter P consents. The increase in dry solids of the imported sludge through additional sludge thickening will also increase the overall treatment capacity at Avonmouth when the two new digesters are built. Therefore, the cost of the additional sludge thickening has been allocated as a growth enhancement expenditure and reported in this section.

As the installation of the additional thickener has been planned within the capital maintenance programme for Avonmouth, the total cost of the programme will be split between enhancement and base. The costs associated with the maintenance of the existing thickeners have been allocated as base expenditure and reported in CWW2.

4.3.5. CWW3.165-167 Odour and other nuisance

There is no enhancement investment identified against this line for PR24.

4.3.6. CWW3.168-170 Resilience

AMP7 costs are for completion of AMP7 resilient schemes, including flooding defences at Portbury Wharf WRC.

For AMP8 these lines cover the following items, as described below.

Table 15 – Resilience expenditure

	Capex (£m)	Opex (£m)
Cellular service communication	0.77	-
Supporting additional sampling and analytics due to legislative changes	1.46	-
Power & Standby Generator Resilience at WRCs	19.12	0.51
Power & Standby Generator Resilience at SPSs	5.31	-
Smart Monitoring of Sewerage Network	35.51	12.00

Cellular service communication

This relates to expenditure to enhance resilience by managing increasing risks of failing to give consumers an appropriate level of service and protection from events caused by hazards that are beyond their control, excluding those covered by other areas of enhancement and base expenditure (CWW2).

The lines under this category look to manage the end of cellular services at private sewerage pumping stations.

All cellular communication companies have signed up to the Government target of switching off 2G and 3G by 2033 - A joint statement on the sunsetting of 2G and 3G networks and public ambition for Open RAN rollout as part of the Telecoms Supply Chain Diversification Strategy - GOV.UK (www.gov.uk). This approach will see a phasing out of the infrastructure that supports the 2G and 3G networks over the next ten years.

Following the private pumping stations for adoption in 2016, on adoption Wessex Water installed monitoring technology. The monitoring solutions available at the time used cellular technology that was only available with access to the 2G and 3G networks. These networks are being retired with the retirement of 3G already underway and 2G due in 2023. There is thus a need to update the technology to monitor Private Sewer Pumping Stations (PSPS) to supported communications technology.

We are proposing a programme of change to meet the 2033 deadline for the end of 2G services. We are expecting the current devices to fall back to 2G operation as the 3G network gets shut down. This enables investment to span AMP8 and AMP9. Further details of this programme can be found in Supporting Documents WSX15 and WSX17.

The split of investment for the communications connectivity resilience is 50% (CWW3) waste and 50% supply (CW3) as this represents the breakdown of our customer contact approach for supply interruptions and sewer flooding, and our rural sites where communications will be restricted.

Supporting additional sampling and analytics due to legislative changes

Our Saltford analytical laboratory is adequately sized to meet the current business sampling needs for wastewater and water supply. With changes in legislation led by our regulators we will see a significant increase in the sampling requirements across the business.

To meet this enhanced sampling requirement, and subject to suitable planning requirements, we will need to expand our laboratories capacity. This would include the overall footprint of the building. Laboratory investment sits within M&G that is traditionally spread across price controls. This investment does not fall under the definition for any of the other lines in this table and is thus allocated as part of an additional line. Further details of this programme can be found in Supporting Documents WSX15 and WSX17. This investment is categorised as resilience to reduce reliance on third party providers which we have no control over. This ensures we can manage analysis for the growth in regulatory requirements including PFAS.

The split of investment for the lab expansion is 50% waste (CWW3) and 50% supply (CW3) as this represents the breakdown of our wastewater and supply assets and the changing sample requirements.

Power & Standby Generator Resilience at WRCs

We include for upgrades to power supplies and provision of standby generators at WRCs where there is an increased risk of pollution incidents and/or discharge compliance due to grid power failure. The Environment Agency no longer exempt sample failures when attributed to third parties.

130 WRCs have existing standby generators, covering all larger sites and any with process-critical pumping. The plan includes providing a standby generator at the remaining WRCs with a numerical permit. Descriptive sites will not be covered by this.

Power & Standby Generator Resilience at SPSs

We include for upgrades to power supplies and provision of standby generators at our SPSs where there is an increased risk of pollution incidents and/or discharge compliance due to grid power failure. The Environment Agency no longer exempt sample failures when attributed to third parties.

Smart Monitoring of Sewerage Network

We are including c£30m to create a smart network by installing 12,000 new in-sewer monitors located at high-risk locations. Using AI we will be able to observe a partial blockage and rectify it before an escape of sewage or pollution incident occurs.

This plan, alongside our Pollution reduction strategy described in CWW3.189-190, will reduce total pollutions and serious pollutions. Further details of this programme can be found in WSX16 and more detail is in our OUT table commentary.

4.3.7. CWW3.171-173 Security – SEMD

Expenditure to comply with the requirements of Security and Emergency Measures Direction (SEMD) 2022. To include schemes to protect CNI and NI assets and assessments of further improvements to comply with industry protective security and emergency planning guidance documents.

There is no enhancement investment identified against this line for PR24.

4.3.8. CWW3.174-176 Security - cyber

Expenditure on schemes to enhance the security of network and information systems to comply with NIS Regulation 2018.

There is no enhancement investment identified against this line for PR24.

4.3.9. CWW3.177-179 Greenhouse gas reduction (net zero)

Expenditure on schemes where the primary driver is to reduce greenhouse gas emissions.

The enhancement expenditure in this line includes our plan to enhance our transport by the installation of EV charging infrastructure.

The national policy is for the phase-out of new petrol and diesel cars and vans by 2030, and new diesel HGVs by 2040. In our management and general (M&G) capital maintenance plan, we have proposed approximately 60% of our small van fleet and 19% of our large van fleet will be upgraded and updated to EV.

By installing EV chargers across our region, we propose that in excess of 70% of the EV fleet will have access to charging infrastructure, which will lead to an impact of higher productivity. This assumes a 20-minute diversion each way to a charger. Further details of this programme can be found in Supporting Document WSX23.

The project to provide fleet charging infrastructure reflects the make-up of our fleet and the breakdown of our assets. We have split the investment 30% to water supply (CW3) and 70% to wastewater (CWW3). Of our sites, around 80% are waste and 20% are supply, and the percentages represent the breakdown of our small van fleet servicing those sites.

4.4. Other Enhancement (Freeform lines – by exception) – Line CWW3.181-192

Due to a shortage of space in the table we have bundled all the AMP7 costs assigned to AMP7 freeform lines into single capex and opex lines. Freeform lines have been used for this expenditure as there were no appropriate standard categories, and for the reporting to be consistent with APR reporting of costs against PR19 allowed expenditure.

4.4.1. CWW3.181-182 AMP7 Additional line comprises:

11. WINEP - Conservation drivers

Projects to address spills to bathing waters at Rockley Sands and provide integrated urban drainage solutions to improve surface water management at Turbary Common, Dorset and reduce flows to Ubley WRC, Somerset. This line also has expenditure for a WINEP output to make improvements at Wadmore Lane SPS under the Habitats Directive.

Operating costs following completion of construction of the project at Ubley providing sustainable drainage.

12. Storm overflow improvement (not storage) - non WINEP

Provide improvements to storm overflows but the solution will not be storage. Improved operation and screening combined with nature-based solutions. These projects do not have WINEP outputs.

13. North Bristol Strategic Sewers

High risk scheme delivered effectively; expenditure advanced compared to the PR19 plan profile. Outstanding contractual issues to be addressed. This project is providing extra capacity in the sewer network for existing housing and new developments in North Bristol.

Opex line includes new running costs following completion of the North Bristol Strategic Sewer.

14. Security - Non SEMD

Replacement of the public switched telephone network (PSTN) which has a phased delivery through AMP7. OpenReach will be ceasing operation of their PSTN network from 2025. As they move toward an internet-based network in the next five years they will stop selling new PSTN lines from 2023. Our outstations currently using analogue PSTN communications as the only way to connect information back to our central systems requires to be switched to an alternative communications method such as Internet Protocol (IP).

15. Network Growth

Opex line includes running costs of adopted SPSs from developers.

16. Partnership Working

Opex costs include continued engagement with catchment partnerships, Rivers & Wildlife Trusts and working with community groups.

4.4.2. CWW3.183-184 Biodiversity and conservation

Expenditure against these lines includes that associated with the WINEP obligation 08WW100070a Habitat improvements for swallows, swifts and martins being undertaken under a NERC_IMP driver.

This line also includes expenditure associated with our tree planting commitment. As this is an M&G expenditure, we have assigned 50% of costs to water (CW3) and 50% to waste (CWW3).

Supporting information can be found in the document WSX25 - Improving biodiversity.

4.4.3. CWW3.185-186 AMP8 Data and AI

With the growing interest in producing a 'data driven company', we need to ensure that we have skills to develop data led solutions. We need to prepare the technical capabilities to be able to efficiently develop and deploy these

solutions along with being able to maintain them in the future. This does not sit within other investment lines due to IT investment falling within the boundary of M&G. Further details of this programme can be found in Supporting Documents WSX15 and WSX17.

Data and AI can be used to predict issues in both the supply of clean water and to prevent pollutions from happening in waste networks. We will be collecting data from various sources, and we will use machine learning and AI techniques to analyse the data and identify patterns, trends, anomalies, or risks that may affect the water supply or cause environmental damage. With an increase to the number of sensors being installed on the waste network, 56% of the investment has been assigned to waste. The remaining budget will used on the supply network to support sustainable abstraction initiatives.

4.4.4. CWW3.187-188 Sludge enhancement (quality)

This section covers all site upgrades required for Industrial Emissions Directive (IED) and Environmental Permitting Regulations (EPR) compliance:

- IED improvements in sites such as Avonmouth, Berry Hill, Poole, Taunton, Trowbridge and Palmersford. The works planned to be done include permitting, assessments, surveys and samplings, tank containment, installing propane tanks, siloxane plants etc.
- EPR improvements in sites such as Minehead, Ratfyn, Vale Road, West Huntspill and Palmersford. The works planned to be done include building solutions for spill containment, covering sludge imports tank and replacing sludge liquor holding tank.

For details refer to WSX18 – Bioresources strategy and investment.

Please note that a small proportion of the proposed IED site improvements relate to additional maintenance on existing bioresources assets to improve their condition to meet standards required under IED. These additional maintenance costs have been allocated as base costs and are therefore not reported in this section. We have submitted base cost adjustment claim to argue that the additional maintenance costs due to IED compliance would need to be included in the base cost modelling in PR24. The claim is detailed in the Supporting Document WSX08-Annex A5-CAC5.

4.4.5. CWW3.189-190 Pollution reduction strategy

We are proposing a significant step change in driving down the number of serious and other pollution incidents, to eliminate pollutions by 2050. This is more ambitious that the WISER which sets the target as a 30% reduction of all pollutions (category 1 to cat 3) by 2040. It does not contain base expenditure.

We are proposing a step change in our Pollution Incident Reduction Plan (PIRP) programme to achieve it, costing c£44m Totex. These include activities like

- Enhanced investigation
- Pollution focussed cctv inspection and rehab.
- Customer engagement teams
- Pumping station performance analysis optimisation
- Trade effluent permit checks
- More tactical interventions

This plan will reduce total pollutions and serious pollutions. Further details of this programme can be found in WSX16 and more detail is in our OUT table commentary.

5. CWW4. Functional expenditure

5.1. CWW4.1-14

There is a decrease in Direct costs for all sewage treatment works / water recycling centres (WRCs) size bands from 2023-24 to 2024-25 as a result of expected power rate reductions between the two periods. This cost is then expected to increase across AMP8.

The growth in direct cost across AMP8 is also a result of the increased investment in WRCs resulting in greater associated operational expenditure and in the activities associated with pollution prevention and health and safety measures as noted in CWW1 commentary. This generates the £35.9m forecast increase in expenditure from 2025-26 through to 2029-30.

All other costs are expected to remain consistent across the final years of AMP7 and AMP8.

6. CWW5. Large sewage treatment works

6.1. CWW5.1 - 5.10. Explanatory variables

Refer to commentary on CWW7 for details on load derivation, classification of treatment works and forecasting.

6.1.1. CWW5.1 Large sewage treatment works

At 2022/23 we have 26 ‘large’ WRCs, with Westbury WRC being added for the reporting year.

Warminster and Westbury WRC are routinely around the 25,000 population equivalent threshold for Size Band 6, because of the variability of trade effluent loads from sole dominant traders (c.10-15% and 15-25% respectively over the past 5 years).

All WRCs are forecast to see an increase in served population equivalent due to population growth. Warminster WRC is forecast to return to Size Band 6 from 2023/24. Keynsham WRC is forecast to reach the threshold in 2026/27.

6.1.2. CWW5.2-9

One of our Size Band 6 works (Christchurch) has permit limits that vary from summer to winter (for the determinands shown in brackets). It is reported in the table against its summer consent limits. The works is listed below with its winter limits:

- Christchurch WRC: BOD (20), SS (30) and AmmN (15)

A number our Size Band 6 works are routinely monitored against UWWTD percentage removal permits, and do not have Water Resources Act LUT (95%ile) numeric limits. The UWWTD numeric BOD limit of 25mg/l also does not apply. The following works are required to achieve 70% removal of BOD:

- Avonmouth (Bristol) WRC

- Portbury Wharf WRC
- Weymouth WRC

There is no distinguishing in the table to account for BOD % removal permits. For these sites we have stated BOD limits of 25mg/l.

At all of the above works there are no suspended solids (SS) consents other than an “absolute standard”; therefore the limit is reported as 0. However, in order to achieve the percentage removal BOD standard, in practice it is also necessary to remove SS. Typically for a 70% BOD removal or 25mg/l BOD standard, the equivalent SS levels are >85% SS removal or 35mg/L SS concentration.

A number of our Size Band 6 works are routinely monitored against UWWTD percentage removal permits and also comply with Water Resources Act LUT (95%ile) limits (for the determinands shown in brackets). These sites are:

- Kingston Seymour WRC (SS)
- Weston-Super-Mare WRC (SS)
- Chilton Trinity (Bridgwater) WRC (BOD, AmmN, SS)
- Shepton Mallet WRC (BOD, AmmN, SS)
- Trowbridge WRC (BOD, AmmN, SS)
- West Huntspill WRC (BOD, SS)
- Yeovil WRC (BOD, AmmN, SS)

Where a works has a Water Resources Act (WRA) consent with limits tighter than UWWTD requirements we have entered the 95%ile WRA parameter limits. Where the UWWTD requirements are tighter than the WRA parameter limits we have entered the UWWTD requirements unless compliance is monitored on a percentage removal basis.

6.1.3. CWW5.10 Flow passed to full treatment

We report MCerts measured average daily flow receiving full treatment only, excluding storm flows.

The baseline 2022/23 is as measured and reported, with forecasts for 2023/24 onwards originating from a 3-year average for each specific WRC. Various sites will thus show an increase/decrease in the initial year. Forecasting onwards we project a 0% change.

Whilst we forecast population growth there is an anticipated reduction in water consumption, e.g. linked to the implementation of smart metering and customers being more conscious about water usage. A significant proportion of our flows volume-wise, however, are storm/groundwater and as such are very weather dependent. The construction of new and larger storm storage tanks within the network and at WRC inlet works will retain/attenuate flows ultimately sending more to treatment, but the forecast quantification of this for any given year would require extensive modelling, including with many assumptions and weather/climate scenarios. Giving these variables, we consider 0% change in flows appropriate for the PR24 planning horizon.

6.1.4. Confidence Grade for CWW5

B2

6.2. CWW5.11 - 5.16. Functional expenditure

As per the commentary for CWW4, the main fluctuations year on year in AMP7 are for band 6 WRCs are for power costs which are assumed to reduce between 2023-24 and 2024-25 and then increase across the remainder of AMP8. The other variances are a direct result of the capital programme planned for AMP8 and the additional operational expenditure that is expected to be required in order to support the assets created by this programme,

along with planned increased expenditure in the areas of pollution prevention and health and safety measures. As per 2.1.1 of this document, the addition of Warminster as a band 6 site in 2023-24 and Keynsham in 2026-27 is reflected in the costs presented in rows 11-16. Data confidence is graded B3 per Ofwat's definitions.

7. CWW6

7.1. Lines CWW6.1 & CWW6.2 S101A Schemes

During report year 2022/23 we completed 1 first time sewerage build, Leigh Road West, Bradford-On-Avon, connecting 7 properties.

There are no named First Time Sewerage schemes in the WINEP, any schemes delivered before March 2030 will be by application only. Construction of 3 schemes is currently ongoing and expected to finish during report year 2023/24, and an allowance is made for these schemes:

Table 16 – Ongoing First Time Sewerage schemes

Scheme	Expected completion	Number of properties
Easton Town, Sherston	July 2023	35
Beanacre, Melksham	January 2024	12
Tolpuddle, Dorchester	January 2024	18

A second scheme in Beanacre may be delivered in the future to connect 41 properties but at present is not planned. No applications we have received and completed a viability study on during AMP7 have been viable, therefore we are reasonably confident that no schemes will be constructed before 2028/29. A nominal allowance based on historic trends is made for report years 2028/29 and 2029/30, since we may reasonably expect that a viable application received in the next 2 -3 years may be completed by then.

7.2. Lines CWW6.3 & CWW6.4 Pumps and Pumping Stations

In line with the updated definitions for lines 3 & 4, pumps related to offline storage have been excluded from this return. A proportion of our pumping station capacity is based on estimated kW values.

For 2022/23 there are 2,159 network pumping stations on our sewer network (13 more than last year, a 0.6% increase) with a total pumping station capacity of 47,560 kW (a 1.7% increase on last year).

For the PR24 forecast, it is anticipated that the rate of discovery of S105A pumping stations will begin to decline, and so the average discovery rate since transfer (7 stations per annum) is projected forwards with a downward trend. An average kW rating for S105A pumping stations is used for the forecasting of pumping station capacity.

The historic rate of adoption and construction of public pumping stations is projected forwards to the end of AMP8, with estimated kW values based on the average kW rating of pumps serving catchments of 2 – 100 properties.

Table 17 – Pump and pumping station forecasts

	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
S105A SPS per annum	7	7	6	6	5	5	4
Public SPS per annum	5	5	5	5	5	5	5

Figure 1 – Number of pumping stations

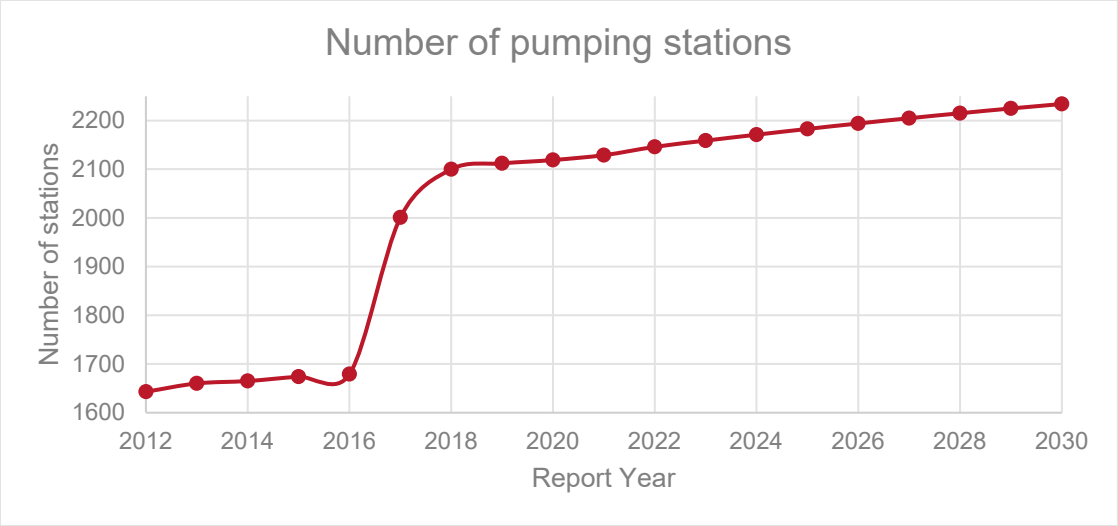
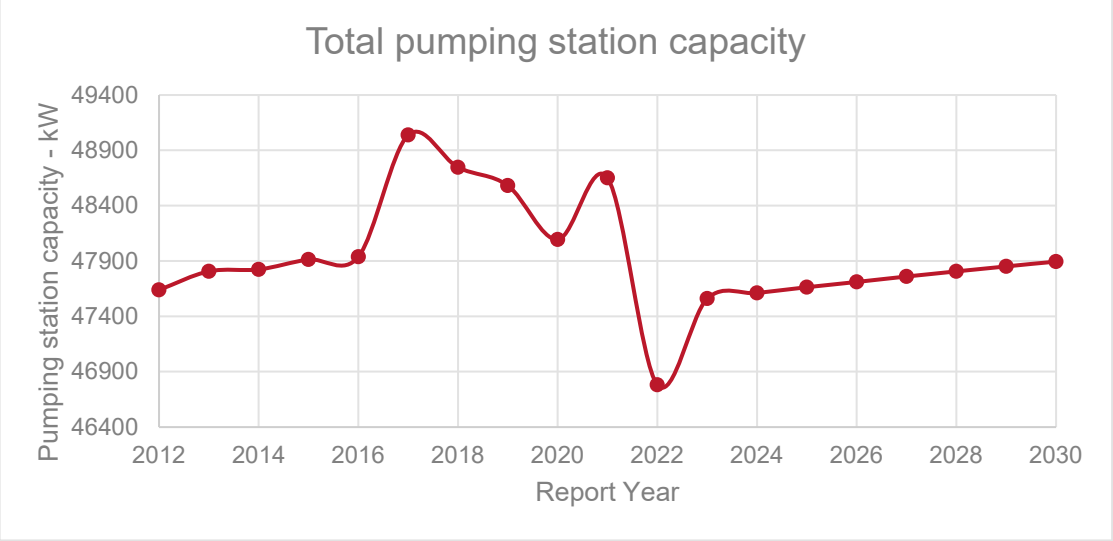


Figure 2 – Total pumping station capacity



Pumped solutions may be constructed to meet our obligations under the Environment Act 2021, but it is likely these will be serving offline storage and therefore will not form part of our in-line pumping capacity. There are currently no named PR24 schemes with pumping stations associated with them, therefore our forecast relies on historic trends.

Our total pumping capacity in kW has changed over time due to better information, as stated in our APR commentaries.

7.3. Line CWW6.5 Sewer Blockages

For 2022/23 there were a total of 14,146 blockages on the sewerage system, an 3.4% increase on last year.

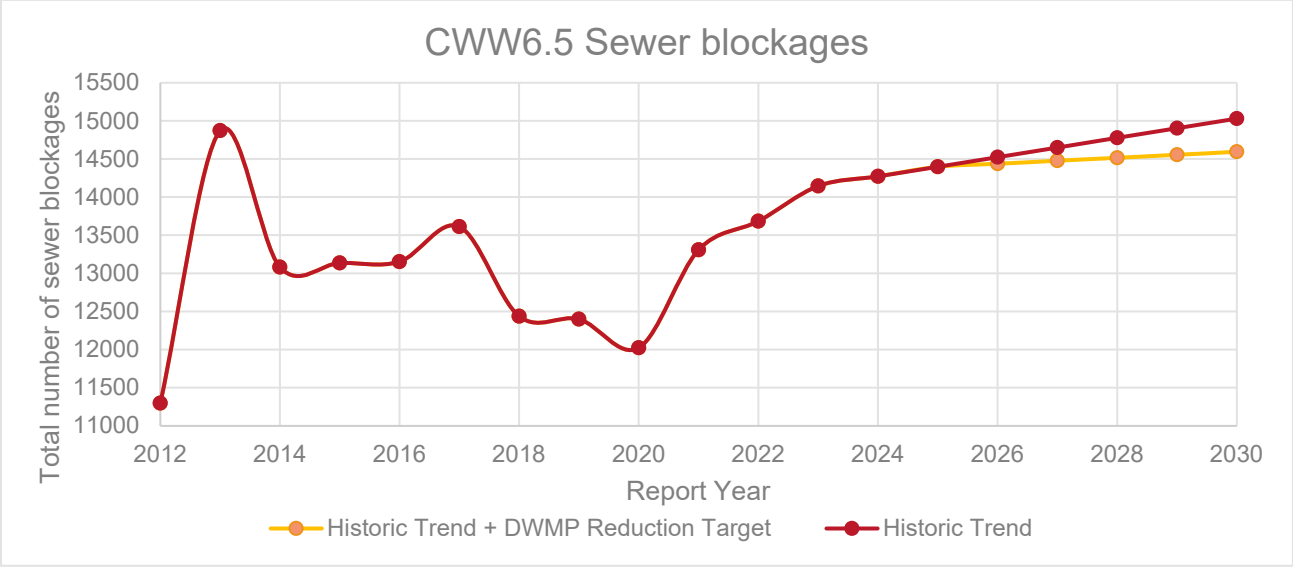
For the PR24 forecast, the rate of sewer blockages is projected initially based on historic trends, which results in a slight increase over time. As part of our DWMP we have proposed to increase expenditure in order to reduce the number of flooding incidents due to blockages for AMP8. These reduction targets are then integrated into the forecast.

Our reported blockage figure notably increased in report year 2020/21 and has remained at that level. This may be due to changing working patterns following the COVID-19 pandemic, and we expect this trend to continue.

Table 18 – Sewer blockage forecast

	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Historic Trend	14272	14399	14525	14651	14777	14904	15030
DWMP Reduction Target			87	174	261	348	435
PR24 Forecast	14272	14399	14438	14477	14516	14556	14595

Figure 3 – Sewer blockages, historic trend and forecast to 2030



7.4. CWW6.6 & CWW6.7 Gravity Sewer Collapses & Rising Main Bursts

For 2022/23 there has been a decrease in the number of sewer collapses on last year, from 148 to 106, a 28% decrease. There has been an increase in the number of burst rising mains from 59 to 77 bursts, a 31% increase, discussed in our APR commentary.

Gravity sewer collapses and rising main bursts form a combined outcome measure in our DWMP. Our core scenario proposes a doubling of base investment on gravity sewer rehabilitation and rising main rehabilitation. The outcome of doubling base investment is forecast in our DWMP, and we are choosing to replicate this forecast for our PR24 collapse and burst numbers, to bring them inline with our DWMP core scenario.

Table 19 – Sewer collapse investment

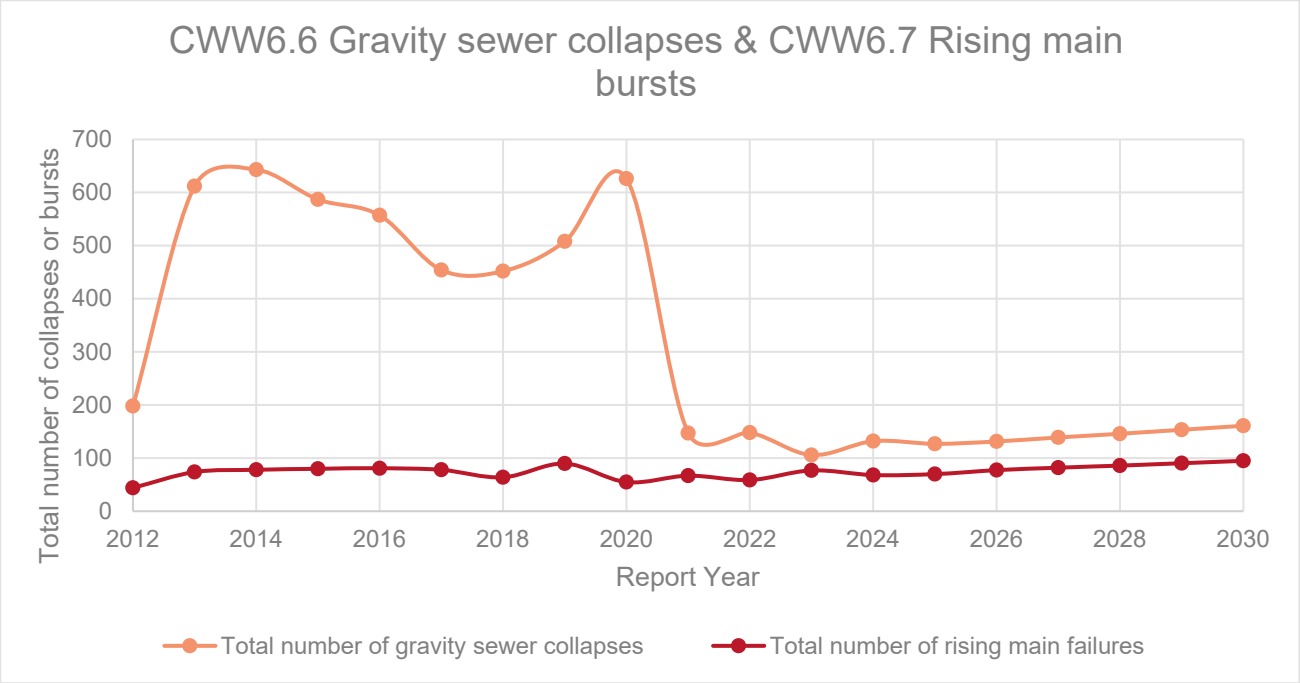
DWMP AMP end positions:	AMP7	AMP8
Gravity sewer collapses – base investment	127	170
Gravity sewer collapses – 2x base investment	127	161
Rising main bursts – base investment	70	110
Rising main bursts – 2x base investment	70	95
Total collapses & bursts – 2x base investment	**197**	**256**

Table 20 - DWMP Combined outcome measure annual profile

	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Collapses & bursts	197	209	221	232	244	256

The combined outcome measure AMP8 end position is comprised 63% gravity sewer collapses and 37% rising main bursts. This ratio is applied to the combined outcome measure annual profile to forecast gravity sewer collapses and rising main bursts for AMP8. The end position for AMP7 is used for forecasting report year 2024/25. To forecast report year 2023/24, the AMP7 end position and the historic average for gravity sewer collapses + rising main bursts is used and apportioned based on the historic average ratio of collapses to bursts. The historic average is taken from report year 2020/21 onwards, when the common performance definition for a collapse was introduced.

Figure 4 – Total number of gravity sewer collapses and rising mains failures – historic trend and forecast



7.5. CWW6.8, CWW6.9 & CWW6.10 Overflows

For 2022/23 there are 1,092 combined sewer overflows (1 fewer than last year, a 0.1% decrease), 199 emergency overflows (no change from last year) and 195 settled storm overflows (no change from last year). During the report

year, 1 combined sewer overflow was found to be abandoned, and the permit was revoked. Each of our overflows are allocated a unique ID, which also contains a reference to the type of overflow (emergency overflow[E], combined storm overflow[C], settled storm overflow[S], both EO and SO [B], etc). The settled storm overflows are currently mostly reported as being at WRCs, however, network overflows can also have significant settlement, so we will these unique classification for the next annual return.

We are more confident in our reported numbers for combined sewer overflows, emergency overflows and settled storm overflows than at PR19, therefore we are not forecasting any change based on historic trends. We do anticipate that a small number of new storm overflow permits may be granted as a result of ongoing investigations and outstanding permit applications made to the Environment Agency, therefore a nominal allowance of 1 permit per year is forecast for CWW6.8 until the end of AMP8. We do not expect our reported number of emergency (CWW6.9), combined sewer overflows or settled storm overflows (CWW6.10) to materially change this year – but next year we will be requesting that circa 20 emergency only overflows are reconsented as storm overflows.

Our storm overflow action plan (SOAP) submitted to WaterUK for the national storm overflow dashboard contains 1290 storm overflows. This excludes emergency overflows. It includes some unpermitted overflows, which we think will become permitted as storm overflows.

7.6. CWW6.11 Sewer age profile

Sewer age profile is a cumulative total of new sewers, gravity sewers rehabilitated (CWW6.14) and rising mains replaced or refurbished (CWW6.15) since 2001. In our 2022/23 APR return, we reported that 158.7 Km had been added to last year's total of 6,508.1 Km to give a total of 6,666.8 Km.

However, we have since reviewed our reporting methodology and noticed an error has been duplicated since 2016/17; some GIS edits to existing sewers were incorrectly included as new sewer length. A similar error was made in 2013/14. We have corrected these errors resulting in a reduction in the length of new sewer added for the following report years:

Table 21 – Restated sewer age profile reported figures

	2013-14	2016 - 17	2017 - 18	2018 - 19	2019 - 20	2020 - 21	2021 - 22	2022 -23
Previously reported in year addition - Km	134.20	85.42	125.72	124.37	191.51	175.56	163.39	158.73
Restated in year addition - Km	125.55	77.09	95.02	113.47	169.92	145.87	135.91	151.97
Difference	-8.65	-8.33	-30.71	-10.89	-21.59	-29.69	-27.48	-6.76
Total revision:								-144.10

In 2009 we estimated our S105A sewer length to be 16,999 Km, and estimated that 20% of this was built between 2001 and 2011 (the transfer date), 3,406 Km. We included this estimate in our Sewer age profile, however we believe this was an overestimate.

During the time period 1st April 2001 – 31st March 2011 (10 report years), we adopted or built 933 Km of public sewer. For the following 10 report years (1st April 2011 – 31st March 2021) we adopted or built 1,317 Km of public sewer. We consider that a more appropriate estimate for the S105A constructed between 2001 and 2011 would be the average length of new public sewer for those two time periods, 1,125 Km. We have revised our estimate for sewer age profile accordingly, resulting in a decrease of 2,281 Km.

We are restating our historical data for CWW6.11 Sewer age profile based on the aforementioned corrections in tandem:

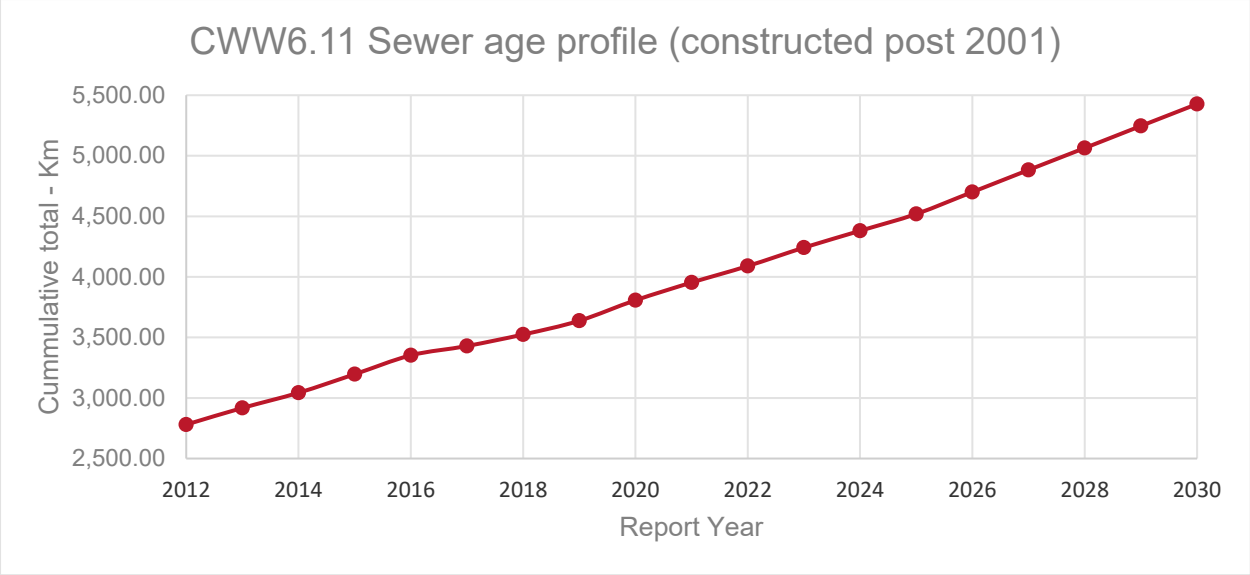
Table 22 – Restated CWW6.11 reported figures

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Reported in APRs	5061.67	5198.73	5,332.94	5,486.15	5,642.09	5,727.51	5,853.23
Restated	2,780.84	2,917.90	3,043.46	3,196.67	3,352.60	3,429.69	3,524.71

	2018-19	2019-20	2020-21	2021-22	2022-23
Reported in APRs	5,977.60	6,169.11	6,344.66	6,508.05	6,666.78
Restated	3,638.18	3,808.10	3,953.96	4,089.87	4,241.84

For PR24 Sewer age profile is forecast using the sum of CWW6.14 and CWW6.15, and a historic trend to account for the addition of new sewers.

Figure 5 – Sewer age profile historic trend and forecast



7.7. CWW6.12 Volume of trade effluent

The baseline 2022/23 is as measured and reported, with forecasts for 2023/24 onwards originating from a 3-year average for each specific WRC.

We have generally seen a stabilisation of trade effluent flows in recent years, when excluding for any reduction during the Covid-19 pandemic and recognising year-on-year variabilities. We are becoming increasingly aware of traders – and particularly larger ones – exploring resource/water recovery which will see us receiving lower flows. We do, however, have a number of open enquiries from traders looking to expand and discharge more flows. These traders are not necessarily in the same catchments as those looking to reduce flows, and there are also enquiries at different stages from speculation to expansion in progress. As appropriate, we liaise with traders regarding the potential timing and scale of any network and treatment improvements that may be required to accommodate any additional flows (and loads).

Confidence Grade: B2

7.8. CWW6.13 Volume of wastewater receiving treatment at sewage treatment works

We report MCerts measured average daily flow receiving full treatment only, excluding storm flows.

The baseline 2022/23 is as measured and reported, with forecasts for 2023/24 onwards originating from a 3-year average for each specific WRC.

Whilst we forecast population growth there is an anticipated reduction in water consumption, e.g. linked to the implementation of smart metering and customers being more conscious about water usage. A significant proportion of our flows volume-wise, however, are storm/groundwater and as such are very weather dependent. The construction of new and larger storm storage tanks within the network and at WRC inlet works will retain/attenuate flows ultimately sending more to treatment, but the forecast quantification of this for any given year would require extensive modelling, including with many assumptions and weather/climate scenarios. Giving these variables, we consider 0% change in flows appropriate for the PR24 planning horizon.

Confidence Grade: B2

7.9. CWW6.14 & CWW6.15 Gravity sewer and rising main rehabilitation

For 2022/23 the length of rising mains and sewers that have been proactively and reactively rehabilitated is shown below:

Table 23 – Length of sewer/rising mains where proactive or reactive rehabilitation has been completed

Length (km)	Proactive rehabilitation	Reactive rehabilitation	Total
Sewerage	23.2	8.5	31.7
Rising Main	8.1	0.1	8.2
Total	31.3	8.6	39.9

Where the actual length of repair is not known for reactive rising main repairs, a 1m repair length is assumed. The total reactive meterage reported is 0.075 Km, 1% of the reported 8.18 Km. If no reactive rising main repairs were reported, the reported number would be 8 Km. Reactive sewer rehabilitation has decreased from 16.2 Km to 8.6 Km, a 46.9% decrease.

Sewer rehab expenditure to the end of AMP7 is expected to be consistent with the preceding 3 years, therefore the average length of sewer rehab for AMP7 is used for forecasting up to 31st March 2025. For AMP8, sewer rehab base expenditure is expected to double in line with the core scenario put forward in the DWMP, therefore a doubling in rehabilitation meterage is forecast.

To forecast rising main rehabilitation for the remainder of AMP7, a fixed replacement rate of 7.2 Km per annum is used in line with our DWMP forecast for AMP7. Our DWMP core scenario proposes to double base expenditure on rising main rehab for AMP8, therefore our AMP8 forecast assumes a replacement rate of 14.4 Km per annum and is profiled across the AMP to ensure the cumulative AMP8 total is met.

7.10. CWW6.16 – CWW6.22 Sewer lengths

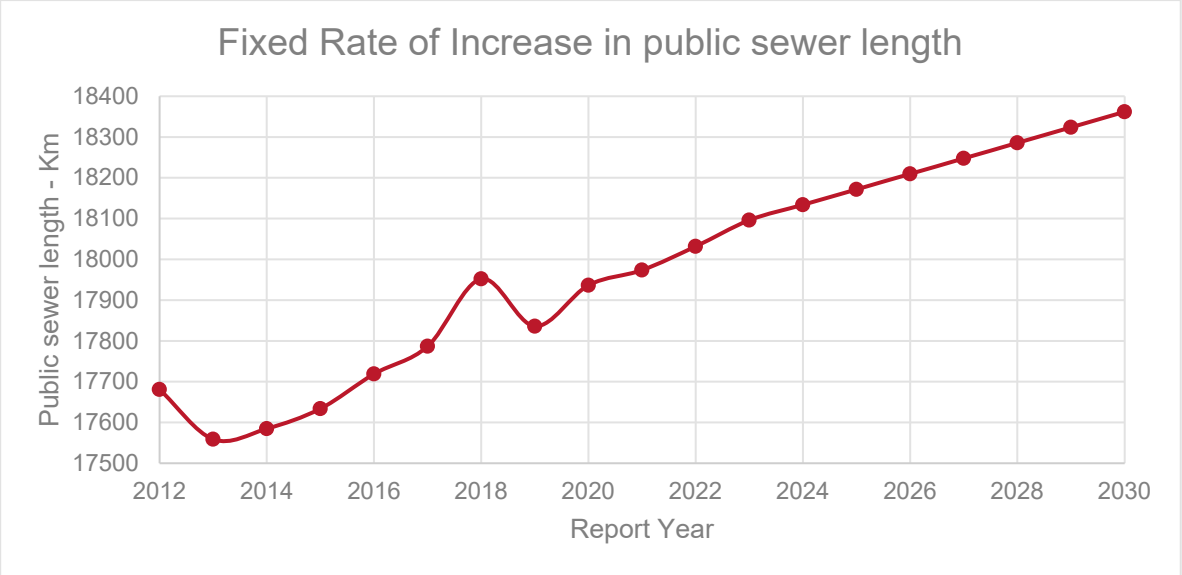
For 2022/23 the total sewer length is derived from our GIS database with the exception of the S105A length which is based on a Nationwide modelling exercise undertaken as part of PR09. The lengths of other wastewater network pipework are included in lines 16 to 19 as shown below with the changes from the previous year:

Table 24 - Lengths of wastewater network pipework

Line	2021-22	2022-23	Change (%)
Line 7C.16 - Length of foul (only) public	9,199	9,237	0.4%
Line 7C.17 - Length of surface water (only)	4,463	4,479	0.3%
Line 7C.18 - Length of combined public sewers	3,113	3,121	0.2%
Line 7C.19 - Length of rising main	1,257	1,260	0.4%
Line 7C.20 - Length of other wastewater sewers	0	0	N/A
Line 7C.21 - Total length of public sewers	18,032	18,096	0.3%
Line 7C.22 - Length of S105A sewers	16,992	16,992	0.0%

For the PR24 forecast, the modelled length of S105A sewer (CWW6.22) is not forecast to change. The total length of sewer is forecast to increase in line with historical trends, and the same rate is applied to foul (CWW6.16), surface water (CWW6.17) and combined (CWW6.18) sewers, as well as to rising mains (CWW6.19). The length of other wastewater sewers (CWW6.20) is expected to remain zero.

Figure 6 - Fixed Rate of Increase in public sewer length



Variance in population growth across our operating region up to 31st March 2030 is not expected to have a discernible impact on our overall length of sewer, so our PR24 forecast does not vary regionally. The provision of new homes, which has a significant impact on our overall length of sewer, will vary with market conditions and is difficult to forecast. Our public sewer length also increases annually as unmapped pipework is added to our GIS, therefore a forecast based on population growth or anticipated addition of new properties would not be appropriate.

We have based our PR24 forecast on the historical growth rate of our public sewer length across the longest appropriate time period. In this case we have selected a fixed rate of increase based on the historical increase since 2011/12, which is more conservative than a forecast based on change since 2017/18, for example.

7.11. Data quality

For report year 2022/23 we assign confidence grades ranging from A1 – B3 for the data in CWW6. The PR24 forecasts all rely on a degree of extrapolation therefore confidence grades for PR24 forecast years will range from B2 – B3.

8. CWW6a

This table is intentionally blank and therefore a commentary has not been provided.

9. CWW7a,b&c. Sewage treatment works data; a. size and consents b. UV permits c. treatment works types

9.1. Load received at sewage treatment works

9.1.1. Derivation of baseline load received

Loads to sewage treatment works / water recycling centres (WRCs) are based on the population equivalent (PE) with an assumption of 60g of BOD_5 per head each day. WRCs are grouped into size bands as per the table below.

Table 25 - WRC size bandings

Size Band	Kg BOD_5/day	Population Equivalent (PE)
1	< 15	0 - 250
2	15 -30	250 - 500
3	30 - 120	500 – 2,000
4	120 - 600	2,000 – 10,000
5	600 – 1,500	10,000 – 25,000
6 (large works)	> 1,500	>25,000

Total PE comprises a number of components:

- Domestic – Mainly domestic residential but also non-household properties if used for domestic use, such as residential schools, prisons, barracks etc. Residential PE is based on the number of domestic billing properties within a WRC catchment multiplied by an occupancy rate (based on council area).
- Commercial – Non-household wastewater that is ‘domestic’ in nature, e.g. offices, shops and restaurants. The commercial PE is based on metered supply flow to commercial properties identified on our billing

system. The emergence and subsequent expansion of Open Water for eligible business and public sector customers has introduced an element of instability to metered supply flow data, although this continues to improve over time.

- Non-Resident – The annual average holiday and tourist population connected to the sewerage system, e.g. hotels / guest houses, camping / caravans. Reporting aligns with Ofwat's RAG 4.11 4R.29, with an assumed occupancy rate of two-thirds for 4 months of the year and day commuters / visitors being excluded from all reporting data sets. Peak PE is considered when designing any upgrades to WRC, particularly on those that experience significant variation in PE between average and peak demands. Holiday population originates from data provided by the South West Tourist Board for number of bed spaces available for various types of holiday accommodation at the time. This data set is amended (as necessary) through our planning liaison team in line with WRC catchment reviews. Without interrogation of individual properties it is not possible to ascertain whether some residential properties are being used for holiday purposes, such as for Airbnb and similar enterprises.
- Trade Effluent – Non-household wastewater that is non-domestic in nature, for which there is a trade effluent permit. Trade effluent loads are calculated from measured flow and sample data (where available) for the report year. Charging data is based on settled COD. To derive a crude BOD a total COD:settled COD ratio of 1.25 is assumed and a COD:BOD ratio of 2:1.
- Tankered Imports – Domestic waste (private septic tanks) and controlled waste (industrial) treated at some our larger WRCs that are licenced by the Environment Agency to receive liquid waste imports.

Non-resident loads are not used in the WRC size band calculation. The treatment of tankered waste is a non-appointed activity and is thus explicitly omitted from CWW7.

9.1.2. Forecasting Population equivalents changes (2024-2030)

Residential PE is forecast by applying a growth rate by council area, based on local plans produced by Local Planning Authorities, which prescribe the scale, scope, and timing of new development to meet demand for housing and employment land. Local plans generally cover a 10-to-15-year period with further information available to inform location through a site allocations document and a 5-year supply of development land. Beyond a 5-year local plan period a long term 25-year projection can draw upon data published by the Office of National Statistics (ONS). In some cases more detailed growth studies have been undertaken, particularly to inform design parameters for any WRC upgrades. All growth rates have been applied to the 2022/23 base year PEs.

Increased levels of nutrients (especially nitrogen and phosphorus) can speed up the growth of certain plants, impacting wildlife. This is called 'eutrophication' and a number of protected sites (under the Habitats Regulations 2017) have been as classified as being in 'unfavourable condition'. Many of these protected sites are within the Wessex Water area, including the Somerset Levels and Moors, Poole Harbour, Hampshire Avon and Fleet & Chesil. Natural England has provided guidance to Local Planning Authorities that any new development in these areas must achieve 'nutrient neutrality' through suitable mitigation, dependent on the phosphorus and/or nitrogen discharge permit of the serving WRC. Nutrient mitigation schemes are in place, but the offsetting costs are currently a disincentive to development, with the Home Builders Federation recently stating,

> *"Natural England's first moratorium on house building was imposed in June 2019. Since then, bans on new builds have spread to over a quarter of England's local authority areas, affecting around 145,000 homes across 74 local authority areas from Cornwall to the Tees Valley, and a further 41,000 fewer homes will be built each year until solutions are found."*[1]

[1] www.hbf.co.uk/news/housing-supply-crisis (30/06/2023)

Even if nutrient neutrality requirements are relaxed, offsetting/mitigation measures become more cost attractive, we do not expect the backlog of homes to be suddenly built due to workforce and supply chain limitations. In the short-term there is also discussion whether these new homes will be occupied by new population to the area or just redistribution within the existing area, for example reducing over-crowding of existing housing stock. Overall however, and at least in the short/medium term, we consider our growth projections are appropriate when smoothing out these short-term peaks/troughs.

Commercial PE is forecast by applying the average historical (regional) growth rate since 2001 (our earliest available complete PE dataset).

Non-resident PE is forecast by applying the average historical (regional) growth rate since 2011 (when the South West Tourist Board initially provided a bed space assessment) to the base year PEs.

For Trade PE we have generally seen a stabilisation of flows in recent years. We are becoming increasingly aware of traders – and particularly larger ones – exploring resource / water recovery. For these traders there would be an increase in concentration but reduction in volume, with no net change. We have taken the 3-year load average and a 0% change throughout, with adjustments only made due to the anticipated activity of specific traders; this is based on feedback from local trade effluent officers.

Tankered waste PE is forecast by using the average tankered load for each catchment since it started to treat tankered waste at a similar capacity to the base year. Tankered loads show no significant trend therefore applying a growth rate is inappropriate.

9.2. Number of sewage treatment works

We have 398 WRCs.

Under the PR19 Water Industry National Environment Programme (WINEP), we will be closing Ubley WRC and converting it to a sewage pumping station, with flows transferred to the nearby Blagdon WRC for treatment.

Our PR24 proposals – as currently developed – do not include for the closure of any other WRCs up to 2030 (Lytchett Minster WRC is proposed to close by 2033, with flows being transferred to Poole WRC). Unless explicitly screened out as an unviable solution through the WINEP options development process, we will still re-assess transfers at an early stage as part of individual scheme design to ensure that any solution being progressed is of best value, including in the light of any improved design, costing or benefit information.

9.3. Sewage treatment works consents

9.3.1. Permits

Ten of our treatment works have consent – referred to by the Environment Agency as permit – limits that vary from summer to winter (for the determinands shown in brackets). They are reported in this table against their summer permit limits. These works are:

- Buckland Newton WRC (AmmN)
- Chard WRC (BOD, SS and AmmN)
- Chideock WRC (SS)
- Christchurch WRC (AmmN)
- Devizes WRC (BOD)
- Osmington Mills WRC (BOD and SS)
- Piddlehinton WRC (BOD, SS and AmmN)
- Wootton Bassett WRC (BOD and AmmN)

- Ringstead WRC (UV)
- Cannington WRC (UV)

A number of our works are routinely monitored against UWWTD percentage removal permits, and do not have Water Resources Act LUT (95%ile) numeric limits. The UWWTD numeric BOD limit of 25mg/l also does not apply. The following works are required to achieve 70% removal of BOD:

- Avonmouth (Bristol) WRC
- Bridport WRC
- Charmouth WRC
- Portbury Wharf WRC
- Sharpness WRC
- Watchet WRC
- Weymouth WRC

These works are reported as having a BOD permit >20mg/l rather than “No Permit” as to achieve 70% removal a standard of <25mg/l is consistently achieved. They do not have Ammonia or Phosphorus permit.

A number of our works are routinely monitored against UWWTD percentage removal permits and also comply with Water Resources Act LUT (95%ile) limits (for the determinands shown in brackets). These sites are:

- Kingston Seymour WRC (SS)
- Minehead WRC (SS)
- Thornbury WRC (AmmN)
- Weston-Super-Mare WRC (SS)
- Chilton Trinity (Bridgwater) WRC (BOD, AmmN, SS)
- Bruton WRC (BOD, AmmN, SS)
- Compton Bassett WRC (BOD, AmmN, SS)
- Shepton Mallet WRC (BOD, AmmN, SS)
- Trowbridge WRC (BOD, AmmN, SS)
- Wellington WRC (BOD, AmmN, SS)
- West Huntspill WRC (BOD, SS)
- Yeovil WRC (BOD, AmmN, SS)

Where a works has a Water Resources Act consent with limits tighter than UWWTD requirements we have entered the 95%ile WRA parameter limits. Where the UWWTD requirements are tighter than the WRA parameter limits we have entered the UWWTD requirements unless compliance is monitored on a percentage removal basis.

Phosphorus

WRCs have historically been permitted on the concentration of phosphorus in final effluent at individual sites, rather than the overall load of phosphorus entering a watercourse.

Initially starting as a trial in 2017, many of our WRCs in the Bristol Avon operate under a catchment permitting approach for phosphorus, whereby they have individual backstop permits but operate to achieve stretch targets to deliver an overall catchment load reduction. As long as this overall load target is achieved and all WRCs satisfy their individual backstop permit limits, then the sites are considered compliant. This is formalised through an operating techniques agreement (OTA) and reported annually to the Environment Agency.

Our PR19 Business Plan included for the expansion of catchment permitting into two more catchments: Parrett (& Tone) and Dorset Stour, with backstop permits in AMP7 and stretch targets through PR24. We also implement catchment nutrient balancing for phosphorus within these two catchments, through other OTAs. Whilst these OTAs have been agreed and signed between Wessex Water and the EA, and despite continued progress by the EA’s

permitting team, the permits for a number of WRCs themselves are yet to be issued. In the absence of a formal permit, these sites are operating to interim permit limits as if the phosphorus permit were in effect, with agreement from the EA.

For the purposes of phosphorus reporting of limits for any WRCs within these three catchments, we have classified against the most stringent limit – either a permit or stretch target (where appropriate). This approach is consistent with how we have completed our Annual Performance Report tables returns for the Bristol Avon.

UV disinfection

The Environment Agency is in the process of updating their guidance on discharge disinfection (UV and membrane) requirements. Two of our WRCs (and one SPS) have had new UV plants installed in recent years. All however are still awaiting permits to be issued. In the absence of a formal permit, these sites are operating as if the UV permit limits that were submitted are in effect, with agreement from the EA:

- Cannington WRC (since 2018)
- Corfe Castle WRC (since 2021)

9.3.2. Forecasting permit changes (2024-2030)

With the exception of nutrients (see following paragraph), forecast permit changes in the table are consistent with the most up to date PR24 Water Industry National Environmental Programme (WINEP). This applies both in relation to the level of the permit and the date at which changes to permits come into effect. Whilst the vast majority of our WINEP schemes and associated permit changes have regulatory completion dates of 31/03/30, deliverability and resourcing pressures, as well as the ambition for making early environmental improvements wherever possible, has led to the phasing and completion of schemes throughout the AMP.

Our PR24 business plan includes an alternative approach to delivery of our WINEP nutrient obligations and, as such, improvements do not directly correlate to lines within the WINEP. Refer to the table and commentary for CWW19 for further details, including the full of list of nutrient (phosphorus and nitrogen) schemes and their limits.

In some cases, a WRC may have more than one permit change in the period for the same determinand, for example if it has different WINEP drivers with different completion dates, or if there is any associated maintenance of loads tightening linked with an increase to dry weather flow permit. We have collaborated with the Environment Agency in the development of the WINEP and as much as possible have tried to align permit changes, although in some cases different regulatory or compliance pressures have necessitated successive permit changes within the AMP.

There are no proposed UV disinfection permit changes, although many of our coastal WRCs will see capital maintenance of these processes. The EA have advised that any substantial modifications to UV plant would need to comply with their updated guidance, although for the purposes of forecast reporting we have assumed the permit limits themselves are unchanged.

The following tables detail schemes due for completion in the relevant reporting period (e.g. Table 1 includes schemes due for completion by March 2025) with comment below on the date of the relevant Permit change(s) etc.. Any grey text in cells indicate no change.

Unless otherwise stated, all BOD and AmmN limits are 95%iles and all P limits are annual means.

Table 26 – WRC permit changes 2023-24

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2022/23	2023/24	2022/23	2023/24	2022/23	2023/24	2022/23	2023/24
13037 Broadway WRC	TB2	TB2	1.00	0.50	30.00	30.00	15.00	15.00
17968 Leyhill WRC	SBI	TB2	-	1	20	20	10	10
13048 Castle Cary WRC	TB1	TB2	0.5	0.5	15	15	5	5
13054 Charfield WRC	SAE	TA2	1	1	20	20	10	10
13055 Charlton Horethorn WRC	SBI	TB2	1	1	30	30	14	14
13104 East Chinnock WRC	SBI	TB2	-	1				
13142 Hardington Mandeville WRC	SBI	TB2	1	1	20	20	5	5
13161 Ilminster WRC	TB1	TB2	-	1	25	25	10	10
13163 Iwerne Minster WRC	TB1	TB2	0.8	0.8	17	17	5	5
13175 Langport WRC	TB1	TB2	-	-	25	25	15	15
13201 Martock WRC	SBI	TB2	-	-	25	25	15	15
13207 Mere WRC	SBI	TB2	-	0.8	25	25	6	6
13214 Milverton WRC	SBI	TB2	-	-	20	20	10	10
13222 North Nibley WRC	SBI	TB2	-	1	50	50	20	20
13144 Haselbury Plucknett WRC	SBI	TB2	-	-	15	15	10	10
13238 Piddlehinton WRC	TB1	TB2	-	-	15	15	5	5
13264 Shaftesbury WRC	TA1	TA2	1	1	12	12	3	3
13278 Somerton WRC	TB1	TB2	-	-	20	20	5	5
13281 South Petherton WRC	TB1	TB2	-	0.8	15	15	5	5
13288 Stogursey WRC	TB1	TB2	-	-	12	12	6	6
13368 Yeovil Without WRC	TB1	TB2	-	-	20	20	10	10

Table 27 – WRC permit changes 2024-25

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2023/24	2024/25	2023/24	2024/25	2023/24	2024/25	2023/24	2024/25
13022 Bishops Lydeard WRC	SB1	TB2	-	0.80	25.00	25.00	12.00	12.00
13025 Blagdon WRC	SAE	TA2	-	0.50	40.00	40.00	5.00	5.00
13027 Bourton WRC	TB2	TB2	-	0.80	40.00	40.00	15.00	15.00
13048 Castle Cary WRC	TB2	TB2	0.50	0.50	15.00	6.50	5.00	5.00
19156 Chard WRC	SB1	TB2	-	0.50	20.00	20.00	2.50	2.50
13082 Cranborne WRC	TB2	TB2	2.00	0.80	30.00	30.00	10.00	10.00
13084 Crewkerne East WRC	TB2	TB2	-	0.80	13.00	13.00	4.00	4.00
13096 Dorchester WRC	TB2	TB2	1.00	0.70	15.00	15.00	5.00	5.00
13118 Evercreech WRC	TB2	TB2	2.00	1.00	8.00	8.00	5.00	5.00
13132 Gillingham WRC	TB2	TB2	-	0.80	15.00	15.00	8.00	6.00
13134 Glastonbury WRC	TB2	TB2	2.00	0.80	25.00	25.00	2.00	2.00
13146 Hazelbury Bryan WRC	TB2	TB2	-	0.80	45.00	45.00	20.00	20.00
13152 Holdenhurst WRC	TA2	TA2	-	0.65	15.00	15.00	5.00	5.00
13160 Ilchester WRC	TB2	TB2	-	0.80	25.00	25.00	15.00	15.00
13161 Ilminster WRC	TB2	TB2	1.00	0.80	25.00	25.00	10.00	10.00
13165 Keynsham WRC	TB2	TB2	1.30	1.30	25.00	25.00	15.00	10.00
13172 Kinson WRC	TB2	TB2	-	0.65	20.00	20.00	10.00	10.00
13175 Langport WRC	TB2	TB2	-	0.80	25.00	25.00	15.00	15.00
13201 Martock WRC	TB2	TB2	-	0.80	25.00	25.00	15.00	15.00
13208 Merriott WRC	TB2	TB2	-	0.80	18.00	18.00	4.00	4.00
13211 Milborne Port WRC	TB1	TB2	-	0.80	20.00	20.00	12.00	12.00
13214 Milverton WRC	TB2	TB2	-	0.80	20.00	20.00	10.00	10.00

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2023/24	2024/25	2023/24	2024/25	2023/24	2024/25	2023/24	2024/25
13219 Nether Stowey WRC	TB2	TB2	-	1.00	9.00	9.00	2.00	2.00
13232 Palmersford WRC	TA2	TA2	-	0.65	15.00	15.00	5.00	5.00
13238 Piddlehinton WRC	TB2	TB2	-	4.00	15.00	15.00	5.00	5.00
13252 Radstock WRC	TB2	TB2	0.70	0.70	20.00	20.00	6.00	4.00
13264 Shaftesbury WRC	TA2	TA2	1.00	0.80	12.00	12.00	3.00	3.00
13267 Shepton Mallet WRC	TB2	TB2	2.00	0.35	18.00	18.00	6.00	3.00
13278 Somerton WRC	TB2	TB2	-	0.50	20.00	20.00	5.00	5.00
13282 Sparkford WRC	TB2	TB2	-	0.80	20.00	20.00	10.00	10.00
13288 Stogursey WRC	TB2	TB2	-	2.10	12.00	12.00	6.00	6.00
13297 Sturminster Newton WRC	TB2	TB2	2.00	0.80	20.00	20.00	10.00	10.00
13304 Tarrant Crawford WRC	TA2	TA2	1.00	0.80	18.00	18.00	14.00	14.00
13305 Taunton WRC	TA2	TA2	1.00	0.80	15.00	15.00	3.00	3.00
13310 Thornford WRC	TB2	TB2	1.50	1.00	20.00	20.00	10.00	10.00
13330 Wellington WRC	TB2	TB2	1.00	0.80	25.00	25.00	12.00	12.00
13332 Wells WRC	TB2	TB2	2.00	1.00	25.00	25.00	10.00	9.00
13347 Wickwar WRC	SB1	TB2	-	1.00	20.00	20.00	6.00	6.00
13349 Wimborne WRC	TA2	TA2	1.00	0.80	25.00	25.00	15.00	15.00
13354 Wiveliscombe - Hillsmoor WRC	SBI	TB2	-	0.80	18.00	18.00	5.00	5.00
13355 Wiveliscombe - Styles WRC	SBI	TB2	-	0.80	20.00	20.00	10.00	10.00
13361 Wotton-Under-Edge WRC	SB1	TB2	-	1.00	25.00	25.00	20.00	20.00
13364 Wrington WRC	SB1	TB2	-	1.00	25.00	25.00	15.00	15.00
13366 Yeovil WRC	TB2	TB2	2.00	0.55	25.00	12.00	15.00	4.00

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2023/24	2024/25	2023/24	2024/25	2023/24	2024/25	2023/24	2024/25
13368 Yeovil Without WRC	TB2	TB2	-	0.80	20.00	20.00	10.00	10.00

Table 28 - WRC permit changes 2025-26

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2024/25	2025/26	2024/25	2025/26	2024/25	2025/26	2024/25	2025/26
13001 Abbotsbury WRC	TB2	TB2	0.81	0.50	12.00	12.00	5.00	5.00
19031 Buckland Newton WRC	TB2	TB2	4.00	1.00	30.00	30.00	15.00	15.00
13086 Cromhall WRC	SAE	TA2	-	2.00	20.00	20.00	10.00	10.00
13113 Edford WRC	SBI	TB2	-	1.00	30.00	30.00	15.00	15.00
13220 Netheravon WRC	TB2	TB2	1.00	0.25	25.00	25.00	25.00	25.00
13229 Oakhill WRC	SBI	TB2	-	1.00	20.00	20.00	10.00	10.00

Table 29 - WRC permit changes- 2026-27

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2025/26	2026/27	2025/26	2026/27	2025/26	2026/27	2025/26	2026/27
13075 Compton Bassett WRC	SBI	TB2	-	-	25.00	25.00	30.00	30.00
13125 Fivehead WRC	SBI	TB2	-	1.00	25.00	25.00	20.00	20.00
13173 Lacock WRC	SBI	TB2	-	-	40.00	40.00	20.00	20.00
13047 Cannington WRC	SBI	TB2	-	1.00	25.00	25.00	10.00	10.00
13227 Nunney WRC	SBI	TB2	-	-	31.00	31.00	12.00	12.00
13269 Sherston WRC	SBI	TB2	-	4.00	30.00	30.00	15.00	15.00
13280 South Perrott WRC	SBI	TB2	-	1.00	20.00	20.00	10.00	10.00
13286 Stanton Drew WRC	SBI	TB2	-	-	30.00	30.00	15.00	15.00
13293 Stratton-On-The-Fosse WRC	TB1	TB2	-	-	20.00	20.00	15.00	15.00
13331 Wellow WRC	SBI	TB2	-	-	25.00	25.00	10.00	10.00

13346 Wick St Lawrence WRC	TA1	TA2	-	-	25.00	25.00	25.00	25.00

Table 30 - WRC schemes - 2027-28

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2026/27	2027/28	2026/27	2027/28	2026/27	2027/28	2026/27	2027/28
13008 Amesbury WRC	TB2	TB2	1.00	0.25	20.00	20.00	10.00	10.00
13004 Bishops Cannings (All Cannings) WRC	TB2	TB2	1.00	0.50	15.00	15.00	5.00	5.00
13025 Blagdon WRC	TA2	TA2	0.50	0.50	40.00	26.00	5.00	4.00
13043 Butleigh WRC	SBI	TB2	-	0.25	25.00	25.00	20.00	20.00
13045 Cam Valley WRC	SAE	TA2	-	-	20.00	20.00	10.00	10.00
13069 Coleford WRC	SAE	TA2	-	-	20.00	20.00	10.00	10.00
13073 Combe St Nicholas WRC	TB1	TB2	-	1.00	12.00	12.00	9.00	9.00
13075 Compton Bassett WRC	TB2	TB2	-	1.00	25.00	25.00	30.00	30.00
13087 Croscombe WRC	SBI	TB2	-	0.25	40.00	40.00	20.00	20.00
13223 North Petherton WRC	TB1	TB2	-	0.25	25.00	25.00	8.00	8.00
13106 East Harptree WRC	TB1	TB2	-	-	15.00	15.00	10.00	10.00
13128 Fordingbridge WRC	TB2	TB2	1.00	0.25	20.00	20.00	10.00	10.00
13158 Hurdcott WRC	TB2	TB2	1.00	0.25	20.00	20.00	5.00	5.00
13144 Haselbury Plucknett WRC	TB2	TB2	-	1.00	15.00	15.00	10.00	10.00
13226 Norton St Philip WRC	TB2	TB2	-	0.50	14.00	14.00	7.00	7.00
13227 Nunney WRC	TB2	TB2	-	1.00	31.00	31.00	12.00	12.00
13286 Stanton Drew WRC	TB2	TB2	-	1.00	30.00	30.00	15.00	15.00
13319 Ubley WRC	TA1	N/A	-	-	-		-	

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2026/27	2027/28	2026/27	2027/28	2026/27	2027/28	2026/27	2027/28
13329 Wedmore WRC	TB1	TB2	-	1.50	20.00	20.00	10.00	10.00
13358 Wookey WRC	SAE	TA2	-	1.50	20.00	20.00	10.00	10.00

Table 31 - WRC permit changes 2028-29

Site Name	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29
13024 Blackheath WRC	TB1	TB1	-	-	20.00	20.00	7.00	4.20
13090 Devizes WRC	TB2	TB2	1.30	0.25	10.00	10.00	5.00	2.30
13045 Cam Valley WRC	TA2	TA2	-	0.25	20.00	20.00	10.00	10.00
17968 Leyhill WRC	TB2	TB2	1.00	1.00	20.00	20.00	10.00	3.40
13223 North Petherton WRC	TB2	TB2	0.25	0.25	25.00	25.00	8.00	5.00
13106 East Harptree WRC	TB2	TB2	-	3.00	15.00	15.00	10.00	10.00
13175 Langport WRC	TB2	TB2	0.80	0.25	25.00	25.00	15.00	15.00
13201 Martock WRC	TB2	TB2	0.80	0.25	25.00	25.00	15.00	15.00
13255 Ringwood WRC	TB2	TB2	1.00	0.25	20.00	20.00	10.00	10.00
13267 Shepton Mallet WRC	TB2	TB2	0.35	0.25	18.00	18.00	3.00	3.00
13287 Stanton St Bernard WRC	SBI	TB2	-	-	-	-	-	-
13330 Wellington WRC	TB2	TB2	0.80	0.25	25.00	25.00	12.00	12.00
13366 Yeovil WRC	TB2	TB2	0.55	0.25	12.00	12.00	4.00	4.00

Table 32 - WRC permit changes 2029-30

	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
Site Name	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29
13017 Beckington WRC	TB1	TB2	-	1.00	20.00	20.00	10.00	10.00
13021 Bishops Caundle WRC	SB1	TB2	-	0.80	40.00	40.00	20.00	20.00
13022 Bishops Lydeard WRC	TB2	TB2	0.80	0.25	25.00	25.00	12.00	12.00
13024 Blackheath WRC	TB1	TB2	-	0.25	20.00	20.00	4.20	4.20
13032 Bradford-On-Tone WRC	SB1	TB2	-	0.25	40.00	40.00	25.00	25.00
13039 Bruton WRC	TB2	TB2	2.00	0.25	25.00	25.00	10.00	10.00
13044 Calne WRC	TB2	TB2	0.50	0.25	18.00	18.00	11.00	11.00
13048 Castle Cary WRC	TB2	TB2	0.50	0.25	6.50	6.50	5.00	5.00
19156 Chard WRC	TB2	TB2	0.50	0.25	20.00	20.00	2.50	2.50
13057 Cheddar WRC	TA2	TA2	0.70	0.25	15.00	15.00	5.00	5.00
13058 Chew Stoke WRC	TB2	TB2	1.00	0.50	15.00	15.00	8.00	8.00
13069 Coleford WRC	TA2	TA2	-	1.00	20.00	20.00	10.00	10.00
13078 Corfe Mullen WRC	SBI	TB2	-	0.80	25.00	25.00	20.00	20.00
13084 Crewkerne East WRC	TB2	TB2	0.80	0.25	13.00	13.00	4.00	4.00
13092 Dilton Marsh WRC	SBI	TB2	-	1.00	35.00	35.00	15.00	15.00
13096 Dorchester WRC	TB2	TB2	0.70	0.25	15.00	15.00	5.00	5.00
13099 Downton WRC	TB2	TB2	1.00	0.25	25.00	25.00	15.00	15.00
13101 Draycott WRC	TB1	TB2	-	2.00	20.00	20.00	10.00	10.00
13105 East Coker WRC	SBI	TB2	-	0.25	20.00	20.00	10.00	10.00
13107 East Knoyle WRC	TB2	TB2	1.00	0.50	15.00	15.00	10.00	10.00
13118 Evercreech WRC	TB2	TB2	1.00	0.25	8.00	8.00	5.00	5.00
13129 Fovant WRC	TB2	TB2	1.00	0.50	17.00	17.00	5.00	5.00

	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
Site Name	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29
13353 Great Wishford WRC	TB2	TB2	1.00	0.25	20.00	20.00	10.00	10.00
13028 Bowerhill WRC	TA2	TA2	0.50	0.25	14.00	5.00	6.00	2.00
13156 Hornsey Bridge WRC	TB1	TB2	-	0.25	15.00	15.00	10.00	10.00
13160 Ilchester WRC	TB2	TB2	0.80	0.25	25.00	25.00	15.00	15.00
13161 Ilminster WRC	TB2	TB2	0.80	0.25	25.00	25.00	10.00	10.00
13172 Kinson WRC	TB2	TB2	0.65	0.50	20.00	20.00	10.00	10.00
13047 Cannington WRC	TB2	TB2	1.00	1.00	25.00	21.00	10.00	9.00
13181 Longbridge WRC	TA2	TA2	-	1.00	13.00	13.00	4.00	4.00
13196 Marden WRC	TB2	TB2	2.00	0.50	20.00	20.00	20.00	20.00
13200 Marshfield WRC	TB2	TB2	-	0.25	10.00	10.00	1.90	1.90
13204 Melksham WRC	TB2	TB2	1.20	0.80	20.00	20.00	15.00	15.00
13208 Merriott WRC	TB2	TB2	0.80	0.25	18.00	18.00	4.00	4.00
13209 Michaelwood WRC	SAE	TA2	-	0.25	20.00	20.00	10.00	10.00
13211 Milborne Port WRC	TB2	TB2	0.80	0.25	20.00	20.00	12.00	12.00
13212 Milborne St Andrew WRC	TB1	TB2	-	1.00	15.00	15.00	10.00	10.00
13144 Haselbury Plucknett WRC	TB2	TB2	1.00	1.00	15.00	15.00	10.00	3.40
13232 Palmersford WRC	TA2	TA2	0.65	0.50	15.00	15.00	5.00	5.00
13235 Paulton WRC	TB2	TB2	1.00	0.25	21.00	21.00	7.00	7.00
13237 Pewsey WRC	TB2	TB2	1.00	0.25	17.00	17.00	8.00	8.00
13244 Potterne WRC	TA2	TA2	1.10	1.10	15.00	15.00	8.00	3.00
13255 Ringwood WRC	TB2	TB2	0.25	0.25	20.00	17.00	10.00	8.00
13258 Salisbury WRC	TB2	TB2	1.00	0.25	18.00	18.00	5.00	5.00
13274 Shoscombe WRC	SBI	TB2	-	1.00	30.00	30.00	15.00	15.00
13275 Shrewton WRC	TB2	TB2	1.00	0.25	25.00	25.00	15.00	15.00

	Treatment Type		P (mg/l)		BOD (mg/l)		AmmN (mg/l)	
Site Name	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29	2027/28	2028/29
13276 Shroton WRC	TB1	TB2	-	0.80	32.00	32.00	16.00	16.00
13278 Somerton WRC	TB2	TB2	0.50	0.25	20.00	20.00	5.00	5.00
13280 South Perrott WRC	TB2	TB2	1.00	1.00	20.00	20.00	10.00	6.60
13281 South Petherton WRC	TB2	TB2	0.80	0.25	15.00	15.00	5.00	5.00
13282 Sparkford WRC	TB2	TB2	0.80	0.80	20.00	20.00	10.00	4.00
13287 Stanton St Bernard WRC	TB2	TB2	-	1.00	-	-	-	-
13293 Stratton-On-The-Fosse WRC	TB2	TB2	-	0.30	20.00	20.00	15.00	15.00
13298 Sutton Benger WRC	TB2	TB2	2.00	0.50	25.00	25.00	10.00	10.00
13305 Taunton WRC	TA2	TA2	0.80	0.25	15.00	15.00	3.00	3.00
13308 Thingley WRC	TA2	TA2	1.20	0.50	15.00	15.00	3.00	3.00
13310 Thornford WRC	TB2	TB2	1.00	0.25	20.00	20.00	10.00	10.00
13312 Tintinhull Ash WRC	TB1	TB2	-	0.25	15.00	15.00	20.00	20.00
13313 Tisbury WRC	TB2	TB2	1.00	0.25	25.00	25.00	15.00	15.00
13320 Upavon WRC	TB2	TB2	1.00	0.50	16.00	16.00	8.00	8.00
13322 Urchfont WRC	TB2	TB2	-	0.40	10.00	10.00	2.00	2.00
13325 Warminster WRC	TA2	TA2	0.50	0.25	16.00	16.00	3.00	3.00
13332 Wells WRC	TB2	TB2	1.00	0.25	25.00	25.00	9.00	9.00
13338 Westbury WRC	TA2	TA2	2.00	0.25	13.00	13.00	2.00	2.00
13360 Wootton Bassett WRC	TB2	TB2	0.50	0.50	20.00	20.00	5.00	2.10

9.4. CWW7a.1-15 Sewage treatment works data – size and consents

9.4.1. CWW7a.1-6 Load received by STWs in size bands 1-6

The increase in load received (excl. trade effluent) across the 6 bands is forecast to vary between -1% and +7.4% by March 2030. This is mainly due to the rate of residential and commercial development across our region as well

as improvements to treatment processes at various WRCs to accommodate growth and / or tighter permit requirements.

The rate at which properties are added to our billing records is variable and depends on the date of the first bill rather than the build or occupancy date, but we do expect population growth to be fairly steady over the period being considered.

9.4.2. CWW7a.7 Total load received

The overall load received (excl. trade effluent) is forecast to increase by 5.2% on average up to March 2030.

9.4.3. CWW7a.8-14 STWs in size band 1-6

The table below lists those WRCs that move into the next size band between April 2022 and March 2030 due to increases in PE served, together with the year in which the change occurs.

Table 33 – Changes in size band 2022-30

Site Name	Size Band 2022-2023	Size Band 2029-2030	Year Change occurs
13025 Blagdon WRC	3	4	2027/28
13076 Compton Dando WRC	2	3	2028/29
13095 Donyatt WRC	1	2	2028/29
13113 Edford WRC	3	4	2027/28
13165 Keynsham WRC	5	6	2026/27
13175 Langport WRC	4	5	2023/24
13178 Leigh-on-Mendip	2	3	2023/24
13201 Martock	4	5	2027/28
13219 Nether Stowey	3	4	2028/29
13274 Shoscombe	3	4	2024/25
13282 Sparkford	3	4	2025/26
13290 Stoke St Gregory	3	4	2025/26
13319 Ubley	3	N/A	2027/28
13325 Warminster	5	6	2023/24
13368 Yeovil Without	3	4	2026/27

9.4.4. CWW7a.15 Total number of works

The closure of one WRC (at Ubley) by 2027/28 reduces the total number of works to 397.

9.5. CWW7b.1-6 Sewage treatment works data – UV permits

9.5.1. CWW7b.1-6 Weighted average number of days that UV permit applies per year for STWs in size bands 1 – 6

There are no changes to permit requirements proposed under PR24, though capital maintenance will be necessary on a number of the installed systems.

The data reflects the fact that the majority of the systems we operate are required to do so 365 days/year, apart from 2 – Cannington and Ringstead WRCs, where the permit requirements vary from summer to winter and these are reflected in the figures shown against Line CWW7b.1 & 4.

9.6. CWW7c.1-15 Sewage treatment works data – treatment works types

9.6.1. CWW7c.1-6 Loads received by STWs in size bands 1-6

The table below lists those WRCs where improvements to treatment processes result in the works treatment type changing between April 2022 and March 2030, together with the year in which the change occurs. This reflects the nature of the AMP8 enhancement programme in that a greater proportion of the flows / loads will be receiving enhanced tertiary treatment by 2030, increasing from 30% to 34%. The proportion receiving some form of tertiary treatment is increasing from 65% to 69%.

Table 34 – Changes in treatment type 2022-30

Site Name	Treatment Type 2022-2023	Treatment Type 2029-2030	Year Change occurs
13017 Beckington WRC	TB1	TB2	2029/30
13047 Cannington WRC	SBI	TB2	2026/27
13021 Bishops Caundle WRC	SBI	TB2	2028/29
13022 Bishops Lydeard WRC	SBI	TB2	2024/25
13024 Blackheath WRC	TB1	TB2	2029/30
13025 Blagdon WRC	SAE	TA2	2024/25
13032 Bradford-on-Tone WRC	SBI	TB2	2029/30
13043 Butleigh WRC	SBI	TB2	2027/28
13045 Cam Valley WRC	SAE	TA2	2027/28
13048 Castle Cary WRC	TB1	TB2	2023/24

Site Name	Treatment Type 2022-2023	Treatment Type 2029-2030	Year Change occurs
19156 Chard WRC	SBI	TB2	2024/25
13054 Charfield WRC	SAE	TA2	2023/24
13055 Charlton Horethorne WRC	SBI	TB2	2023/24
13069 Coleford WRC	SAE	TA2	2027/28
13073 Combe St Nicholas WRC	TB1	TB2	2027/28
13075 Compton Bassett WRC	SBI	TB2	2026/27
13078 Corfe Mullen WRC	SBI	TB2	2029/30
13086 Cromhall WRC	SAE	TA2	2025/26
13087 Croscombe WRC	SBI	TB2	2027/28
13092 Dilton Marsh WRC	SBI	TB2	2029/30
13101 Draycott WRC	TB1	TB2	2029/30
13104 East Chinnock WRC	SBI	TB2	2023/24
13105 East Coker WRC	SBI	TB2	2029/30
13106 East Harptree WRC	TB1	TB2	2027/28
13113 Edford WRC	SBI	TB2	2025/26
13125 Fivehead WRC	SBI	TB2	2026/27
13142 Hardington Mandeville WRC	SBI	TB2	2023/24
13144 Haselbury Plucknett WRC	SBI	TB2	2023/24
13156 Hornsey Bridge WRC	TB1	TB2	2029/30
13161 Ilminster WRC	TB1	TB2	2023/24
13163 Iwerne Minster WRC	TB1	TB2	2023/24
13173 Lacock WRC	SBI	TB2	2026/27
13175 Langport WRC	TB1	TB2	2023/24
17968 Leyhill WRC	SBI	TB2	2023/24
13201 Martock WRC	SBI	TB2	2023/24
13207 Mere WRC	SBI	TB2	2023/24

Site Name	Treatment Type 2022-2023	Treatment Type 2029-2030	Year Change occurs
13209 Michaelwood WRC	SAE	TA2	2029/30
13211 Milborne Port WRC	TB1	TB2	2024/25
13212 Milborne St Andrew WRC	TB1	TB2	2029/30
13214 Milverton WRC	SBI	TB2	2023/24
13222 North Nibley WRC	SBI	TB2	2023/24
13223 North Petherton WRC	TB1	TB2	2027/28
13227 Nunney WRC	SBI	TB2	2026/27
13229 Oakhill WRC	SBI	TB2	2025/26
13238 Piddlehinton WRC	TB1	TB2	2023/24
13264 Shaftesbury WRC	TA1	TA2	2023/24
13269 Sherston WRC	SBI	TB2	2026/27
13274 Shoscombe WRC	SBI	TB2	2029/30
13276 Shroton WRC	TB1	TB2	2029/30
13278 Somerton WRC	TB1	TB2	2023/24
13280 South Perrott WRC	SBI	TB2	2026/27
13281 South Petherton WRC	TB1	TB2	2023/24
13286 Stanton Drew WRC	SBI	TB2	2026/27
13287 Stanton St Bernard WRC	SBI	TB2	2028/29
13288 Stogursey WRC	TB1	TB2	2023/24
13293 Stratton-On-The-Fosse WRC	TB1	TB2	2026/27
13312 Tintinhull Ash WRC	TB1	TB2	2029/30
13319 Ubley WRC	TA1	N/A	2027/28
13329 Wedmore WRC	TB1	TB2	2027/28
13331 Wellow WRC	SBI	TB2	2026/27
13346 Wick St Lawrence WRC	TA1	TA2	2026/27
13347 Wickwar WRC	SBI	TB2	2024/25

Site Name	Treatment Type 2022-2023	Treatment Type 2029-2030	Year Change occurs
13354 Wiveliscombe - Hillsmoor WRC	SBI	TB2	2024/25
13355 Wiveliscombe - Styles WRC	SBI	TB2	2024/25
13358 Wookey	SAE	TA2	2027/28
13361 Wotton-Under-Edge WRC	SBI	TB2	2024/25
13364 Wrington WRC	SBI	TB2	2024/25
13368 Yeovil Without WRC	TB1	TB2	2023/24

9.6.2. CWW7c.7 Total load received

The overall load received (excl. trade effluent) is forecast to increase by 5.2% on average up to March 2030.

9.6.3. CWW7c.8 Load received from trade effluent customers at treatment works

The load received as trade effluent is forecast to remain at a consistent level through to 2030, representing 4.7% of the total load on average.

9.6.4. CWW7c.9-14 STWs in size bands 1-6

Refer to 10.4.6

9.6.5. CWW7c.15 Total number of works

Refer to 10.4.7.

9.6.6. Confidence Grade for CWW7a, b & c

B2

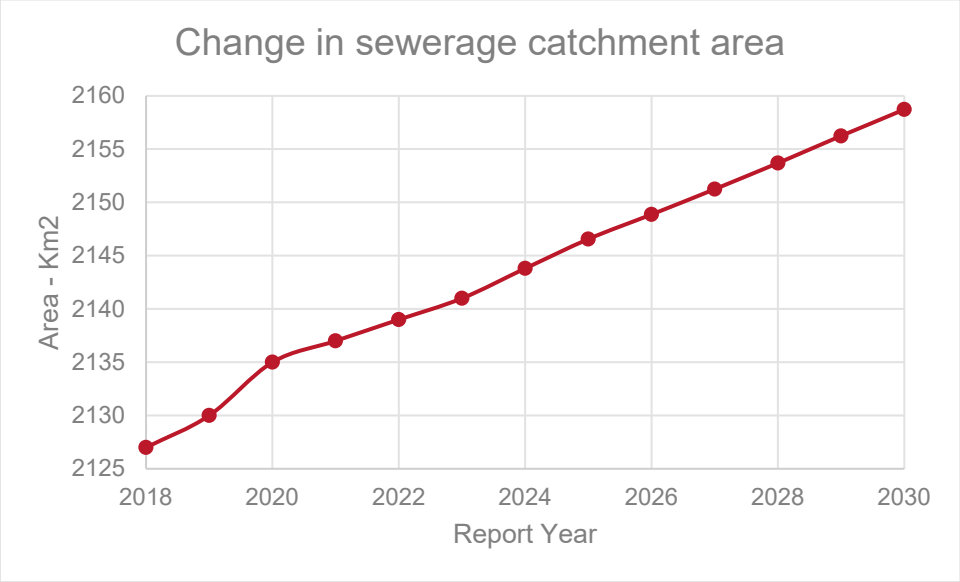
10. CWW8 Wastewater network+ - Energy consumption and other data.

10.1. CWW8.1 Total sewerage catchment area

The catchment area is calculated by querying our GIS system to provide the total area of our sewage treatment works catchments. For 2022/23 the total area of sewered catchments has increased from 2,139 km^2 to 2,141 km^2, a 0.09% increase.

For the PR24 forecast the catchment area of projected based on the historic trend since 2018-19 from whence it has been relatively stable.

Figure 7 – Change in sewerage catchment area



10.2. CWW8.2 & CWW8.3 Bathing Waters

There were 48 coastal bathing waters within the Wessex Water region for the bathing season in 2022/23 (CWW8.2). 1 bathing water, Henleaze, is an inland bathing water with no Wessex Water assets discharging to it; it is now reportable under CWW8.3, inland bathing waters.

We anticipate that Warleigh Weir may become a designated Inland Bathing Water before the end of AMP8, but it is not possible to forecast this with any certainty, therefore our PR24 forecast for CWW8.2 and CWW8.3 is for no change.

10.3. CWW8.4 Number of intermittent discharge sites with event duration monitoring

Wessex Water have completed 128 EDM outputs for report year 2022/23 which have also been signed-off by the Environment Agency (EA). Wessex Water have completed an additional 71 EDM outputs which are required by the

EA, but not due to be signed off until December 2023. CAPEX for these installations is reported in 4M.4-6 therefore for consistency we are reporting 199 EDM outputs for 2022/23.

Our investigations are not mature enough to forecast the exact number of monitors that will be installed, therefore all lines are reported based on the number of sites.

All U_MON1 & 2 WINEP drivers have now been delivered. AMP7 U_MON3 drivers programmed for delivery in 2023/24 & 2024/25 will be commissioned with MCERTS certified at 2 minute read intervals to align with the AMP8 U_MON3a driver. The are counted as a single monitor install although they have WINEP targets in both AMP7 & AMP8. For other AMP8 U_MON3a drivers, the AMP7 driver has already been delivered, therefore either re-certification or meter modification is required to meet the AMP8 driver. Most sites with an AMP8 U_MON3b driver will require an element of civils, however a small number have monitors that can be recertified.

Table 35 – U_Mon details - intermittent discharge sites with EDM

Driver	Detail	2022/23	2023/24	2024/25	2025/26	2026/27
U_MON1	Permit		All AMP7 drivers delivered			
U_MON1	Meter	108				
U_MON1	Civils	51				
U_MON3	Permit				AMP7 only	
U_MON3	Meter	40				
U_MON3	Civils		43	44		
U_MON3a	Permit				104	
U_MON3a	Meter				36	
U_MON3a	Civils	No civils for this driver				
U_MON3b	Permit					10
U_MON3b	Meter					
U_MON3b	Civils			1		37

Driver	Description	No. of Sites
U_MON3a	Existing U_MON3 overflow operation monitor will be MCERTS certified; may need some improvement work requiring MCERTS inspector assessment to obtain certification	227
U_MON3b	Installation and MCERTS certification of a U_MON3 overflow operation monitor which was not included in AMP7. There may in some unusual cases also be a need for a new discharge operation monitor (EDM) to be installed as well.	21 WRCs +27 SPSs

10.4. CWW8.5 Number of monitors for flow monitoring at STWs

In 2022/23 we installed MCERTS flow monitors at 19 STWs with U_MON4 drivers. This is the number of WINEP lines with a U_MON4 driver that were included on the Environment Agency's sign-off spreadsheet, with a 2022/23 sign-off date. There are no U_MON5 outputs identified for Wessex Water in the WINEP for PR19.

Our investigations are not mature enough to forecast the exact number of monitors that will be installed, therefore all lines are reported based on the number of sites.

AMP7 U_MON4 drivers programmed for delivery in 2023/24 & 2024/25 will be commissioned with MCERTS certified at 2 minute read intervals to align with the AMP8 U_MON4a driver. There are counted as a single monitor install although they have WINEP targets in both AMP7 & AMP8.For other AMP8 U_MON4a drivers, the AMP7 driver has already been delivered, therefore recertification is required to meet the AMP8 driver. Sites with an AMP8 U_MON4b driver will require recertification, no meter installs or civils work is anticipated. Sites with an AMP8 U_MON4c or a U_MON4e driver all require new flow meters to be installed, some will also require civils work.

Table 36 - U_Mon details - flow monitoring at STW

Driver	Detail	2022/23	2023/24	2024/25	2025/26	2026/27
U_MON4	Permit	10			AMP7 only	
U_MON4	Meter					
U_MON4	Civils	9	21	17		
U_MON4a	Permit		4	1	20	
U_MON4a	Meter	No meter installs or civils for this driver				
U_MON4a	Civils					
U_MON4b	Permit		29		42	
U_MON4b	Meter	No meter installs or civils for this driver				
U_MON4b	Civils					
U_MON4c	Permit					
U_MON4c	Meter		5	8		12
U_MON4c	Civils		25	25		16
U_MON4d	No drivers					
U_MON4e	Permit	No recertification sites for this driver				
U_MON4e	Meter					2
U_MON4e	Civils					20

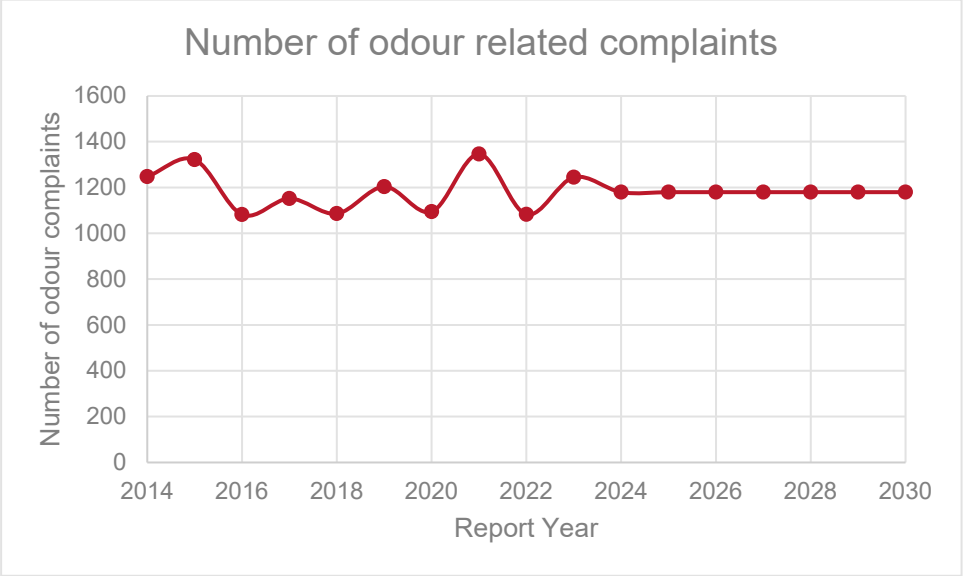
Driver	Description	No. of Sites
U_MON4a	Existing front-end flow passed forward flow monitors which were AMP7 U_MON4 outputs will move from 15 to 2-minute flow monitoring. This may require work at the monitor and/or elsewhere to allow the additional monitoring data to be received and processed.	63
U_MON4b	Existing front-end flow passed forward flow monitors that were AMP7 U_INV2 outputs capable of being MCERTS certified in AMP7 (so no U_MON4 in PR24) will move from 15 to 2-minute flow monitoring. This may require work at the monitor and/or elsewhere to allow the additional monitoring data to be received and processed.	71
U_MON4c	Installation and MCERTS certification of a front-end flow monitor, monitoring at 2-minute intervals, where the AMP7 U_INV2 investigation concluded that there was no suitable existing flow monitor for measuring flow passed forward flow. The work required will involve civils which could range from installing a new flume and monitor to an entire rebuild of a WwTW inlet works.	91
U_MON4d	Installation and MCERTS certification of a U_MON4 flow passed forward flow monitor, monitoring at 2-minute intervals, which was not included in AMP7.	0
U_MON4e	Installation and MCERTS certification of a U_MON4 flow passed forward flow monitor, monitoring at 2-minute intervals, which was not included in AMP7. The work required will include civils which could range from getting MCERTS certification of an existing flow monitor to an entire rebuild of a WwTW inlet works.	22

10.5. CWW8.6 Number of odour related complaints

There were 1,245 odour related complaints reported on our customer contact system, RAPID. This is a 15% increase on last year and similar to the number of complaints reported in 2018/19 (1,204) and in 2020/21 (1,346). This includes odour complaints related to sewage and sludge treatment centres.

For the PR24 forecast the number of odour related complaints is based on the historic trend since 2013-14 from whence it has been relatively stable.

Figure 8 – Number of odour related complaints



10.6. CWW8.7 to 8.9 Energy Consumption

Based on actual electricity and gas consumption for April – June 2023, electricity and gas budgets for the remainder of the 2023-24 financial year and other fuel and fleet actuals from 2022-23, we are currently forecasting 46.9 GWh for Sewage Collection and 163.1 GWh for Sewage Treatment for 2023-24.

Both of these numbers are an increase from 2022-23. This is due to higher-than-expected electricity consumption so far this financial year and expected higher consumption for the rest of the year following completion of site upgrades to improve treatment processes.

The PR24 forecast matches the current forecast for 2023-24.

10.7. Data quality

For report year 2022/23 we assign confidence grades ranging from A1 – A2 for the data in CWW8. Some forecasts rely on a degree of extrapolation therefore confidence grades for PR24 years will range from A1 – B3.

11. CWW8a

This table is intentionally blank and therefore a commentary has not been provided.

12. CWW9

12.1. Enhancement expenditure analysis (cumulative)

This table includes the cumulative expenditure on schemes completed in the year. Our totex programme is a combination of programmes of work and individual projects.

Schemes are reported as completed when they come into beneficial use, the summary of these assumptions are that:

- For individual projects, beneficial use is in the first year of operation (when opex costs are incurred).
- For programmes of activity (capital &/or opex) beneficial use is in the first year of expenditure
- For investigatory works, such as feasibility studies there are no benefits as such as their purpose is to inform PR29 or other decisions.

For costs reported in 2022/23, we have directly taken the cumulative expenditure reported in our APR table 4M where the regulatory drivers are the same as the ones used in CWW9. If the regulatory drivers are similar but not exact, we have not reported the costs in CWW9. For example, for the 'treatment for phosphorus removal' driver, we have not reported the costs in CWW9 as we do not have the data split of the costs between 'chemical' and 'biological'.

13. CWW10

13.1. Overall Approach to business rates for Waste Water

The Company has used the business rates profile as currently included in the 2023 published rating list for all Waste water sites. As a result of the large increase in rateable values from the 2017 to 2023 list, the company is benefiting of transitional reliefs in the period 2023 to 2026. This has been reflected and is included in CWW10.3.

In relation to the UBR, we have assumed that it effectively remains constant at 51.2% for each of the years in question.

Current legislation is set to have further revaluations effective in 2026 and 2029. We have reflected an increase in the overall values at these two points on our existing asset base. The increase in value reflected in the table is above the assumed inflation in the OFWAT model and has been based on projected indices both effective at the relevant dates. This is reflected at CWW10.11

As a result of the large capital investment included in the business plan, the waste water business rates liability will increase each year as new assets are brought into the scope of business rates. This is reflected in lines CWW10. 12. The annual increases have been reflected using the growth in the year on year waste water RCV.

14. CWW11

14.1. Lines 1-13

The third party operating expenditure for Bioresources and Waste water network plus are expected to remain materially consistent across the entirety of AMP7 and AMP8, with no anticipated changes in activity that would generate material variances.

14.2. Lines 14-26

There is no capital expenditure forecast for AMP7 or AMP8.

15. CWW12

15.1. Transition investment proposals

Wessex Water with our in-house management and blended in-house and external design and construction teams has always needed to minimise the boom-bust profile from the end of one periodic cycle and the start of another. We have been very effective in bridging these periods through a combination of early start, transition investment and overlap programme.

The significant step up in the scale of the investment programme required for AMP8 means this is even more important and this has been recognised by Ofwat in extending the transition investment period to cover 2023-24 as well as 2024-25. Nevertheless, given the significant preparatory work required we have already incurred some costs in 2022-23 but we have not included them in this submission.

The uncertainty surrounding some of the key programmes of work has made it particularly difficult to allocate the transition investment to specific projects and activities, however, we have done so and the information in the following sections reflects our current thinking, but we ask Ofwat to recognise that there may be small variations in the exact regulatory drivers where transition investment is allocated as the current uncertainties reduce. Any such movements we will report in our APR submissions and would not expect the total amount of transition investment in the Wastewater Network Plus and Bioresources price controls to be more than that being proposed now.

We have only tagged activities as transition investment if they are enhancement capex in nature and all the proposals relate to statutory requirements.

Each specific statement explains why we believe the investment meets the criteria for transition investment as defined in ‘Appendix 9 – Setting expenditure allowances’ of the PR24 final methodology (referenced below as ‘Ofwat’s Appendix 9’).

15.1.1. Wastewater network plus price control

The transition investment proposed for the Wastewater Network Plus price control is summarised in the following table using the regulatory driver coding.

Table 37 - Transition investment proposed for the Wastewater Network Plus price control

Wastewater Network Plus price control (Capex £ms)	2023/24	2024/25	AMP7 Total
Investigations, WINEP/NEP survey, monitoring or simple modelling wastewater Infra {storm overflow investigations}	5.7	15.2	20.8
Treatment for phosphorus removal chemical WINEP/NEP	2.4	16.8	19.2
Treatment for phosphorus removal biological WINEP/NEP	0.2	0.8	1.0
WINEP Event Duration Monitoring at intermittent discharges	9.3	6.3	15.6
Investigations, multiple surveys, and/or monitoring locations, and/or complex modelling wastewater	1.2	3.9	5.0
WINEP Nutrients nitrogen removal chemical	0.3	1.2	1.5
WINEP Nutrients nitrogen removal biological	0.1	0.4	0.5
Continuous river water quality monitoring WINEP/NEP wastewater	0.2	0.8	1.0
Nitrogen technically achievable limit monitoring, investigation or option appraisal	0.0	0.5	0.5
Investigations, WINEP/NEP deskbased studies only wastewater	0.0	0.1	0.2
25 Year Environment Plan	0.1	0.1	0.2
Catchment management habitat restoration WINEP/NEP	0.0	0.0	0.0
WINEP Chemicals monitoring investigations options appraisals	0.0	0.0	0.0
Biodiversity and Conservation	0.0	0.0	0.0
Totals	**19.6**	**46.3**	**65.9**

The justification for the proposed transition investment can be aligned to the drivers in the following five categories:

- Phosphorus and Nitrogen nutrient removal – The largest element of our investment plan relates to the statutory requirement to remove Phosphorus and Nitrogen. The scale of these programmes and the constraints in terms of land purchase, planning, and the long-lead times for the procurement of process equipment mean we have to progress early design now to ensure the most efficient delivery of the statutory requirements set out in the PR24 WINEP. Under Ofwat's Appendix 9 criteria we believe the early start ensures both deliveries to required dates and at lowest cost which benefits both customers and the environment. Even with this proposal there are individual projects that due to their complexity cannot be delivered until AMP9, in particular the Poole Nutrients projects.
- Storm overflow investigations – We have to complete 370 investigations for AMP8 & AMP9 improvements by April 2027. Screening appraisals for all 1312 storm overflows will need to be assessed by March 2025, but in reality, this is needed sooner. We are still awaiting detailed guidance from DEFRA/EA to enable us to screen what level of investigation is required but where receiving watercourses are sensitive, a full Urban Pollution Modelling (UPM) is likely to be required. Full UPM studies require the sampling of river water quality in different seasons of the year, often required over 2 years. Once that data is collected it then takes time to process and undertake water quality modelling to determine if the overflow has an ecological impact on the environment. If it does, we then need to develop, using computer models, what options are needed to reduce the discharge frequency so it will no longer cause harm. This is a scale of monitoring and investigations that has not been delivered before and we need to start immediately to stand any chance of achieving the 2027 WINEP completion dates. Under Ofwat's Appendix 9 criteria we believe this preparatory work is required to enable confirmation of scope of works to allow efficient delivery of this substantial programme of statutory requirements bringing benefits to the environment by het target dates that are required.
- Flow compliance EDM U_MON4 monitoring – The board committed to advancing AMP8 U_MON4 monitors into AMP7 as part of our response to demonstrate commitment to meet full flow to treatment (FFT) compliance as soon as possible. If this had not been done compliance solutions, where necessary, would not have been deliverable until late in AMP8 or into AMP9. Under Ofwat's Appendix 9 criteria we believe this advancement was recognised by regulators as helping early delivery of statutory requirements set out in the WINEP/NEP, delivering early benefit to customers and the environment.
- Environmental Investigations (desktop and complex modelling) – the size and scale of the environmental investigations programme means we need to commence investigations of various types in order to confirm detailed scoping with the Environment Agency, to collect field data to inform modelling and overall to ensure the efficiency delivery of these activities. Most investigations have an early completion date as they are expected after some period of data collection and modelling to be completed in time to inform the PR29 Final Business Plan submission and therefore are required to be substantially complete in 2026-27. In addition, we also need to spread the substantial investigation workload over a number of years to achieve effective use of specialist resources to ensure that the overall programme is delivered most efficiently. Under Ofwat's Appendix 9 criteria we believe these proposals meet the criteria for transition investment as this work is necessary to meet a combination of early completion dates and to enable the efficient delivery of statutory requirements.
- Other investigations and monitoring – the remainder of the proposed transition investment reflects the need to commence investigations and preparation of monitoring programmes that require scope clarification. The largest project is the commencement of the continuous water quality monitoring which has uncertainties that require clarification and confirmation of guidance from the Environment Agency. This programme potentially includes the need for land access, planning and these third party constraints as well as trialling mean we need to start the programme now in order to deliver the statutory requirement in the PR24 WINEP. Under Ofwat's Appendix 9 criteria we believe these proposals for minor expenditure meet the criteria for transition investment as this work is necessary to meet a combination of early completion dates and to enable the efficient delivery of statutory requirements.

15.1.2. Bioresources price control

There is no transition investment proposed for the Bioresources price control at this time. Once more detailed assessments have been made it is possible that small values of transition investment will be reported under this price control, but the total transition investment across Wastewater network plus and Bioresources price controls is not anticipated to be greater than the total value proposed now.

16. CWW13 – 16

Please refer to commentary for CW13-16.

17. CWW17

Table blank – our proposed Accelerated programme was not accepted by the regulator.

18. CWW18

We have submitted six wholesale cost adjustment claims. Those that relate to wholesale wastewater and detailed in this table are:

- CAC1 – Increases to efficient costs over time
- CAC3 – Growth at Water Recycling Centres (WRCs)
- CAC4 – Catchment and nature-based solutions
- CAC5 – Industrial Emissions Directive (IED) and Environmental Permitting Regulations (EPR) costs
- CAC6 – Energy costs

Further information on the cost adjustment claims can be found in WSX09 – Annex A1-A6 Cost adjustment claims.

19. CWW19. WINEP nutrient removal (phosphorus and total nitrogen) scheme costs and cost drivers

Table CWW19 requires a complete listing of every nutrient removal (phosphorus and nitrogen) scheme, as identified in the Water Industry National Environment Programme (WINEP), along with forecast cost profiles (capex and opex) and explanatory variables.

Our PR24 business plan includes an alternative approach to delivery of our WINEP nutrient obligations and, as such, the schemes included in CWW19 do not directly correlate to lines within the WINEP. Refer to Annex 1 for the full of list phosphorus and nitrogen schemes and their respective limits.

19.1. Costs (capital and operational expenditure)

Whilst costs are provided – as requested – to 3 decimal places, this gives a false impression of individual scheme accuracy. Costs have been proportioned between drivers, whilst recognising that there are cost efficiencies of enhancements when against multiple drivers.

Both capex and opex costs have been derived through a mixture of bottom-up estimates, cost models and cost curves. A representative sample of solutions covering a range of types, sizes and complexities have been bottom-up costed, incorporating supplier quotes, to inform the cost models and cost curves. Operational costs have been reviewed at an appropriate scale which reflects the level of detail of the capital costing, including deriving breakdowns between maintenance, labour, power, sludge, chemical usage, and business rates, and calibrating through actual site-based opex costs.

Scheme completions have been profiled as much as possible to meet PR24 WINEP regulatory dates, taking into consideration resources and other priorities across the whole PR24 business plan. Scheme durations and associated spend profile related to scheme values. The column for 2024/25 includes transition costs for 2023/24 and 2024/25.

Only costs to meet new PR24 obligations and with spend in AMP8 are included in this table. A number of sites are being enhanced in AMP7 for phosphorus drivers with PR19 WINEP regulatory completion dates of December 2024, resulting in costs in 2024/25 and also 2025/26. Our total phosphorus costs are included in table CWW3.

As with any large programme of work, there are a number of upfront programme-level activities, such as technology trials and design standardisation, environmental impact and land purchasing reviews etc. These have been considered in the around amongst all cost estimates. And whilst individual schemes may not show spend in 2025/26 or 2026/27, there will be some degree of individual optioneering but generally less than £100k captured through the overall scheme cost.

19.2. Population equivalent served

Refer to commentary on CWW7 for details on population equivalent derivation and forecasting.

19.3. Cost Drivers

19.3.1. Cost Driver 1 – Scheme design population equivalent

Scheme design horizon taken as 20-yrs from end of AMP8, being 2050. For details on forecasting refer to the commentary on CWW7.

19.3.2. Cost Drivers 2 & 8 – Historical permit level for phosphorus (mg/l)

A number of sites are being enhanced in AMP7 for phosphorus drivers with PR19 WINEP regulatory completion dates of December 2024. The 'historical' permit level stated is the phosphorus or nitrogen (as appropriate) permit level ahead of any PR24 enhancements and, as such, may not align with current permit limits. These limits are as agreed with the Environment Agency.

For sites with no historical permit a N/A is entered.

19.3.3. Cost Drivers 3 & 9 – Enhanced permit level for phosphorus/nitrogen (mg/l)

We include here enhanced permit levels for our alternative approach to delivery of our WINEP nutrient obligations. Values states are permit levels, and in many cases do not reflect actual limits being targeted with many sites having stretch targets.

Our PR24 business plan includes an alternative approach to delivery of our WINEP nutrient obligations, including:

- Bristol Avon – Catchment permitting for Water Framework Directive (WFD), at a sub-catchment scale.
    - This is an adaption of an already established approach – which initially ran as a trial 2017-2020 and now is fully implemented – to achieve revised WFD targets identified for PR24.
- Parrett & Tone – Catchment permitting for WFD, at a catchment scale.
    - This includes already agreed Stretch Targets from 1st January 2025.
    - Further tightening of limits at some sites – either through a tightening of this stretch target or a new permit superseding the stretch target, to achieve revised WFD targets identified for PR24.
- Dorset Stour – Catchment permitting for WFD, at a catchment scale.
    - This includes already agreed Stretch Targets from 1st January 2025.
    - Further tightening of limits at some sites – either through a tightening of this stretch target or a new permit superseding the stretch target, to achieve revised WFD targets identified for PR24.
- Hampshire Avon – Catchment permitting for Levelling-up & Regeneration Bill (LURB), at a catchment scale.
    - Equivalent load reduction as that identified through the LURB, but with flexibility on the size of sites allowing a more cost-effective and cost-beneficial approach.

We already operate a catchment permitting approach within the Bristol Avon catchment, whereby many sites have individual backstop permits but operate to achieve stretch targets to deliver an overall catchment load reduction. As long as this overall load target is achieved and all sites satisfy their individual backstop permit limits, then the sites are considered compliant. This is formalised through an operating techniques agreement (OTA), and reported annually to the Environment Agency.

Our PR19 Business Plan included for the expansion of catchment permitting into two more catchments: Parrett (& Tone) and Dorset Stour, with backstop permits in AMP7 and stretch targets through PR24. We also implement catchment nutrient balancing (CNB) for phosphorus within these two catchments, through other OTAs. These OTAs have been agreed and signed between Wessex Water and the EA.

Costs to achieve these stretch targets were not included within our PR19 plan, but were identified for potential future inclusion in PR24. For many sites we believe these stretch targets can be achieved through optimisation of any newly built processes and with minimal opex increase, although for several schemes many of these processes are not yet built/operational within AMP7 and there is risk further enhancement will be required. A capital (and operational) allowance has been spread across a number of relevant sites. Our PR19 plan envisaged that stretch targets in the Parrett and Stour catchments would come into effect from December 2027, however the developed OTAs require a three trial from January 2025 – December 2027. Given many of the PR19 schemes don't complete until late 2023 or 2024 ahead of December 2024 regulatory dates, this gives little opportunity to fully understand

and respond to the risk should we have been over-optimistic in their ability to achieve the stretch targets. To ensure a successful trial of catchment permitting, these costs are included early in the PR24 timeframe.

There are a few sites – namely Crewkerne, Holdenhurst and Kinson – where the PR24 stretch target is more stringent than that envisaged through PR19 planning.

For full transparency, please see Annex 1 for a list of all phosphorus removal sites as contained within CWW19, and with their historical and enhanced backstop permit and stretch target levels.

19.3.4. Cost Driver 4 – Permit change only (Y/N)

For schemes where we envisage that the change in permit (or stretch target) levels can be achieved through a change/optimisation of the current process with no or limited capital works, then 'Yes' is entered.

With the exception of Cromhall, all sites have existing nutrient permit conditions. An integrated constructed wetlands was built at Cromhall during AMP6 – principally as a trial to establish its effectiveness as phosphorus reduction – with investigations during AMP7 to monitor overall nutrient (phosphorus and nitrogen) removal, alongside other parameters and measures such as sediment, carbon and biodiversity.

19.3.5. Cost Driver 5 – Catchment-based solution (Y/N)

Ongoing dialogue continues with the EA for some sites where a catchment alternative (catchment permitting and/or catchment nutrient balancing) may achieve the equivalent nutrient reduction outcome. This is to achieve the permit level as stated in the WINEP. Any alternative approach will be agreed with the EA through an Operating Techniques Agreement and with the WINEP updated accordingly.

A number of sites will be further adapted through PR29 to achieve Environment Act catchment targets.

19.3.6. Cost Drivers 6&7 – Transfers

On occasion the transfer of flows and treatment at an alternative site is preferable to enhancement of the origin site.

It is proposed to transfer flows from Lytchett Minster WRC for treatment at Poole WRC.

19.3.7. Cost Driver 10 – Solution Type

We align our ‘Solution Type’ to the dropdown list provided by Ofwat, as included below.

1. Chemical treatment only
2. Biological treatment only
3. Nature based solution only
4. Catchment nutrient balancing only
5. Combined chemical and biological
6. Combined chemical and nature based
7. Combined chemical and CNB
8. Combined biological and nature based

9. Combined biological and CNB
10. Other

We note that this list differs slightly from how we have apportioned costs or scheme details in tables CWW3 and CWW20, as tabled below. For classification in these tables we have used the dominant solution type.

Table 38 – Nutrient removal solution types in CWW3 and CWW20

Solution Type	CWW3	CWW20
Nature based / wetlands treatment solution	3.70-72	20.9
Biological treatment for P or N	3.67-69 (P) & 3.58-60 (N)	20.19 (P) & 20.21 (N)
Chemical treatment for P or N	3.64-66 (P) & 3.55-57 (N)	20.20 (P) & 20.22 (N)
Catchment management – nutrient balancing	3.79-81	N/A
Catchment management – catchment permitting	3.82-84	N/A

Through PR24 planning we have undertaken a design and cost comparison between various chemical and/or biological treatment processes, which has built on prior evaluations for PR19 and earlier. Whilst all sites have natural biological nutrient removal, we are not proposing any new enhanced biological nutrient removal (EBNR) processes without any form of chemical dosing. We envisage Dorchester to be designed as an EBNR process, however it will still have chemical dosing for both phosphorus and nitrogen, likely to be ferric sulphate and methanol respectively, and has been categorised as '*Combined chemical and biological*'. The dominance and reliance on chemical dosing has led to others being categorised as '*Chemical treatment only*'.

For any schemes highlighted as a permit change only through cost driver 4, the solution type of the existing treatment works has been included.

The following site(s) have been categorised as 'Other':

Table 39 – Nutrient removal solution types - Other

Scheme Name	Nutrient of Concern	Details
LYTCHETT MINSTER WRC - 08WW102105	P & N	Transfer of flows to POOLE WRC - 08WW102107

Catchment nutrient balancing agreed in PR19 for the Parrett and Dorset Stour catchments will continue during AMP8 and is not included in CWW19 as is now considered base, having been allowed for through our PR19 business plan. Much PR24 legislation and regulatory guidance, however, requires us to make improvements to point-source discharges and, as such, in many cases this CNB cannot contribute to our required load removal targets going beyond AMP8 and will reduce accordingly.

As detailed earlier, we continue to engage with the EA regarding catchment alternatives such as catchment permitting and/or catchment nutrient balancing. Individual schemes will also continue to be re-assessed ahead of and during AMP8 to ensure we are delivering the best value solution – within the constraints of any regulations or guidance at the time – potentially leading to the changing of solution types.

Annex 1 – Phosphorus Removal Limits

The table below lists our PR24 proposals for phosphorus removal, including any proposed phasing and deviations from limits stated in the latest version of the WINEP. Any blank cells for enhanced permits are retaining the historical permit. Any enhanced stretch targets in brackets are interim from 1st January 2025, and will be superseded by other limits (permits or stretch targets) by the PR24 completion date shown. Not included are any sites included in the WINEP or otherwise that we do not propose to upgrade in PR24, such as those to meet Environment Act catchment load targets through PR29.

Table 40 - PR24 proposals for phosphorus removal

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
ABBOTSBURY	08WW102206	0.81		0.5		0.5		31/03/2030
ALL CANNINGS	08WW102063	1		0.25			0.5	31/03/2030
AMESBURY	08WW102062	1		0.25		0.5	0.25	31/03/2030
BECKINGTON	08WW103001			1.5		2	1	31/03/2030
BISHOPS CAUNDLE	08WW103016			0.8		1.5	0.8	31/03/2030
BISHOPS LYDEARD	08WW102077	1		0.25		0.25	(0.8)	31/03/2030
BLACKHEATH	08WW102103			0.25		0.25		31/03/2030
BOURTON	08WW103017	1			0.8		0.8	31/12/2024
BOWERHILL	08WW103002	2	0.5	0.25		1	0.25	31/03/2030
BRADFORD-ON-TONE	08WW103025			0.25		0.25		31/03/2030

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
BRUTON	08WW102035	2		0.25		0.25		31/03/2030
BUCKLAND NEWTON	08WW103018	4		1			1	31/03/2030
BUTLEIGH	08WW102036			0.25		0.25		31/03/2030
CALNE	08WW103003	2	0.5	0.4		1	0.25	31/03/2030
CAM VALLEY	08WW102004			0.7		1	0.25	31/03/2030
CANNINGTON	08WW103151			TBC		1		31/03/2030
CASTLE CARY	08WW102078	0.5		0.25		0.25		31/03/2030
CHARD	08WW102079	0.5		0.25		0.25		31/03/2030
CHARLTON HORETHORNE	08WW103026	1.5		1		1	1	31/12/2024
CHEDDAR	08WW102037	0.7		0.25		0.25		31/03/2030
CHEW STOKE	08WW102005	2	1	0.3		1	0.5	31/03/2030
CHILCOMPTON	08WW103004	1.5	0.8	0.8		1	0.8	31/03/2030
CHIPPENHAM	08WW102006	2	0.6	0.25		1	0.25	31/03/2033
CHRISTCHURCH	08WW102064			0.25		0.25		31/03/2033
COLEFORD	08WW102007			1		2	1	31/03/2030
COMBE ST NICHOLAS	08WW103028			1.5		1		31/03/2030
COMPTON BASSETT	08WW102009			1		1		31/03/2030
CORFE MULLEN	08WW102045			1	0.8	1	0.8	31/03/2030

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
CRANBORNE	08WW102046	1		0.4			0.8	31/12/2024
CREWKERNE EAST	08WW102080	1		0.25		0.25	(0.8)	31/03/2030
CROMHALL	08WW102112			4	2	4	2	31/03/2030
CROSCOMBE	08WW103014			0.25		0.25		31/03/2030
DEVIZES	08WW102010	2	1.3	0.25		1	0.25	31/03/2030
DILTON MARSH	08WW102011			1		1		31/03/2030
DORCHESTER	08WW102104 / 08WW102201	0.7		0.25		0.25		31/03/2030
DOWNTON	08WW102065	1		0.25		0.5	0.25	31/03/2030
DRAYCOTT	08WW102038			2		2		31/03/2030
EAST COKER	08WW102081			0.25		0.25		31/03/2030
EAST HARPTREE	08WW102203			3		3		31/03/2030
EAST KNOYLE	08WW103022	1		0.25			0.5	31/03/2030
EDFORD	08WW102012			1		2	1	31/03/2030
EVERCREECH	08WW102039	1		0.25		0.25		31/03/2030
FIVEHEAD	08WW103030			1		1		31/03/2030
FORDINGBRIDGE	08WW102066	1		0.25		0.5	0.25	31/03/2030
FOVANT	NOT IN WINEP	1		N/A	N/A		0.5	31/03/2030
FROME	08WW102013	2	1.3	0.25		1	0.25	31/03/2033

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
GILLINGHAM	08WW102047	1			0.8		0.8	31/12/2024
GLASTONBURY	08WW102040	0.8		0.25		0.25		31/03/2033
GREAT WISHFORD	08WW102067	1		0.25			0.25	31/03/2030
HASELBURY PLUCKNETT	08WW103032			1		1		31/03/2030
HAZELBURY BRYAN	08WW102048	1.5			1		0.8	31/12/2024
HOLDENHURST	08WW102049	1			0.8		(0.65) 0.25	31/03/2033
HORNSEY BRIDGE	08WW102082			0.25		0.25		31/03/2030
HURDCOTT	08WW102068	1		0.25			0.25	31/03/2030
ILCHESTER	08WW102083	1		0.25		0.25	(0.8)	31/03/2030
ILMINSTER	08WW102084	1		0.25		0.25	(0.8)	31/03/2030
IWERNE MINSTER	08WW102050	1			0.8		0.8	31/12/2024
KINSON	08WW102051	1			0.65		(0.65) 0.5	31/03/2030
LANGPORT	08WW102086	1		0.25		0.25	(0.8)	31/03/2030
LONGBRIDGE	08WW103033			1		1		31/03/2030
LYNEHAM	08WW102017	2	1	0.25		1	0.25	31/03/2033
LYTCHETT MINSTER	08WW102105			0.25		0.25		31/03/2033
MALMESBURY	08WW102018	2	1	0.4		1	0.4	31/03/2033
MARDEN	08WW103023	2		0.25		1	0.5	31/03/2030

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
MARNHULL (REED BEDS)	08WW102052	1			0.8		0.8	31/12/2024
MARNHULL COMMON	08WW102053	1			0.8		0.8	31/12/2024
MARSHFIELD	08WW102019			1		0.25		31/03/2030
MARTOCK	08WW102087	1		0.25		0.25	(0.8)	31/03/2030
MELKSHAM	08WW102020	2	1.2	0.8		1.5	0.8	31/03/2030
MERE	08WW102054	1			0.8		0.8	31/12/2024
MERRIOTT	08WW102088	1		0.25		0.25	(0.8)	31/03/2030
MICHAELWOOD	NOT IN WINEP			N/A	N/A	1	0.25	31/03/2030
MILBORNE PORT	08WW102089	1		0.25		0.25	(0.8)	31/03/2030
MILBORNE ST ANDREW	08WW102106			0.3		1		31/03/2030
MILVERTON	08WW102090	1			0.8		0.8	31/12/2024
NETHERAVON	08WW102069	1		0.25			0.25	31/03/2030
NORTH PETHERTON	08WW102091			0.25		0.25		31/03/2030
NORTON ST PHILIP	08WW102021			0.6		1	0.5	31/03/2030
NUNNEY	08WW102022			1.4		2	1	31/03/2030
OAKHILL	08WW102023			1.5		2	1	31/03/2030
PALMERSFORD	08WW102055	1			0.65		(0.65) 0.5	31/03/2030
PAULTON	08WW102024	1		0.5			0.25	31/03/2030

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
PEWSEY	08WW102070	1		0.25		0.5	0.25	31/03/2030
POOLE	08WW102107			0.25		0.25		31/03/2033
POTTERNE	08WW102025	2	1.1	0.25		1	0.25	31/03/2033
RATFYN	08WW102071	1		0.25		0.5	0.25	31/03/2033
RINGWOOD	08WW102072	1		0.25		0.5	0.25	31/03/2030
ROYAL WOOTTON BASSETT	08WW103013	2	0.5	0.7		0.5	0.5	31/03/2030
SALISBURY	08WW102073	1		0.25		0.5	0.25	31/03/2030
SHAFTESBURY	08WW102056	1			0.8		0.8	31/12/2024
SHEPTON MALLET	08WW102041	0.35		0.25		0.25		31/03/2030
SHERBORNE	08WW102092	0.5		0.25		0.25		31/03/2030
SHERSTON	08WW102028			4		4		31/03/2030
SHOSCOMBE	08WW102029			1		1		31/03/2030
SHREWTON	08WW102074	1		0.25			0.25	31/03/2030
SHROTON	08WW103021			0.9		1.5	0.8	31/03/2030
SOMERTON	08WW102093	0.5		0.25		0.25		31/03/2030
SOUTH PERROTT	08WW103034			1		1		31/03/2030
SOUTH PETHERTON	08WW102094	1		0.25		0.25	(0.8)	31/03/2030
SPARKFORD	08WW102095	1		0.8			0.8	31/12/2024

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
STANTON DREW	NOT IN WINEP			N/A	N/A	2	1	31/03/2030
STANTON ST BERNARD	08WW103024			1		1		31/03/2030
STRATTON-ON-THE-FOSSE	08WW103010			0.3		1	0.3	31/03/2030
STURMINSTER NEWTON	08WW102057	1			0.8		0.8	31/12/2024
SUTTON BENGER	08WW102030	3	2	0.5		1	0.5	31/03/2030
TARRANT CRAWFORD	08WW102058	1			0.8		0.8	31/12/2024
TAUNTON	08WW102096	1		0.25		0.25	(0.8)	31/03/2030
TEMPLECOMBE	08WW102059	1			0.8		0.8	31/12/2024
TETBURY	08WW103011	2	0.5	0.5		0.5	0.5	31/03/2030
THINGLEY	08WW102031	2	1.2	0.5		1	0.5	31/03/2030
THORNFORD	08WW102097	1.5		0.25		0.25	(1)	31/03/2030
TINTINHULL ASH	08WW103035			0.25		0.25		31/03/2030
TISBURY	08WW102075	1		0.25			0.25	31/03/2030
UPAVON	NOT IN WINEP	1		N/A	N/A		0.5	31/03/2030
URCHFONT	08WW102032			0.4		0.4		31/03/2030
WAREHAM	08WW102108			0.25		0.25		31/03/2033
WARMINSTER	08WW102076	0.5		0.25			0.25	31/03/2030
WEDMORE	08WW102042			1.5		1.5		31/03/2030

Site Name	WINEP ID(s)	Phosphorus Limits (mg/l)						PR24 Completion Date
		Historical		WINEP		PR24		
		Permit	Stretch Target	Enhanced Permit	Enhanced Stretch Target	Enhanced Permit	Enhanced Stretch Target	
WELLINGTON	08WW102098	1		0.25		0.25	(0.8)	31/03/2030
WELLS	08WW102043	1		0.25		0.25		31/03/2030
WESTBURY	08WW102033	2		0.25		0.25		31/03/2030
WIMBORNE	08WW102060	1			0.8		0.8	31/12/2024
WINCANTON	08WW102061	1			0.8		0.8	31/12/2024
WIVELISCOMBE (HILLSMOOR)	08WW102099	1			0.8		0.8	31/12/2024
WIVELISCOMBE (STYLES)	08WW102100	1			0.8		0.8	31/12/2024
WOOKEY	08WW103015			1.5		1.5		31/03/2030
WOOL	08WW102109 / 08WW102202	1		0.25		0.25		31/03/2033
YEOVIL	08WW102101	0.59		0.25		0.25	(0.55)	31/03/2030
YEOVIL WITHOUT	08WW102102	1			0.8		0.8	31/12/2024

20. CWW20. Sewage treatment works population, capacity and network data

20.1. CWW20.1-35 Sewage treatment data

20.1.1. CWW20.1 Current population equivalent served by STWs

Refer to the commentary for CWW7 for details on population equivalent (PE) baseline derivation and forecast projections.

As per the line definition, the stated PE excludes any non-resident (or tankered imports). As such it will not tally with the total loads in CWW7a if converted to PE.

20.1.2. CWW20.2 Current population equivalent served by STWs with tightened/new P permits

PE stated relates to WRCs with a tightened/new phosphorus (P) permit in the given year. This also includes any with a tightened/new stretch target. Refer to commentary on CWW19 for the list of relevant WRCs. This includes population equivalents of AMP7 WRC P schemes being delivered within the data table timeframes.

20.1.3. CWW20.3 Current population equivalent served by STWs with tightened/new N permits

PE stated relates to WRCs with a tightened/new Nitrogen (N) permit in the given year. Refer to commentary on CWW19 for the list of relevant WRCs. This includes population equivalents of AMP7 WRC N schemes being delivered within the data table timeframes.

20.1.4. CWW20.4 Current population equivalent served by STWs with tightened/new sanitary parameter permits

PE stated relates to WRCs with a tightened/new sanitary (BOD or AmmN) permit in the given year. Refer to commentary on CWW7 for the list of relevant WRCs.

This includes sites with changes to permit limits through the WINEP as well as any associated with dry weather flow permit changes due to population growth. This includes population equivalents of AMP7 WRC sanitary schemes being delivered within the data table timeframes.

20.1.5. CWW20.5 Current population equivalent served by STWs with tightened/new microbiological standards

There are no proposed UV disinfection permit changes required through the WINEP and thus no PE is reported.

20.1.6. CWW20.6 Population equivalent served by STWs with enhanced treatment capacity

PE stated relates to WRCs where we are providing additional treatment capacity to ensure compliance with current permit limits or to meet permit limits associated with a change (i.e. increase) to dry weather flow permit due to population growth. The upgrades associated with WINEP quality drivers will also provide a varying degree of enhanced treatment capacity, but unless additional capacity is explicitly provided to accommodate growth the PE is excluded from this summation. This includes population equivalents of AMP7 WRC sanitary schemes being delivered within the data table timeframes.

20.1.7. CWW20.7 Current population equivalent served by STWs with tightened/new permits for chemicals / hazardous substances

PE stated relates to WRCs with a tightened/new permit for chemicals / hazardous substances in the given year as required by the WINEP. Permit changes are as listed below. PEs are only included once for a WRC in a given year irrespective of the number of tightened/new chemical limits, however PEs are repeated if limits change in different years. The forecast PE for the given year in question.

Table 41 – Tightened/new permits for chemicals/hazardous substances

WINEP Action ID	Driver_Code_Primary	Site	Completion Date	Substance of Interest
08WW100220	WFD_NDLS_Chem2	Castle Cary	31/03/2027	Copper (dissolved)
08WW100221	WFD_IMP_CHEM	Crewkerne East	31/03/2030	Cypermethrin
08WW100222	WFD_NDLS_Chem2	Devizes	31/03/2027	Cypermethrin
08WW100223	WFD_IMP_CHEM	Merriott	31/03/2030	Cypermethrin
08WW100224	WFD_NDLS_Chem2	Royal Wootton Bassett	31/03/2027	Cypermethrin
08WW100225	WFD_IMP_CHEM	Shepton Mallet WRC	31/03/2030	Zinc (dissolved)
08WW100226	WFD_IMP_CHEM	Somerton WRC	31/03/2030	Cypermethrin
08WW100227	WFD_NDLS_Chem2	Sparkford WRC	31/03/2027	Cypermethrin
08WW100228	WFD_ND_CHEM3	Tetbury WRC	31/03/2030	Cypermethrin
08WW100240	WFD_ND_CHEM3	Crewkerne East	31/03/2030	Cypermethrin
08WW100241	WFD_NDLS_Chem1	Crewkerne East	31/03/2027	Cypermethrin
08WW100242	WFD_NDLS_Chem1	Merriott	31/03/2027	Cypermethrin
08WW100243	WFD_NDLS_Chem1	Somerton	31/03/2027	Cypermethrin
08WW100244	WFD_NDLS_Chem2	Tetbury	31/03/2027	Cypermethrin

08WW100245	WFD_NDLS_Chem2	Devizes	31/03/2027	Nickel (dissolved)
08WW100246	WFD_NDLS_Chem2	Devizes	31/03/2027	Zinc (dissolved)

20.1.8. CWW20.8 Current population equivalent served by septic tank replacement projects

PE stated relates to WRCs where existing septic tanks are to be replaced under WINEP with alternative treatment or diversion of flow and load to another site.

There are three proposed septic tank replacements in AMP8 under the U_IMP7 driver, serving a total population equivalent of 32 p.e, all of which will be delivered in 2027/2028.

20.1.9. CWW20.9 Number of new wetland treatment solutions for tightened sanitary or nutrient (N or P) permits

Number of treatment wetlands installed for removal of sanitary determinants (BOD, SS or ammonia) or nutrients (nitrogen or phosphorus).

Our PR24 proposals – as currently developed – include for new wetland treatment solutions at the following sites, with the target parameter in brackets:

- Maiden Bradley (N)
- East Harptree (P)

Our existing integrated constructed wetland at Cromhall (built in AMP6) will be used to achieve a new P permit at the site.

Excluded from the number is a wetland at Collingbourne Ducis as it will be supported by additional grey infrastructure as the best value solution to achieve the required N permit, as the N permit limit is too stringent to be achieved without additional carbon dosing.

Unless explicitly screened out as an unviable solution through the WINEP options development process, we will still, however, re-assess wetland treatment solutions at early stages of individual scheme design to ensure that any solution being progressed is of best value, including in the light of any improved design, costing or benefit information. Similarly, any currently proposed wetlands will also be subject to review.

20.1.10. CWW20.10 Total area of new wetlands for tightened sanitary or nutrient (N or P) permits

Total surface area, in hectares, of treatment wetlands. The stated area is the effective water surface area, with no statement as to additional land required around or in between cells to facilitate construction or ongoing operation/maintenance of the wetlands.

At Maiden Bradley WRC the proposed effective water surface area for two cells plus a soakaway is 0.4 hectares. The proposed area including infrastructure, access and embankments equates to approximately 1.7 hectares.

The wetland at East Harptree WRC requires a minimum of 0.803 hectares of surface water area to achieve the proposed P permit.

Also included in the stated area is the wetland at Collingbourne Ducis WRC which will be used to remove nitrogen with additional of grey infrastructure and carbon dosing to achieve the permit requirements. The surface water area proposed is 1.435 hectares. The proposed area including infrastructure, access and embankments equated to approximately 3 hectares.

20.1.11. CWW20.11 Total number of septic tank replacement projects

Total number of sites where septic tanks are due to be replaced under a WINEP driver (U_IMP7). This does not include septic tank sites being replaced for other reasons, for example due to asset deterioration.

There are three proposed septic tank replacements in AMP8 under the U_IMP7 driver, all of which will be delivered in 2027/2028.

20.1.12. CWW20.12 Total number of STW outfall screens

We have no plans to install outfall screens at our WRCs to prevent the entrainment of fish.

20.1.13. CWW20.13 Cumulative shortfall in FFT addressed by WINEP / NEP schemes to increase STW capacity

Cumulative shortfall (l/s) in flow to full treatment at WRCs being addressed by schemes listed in the WINEP. We do not have any new FFT increase (U_IMP5) schemes in our PR24 WINEP, however include here the shortfall linked with ongoing PR19 schemes at Avonmouth and Saltford, which have completion dates during AMP8.

Both FFT values are considerable increases to our PR19 stated values, due to a change in calculation methodology as that used in the development of the PR19 WINEP.

There are eight further schemes being addressed in AMP7 which are dure to be completed by 31st March 2024 and 31st March 2025.

Table 42 – Schemes in AMP7 to increase STW capacity due to FFT shortfall

WINEP AMP7 Action ID	Driver_Code_Primary	Site	Completion Date
WSX00051	U_IMP5	Avonmouth	31/03/2028
WSX00063	U_IMP5	Bath (Saltford)	31/12/2026
WSX00116	U_IMP5	Bourton	31/03/2025
WSX00192	U_IMP5	Castle Cary	31/03/2025
WSX00468	U_IMP5	Halstock	31/03/2025
WSX00578	U_IMP5	Lacock	31/03/2024

WSX00842	U_IMP5	Rode	31/03/2024
WSX00911	U_IMP5	Shillingstone	31/03/2025
WSX00915	U_IMP5	Shoscombe	31/03/2024
FLO00723	U_IMP5	Marnhull Common	31/03/2024

Not included is any additional flow capacity related to increase to FFT permits associated with DWF permit changes.

20.1.14. CWW20.14 Additional storm tank capacity provided at STWs - grey infrastructure

The new or additional storm tank volume (m^3) provided at WRCs by a conventional grey solution to provide adequate settlement and detention and/or to address the reduction in storm overflow spills.

All PR19 storm storage capacity increase (U_IMP6) schemes will be completed in AMP7, and we have no new U_IMP6 schemes in our PR24 WINEP.

Not included is any additional storm storage being provided as required due to DWF permit changes.

AMP8 volumes are the WINEP (August 2023 proposal of 128 total improvements at WRCs and Networks in AMP8) storm overflow reduction plan improvements, where located at a STW (WRC). The volumes are based on hydraulic computer modelled predictions. Some extrapolation has been undertaken where appraisals have not been undertaken. The target of no ecological harm is not known at each site, so we have generally used either 5 spills or 10 spills per year depending on the sensitivity of the environment. Extrapolation has been undertaken where appraisals have not been undertaken.

Note: The final WINEP may be smaller or larger due to deferrals proposed for affordability and deliverability or the EA/Defra may insist on the draft WINEP (June23) 148 improvements at WRCS and network storm overflows.

This line has a low confidence grade for AMP8. More confidence will be following the EnvAct_INV4 investigations which will be completed by 2027.

20.1.15. CWW20.15 Additional volume of effective storm storage at STWs - nature based/green solution

New or additional volume-equivalent storage (m^3) provided at sewage treatment works by a green (nature-based) solution, such as a wetland, as an alternative to conventional storm tank storage.

We are proposing wetlands to treat the flow from groundwater inundated storm overflows, as a solution, so will in the future not be reportable as spills (discharges). Defra has verbally agreed this, but has not been written down to date. We assume that future treated spills will not be reportable on the EDM returns or the Storm overflow Performance commitment metric.

It is these wetland treatment of groundwater inundated storm overflows schemes that are presented in this line, if located at WRC sites.

Spill volumes are not measured and our computer models do not represent seasonal groundwater inundation. We have used an average volume of the modelled predicted hydraulic (rainfall related) storm overflow discharges for the AMP8 improvements, which may be an underestimate – since groundwater inundation can occur for months. However, it tends to occur in smaller 'foul only catchments' so the average is deemed best available assumption.

20.1.16. CWW20.16 Total number of STW sites where additional storage has been delivered

Total number of sewage treatment works where additional storm storage of any type or scale has been delivered.

This includes sites where additional storm storage is being provided to meet DWF permit change requirements. These have been included for Amp7.

AMP8 includes the WINEP (June 2023) storm overflow improvement drivers (EnvAct_IMP2 to 4) solutions evaluated to date for overflows at WRCs. We have extrapolated schemes that have not been evaluated.

See Line CWW20.36 for general commentary for storm overflow improvements.

20.1.17. CWW20.17 Number of STW sites where additional storage has been delivered with pumping

We have assumed this is the same as the above line, as most schemes require pumping.

20.1.18. CWW20.18 Number of STW sites benefitting from green infrastructure replacing the need for storm tank storage

Our wetlands proposals to treat groundwater inundation storm overflows have been included in this line.

20.1.19. CWW20.19 Total number of schemes with tightened / new P permits (met by biological treatment)

Whilst WRCs by their very nature will do some natural biological treatment for phosphorus reduction, we are not proposing any standalone biological nutrient removal plants for tightened/new P permits. Any such plants will be enhanced through chemical dosing, and so are included in the numbers for CWW20.20.

20.1.20. CWW20.20 Total number of schemes with tightened / new P permits (met by chemical treatment)

Refer to CWW19 for details of phosphorus schemes.

20.1.21. CWW20.21 Total number of schemes with tightened / new N permits (met by biological treatment)

Whilst WRCs by their very nature will do some natural biological treatment for nitrogen reduction, we are not proposing any standalone biological nutrient removal plants for tightened/new N permits. Any such plants will be enhanced through chemical dosing, and so are included in the numbers for CWW20.22.

20.1.22. CWW20.22 Total number of schemes with tightened / new N permits (met by chemical treatment)

Refer to CWW19 for details of nitrogen schemes.

20.1.23. CWW20.23 Total number of schemes with tightened/new sanitary parameter permits

There are a total of 20 sanitary schemes being delivered between 2023/24 and 2029/30. Seven of the 20 schemes are AMP7 sanitary schemes as seen in the table below. The remaining 13 schemes are AMP8 related and will be delivered in 2028/29 and 2029/30.

Table 43 - AMP7 schemes to tighten sanitary permits

WINEP AMP7 Action ID	Driver_Code_Primary	Site	Completion Date
WSX00198	WFD_ND	Castle Cary	31/03/2025
WSX00433	WFD_ND	Gillingham	31/12/2024
WSX00810	WFD_ND	Radstock	31/03/2025
WSX01095	WFD_ND	Wells	31/03/2025
WSX01189 WSX01190	WFD_ND WFD_ND	Yeovil Pen Mill	22/12/2024
WSX00894	WFD_IMPg	Shepton Mallet	31/03/2025
WSX01223	WFD_ND	Keynsham	31/03/2025

20.1.24. CWW20.24 Total number of schemes with tightened/new microbiological standards (UV, ozone etc)

There are no proposed UV disinfection permit changes, although many of our coastal WRCs will see capital maintenance of these processes. The EA have advised that any substantial modifications to UV plant would need to comply with their updated guidance, although for the purposes of forecast reporting we have assumed the permit limits themselves are unchanged.

20.1.25. CWW20.25 Total number of STWs with microbiological treatment - new and existing (UV, ozone etc)

As CWW20.25 above.

20.1.26. CWW20.26 Total number of schemes with tightened/new chemicals/hazardous substances permits

Refer to CWW20.7

20.1.27. CWW20.27 Total number of schemes with new chemical dosing installations

Total number of schemes where new chemical dosing installations are required.

For any site with existing chemical dosing installations we have considered whether it is adequate to achieve the new/tightened permit requirements, and have included where it requires to be replaced with a larger and/or more appropriate system.

- Total number of sites requiring dosing installations: 160

20.1.28. CWW20.28 Volume of chemical dosing storage installed (m3)

Volume in m^3 of new chemical dosing storage installed. In the table we have reported the combined volume of ferric sulphate, alkalinity and methanol, which is broken as follows:

Table 44 – Chemical storage installed

	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Ferric Sulphate	5	84	1046.5	15	255	0	1615	345
Lime	0	0	0	0	1.33	0	4.78	0
Methanol	0	0	0	0	0	0	0	43

We typically use ferric sulphate as the chemical dose for phosphorus removal. We also use ferric chloride, ferrous chloride and aluminium sulphate at specific sites. Most of the dosing equipment is similar, however the dosing storage volumes can be different dependent on the chemical.

We propose to use lime as our alkalinity dose to support phosphorus removal. Additional alkalinity is potentially required for sites with both stringent phosphorus and nitrification requirements, however it can also be very site-specific dependent on influent concentrations.

We propose to use methanol as our carbon dose to assist with nitrogen removal.

Excluded is any storage for polymer, which we are considering as a facilitating flocculant to assist ferric sulphate.

20.1.29. CWW20.29 Total number of schemes with new tertiary solids removal

Total number of schemes where new tertiary solids removal is required.

For any site with existing tertiary solids removal processes we have considered whether it is adequate to achieve the new/tightened permit requirements, and have included where it requires to be replaced with a larger and/or more appropriate system.

- Total number of sites requiring TSR installations: 81

In some cases the above includes replacing tertiary solids removal processes installed in AMP7 (including in the 2023/24 and 2024/25) for PR19 WINEP phosphorus permits but are unsuitable to meet further tightening of the permits through the PR24 WINEP.

In some cases we have been able to change scheme designs to change our TSR process (at additional cost), however this was not possible for others without putting at risk missing AMP7 regulatory dates.

We have engaged with the EA and suggested an extension to some AMP7 completion dates and early delivery of AMP8 to avoid abortive spend, however given regulatory uncertainty with some of the PR24 WINEP drivers an extension was not possible.

20.1.30. CWW20.30 Volume to water treated through tertiary solids removal (m3/day)

Maximum daily volume in m^3/day treated through new tertiary solids removal processes.

We have taken this to be the flow passed forward (FPF) assumed over the course of the day.

Excluded is any re-treatment of backwash flows generated through the TSR process itself. These are estimated to be c.15% of FPF, dependent on the chosen TSR process and site-specifics.

20.1.31. CWW20.31 Total number of N-TAL trials

We are implementing three trials as part of the national Nitrogen technically achievable limit trial:

- Wareham (optimisation of N-removal plant built in 2021).
- Studland (new)
- Milborne Port (new)

20.1.32. CWW20.32 - 35 Number of STW flow monitors installed

Our investigations are not mature enough to forecast the exact number of monitors that will be installed, therefore all lines are reported based on the number of sites.

AMP7 U_MON4 drivers programmed for delivery in 2023/24 & 2024/25 will be commissioned with MCERTS certified at 2 minute read intervals to align with the AMP8 U_MON4a driver. There are counted as a single monitor install although they have WINEP targets in both AMP7 & AMP8.For other AMP8 U_MON4a drivers, the AMP7 driver has already been delivered, therefore recertification is required to meet the AMP8 driver. Sites with an AMP8 U_MON4b driver will require recertification, no meter installs or civils work is anticipated. Sites with an AMP8 U_MON4c or a U_MON4e driver all require new flow meters to be installed, some will also require civils work.

Table 45 - MCerts flow monitoring installations

Driver	Detail	2022/23	2023/24	2024/25	2025/26	2026/27
U_MON4	Permit	10	-	-	AMP7 only	
U_MON4	Meter	-	-	-		
U_MON4	Civils	9	21	17		
U_MON4a	Permit	-	4	1	20	-
U_MON4a	Meter	No meter installs or civils for this driver				
U_MON4a	Civils					
U_MON4b	Permit	-	29	-	42	-
U_MON4b	Meter	No meter installs or civils for this driver				

Driver	Detail	2022/23	2023/24	2024/25	2025/26	2026/27
U_MON4b	Civils					
U_MON4c	Permit	-	-	-	-	-
U_MON4c	Meter	-	5	8	-	12
U_MON4c	Civils	-	25	25	-	16
U_MON4d	No drivers					
U_MON4e	Permit	No recertification sites for this driver				
U_MON4e	Meter	-	-	-	-	2
U_MON4e	Civils	-	-	-	-	20

Table 46 – AMP7 MCerts flow monitoring installations

Driver	Description	No. of Sites
U_MON4a	Existing front-end flow passed forward flow monitors which were AMP7 U_MON4 outputs will move from 15 to 2-minute flow monitoring. This may require work at the monitor and/or elsewhere to allow the additional monitoring data to be received and processed.	63
U_MON4b	Existing front-end flow passed forward flow monitors that were AMP7 U_INV2 outputs capable of being MCERTS certified in AMP7 (so no U_MON4 in PR24) will move from 15 to 2-minute flow monitoring. This may require work at the monitor and/or elsewhere to allow the additional monitoring data to be received and processed.	71
U_MON4c	Installation and MCERTS certification of a front-end flow monitor, monitoring at 2-minute intervals, where the AMP7 U_INV2 investigation concluded that there was no suitable existing flow monitor for measuring flow passed forward flow. The work required will involve civils which could range from installing a new flume and monitor to an entire rebuild of a WwTW inlet works.	91
U_MON4d	Installation and MCERTS certification of a U_MON4 flow passed forward flow monitor, monitoring at 2-minute intervals, which was not included in AMP7.	0
U_MON4e	Installation and MCERTS certification of a U_MON4 flow passed forward flow monitor, monitoring at 2-minute intervals, which was not included in AMP7. The work required will include civils which could range from getting MCERTS certification of an existing flow monitor to an entire rebuild of a WwTW inlet works.	22

20.1.33. CWW20.33 Number of STW flow monitoring schemes requiring permit changes only

See commentary in Line CWW20.32

20.1.34. CWW20.34 Number of STW flow monitoring schemes requiring simple meter installations

See commentary in Line CWW20.32

20.1.35. CWW20.35 Number of STW flow monitoring schemes requiring complex civils installations

See commentary in Line CWW20.32

20.1.36. Confidence grade for Lines CWW20.1 – 35

B2

20.2. CWW20.36-60 Network / Storm overflow data

20.2.1. CWW20.36 Additional volume of network storage at CSOs etc to reduce spill frequency - grey infrastructure

Storm overflow improvements – general commentary

A small number of hydraulic Storm overflow improvements are being undertaken in AMP7 with 128 WINEP improvements in AMP8 to achieve the targets of the Storm overflow reduction plan enhancement investment.

AMP7 schemes include those related to the Frequent spilling overflow improvements (under the Storm Overflow Assessment Framework) included on the WINEP with drivers U_IMP4.

AMP8 values are for the WINEP (August 2023 proposal of 128 total improvements at WRCs and Networks in AMP8) storm overflow reduction plan improvements.

The volumes are taken from recent investigations for PR24 or based on hydraulic computer modelled predictions from the DWMP. Extrapolation has been undertaken where appraisals have not been undertaken. The target of no ecological harm is not known at each site, so we have generally used either 5 spills or 10 spills per year depending on the sensitivity of the environment (5 discharges RNAG and Chalk stream) .

Note: The final WINEP may be smaller or larger due to deferrals proposed for affordability and deliverability or the EA/Defra may insist on the draft WINEP (June23) which contained 148 improvements at WRCS and network storm overflows.

Storm overflows have a low confidence grade for AMP8 (B3) because they have not all been investigated and we don't know the level of improvements need so they don't cause harm. We will have more confidence following the EnvAct_INV4 investigations which will be completed by 2027. This will also promote separation schemes rather than attenuation scheme. The attenuation storage costs is the best value option compared with the separation option so have been used if unknown.

The optioneering undertaken to date has recommended three types of solutions. Below list the options and where we have populated the data table:

- 84 attenuation solutions = Storage delivered through Grey solutions (CWW20.36)
- 36 wetlands to treat groundwater inundated storm overflow discharges = Storage delivered through green solutions (CWW20.37).
- 8 separation schemes = Separation at source.

Due to the low confidence and stage where we are at in undertaking investigations we have therefore not provided the requested level of accuracy. Many lines in this table request 3 decimal places, which if we provided would suggest an accurate number – which may lines are not. Also the solution type (spearation at source, sustainable solutions) and detail such as length of sewers provided is not known at this stage.

Line CWW20.36 contains the storage volume, where the solution is storage (attenuation) and the overflows are located on the network (not at a WRC).

The storage volume, is in order of preference;

- the PR24 optioneering study (see WSX17 for summary reports)
- the DWMP predicted discharge volume from the ranked 10 years Stompac series. No harm of 5 spills per year (51st ranked 10 year volume) if at RNAG or Chalkstream. 10 discharges per year at other sites (101st ranked 10 year discharge volume).
- If unknown, then the average from the above is used.

Our storm overflow alternative plan, promotes a different approach where we will explore more retrofitting sustainable options rather than grey solutions. But this will not achieve the required SODRP targets.

20.2.2. CWW20.37 Additional volume of effective network storage to reduce CSO spill frequency - nature based/green solution

See Line CWW20.36 for general commentary for storm overflow improvements.

New or additional volume-equivalent storage (m3) provided on the network (not WRC) by a green (nature-based) solution, such as a wetland, as an alternative to conventional storm tank storage.

We are proposing wetlands to treat the flow from groundwater inundated storm overflows, as a solution, so will in the future not be reportable as spills (discharges). Defra has verbally agreed this, but has not been written down to date. We assume that future treated spills will not be reportable on the EDM returns or the Storm overflow Performance commitment metric.

It is these wetland treatment of groundwater inundated storm overflows schemes that are presented in this line, if located on the network (not at WRC sites).

Spill volumes are not measured and our computer models do not represent seasonal groundwater inundation. Therefore, we have used an average volume of the modelled predicted hydraulic (rainfall related) storm overflow discharges for the AMP8 improvements. This may be an underestimate – since groundwater inundation can occur for months. However, it tends to occur in smaller ‘foul only catchments’ so the average is deemed the best available assumption. The average predicted discharges volume is 1752m3.

20.2.3. CWW20.38 Number of individual sites delivering additional network storage - grey infrastructure

See Line CWW20.36 for general commentary for storm overflow improvements.

For this line we have assumed 100% of all grey solutions will need pumping, which is what we assume this line is intended for. We do not have detail design of these schemes at this level of granularity. T

20.2.4. CWW20.39 Number of individual sites delivering additional network storage - grey infrastructure - which include pumping

See Line CWW20.36 for general commentary for storm overflow improvements.

For this line we have assumed 100% of all grey solutions will need pumping. We do not have detail design of these schemes at this level of granularity.

20.2.5. CWW20.40 Number of individual sites delivering additional network storage through green infrastructure

This is the number of individual sites associated with line CWW20.37.

20.2.6. CWW20.41 Surface water separation drainage area removed

See Line CWW20.36 for general commentary for storm overflow improvements.

The WINEP process selected a few surface water separation solutions as the preferred option, often also requiring storage. It is the surface water area removed (m^2) reported in this line. We have assumed this will be piped (grey) solutions to local watercourses or locally to soakaways.

This return does not include the 2 WRC storm overflows that are proposed to being addressed by separation scheme. One is the Evershot scheme, which is also a Network separation scheme which has been combined to become a sustainable solution for this catchment.

20.2.7. CWW20.42 Total number of surface water separation schemes to reduce storm overflows

This is the number of individual storm overflow sites associated with line CWW20.42. We have assumed this is the ‘separations at source’. Solutions could be soakaways, water-butts, swales, retrofit sustainable drainage etc. So we have put all our sustainable separation solutions on this line and not CWW20.43.

20.2.8. CWW20.43 Sustainable drainage / attenuation schemes (green) area removed / attenuated

See Line CWW20.36 for general commentary for storm overflow improvements.

This level of granularity of solutions is not available. The above line in CWW20.42 is sufficient. This line is therefore zero as it is a sub-set of Line CWW20.42.

Sustainable drainage for new development (including schedule 3) has not been included in this line, as that is not funded by companies as it is allow new development to occur sustainably, not to address overflows.

Retrofitting ponds in locations where we undertake surface water separation is often not possible in urban areas (where we have combined sewers and overflows) due to lack of space. We have therefore assumed separation schemes will include pipes solutions or soakaways, included in section CWW20.42 and not duplicated here.

20.2.9. CWW20.44 Total number of sustainable drainage / attenuation schemes

Zero as described in CWW20.43.

20.2.10. CWW20.45 Flow rate diverted to reduce storm overflow spills

We have not identified any pump away options (unless upgrading existing stations).

20.2.11. CWW20.46 Total number of sewer flow management / control schemes to reduce storm overflow spills

We do not have any AMP8 schemes that can be resolved by sewer flow management, as the prioritisation process has selected high frequency spillers, where this approach will not be sufficient.

For site that are only just above the threshold, that have large sewers, then future scheme could use this approach. We already do this at some storm overflows.

20.2.12. CWW20.47 Total storm overflow spill volume avoided

See Line CWW20.36 for general commentary for storm overflow improvements.

This line contains predicted volumes prevented at **both** WRC and the network, as 'Total' implies WRC and network schemes, and the STW table does not ask for this.

This is calculated from our hydraulic computer models results taken from the DWMP for overflow predictions. The results are a few years old, so may be superseded by reverified models. It assumes the predicted annual spill volume from the baseline, and assumes 10 or less 'average' spills per year occur in the future. The average spills is the baseline spill volume divided by the baseline number of spills per year, calculated for each modelled site. Some sites do not have model predictions, so the modelled results where available were prorated up to allow for the unmodelled sites. We have not taken climate change into account.

Low confidence grade.

20.2.13. CWW20.48 Total number of new storm overflow screens installed

This line contains new screens at both WRC and on the network, as 'Total' implies WRC and network schemes, and the STW table does not ask for this.

Each storm overflow improvement will have a new fine screen provided as part of the screen, unless it already has one. Just over 60% of the AMP8 schemes already have a 6mm screening requirement in their permit, so these were not included in this Enhancement line.

We are not proposing screen only installations in AMP8.

20.2.14. CWW20.49 Number of continuous water quality monitor (CWQM) installations

We are awaiting Defra guidance on CWQM so the number of monitors, profile and associated costs are indicative only. They are preliminary and subject to change.

The Environment Act includes a new duty on WaSCs to monitor the quality of water potentially affected by discharges from storm overflows and sewage disposal works (WRCs).

This is referenced in the SODRP as "The Environment Act 2021 requires the water industry to measure the water quality both up and downstream of these assets. This monitoring framework will give clear evidence to the public on whether improvement schemes are achieving the required outcomes, and where further upgrades may be required."

Defra issued draft CWQM guidance in July 2022 and following consultation, issued final guidance on 9 August 2023. Due to the scale of the requirements specified in the draft guidance, the final guidance scales down the requirements required by 2030. The reduced scope requires 25% of the monitors installed by 2030 (prioritised at high priority environments) and also extended the range of clustering and exclusions, so requires fewer monitors in

the medium term. It still remains a very challenging and expensive programme to deliver (Capex) and operate (Opex).

It require us to install permanent monitoring kiosks on private land, with all the issues of access and health and safety on installing sondes in rivers. Significant uncertainty about how this programme will be implemented remains.

Using the latest guidance we estimate that c450 monitors are required to achieve the 25% installation by 2030. This is only an indicative level of installation as more detailed analysis is required, but we have made assumptions in the short time available to include within the PR24 plan.

See WSX16 section 7.1 for details.

20.2.15. CWW20.50 Number of new MCERTs event duration monitors installed at SPS emergency overflows

Our permits database currently includes 195 Emergency only overflows. This is slightly lower than our APR23 return of 199 (Table 7c line 9).

We have applied 25% of the 195 EO only sites for our AMP8 profile for U_MON6 delivery. This follows the phasing EA letter of 5 July 2023 and further Q&A instruction to defer 75% of the U_MON6 installations to AMP9.

There are 49 EO only EDM on our return.

20.2.16. CWW20.51 Number of new MCERTs flow monitors (PFF) installed at SPSs with combined emergency and storm overflows.

Our permitting database identifies that there are 408 storm overflows at pumping stations or WRCs that also have EOs. 25 of these are at WRCs. We have assumed these 25 are at the inlet works of the WRc.

We have included 25% of the 408 EO/SO at pumping stations and WRC sites for our AMP8 profile for U_MON6 delivery in AMP8. This follows the EA phasing letter of 5 July 2023 and further Q&A instruction to defer 75% of the U_MON6 installations to AMP9.

There are 102 flow monitors on our return.

20.2.17. CWW20.52 – 55 Number of event duration monitors installed (to include at STWs and in network)

Our investigations are not mature enough to forecast the exact number of monitors that will be installed, therefore all lines are reported based on the number of sites.

All U_MON1 & 2 WINEP drivers have now been delivered. AMP7 U_MON3 drivers programmed for delivery in 2023/24 & 2024/25 will be commissioned with MCERTS certified at 2 minute read intervals to align with the AMP8 U_MON3a driver. There are counted as a single monitor install although they have WINEP targets in both AMP7 & AMP8. For other AMP8 U_MON3a drivers, the AMP7 driver has already been delivered, therefore either re-certification or meter modification is required to meet the AMP8 driver. Most sites with an AMP8 U_MON3b driver will require an element of civils, however a small number have monitors that can be recertified.

Table 47 – Number of installed EDM sites

Driver	Detail	2022/23	2023/24	2024/25	2025/26	2026/27
U_MON1	Permit	-	All AMP7 drivers delivered			
U_MON1	Meter	108				
U_MON1	Civils	51				
U_MON3	Permit	-	-	-	AMP7 only	
U_MON3	Meter	40	-	-		
U_MON3	Civils	-	43	44	-	-
U_MON3a	Permit	-	-	-	104	-
U_MON3a	Meter	-	-	-	36	-
U_MON3a	Civils	No civils for this driver				
U_MON3b	Permit	-	-	-	-	10
U_MON3b	Meter	-	-	-	-	-
U_MON3b	Civils	-	-	1	-	37

Table 48 – Number of installed EDM sites

Driver	Description	No. of Sites
U_MON3a	Existing U_MON3 overflow operation monitor will be MCERTS certified; may need some improvement work requiring MCERTS inspector assessment to obtain certification	227
U_MON3b	Installation and MCERTS certification of a U_MON3 overflow operation monitor which was not included in AMP7. There may in some unusual cases also be a need for a new discharge operation monitor (EDM) to be installed as well.	21 WRCs +27 SPSs

Number of event duration monitoring schemes requiring permit changes only (at STWs and in network)

These are the U_MON3 EDM schemes requiring permit changes only, except 29 in 2025/26 that are AMP6 Flow_4 schemes that were not funded for MCERTs in AMP6.

20.2.18. CWW20.56 Total number of storm overflow discharge relocation schemes

See Line CWW20.36 for general commentary for storm overflow improvements.

We have not identified any storm overflow relocations schemes in AMP8, as they are isolated solutions. Strategies for larger conurbations (Bristol and Bath) in future Amps will require tunnels and relocations/amalgamation of storm overflows. We may find some during the storm overflow investigations by 2027.

20.2.19. CWW20.57 Total number of schemes to increase combined or trunk sewer capacity to reduce storm overflow spills

See Line CWW20.36 for general commentary for storm overflow improvements.

A scheme we just completed in AMP7 had a short length (c100m) of throttle pipe, which we upsized along with providing a new screen.

Our optioneering for AMP8 has not identified any opportunities for upsizing as it tends to create flooding issues downstream, or simply makes the next overflow downstream discharge more.

20.2.20. CWW20.58 Total number of infiltration management schemes to reduce storm overflow spills

See Line CWW20.36 for general commentary for storm overflow improvements.

We need to have a programme of sewer inspection and sealing upstream of overflows that respond to seasonal groundwater. We have included a separate line in PR24 to undertake this in many catchments (capital maintenance – so not reported here). This is unlikely to resolve the issue, hence we are also proposing wetland solutions.

20.2.21. CWW20.59 Length of new rising main installed to reduce storm overflow spills (km)

See Line CWW20.36 for general commentary for storm overflow improvements.

Two AMP7 schemes (West Bexington and Sandy Lane) are increasing the pumping station capacity and upsizing the rising mains to reduce the discharge frequency.

Our optioneering for AMP8 has not identified any opportunities for upsizing pumping stations, as it tends to create flooding issues downstream, or simply makes the next overflow downstream discharge more, or overload the WRC. We may find some during the storm overflow investigations by 2027.

20.2.22. CWW20.60 Total length of sewer installed to reduce storm overflow spills (km)

See Line CWW20.36 for general commentary for storm overflow improvements.

We have not got details of sewer length that will be installed. This will be calculated during detailed design. Our return assumes each improvement will provide 100m of new sewers. For separation schemes we assumed 200m of new sewers in addition to many soakaways/water butts/rain gardens etc.

20.3. CWW20.61 – 77 Other data

20.3.1. CWW20.61 Number of WINEP/NEP investigations - desk-based studies only

There six WINEP/NEP investigations - desk-based studies only investigations.

Three are driven by SW_INV drivers (Shellfish waters improvement or prevent deterioration investigation), and a fourth by WFD_INV_CHEM (Investigations [chemical investigations]). The latter includes some of Wessex Water's financial obligations to the project management costs of the National Chemical Investigations Programme Phase 4 (CIP4), managed on behalf of the industry by UK Water Industry Research. All four are to be delivered by 30/04/2027.

There are also two desk-based nutrient reduction investigations which are due to be completed by 31st March 2027, with a regulatory date as per the table below. Fleet Lagoon - Investigation and options appraisal to reduce nutrient load entering the Fleet Lagoon from Wessex Water assets (namely Abbotsbury and Langton Herring WRCs) – which are to include an investigation of misconnections in the catchment. Halstock WRC - Investigation into options to reduce nutrient load entering Sutton Bingham Reservoir.

Table 49 - Desk-based nutrient reduction investigations

WINEP Action ID	Driver_Code_Primary	Site	Completion Date	Substance of Interest
08WW102204	HD_INV	Fleet Lagoon	30/04/2027	Nutrients
08WW102205	WFD_INV	Halstock WRC	30/04/2027	Nutrients

20.3.2. CWW20.62 Number of WINEP/NEP investigations - survey, monitoring or simple modelling

There are 174 WINEP/NEP investigations – survey, monitoring or simple modelling.

Twenty six of these include the majority (15) of the WINEP outputs under the national CIP4, with a further 11 investigations into the contribution and effects of nutrient discharges from our wastewater assets on designated sites. These investigations require some basic environmental monitoring (sampling) and/or limited modelling. The investigations are included under the following drivers, and are to be delivered by 30/04/2027:

- HD_INV – Four WINEP outputs. Investigation and/or options appraisal to determine impacts of Water Company activities, or permit/licence conditions/standards on a European Site or Ramsar site or to determine the costs and technical feasibility of meeting targets.
- NERC_INV – One WINEP output - Investigations and/or options appraisal for changes to permits or licences, and/or other action that contributes towards biodiversity duties, requirements and priorities.
- SSSI_INV – One WINEP output - Investigation and/or options appraisal to determine impacts of water company activities, or permit or licence conditions/standards on a SSSI or to determine the costs and technical feasibility of meeting targets
- WFD_INV – One WINEP output - Investigations of actions to improve water quality in terms of relevant WFDR status objectives
- WFD_INV_CHEM – 15 WINEP outputs - Investigations [chemical investigations]
- WFDGW_INV – four WINEP outputs - Groundwater good status investigation relating to water resource or water quality

Also included in this line are 148 WINEP investigation outputs under an EnvAct_INV4 driver; Investigations to reduce storm overflow spills to protect the environment so that they have no local adverse ecological impact. These have been classified under the following Action_Categorisation_Type in the WINEP (sic) *"Investigation - mostly desktop (water quality modelling/dilution impact) as advised by Phil Hulme at Intermittents T&F group, but some Investigaitions will include water quatility sampling".* All have a 30/04/2027 completion date.

The draft WINEP (July 2023) contained a list of 370 storm overflow investigations (EnvAct_INV4) to be completed by 2027. Following meetings with the Environment Agency (EA) - in which the extent of urban pollution management (UPM) studies became apparent - we did not think that was achievable. So, following the EA phasing letter of 5 July 2023 we proposed to defer 222 investigations, that were to inform improvements in AMP9 and

beyond. The final WINEP has not been agreed. It is likely that some of these proposed 222 deferrals may be given a later profile in AMP8 (2028, 2029 and 2030). If this happens, we could treat these as AMP9 transitional funded investigations.

20.3.3. CWW20.63 Number of WINEP/NEP investigations - multiple surveys and/or monitoring locations, and/or complex modelling

There are 14 WINEP/NEP investigations - multiple surveys and/or monitoring locations, and/or complex modelling. These include our inland bathing waters and benefits of wetlands investigations, coastal nutrient and chemical investigations and microplastics and chemicals investigation as part of the national CIP4. These investigations require significant environmental monitoring and/or more detailed and complex modelling. The investigations are included under the following drivers:

- BW_INV5 - One WINEP output. Investigations at non-designated waters where there is evidence of customer support.
- 25YEP_INV - One WINEP output. Investigations into a locally significant environmental issue not eligible under any other driver, but with clear evidence of customer support.
- HD_INV - Seven WINEP outputs. Investigation and/or options appraisal to determine impacts of Water Company activities, or permit/licence conditions/standards on a European Site or Ramsar site or to determine the costs and technical feasibility of meeting targets
- WFD_INV_CHEM – Three WINEP outputs - Investigations [chemical investigations]
- WFD_INV_MP – Two WINEP outputs - Investigations into micro-plastics

All expenditure is under the Wastewater Networks Plus Price Control (regulatory purpose: ENW PR24 NEW Investigations, WINEP/NEP multiple surveys, and/or monitoring locations, and/or complex modelling wastewater Non Infra). All to be delivered by 30/04/2027.

20.3.4. CWW20.64 Total number of WINEP/NEP investigations

This is the sum of the above lines.

20.3.5. CWW20.65 Total number of catchment management chemical source control schemes

20.3.6. CWW20.66 Total number of catchment management nutrient balancing schemes

20.3.7. CWW20.67 Total number of catchment management catchment permitting schemes

20.3.8. CWW20.68 Total number of catchment management habitat restoration schemes

There are three catchment management habitat restoration schemes due for completion by 31st March 2030.

In the Chew Valley there is the Chew Valley Partnership Project led by a third party with Wessex Water support (financial and in-kind) - with Bristol Water and others. Similarly in the Hampshire Avon catchment there is the Hampshire Avon Partnership Project (Resilient Avon), which will be led by a third party with financial and in-kind support from Wessex Water and others.

At Parley Common there is a Partnership scheme to ensure no deterioration of West Parley Common mire by land management.

Table 50 - Catchment management habitat restoration schemes

WINEP Action ID	Primary Driver Code	Action Name	Completion Date	Nature of investment
08MU100851a	HD_IMP	Hampshire Avon Partnership Project (Resilient Avon)	31/03/2030	Habitat restoration
08MU100852a	HD_IMP	Chew Valley Partnership	31/03/2030	Habitat restoration
08WW101007a	HD_IMP	West Parley Common investigation on WW assets impacting on the mire.	31/03/2030	Habitat restoration

20.3.9. CWW20.69 Number of river connectivity schemes (fish passes etc)

20.3.10. CWW20.70 Number of marine conservation zones (new and existing)

20.3.11. CWW20.71 Total number of contribution to 3rd party WINEP/NEP schemes

20.3.12. CWW20.72 Total number of 25 yr Environment Plan schemes

There are two partnership projects included in the WINEP with 25YEP_IMP as the primary driver. Cam and Wellow Brook Partnership Project and the Frome Headwaters Flagship Chalk Stream Project.

The Cam and Wellow Brook Partnership Project concerns the effect of our wastewater assets (and third party influences) on water quality in this sub-catchment of the Bristol Avon and has therefore been assigned to the Wastewater Network Plus price control (regulatory purpose: ENW PR24 NEW 25 Year Environment Plan Non Infra). The WINEP output has a delivery date of 31/03/2030 and the output has been included against line CWW20.72.

The Frome Headwaters Flagship Chalk Stream Project concerns the operation of our wastewater and water supply assets on chalk stream health in Frome Headwaters, Dorset. For this reason, 50% of expenditure has been assigned to the Water Resources Price Control (regulatory purpose: ENS PR24 NEW 25 year environment plan Non Infra) and 50% to the Wastewater Networks Plus Price Control (regulatory purpose: ENW PR24 NEW 25 Year Environment Plan Non Infra). The Water Resources Price Control has been assigned as the primary price control and for this reason, the output has not been included in line CWW20.72 (it has been counted in line CW3.25-CW3.27).

Table 51 - Partnership project included in the WINEP

WINEP Action ID	Driver Codes	Action Name	Action Description
08WW100036	25YEP_IMP	Cam and Wellow Brook Partnership Project	Partnership project in Midford Brook catchment / under CIP4. Working with Local Authorities, academics and others

20.3.13. Additional line 1; wastewater network+ cost driver

20.3.14. Additional line 2; wastewater network+ cost driver

20.3.15. Additional line 3; wastewater network+ cost driver

20.3.16. Additional line 4; wastewater network+ cost driver

21. CWW20a

21.1. CWW20a Sewage treatment data

21.1.1. CWW20a.1 Current population equivalent served by STWs

Refer to the commentary for CWW7 for details on population equivalent (PE) baseline derivation and forecast projections.

As per the line definition, the stated PE excludes any non-resident (or tankered imports). As such it will not tally with the total loads in CWW7a if converted to PE.

21.1.2. CWW20a.32 - 35 Number of STW flow monitors installed

Refer to commentary for CWW20.32 - 35 Number of STW flow monitors installed.

21.2. CWW20a Network / Storm overflow data

21.2.1. CWW20a.52 – 55 Number of event duration monitors installed (to include at STWs and in network)

Refer to commentary for CWW20.52 – 55 Number of event duration monitors installed (to include at STWs and in network).

21.3. CWW20a other lines

21.3.1. CWW20a.2 – 32, CWW20a.36 – 51 & CWW20a 56 – 77

Lines CWW20a.1 – 32, CWW20a.36 – 51 & CWW20a 56 – 77 have been left blank as there are no schemes being delivered for these lines during 2023/24 and 2024/25 using transitional expenditure.

22. CWW21

22.1. Guidance Commentary

Ofwat provide guidance for the CWW21 condition grading analysis , providing clarification on the most important parts of the process. We worked closely with our consultants to interpret the guidance and agree a path to completion. In some instances, it was necessary to deviate from certain parts of the guidance. This section sets out exactly where and how the guidance was or was not followed and provides justification for any deviations.

The corresponding guidance line reference number is included in brackets next to each of the sub-headings in this section. Excerpts from the guidance have been provided in italics.

22.2. Sewer Length profile

Compliant – our consultant have performed assurance checks on the length of sewer in each grade.

22.3. Cohort tolerance

Deviation - 51 out of the 151 cohorts (33.8%) were within the 50% tolerance. The reason this figure is so low is due to the relatively small amount of failure data provided. This meant that when cohorting the data, most cohorts had zero failures associated with them. Because of this, the overall 10% tolerance was not met. For reference, there were 593 instances of a burst or collapse over a three-year period. During the first draft of the analysis the number of cohorts within the tolerance was significantly lower. This led to a reduced number of primary variables would be used to create the cohorts. By doing this, we were able to reduce the total number of cohorts and reduce the incidence of cohorts with zero failures. Primary age and primary size were used to cohort legacy and S105A foul and combined sewers, with material, depth and STW catchment utilised in the sub-cohorting process. Regarding legacy and S105a surface sewers, primary age was used to cohort and material was used to sub-cohort.

22.4. Burst and Collapses period

Deviation - Due to change in sewer collapses definition only three years of failure data as previous years data were not available at the time of analysis.

22.5. Nominal Collapses

Deviation – Due to change in sewer collapses definition change only the failure data over a three-year period as previous years data were not available at the time of analysis. We have used GIS geodatabase to plot the incidents by matching the reported collapses in the master tables with the corporate work management systems to obtain X and Y coordinates for the analyses. This resulted in a minor difference between the number of collapses reported and used in this analyses due to using “date raised” for the incident instead “date completed” as reported. This has been deem not to affecting in any statistically significant way the asset condition profile results. The total length of sewer does very between cohorts.

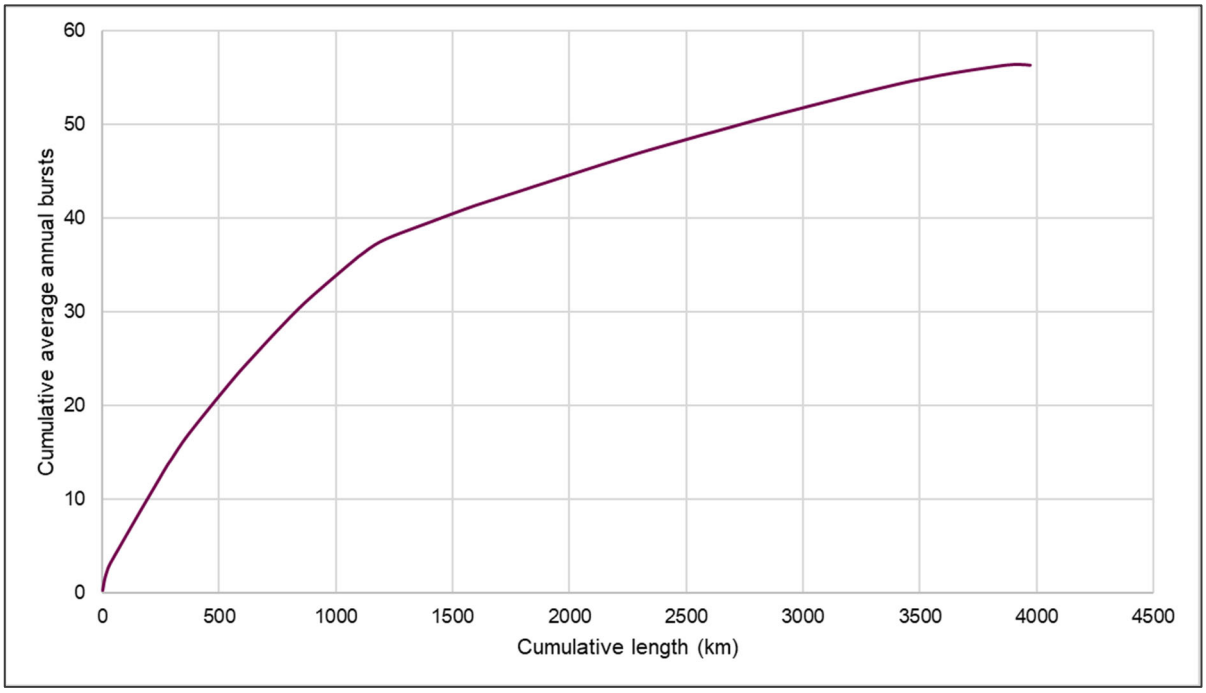
22.6. Cumulative bursts and mains length charts

A supporting .xls file should be provided that includes a full breakdown of cohorts and relative burst rate information.

Compliant - charts of cumulative bursts versus cumulative mains length are provided, an example of which is shown in Figure 9, for the following sewers

- Public surface
- Public foul and combined
- S105A surface
- S105a foul and combined

Figure 9 - An example of cumulative bursts and mains lengths (S105A foul & combined)



The suggested supporting .xlsx file which includes a full breakdown of cohorts and relative burst rate information has been provided.

22.7. Primary variables

Deviation - As discussed in previous section, a reduced number of primary variables was used to cohort the data. When age, diameter, and material were used (as per the guidance) too many cohorts were generated. Most of these cohorts had zero failures associated with them. Table 3.1 details the primary variables used for each type of sewer. Reducing the number of primary variables allowed for less cohorts to be generated, meaning there were less cohorts with zero failures in addition to increased lengths of main in each cohort.

For clarity, foul and combined sewers were cohorted based on their age and size and sub cohorted using material, depth and STW catchment. Additionally, surface sewers were cohorted using age and sub-cohorted using material.

Table 52 - Primary variables used for cohorting

Type combination	Primary variable(s) used
Public surface	Age
Public foul and combined	Age and material
S105A surface	Age
S105a foul and combined	Age and material

22.8. Pipeline rehabilitation

Deviation - This activity was not analysed during this assessment due to unreliable rehabilitation data, thus no commentary is provided.

22.9. Sewage pumping mains

Compliant - Sewage pumping mains were graded using the same condition grading as every other sewer type, which follows the approach laid out for gravity sewers in the guidance2. Due to the relatively small amount of burst and collapse data provided (a three-year period instead of five-year), CWW21 guidelines on grading were adhered to after careful consideration. This decision was made due to the more applicable thresholds within the CWW21 guidelines, compared to those in CW20 . The boundaries for the gradings used are set out in Table 2.7

22.10. Conclusions

Out of the 151 cohorts 51 were within the ±50% tolerance (33.8%). This is due to the relatively small amount of failure data (593 failures) in comparison to the size of the network analysed (21,944km – length plotted on our GIS system and downloaded on July-2023), meaning many cohorts had zero failures attached to them. It is because of this that the majority of our sewer network (83.3%) falls into grade 1. This majority is driven by the 6,308km of surface sewers which had only 53 failures of the 593 failures associated with them. 99.9% of surface sewers were classed as grade 1, 0.1% as grade 4 and 0.01% grade 5.

Foul and combined sewers comprised 76.5% graded as 1, 9.0% grade 2 and 14.0% grade 3, 0.3% grade 4 and 0.2% grade 5. Foul sewers were subject to cohorts with zero failures too, though by cohorting foul and combined sewers together we were able to apportion acceptable amounts of failures to their cohorts. The grading percentages for foul and combined were the same as a result of their joint cohorting process and subsequent splitting out. Section 4 provides full details on this.

We have also completed asset condition profile analysis using the old methodology with the sewer CCTV surveys data, based on c4800km of surveyed network. The results shown on Table 4.0 which is comparable with what has been reported when this method was last used.

Table 53 - Sewer Structural Condition profile based on CCTV surveys

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
PR24	60.4%	11.1%	9.6%	13.7%	5.2%
PR09	60.7%	11.9%	6.1%	14.8%	6.5%

The condition gradings for sewage pumping mains taken in isolation were more in line with expectations, with 5.2% grade 1, 15.4% grade 2 and 77.1% grade 3, 1.1% grade 4 and 1.3% grade 5. The grade 3 majority is likely due to

the pressurised nature of these mains which is known to increase failure potential. The majority of failures recorded were found to be on the sewage pumping mains.

Table 54 - S105A foul and combined lengths

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Total (km)	2769.08	336.07	836.57	21.74	6.91
Foul (km)	2069.61	251.18	625.25	16.25	5.16
Combined (km)	699.47	84.89	211.32	5.49	1.74

22.11. Results

The completed CWW21 submission table which summarises the gradings applied to each of cohorts. The total lengths of foul, combined and surface water sewers across all gradings sums to the total length of legacy and formerly private sewers, as expected. Since foul and combined were cohorted together it meant that they were also graded together. To split them back out from each other a ratio of 74.74:25.26 (foul:combined) was applied and is shown in Table 4.1 and Table 4.2.

Table 55 - S105A foul and combined lengths

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Total (km)	2769.08	336.07	836.57	21.74	6.91
Foul (km)	2069.61	251.18	625.25	16.25	5.16
Combined (km)	699.47	84.89	211.32	5.49	1.74

Table 56 - Public foul and combined lengths

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Total (km)	9192.16	1074.35	1350.67	24.76	16.54
Foul (km)	6870.22	802.97	1009.49	18.50	12.36
Combined (km)	2321.94	271.38	341.18	6.25	4.18

22.12. Data quality

For report year 2022/23 we assign confidence grades ranging from A1 – B3 for the data in CWW21. The PR24 forecasts all rely on a degree of extrapolation therefore confidence grades for PR24 forecast years will range from B2 – B3.

23. CWW22 Wastewater – greenhouse gas emissions enhancement schemes

23.1. Overall approach

23.1.1. Emissions calculation

Our greenhouse gas emissions are estimated using the water industry's standardised Carbon Accounting Workbook (CAW) published by UK Water Industry Research (UKWIR). since 2007. The workbook is updated annually with emission factors issued by the government, and has had periodic updates of sector-specific emission factors from other sources such as research and industry databases.

The CAW produces itemised accounts in various ways:

- Water, wastewater and admin emissions
- By GHG Protocol scope
- By individual greenhouse gas i.e. carbon dioxide, methane, nitrous oxide and others

These help companies determine the materiality of different activities. The government emission factors can also be used for assessing the emissions of any quantity of any given input, e.g. fuels by volume, vehicles by distance. Similarly they can be used for estimate the emissions reduction that can be achieved by changing an activity.

23.1.2. Shortlisting and allocating interventions

Our main approach to identifying material reduction options for operational emissions was to review known methods, related to each of the categories used in annual reporting:

- fossil fuels - alternatives to gas in CHP engines and diesel-power standby generators
- process emissions – reducing nitrous oxide emissions through process optimisation; methane leakage detection and repair
- transport - alternative propulsion and fuels in cars, vans and medium- and heavy-goods vehicles
- electricity – energy efficiency; additional renewable self-generation and behind-the-meter purchase agreements
- subtractions – options for currently exported renewable energy; carbon removals via biosolids and land.

We have drawn on the knowledge of Wessex Water managers with responsibility for relevant activities; and our awareness of emerging techniques via industry networks, discussion with suppliers etc. We also cross-checked against other water-sector specific sources on reducing operational greenhouse gas emissions, notably Jacobs 2022 Net Zero Technology Review commissioned by Ofwat. and the Water UK net zero routemap produced with Mott MacDonald and Ricardo. The Jacobs review refined a longlist of identified technologies into an ultimate shortlist through a detailed Multi Criteria Analysis (MCA) assessment exercise.

Potential interventions were discussed at the series of internal challenge meetings held from summer 2022 to spring 2023. The deployability during AMP8 of potential interventions was also a factor.

These were then allocated to the categories specified by Ofwat for greenhouse gas emissions reduction, as follows:

- Base: opex-led interventions e.g. involving substitutable fuels, buying energy from existing installations, or asset replacement
- Standard enhancement: interventions requiring capital investment, involving sites or assets where an enhancement scheme is scheduled where greenhouse gas emissions are not the main driver
- Net zero challenge enhancement: interventions requiring capital investment where greenhouse gas emissions are the main driver

The following are items that align with one of the two enhancement types.

23.2. Fossil fuels: alternative, low carbon heating of anaerobic digesters

23.2.1. Description

The main use historically of biogas from anaerobic digesters has been to generate electricity, via combined heat and power engines. The exhaust heat from the CHP engines is in turn used to maintain the correct operating temperature in the digesters. Since 2014, at Avonmouth sludge treatment centre we diverted sewage-derived biogas from the CHP engines to the production of biomethane, which is exported to the local gas grid. To compensate we have imported additional natural gas to run the CHP engines for two purposes, namely a) to maintain the exhaust heat output required by the digesters and b) to produce electricity as a substitute for imported grid electricity, based on their relative prices.

We propose to install a 2MW heat pump that draws heat from the treated effluent downstream of the secondary treatment process at Avonmouth water recycling centre. This would supply heat to the mesophilic anaerobic digesters' hot water circuit by as much as 50 degrees celsius, reducing the need to use the CHPs and an associated boiler as a heat source.

23.2.2. Estimated emissions reduction

It is estimated that the heat provided would offset around 10 GWh of natural gas per year, saving around 1.8 kt CO_2e. With the additional electricity required to run the heat pump, the net CO_2 saving would be around 0.7 kt CO_2e per year. This is the scheme benefit figure shown in CW22, scheme ID CW22_1. The sum total of the scheme benefits by 2029-30 i.e. adding together the CO2 benefits for each year of its operation in AMP8, is 2,919 tonnes.

23.2.3. Financial estimate

Project costs estimates have been informed by a quote from a company specialising in heating and cooling systems (IPT-Technology) based on their GeoCube heat pump. Estimated savings are based on our measurements of gas, electricity and heat flows in relation to our CHPP equipment and the digesters, and the forecasts of future energy costs. We believe that this overall approach presents good value, deriving renewable from a plentiful onsite source and reducing exposure to external energy markets, while sustaining the use of current digester assets. Operational savings would pay back the initial investment comfortably within the AMP8 period. The principal uncertainties relate to actual future energy prices (and therefore savings) and downtime for maintenance. The main mitigation is the processes we apply routinely in the management of mechanical and electrical equipment assets.

Table 57 – Project cost estimates

Water	**Wastewater**	Both services
Capex £m: 1.079	**Total opex £m: -£4.769**	**Totex 2025-30: £m -£3.690**

Annual tCO2 saving in 2030 730	Cumulative totex / cumulative tCO2e (2025-30) - £1,264

Nb. all estimated opex is variable i.e. power consumption, gas consumptions savings and maintenance costs.

23.3. Nitrous oxide monitoring & control

23.3.1. Description

Nitrous oxide (N_2O) is formed during secondary treatment of sewage as a by-product when incoming ammonia is converted by microbes to nitrate, and with conversion of nitrate to nitrogen gas if there is a denitrifying stage. Once released, N_2O has a global warming potential of 298 times that of carbon dioxide over a 100 year period. As energy and transport decarbonises, process and fugitive emissions will account for a growing proportion of our total emissions.

STANDARD ENHANCMENT: 7 SITES

NET ZERO CARBON CHALLENGE: 13 SITES

Having started to investigate the monitoring of N_2O emissions, we wish to enact a company-wide monitoring campaign during AMP8. We propose starting with the largest water recycling centres (WRCs) where secondary treatment mainly takes place through aeration processes, as these are more amenable to measurement than sites with trickling filters. As our 20 largest WRCs of this type account for around 63% of the population we serve we consider this to be a cost-effective approach, i.e. starting with the sites that are likely to have the greatest overall impact.

Investigatory monitoring will take place for two years, with the default technology being sensors that measure N_2O in solution in the aqueous phase. Two years of continuous monitoring will help us better understand the cause-effect relationships at specific sites of the variables noted above and N_2O formation, while also allowing us to see the degree to which N_2O spikes can be prevented and whether levels observed at other times can be reduced. After two years of monitoring at the first tranche of sites, rigs will be de-mounted, moved and re-assembled at other WRCs to repeat the exercise. We are also aware of the emergence of data-led solutions, which can reduce or eliminate the need for permanent physical monitoring at WRCs, once the principal causes of N_2O formation at each site has been established through monitoring campaigns. We will engage the suppliers of these solutions as part of this exercise with a view to data led optimisation in the medium to long term.

We propose two types of sites, and two corresponding enhancement funding streams

- seven sites where enhancement investment is planned for AMP8 where the driver is another service improvement e.g. improved water quality in rivers of estuaries. The nitrous oxide monitoring in these cases will be classed as standard enhancement.
- thirteen sites where there is no other enhancement requirement, which means that net zero carbon is the primary driver. For this block we are bidding to the net zero challenge.

The need for enhancement investment
To date, there has been little incentive to address N_2O emissions beyond the fact of it being a greenhouse gas. It is not covered by environmental regulation, there is no cost driver (unlike energy and fuels), nor any obvious commercial opportunities. We are pursuing this enhancement investment now because it is the right thing to do for the environment and we foresee greater stakeholder scrutiny of this specific issue in future.

There are considerable uncertainties about the true level of methane and nitrous oxide emitted from sewage and sludge treatment processes arise from them. These are not measured directly because of how they arise, e.g.

diffusing into the air from tanks and filters in which sewage is treated, or from anaerobic digesters that are not fully-sealed. Instead, UK water companies estimate these emissions via a standard method, using a few emissions factors that have remained largely the same for around fifteen years.

Currently the emissions of N_2O are estimated using a standardised method (the UKWIR CAW) based on the population served, and assumptions of a) the average nitrogen load per person in sewage and b) the amount of incoming nitrogen converted to N_2O. Using this calculation method, our emissions during the last five years have been just under 20,000 t CO_2e per year. While this approach has served the purpose of annual reporting, it does not differentiate by process type or operating conditions. However, there is now a facility for reporting companies to input their emissions based on their own monitoring; this proposal will help us provide data specific to Wessex Water, and to then start to manage-down our emissions. The water companies recognise the shortcomings of this estimation method, and are reviewing it in the light of evolving science and the availability of new technology that enables some degree of measurement.

In 2019, the Intergovernmental Panel on Climate Change revised and quadrupled its standard assumption for the amount of incoming nitrogen converted to N_2O). For Wessex Water, if this conversion factor were to be applied top-down our N_2O emissions would increase from to circa 80 ktCO2e. Even with the emissions factors in the current UKWIR CAW, N_2O from sewage treatment is likely to be the largest single aspect of our operational greenhouse gas emissions. Consequently, we are aware of the need to better quantify the issue at site level as a precursor and enabler for corrective action, and to reduce reliance on high-level estimates. For now, monitoring work is underway that will help better quantify nitrous oxide emissions at UK water recycling centre and we expect a revised set of emissions factors in the future, at which point we will need to revise our overall carbon footprint calculation. Overall, this is rapidly becoming one of our largest emissions liabilities.

With this project, analysis of N2O levels would be added to tasks of current process scientists. The majority of the project cost involves the purchase of equipment including monitoring rigs, sensors and calibration kit.

Best option for customers
Two broad methods have been identified for carrying out this work, both of which require secondary treatment taking place in aerated chambers of liquid (e.g. activated sludge plants, sequencing batch reactors), rather than where biofilm grown on a solid media (e.g. stone trickling filters). The preferred method involves the placement of probes directly into the sewage being treated – this is the most commonly used method where trials have been carried out in the UK; there is single dominant supplier (Unisense) of the probes for this option. A second available method involves domed hoods that float on the surface, with gas sensors in the ceiling of the dome. need to look at relative costs; would be outlined in enhancement case;

As this is a new, developing area of work, neither the costs nor the benefits are well established and the supply chain is relatively small. Current emissions estimates are at a very broadly estimated, and true values may vary widely; through this project we seek be in a position to better quantify our emissions. As such we can not yet claim that the current cost-benefit assessment is robust. However, any future investment in corrective action or management practices will be more robust based on the findings from this project. Moreover, we are seeing entrants to this field from the arena of big data, digital twins and predictive analytics / machine learning – see for example the ongoing innovation challenge being run by Spring. We will learn from these approaches during AMP8, as they offer the prospect of managing sewage treatment to minimise nitrous oxide based on modelling and the use of proxy measurement, rather than continuous real-world measurement of nitrous oxide itself.

23.3.2. Estimated emissions reduction

In terms of the actual emissions benefits that we envisage, we are drawing on monitoring of N2O emissions using dedicated sensors by some wastewater utilities. Some of this information has been assembled in the first two phases of the UKWIR project on process emissions, which has looked for evidence from around the world. There is also early monitoring of N2O emissions underway among some UK wastewater companies. This is helping to build understanding the circumstances leading to high chronic levels of N_2O or acute spikes. Anecdotally, subsequent

control measures often leads to reductions of around one quarter to one third. However, there are a number of variables at play, including dissolved oxygen levels and their stability, flow, biological load and the time of year.

For the purpose of this proposal, our estimates of potential emission reductions is summarised in the table below:

Table 58 - Estimates of potential emission reductions

	% of total population equivalent served	Emissions to be addressed	% reduction assumed	Emissions reduction tCO2e
Sites covered by standard enhancement	43%	7.9	25%	1,978
Sites covered by net zero carbon challenge	19%	3.7	25%	920

We will be able to identify at the end of this work what emissions reduction could be achieved or sustained through future management of the WRCs monitored during the AMP8 assessments. It will also help us estimate savings from WRCs that have not been monitored but have similar processes. We also understand that some WRCs may be more complicated than others, e.g. those (such as Avonmouth) with sequencing batch reactors where the water level rises and falls constantly as an inherent part of the treatment process, Nevertheless, the approach we advocate here is flexible as we are not proposing long-term fixed installations; instead, this project involves temporary calculation to build up picture about each WRC which should enable more accurate emissions calculation based on this 'ground truthing'.

23.3.3. Financial estimate

The cost involved for installation and monitoring is understood; we have quotations from the technology supplier and local installers of monitoring rigs. We expect some variability for the installation cost at sites that are more complicated. We will seek opportunities for efficiencies and competitive quotes on a per-unit basis with a larger volume of installation. We have also included added assumptions around the time required carry out site visits and calibrate sensing tools. This activity will result in opex from the first year in which monitors are installed, due to staff costs and the cost of consumables (e.g. probes, calibration kit) that occur immediately. At present, we have not assessed potential cost savings from reducing nitrous oxide emissions. In the future, with a better understanding of the costs and benefits of this activity, we will be able to better compare N2O reduction with other monetised reduction and the cost to offset residual emissions as part of our corporate commitment. However, we are fully aware that this would not count towards the common performance commitment for 2025-30.

a. Standard enhancement (7 sites)

Table 59 - CO2e saving standard enhancement

Water	**Wastewater**	Both services
Capex £m: £0.506	**Total opex £m: 0.346**	**2025-30 Totex £m: £0.852**
Annual tCO2 saving by 2030 1,978	**Cumulative totex / cumulative tCO2e (y5) £216**	

The CO2e saving shown above (and in table CWW22) is the annual benefit reached in 2030 from the cumulative work in this scheme. The sum total CO2e benefit of this scheme (i.e. adding together the CO2 benefits for each year of its operation in AMP8) would be 3,936 tonnes.

b. Net zero carbon challenge (13 sites)

Table 60 – CO2e saving net zero carbon challenge

Water	**Wastewater**	Both services
Capex £m: £0.831	**Total opex £0.538**	**2025-30 Totex £m: £1.370**
Annual tCO2 saving by 2030 892	**Cumulative totex / cumulative tCO2e (y5) £771**	

The CO2e saving shown above (and in table CWW22) is the annual benefit reached in 2030 from the cumulative work in this scheme. The sum total CO2e benefit of this scheme (i.e. adding together the CO2 benefits for each year of its operation in AMP8) would be 1,776 tonnes.

Nb. Across this work, 59% of the opex is variable (i.e. consumables) and 61% is fixed (i.e. staff).

23.4. Projects with costs in other part of the Plan

23.4.1. Process emissions: reductions related to the Industrial Emissions Directive.

STANDARD ENHANCEMENT - BIORESOURCES

Proposal

Our proposals for covering digestate storage are set out in WSX18 *Bioresources strategy and investment.* The costs of this work are submitted separately through the Bioresources programme; i.e. they are not being submitted under a greenhouse gas emissions heading.

We estimate that the greenhouse gas emissions savings will amount to 2,983 tonnes CO_2e with all storage tanks covered. This is based on the conversion factor used in the UKWIR CAW, i.e. 8kg methane emitted per tonne dry solid in unenclosed secondary storage. This is then multiplied by 25 for the global warming potential of methane, and applied to the forecast tonnage in dry solids of raw sludge to be processed in conventional digestion.

23.4.2. Transport: Installation of EV charging infrastructure

STANDARD ENHANCEMENT (M&G ENHANCEMENT)

Proposal

In line with the trend of decarbonisation happening first for lighter vehicles, we propose to invest in the infrastructure necessary for running electric cars and smaller vans. We propose to meet in excess of 70% of the EV fleets charging needs and to conduct further studies in AMP8 on how best to deliver the fleet requirements given the estimates provided by Stantec. The proposed sites, charger types and numbers are subject to change.

The cost of this approach has been calculated at c£5.7m (inc. a proportion of DNO costs) with an ongoing c£24k operational maintenance cost. Given the likely pace of roll out this approach, we consider this an appropriate balance of meeting the EV infrastructure requirements and minimising the impact on productivity. More EV infrastructure will be required in AMP9 to support the growth of the EV fleet following the ICE ban in 2030. It is also likely that other options will become available to support the large van fleet that have to tow.

The costs of this work are submitted separately through the Management and General enhancement programme; i.e. they are not being submitted under a greenhouse gas emissions heading.

Alongside as part of our base maintenance programme we will introduce electric cars and vans. These vehicles would not be zero carbon given the requirement for additional grid electricity; however with the reducing carbon intensity of grid electricity the carbon benefits of this intervention will increase over time. For now we are projecting a circa 1,500 kilotonne saving based on a 60% reduction from the baseline LGV emissions of 2,300 kt.

23.5. Projects deemed feasible but not selected

23.5.1. On-site renewables - 1x 3MW wind turbine on WW land

Historically, electricity consumption - especially at water recycling centres - has been the largest single aspect of our carbon footprint. With the decarbonisation of gird electricity its share is decreasing; nonetheless, opportunities remain for emissions reduction and with high electricity prices in recent years the economic justification has improved. In the leadup to this submission we revisited the possibility of additional wind turbines sited on our land, either owned and operated by ourselves, or owned and operated by a third party with electrical output consumed on-site.

For evidence regarding this option we have the 2006 findings from an independent third party company that is expert in the planning issues for wind power development. This considered the costs and benefits of a single wind turbine Weston Super Mare WRC, on one corner of site, and serves an indicative case for cost estimates and on-site utilisation of power generated. A site such as Weston-super Mare could support a single turbine. If sized at 3 MW capacity, it would generate around 6.5 GWh per year, avoiding 1,700t CO2e at the 2022/23 grid emission factor. This option is eminently feasible, however we have not selected it for this business plan submission. The main reason is the delivery risks associated with wind development in the Wessex Water region, especially regarding local planning and wildlife conservation constraints. We do not believe that any of our sites are sufficiently advanced on these issue in relation to wind development that we can expect successful delivery during AMP8.

Financial estimate

Capex of £3,900k was based on a multiplier of £1,300k per MW installed

Financing-and-Investment-Trends-2019.pdf (windeurope.org); WindEurope-finance-and-investment-trends-2022.pdf

Potential opex benefits would be based on savings related to 50% of output being consumed on site, and our best estimates of future power pries; and income related to 50% of export being sold.

23.5.2. Sewer heat recovery and export - large pumping station

Wastewater heat recovery has been discussed widely in the water sector for several years as a potential method for obtaining renewable heat. Recovery from treated effluent at water recycling centres (as proposed in 1.2) is one method, although there is less residual heat by that point. Another option is to recover heat further upstream, preferably where there is larger flow at gathering points such as large sewage pumping stations.

In 2019 GENeco commissioned a third-party consultant report into the feasibility of deploying wastewater heat recovery technology in combination with water-source heat pumps at a large sewage pumping station in Bath to capitalise on the renewable heat potential. The concept involved heat being supplied as low temperature hot water via a district heat network to a nearby housing development for space heating and domestic hot water. The report included a preliminary conceptual design and costing to support any subsequent development of a business case and project plans. The report concluded that a 3MW sewer heat recovery system at the pumping station could provide in the region of 3.24 GWh of heat. This would be supplemented by gas heating to meet the housing

development’s hot water requirements. We are not proposing this solution within the AMP8 business plan, because of uncertainty about our ability deliver this project at this location (or an equivalent elsewhere) in the next five years.

Financial estimate

The 2019 Recirc study estimated capex at £2.5m.