Final DWMP24 Data Tables

May 2023

Commentary

Overview

Draft DWMP24 data tables were submitted to Ofwat in July 2022. Subsequent to this a water company task and finish group was established to work with Ofwat to refine the data tables for the final DWMP. The task and finish group held a series of workshops, and the chair had several meetings with Ofwat to support production of the final tables. Version 3 of the final DWMP24 data tables were issued, via email, from Ofwat on 15 December 2022.

We have undertaken the process of completing the data tables and have provided this commentary to support the data tables.

Yorkshire Water (YW) appointed an external assurance provider, to provide third line assurance of the completion of the fDWMP data tables. The approach to assurance that was undertaken is two-fold:

- Methodology audits: to assess whether YW's methodology aligns with appropriate guidance, reporting requirements and whether appropriate checks, controls and explanatory documents exist.
- Data audits: to assess whether processes and procedures are applied as indicated as well as validating the quality and reliability of the base data and the accuracy of the reported information.

We have approached our DWMP as a long-term strategic plan that outlines the needs and requirements of drainage, wastewater and environmental water quality for the next 25-years and beyond. Between draft and final and following consultation on the plan we have now incorporated all the requirements of the Storm Overflow Discharge Reduction Plan (SODRP) and included all storm overflow assets within the fDWMP and associated data tables.

The data provided within the final DWMP24, and these tables is based on achieving the SODRP issued by Defra in August 2022 and hydraulic modelled risks relating to internal and external flooding. This is alongside YWs wastewater WINEP submissions to the Environment Agency in November 2022 and January 2023. We have used these submissions for our costs and data. We acknowledge that the wastewater WINEP submissions in November 2022 and January 2023 have not yet been signed off by the EA and are subject to change and will continue to change as further guidance and clarity is issued. Where changes occur, we will endeavour to update the tables and republish in line with the PR24 Business Plan submission in October 2023.

Where we do not have hydraulic model coverage, we have used data and cost extrapolations. For Hull, we have utilised the Living With Water (LWW) blue-green plan, to cost and complete benefit analysis for metrics relating to modelled hydraulic flooding. This blue green plan and the associated data is a detailed bespoke hydraulic modelled plan for Hull that has been developed by the LWW partnership. It should be noted that these schemes are designed to provide a level of protection up to a 1 in 75 return period rainfall event.

To fully complete the data tables, we have also utilised our Performance Commitment (PC) data and forecasts to complete data lines linked to collapses, pollution and ISF (internal sewer flooding). We have not included any totex spend or benefits that may arise from our AMP7 programme to reduce storm overflow average spills. This programme is still under investigation and review, and we are therefore unable to incorporate it at this time.

We have utilised our Decision-Making Framework and cost models to provide costs and benefits and to support the optimisation and constraints applied to our plan.

We have developed our solutions based on 2050 modelled data against a 2020 baseline. We have developed two principal options for our network solutions:

- blue-green with 50% impermeable area removal + any additional grey storage or
- traditional grey infrastructure
- individual bespoke solutions for treatment works.

We have populated tables 1 - outcomes and 2 - expenditure based on our preferred plan. Our fDWMP24 preferred plan contains all our storm overflow assets. This has been constrained to ensure we comply with the targets set within the SODRP. It also has a company ambition applied to deliver at least 20% of our SODRP by blue-green solutions in AMP8 and this increases to 50% in each subsequent AMP. It contains the relevant wastewater WINEP and growth plan. It also contains our modelled hydraulic flood risk reduction plan for internal and external flooding.

Where a scheme is profiled to be delivered for the end of an AMP (e.g. 31 March 2030), it has been assumed the benefit will be available from the beginning of the following AMP (e.g. 01 April 2030) and therefore benefit is shown in the table line from Year 1 of the following AMP.

Enhancement OPEX has been included where a scheme is known to have a delivery date before the end of the AMP. After this point it is assumed that OPEX becomes base expenditure.

Table 3, adaptive plans, contains a series of adaptive pathways. Our core plan represents the delivery of our regulatory requirements. Our preferred plan replicates this but also presents our hydraulic flooding aspirations. Our least cost plan represents delivery of our regulatory requirements but by predominately grey (least cost) solutions.

We have included an alternative pathway representative of an adverse climate change scenario impacting our wastewater network and assets, and an alternative pathway representative of an adverse growth scenario impacting our wastewater treatment works.

Our data is provided in 2020-2021 price base as per Ofwat's PR24 methodology. Our costs within these tables do not include for any grants or partnership contributions that may be received in the future. We have not offset any costs or benefits at this stage.

Our costs reflected in tables 1,2 and 3, unless otherwise specified, include a total cost build-up of all ancillary costs and do not just reflect the cost of the storage. Ancillary costs include, but are not limited to; connection of sewers to storage tanks and other assets, manholes, electricity supply, telemetry and pumps. Screen costs have been added to the appropriate screen lines in table 1 and 2.

We have completed some cells with 'ILB' (intentionally left blank), as we currently do not have the information to share. In respect of cells containing TBC, these are linked to storm overflows and no ecological harm investigations which will run across AMP8 and AMP9, which will inform these cells for future cycles of the DWMP.

We have amended the cells in table 1 outcomes summary for Total AMP8 and Total AMP9 to reflect the final year of the AMP data and the Total 25-year cells are the end of AMP12 position. This replaces a sum formula.

Table line commentary

1. Outcome summary Line reference(s): 1a – Pollution Incidents – baseline 1b - Pollution Incidents – base 1c - Pollution Incidents - post enhancement 1ci - Pollution Incidents - enhancement cost (CAPEX) 1cii - Pollution Incidents - enhancement cost (OPEX) 1ciii - Pollution Incidents - enhancement cost (TOTEX)
Calculation method: Line 1a: The end of AMP7 position is a forecast based on APR data and internal predictions of outturn performance. For AMP8 and beyond performance has been profiled and this reflects a 21% improvement through AMP8, and a 10% improvement profiled from AMP9 onwards linked to advances in technology being deployed. This line value is normalised per 10,000km of wastewater network. This is to cover the full region and to include both gravity pipes and rising mains. Line 1b: The end of AMP7 forecast is our forecasted outturn position based on recent performance. The AMP8 profile reflects the industry mean (average) and for AMPs9-12 the profile reflects a linear trend and does not reflect any changes there maybe to CICS classification, incident inclusion or definition. Line 1c: No enhancement spend is forecast in direct relation to this driver therefore line 1c will be the same as line 1b. Line 1ci: No enhancement spend is forecast in direct relation to this driver. Line 1cii: No enhancement spend is forecast in direct relation to this driver. Line 1ciii: No enhancement spend is forecast in direct relation to this driver.

1. Outcome summary

Line references:

2a - Compliance at STWs – baseline
2b - Compliance at STWs – base
2c - Compliance at STWs - post enhancement
2ci - Compliance at STWs - enhancement cost (CAPEX)
2cii - Compliance at STWs - enhancement cost (OPEX)
2ciii - Compliance at STWs - enhancement cost (TOTEX)

Calculation method:

We have utilised final effluent and quality compliance metrics only, aligned with the EPA methodology[1] for 2021 to 2025 referenced in the line definition. As such, DWF compliance and investment to ensure future DWF compliance has not been considered in the population of this line. However, if a site that is at risk of DWF compliance failure is also at risk of final effluent compliance as a result of growth, that site has also been included within this line.

As discussed above the investment reflected here is linked to the WINEP submissions in November 2022 and January 2023.

Enhancement expenditure through the WINEP will address new permitting requirements rather than current, with expenditure planned to mitigate any compliance risk prior to the commencement of the new permit. A situation where new permit requirements are introduced without WINEP expenditure to address them is not envisaged and therefore an increase in compliance through enhancement expenditure is not anticipated. We have utilised our internal design and value tool to calculate size and costs of our WwTW interventions.

Line 2a: The AMP7 forecast is based on our current performance and predictions to the end of AMP7. The AMP8 - 12 baseline position is the AMP8 entry point, minus any works that are predicted to be at risk of final effluent compliance failure due to growth (not through WINEP drivers), as a percentage of the reported number of numeric works in APR.

Line 2b: For AMP7, this aligns with the baseline forecast position. The AMP8-12 base risk position is based on the company ambition of 100% compliance from Year 1 AMP8 onwards, minus any works that are predicted to be at risk of final effluent compliance failure due to growth (not through WINEP drivers), as a percentage of the reported number of numeric works in APR.

Line 2c: For AMP7, this aligns with the baseline forecast position. The AMP8-12 base risk position has been populated based on the company ambition of 100% compliance from Year 1 AMP8 onwards.

Line 2ci: AMP7 is the predicted end of AMP7 Year 5 spend. The values for AMP8-12 are compiled from selected elements of the submitted AMP8 PR24 WINEP & AMP9-12 WINEP expenditure where predictable, in combination with schemes required to maintain final effluent compliance as a result of growth.

All expenditure for WINEP drivers relevant to WwTW compliance will be included for AMP8, these are:

- 25YEP_IMP
- U_IMP2
- BW_IMP1
- BW_IMP4
- WFD_IMP

[1] https://www.ofwat.gov.uk/wp-content/uploads/2021/06/EPA-methodology-version-9-May-2021.pdf.

- WFD_ND

U_IMP7 schemes are not included as these are associated with WwTW with descriptive permits. Expenditure associated with monitoring and investigation drivers is also not included in this line.

Solutions have been established using a variety of methods dependent on the driver, these solutions have been entered into EDA, from which CAPEX can be extracted to populate this line.

For AMPs 9-12, due to uncertainty over potential future drivers, only indicative estimates for WINEP drivers that can be broadly predicted at this stage. These are:

- EnvAct_IMP1

Whilst future expenditure against other future WINEP drivers is anticipated, this has not been included.

We submitted sites into the PR24 WINEP, based on EA feedback, showing how we would achieve the 80% P removal target (EnvAct_IMP1). This list of sites was derived by:

- Calculating the percentage removal provided by the AMP7 programme (54%)
- Forecasting the percentage removal provided by the AMP8 programme (through other drivers) (9%)
- Forecasting the remainder (17%)
- Costing was established using a unit cost approach, based on AMP7 P removal schemes.

Where sites have been identified as requiring investment to ensure DWF compliance due to growth (as described in the commentary for Table 2 Line 3 below), a review of the risk of final effluent compliance has also been undertaken as part of scheme development and where risk of failure identified, the scheme costs included in this line.

Line 2cii: Enhancement OPEX has been included for those schemes which are planned for delivery before the end of the AMP.

Line 2ciii: This is the sum of lines 2ci CAPEX and 2cii OPEX.

1. Outcome summary

Line reference(s):

3a - Risk of Sewer flooding in a 1 in 50 storm – baseline
3b - Risk of Sewer flooding in a 1 in 50 storm – base
3c - Risk of Sewer flooding in a 1 in 50 storm - post enhancement
3ci - Risk of Sewer flooding in a 1 in 50 storm - enhancement cost (CAPEX)
3cii - Risk of Sewer flooding in a 1 in 50 storm - enhancement cost (OPEX)
3ciii - Risk of Sewer flooding in a 1 in 50 storm - enhancement cost (TOTEX)

Calculation method:

Line 3a: The end of AMP7 forecast figure is in line with our PC measure sewer flooding in a storm and is a percentage of the population at risk.

For AMP8 and beyond we have primarily utilised the BRAVA data compiled for Planning Objective 01: Risk of sewer flooding in a storm. The table line has been compiled from three data sources:

1. 1D-2D modelled results
2. Bespoke assessment for unmodelled catchments
3. Living with Water (LWW) Blue-Green Plan

The provided data is a percentage of residential properties at risk. A linear interpolation between the modelled epochs to 2050 has been carried out with the requested years being provided for AMP8 and AMP9 (e.g. 2025-26, will be interpolated as 2025). Total AMP positions are the end of AMP values for all AMPs, with the 25-year total being equal to the AMP12 total.

Line 3b: this will reflect line 3a as there is no predicted base spend on this metric.

Line 3c: No enhancement spend is forecast in direct relation to this driver. However, enhancement expenditure is proposed within the network to reduce storm overflow operation and to reduce model predicted hydraulic 2D flood risk up to a 1 in 30 return period. An approximation of the impact of this expenditure on the 1 in 50 risk position has been made.

This data has been compiled from three data sources:

1. Benefit approximation from 1D-2D modelled results
2. Average risk reduction from item 1 extrapolated to unmodelled catchments
3. Living with Water (LWW) Blue-Green Plan

This benefit has been profiled in relation to our delivery programme.

Line 3ci: We have not attributed any enhancement spend to this metric.

Line 3cii: We have not attributed any enhancement spend to this metric.

Line 3ciii: We have not attributed any enhancement spend to this metric.

1. Outcome summary

Line reference(s):

4a - Storm overflows - more than 10 spills per year – baseline
4b - Storm overflows - more than 10 spills per year – base
4c - Storm overflows - more than 10 spills per year - post enhancement
4ci - Storm overflows - more than 10 spills per year - enhancement cost (CAPEX)
4cii - Storm overflows - more than 10 spills per year - enhancement cost (OPEX)
4ciii - Storm overflows - more than 10 spills per year - enhancement cost (TOTEX)

Calculation method:

All coastal and inland bathing sites (designated and proposed) and any ecological harm overflows have been excluded from this table line assessment.

The costing lines do not include screen costs.

Assessments are based on a single year analysis.

This plan will be subject to change as we proceed with investment plans in AMP7. At the time of completing the tables and fDWMP24 we do not have an agreed AMP7 delivery plan for the storm overflow improvement programme so are unable to incorporate this within these lines.

Line 4a: The AMP7 forecast outturn represents an average of our EDM spill frequency returns, 2020, 2021 and 2022 data and aligns with current EDM reporting. This is observed data rather than forecast. EDM coverage does not have 100% coverage for the years stated.

Predicted spill volumes and number of spills per modelled overflow are available for the 2020, 2030 and 2050 epoch models. A linear interpolation of spill frequency between the epochs has been used and a count of storm overflow assets spilling more than 10 times per year has been collated for each requested year. The deteriorating baseline position is attributed to the application of climate change, population growth and creep to the different epoch models.

It was assumed that all non-modelled overflows exceed the 10 spills target from 2025 onwards.

Year 1 of AMP8 is considered as the interpolated 2025 position, with Year 5 of AMP8 being 2029. Total AMP positions are the end of AMP values for all AMPs, with the 25-year total being equal to the AMP12 total.

There are a small number of sites that have a predicted spill frequency greater than 10 spills per annum which do not have a solution generated and have not been included in these line generations. The volumes of each spill have been analysed and is not deemed to require a solution at this point in time, but we will seek to maintain these assets using base maintenance where applicable. We will monitor these assets and look to include solutions when better information is available linked to spill frequency from EDM data and also revised modelling confidence.

Line 4b: This line is completed in line with the baseline 4a, above, as enhancement spend is required to ensure delivery of the 10 spills target for all overflows. Base maintenance will always be utilised to reduce average number of spills across our assets, by ensuring the network is maintained and to provide accurate telemetry information for reporting purposes.

Line 4c: The proposed schemes have been sized based on achieving 10 spills in 2050. Where a scheme is profiled to be delivered for the end of an AMP (e.g. 31 March 2030), it has been assumed the benefit will be available from the beginning of the following AMP (e.g. 01 April 2030) and therefore benefit is shown in the table line from Year 1 of the following AMP. This creates a scheme delivery

profile. To populate line 4c with the number of storm overflows spilling more than 10 times per annum the scheme delivery profile was subtracted from the data points in line 4b.

The difference between the 25-year totals for 4a and 4c is 1571. This includes 1565 interventions at storm overflows plus a further six storm overflows where the 2030 modelled spill frequency is >10 and the 2050 modelled spill frequency is ≤10. This is due to changes in the climate change perturbance and rainfall grouping which results in 2030 having a greater impact on these assets. No interventions are planned for these six sites at this stage.

Line 4ci: Enhancement CAPEX has been profiled across the AMPs in line with our current delivery targets.

Line 4cii: Enhancement OPEX has been included for those schemes which are planned for delivery before the end of the AMP.

Line 4ciii: This is the sum of lines 4ci CAPEX and 4cii OPEX.

1. Outcome summary

Line reference(s):

5a - Storm overflows - (high priority) - ecological harm – baseline
5b - Storm overflows - (high priority) - ecological harm – base
5c - Storm overflows - (high priority) - ecological harm - post enhancement
5ci - Storm overflows - (high priority) - ecological harm - enhancement cost (CAPEX)
5cii - Storm overflows - (high priority) - ecological harm - enhancement cost (OPEX)
5ciii - Storm overflows - (high priority) - ecological harm - enhancement cost (TOTEX)

Calculation method:

We have currently identified one high priority site for investment in AMP8 and have reflected this in the table, with costs and delivery in AMP8 only. Whilst we await further guidance on assessment of no local ecological harm from storm overflows, we have completed the remaining cells as TBC for AMP9-12. We have a detailed investigation programme proposed as part of the WINEP in AMP8 which will support and inform our future planning and investment needs to achieve this SODRP target for high priority and all storm overflows. This may mean we have to invest to achieve tighter targets than <10 spills.

1. Outcome summary

Line reference(s):

6a - Storm overflows - (all) - ecological harm – baseline
6b - Storm overflows - (all) - ecological harm – base
6c - Storm overflows - (all) - ecological harm - post enhancement
6ci - Storm overflows - (all) - ecological harm - enhancement cost (CAPEX)
6cii - Storm overflows - (all) - ecological harm- enhancement cost (OPEX)
6ciii - Storm overflows - (all) - ecological harm - enhancement cost (TOTEX)

Calculation method:

Whilst we await further guidance on assessment of no local adverse ecological harm from storm overflows, we have completed this table as TBC for AMPs9-12. We have a detailed investigation programme proposed as part of the WINEP in AMP8 which will support and inform our future planning and investment needs to achieve this SODRP target for high priority and all storm overflows. This may mean we have to invest to achieve tighter targets than <10 spills. We have not included the high priority overflow identified in line 5 AMP8 within this table to avoid double counting of storm overflows and costs.

1. Outcome summary

Line reference(s):

7a - Storm overflows - designated bathing waters (coastal and inland)– baseline
7b - Storm overflows - designated bathing waters (coastal and inland) – base
7c - Storm overflows - designated bathing waters (coastal and inland) - post enhancement
7ci - Storm overflows - designated bathing waters (coastal and inland) - enhancement cost (CAPEX)
7cii - Storm overflows - designated bathing waters (coastal and inland) - enhancement cost (OPEX)
7ciii - Storm overflows - designated bathing waters (coastal and inland) - enhancement cost (TOTEX)

Calculation method:

The provided table definition is *'Number of overflows in designated bathing waters spilling more than 3 times per bathing season'*. We have defined this as assets not achieving the specific spill target for coastal or inland designated bathing waters.

We have included all our coastal designations and applied a spill reduction to achieve excellent, no more than 2 spills per bathing season on average, within the 1km radius of the designation as supplied by the EA. We have included our designated inland bathing site at Cromwheel, Ilkley with a target of 1 spill per bathing season on average, 5km upstream of the designation and have committed to provide this at the WwTW. We have included data here for work to bring assets in and around a number of potential new inland bathing water designations up to SODRP targets; Wetherby and Knaresborough to again achieve the 1 spill per bathing season on average, 5km upstream of the designation point. This is in line with our WINEP24 submission. We have not provided an AMP7 forecast for these assets.

The costing lines do not include screen costs.

Spills within bathing season have been calculated based on an annual proxy for a typical single year analysis.

Line 7a: Predicted spill volumes and number of spills per modelled overflow are available for the 2020, 2030 and 2050 epoch models. A linear interpolation of spill frequency between the epochs has been used and a count of bathing water assets spilling more than the calculated annual proxy for the asset has been collated for each requested year. The deteriorating baseline position is attributed to the application of climate change, population growth and creep to the different epoch models.

Year 1 of AMP8 is considered as the interpolated 2025 position, with Year 5 of AMP8 being 2029. Total AMP positions are the end of AMP values for all AMPs, with the 25-year total being equal to the AMP12 total.

Line 7b: This line is completed in line with the baseline 7a, above, as enhancement spend is required to ensure delivery of the bathing target for these overflows. Base maintenance will always be utilised to reduce average number of spills across our assets, by ensuring the network is maintained and to provide accurate telemetry information for reporting purposes.

Line 7c: The proposed schemes have been sized based on achieving the annual proxy in 2050. Consequently, line 7b has been modified to reduce by one based on the proposed delivery date of each overflow scheme.

All our bathing sites have been profiled to be completed by the target date of 2035. For Ilkley, scheme completion is planned for 31 March 2026 and our potential inland designations for completion by 31 March 2030.

Where a scheme is profiled to be delivered for the end of an AMP (e.g. 31 March 2030), it has been assumed the benefit will be available from the beginning of the following AMP (e.g. 01 April 2030) and therefore benefit is shown in the table line from Year 1 of the following AMP.

Line 7ci: Enhancement CAPEX has been profiled across the AMPs in line with our current delivery targets.

Line 7cii: Enhancement OPEX has been included for those schemes which are planned for delivery before the end of the AMP.

Line 7ciii: This is the sum of lines 7ci CAPEX and 7cii OPEX

1. Outcome summary

Line reference(s):

8a - Sewer collapses – baseline
8b - Sewer collapses – base
8ci - Sewer collapses - base cost (CAPEX)
8cii - Sewer collapses - base cost (OPEX)
8ciii - Sewer collapses - base cost (TOTEX)

Calculation method:

Number of sewer collapses, nr per 1000km

Line 8a: The end of AMP7 position is a forecast based on APR data and internal predictions of outturn performance. The AMP8 - 12 baseline will show a forecast deterioration in risk position. The baseline risk position assumes the AMP7 base expenditure remains constant for all future AMPs. We have used our internal modelling tool to calculate these values. The interventions have been optimized to get the most efficient blend of capital interventions and based on the investment we believe will be affordable within the financial constraints of the modelled base allowance. This line value is normalized per 1,000km of wastewater network. This is to cover the full region and to include both gravity pipes and rising mains, legacy and t2011 assets.

Line 8b: AMP7 reflects our forecast outturn position at 2025 based on our current performance and planned investment. The scenario chosen for investment in AMP8 is an improvement of 5% over 5 years leading to a 25% improvement by 2050. We believe this scenario is stretching but achievable within our affordability constraints and is optimised based on the most efficient blend of capital interventions.

Line 8ci: We have profiled this spend based on improvement plan and based on asset deterioration model optimised outputs.

Line 8cii: There is no base OPEX associated with sewer collapses as this is assumed to be a structural intervention and delivered via CAPEX.

Line 8ciii: This line is the sum of line 8ci and 8cii.

1. Outcome summary

Line reference(s):

9a - Internal sewer flooding – baseline
9b - Internal sewer flooding – base
9c -Internal sewer flooding - post enhancement
9ci - Internal sewer flooding - enhancement cost (CAPEX)
9cii - Internal sewer flooding - enhancement cost (OPEX)
9ciii - Internal sewer flooding - enhancement cost (TOTEX)

Calculation method:

Line 9a: The end of AMP7 position is a forecast based on APR data and internal predictions of outturn performance. For AMP8 and beyond performance has been profiled and this reflects a 29% improvement through AMP8 from our expected outturn position and a further 10% improvement profiled from AMP9 onwards linked to advances in technology being deployed. This line value is normalised by the number of incidents per 10,000 sewer connections.

Line 9b: The AMP7 forecast is based on the expected outturn position given recent performance and planned funding. The AMP8 profile based on the "purple line" which equates to a 42% improvement in service. AMP9 and beyond is profiled to represent a moderate improvement.

Line 9c: No enhancement spend is forecast in direct relation to this driver for AMP8 and beyond. Base expenditure will be utilised.

Line 9ci: No enhancement spend is forecast in direct relation to this driver

Line 9cii: No enhancement spend is forecast in direct relation to this driver

Line 9ciii: No enhancement spend is forecast in direct relation to this driver

1. Outcome summary

Line reference(s):

10a - Screening storm overflows – baseline
10b - Screening storm overflows – base
10c - Screening storm overflows - post enhancement
10ci - Screening storm overflows - enhancement cost (CAPEX)
10cii - Screening storm overflows - enhancement cost (OPEX)
10ciii - Screening storm overflows - enhancement cost (TOTEX)

Calculation method:

This line has been populated on the assumption that all storm overflows will require new screening installations as a result of the requirements arising from the SODRP and the line has been populated based on this assumption, and not with reference to the 'additional line definition' guidance.

Each overflow will need a change to the existing screen installed to meet whatever new criteria and guidance is issued in relation to the SODRP or to fulfill the requirement for all storm overflows to have a screen by 2050. We have profiled screen interventions in line with the SODRP targets and our preferred plan.

Line 10a: A flatline profile reflecting all storm overflows

Line 10b: as line 10a. All spend on screens will be from enhancement. This is based on the expectation that existing permit conditions will be insufficient to meet requirements arising from the SODRP. We will continue to deliver base maintenance spend to ensure screens are operational.

Line 10c: We have profiled screen interventions in line with the SODRP targets and our preferred plan.

Line 10ci: Screen only CAPEX profiled in line with the SODRP targets and our preferred plan

Line 10cii: Screen only OPEX where a site is delivered before the end of the AMP.

Line 10ciii: A sum of lines 10ci & 10cii

NETWORK
2. Expenditure Analysis
Line reference(s):

1A - Additional network storage / conveyance / containment
TRADITIONAL GREY INTERVENTIONS
Interventions to reduce the risk of sewer flooding in a storm including storage, or other containment, to reduce spill frequency at storm overflows (network only)

- Additional grey storage / containment volume to be delivered in the network (enhancement) 1000m3
- Number of individual schemes
- Projected spend on grey network storage - CAPEX
- Projected spend on grey network storage - OPEX
- Projected spend on grey network storage – TOTEX

Calculation method:
This does not include overflows at WwTW but does include all bathing water sites and no ecological harm sites identified.

Volumes & Costs are the summation of values from:

- Grey only storage solutions for storm overflows
- The grey element of the blue-green storage solutions for storm overflows
- Storage associated with modelled and extrapolated flood clusters

The number of schemes is a count of:

- Grey only storage solutions for storm overflows
- Storage associated with modelled and extrapolated flood clusters

The volume and scheme count will be entered on the year of scheme completion e.g. 31 March 2030 is entered as 2029-2030 for end of AMP8 completion.

CAPEX will be phased throughout the construction period.
Enhancement OPEX has been included for those schemes which are planned for delivery before the end of the AMP.
TOTEX is the sum of CAPEX and OPEX.

The storm overflow costs do not include screens.

NETWORK
2. Expenditure Analysis
Line reference(s):

1B - Upstream surface water separation / removal or other network storage
BLUE / GREEN SEPARATION & STORAGE
Additional blue/green interventions (including associated enabling works) to remove impermeable area inflow from entering the storm/foul/combined network.

- Permeable area inflow removed from entering the network or stored in environment (enhancement) - hectares
- Number of individual schemes
- Projected spend on green network schemes - CAPEX
- Projected spend on green network schemes - OPEX
- Projected spend on green network schemes - TOTEX

Calculation method:
This does not include overflows at WwTW but does include all bathing water sites and no ecological harm sites identified.

The amount of impermeable area removed in hectares and costs are the summation of values from:

- Blue-green storm overflow solutions
- Blue-green catchment strategies for flood risk mitigation
- Living with Water

The number of schemes is a count of:

- storm overflow with a blue-green solution
- Level 3s with a blue-green catchment strategy for flood risk mitigation
- Each AMP for Living with Water

The area removed and scheme count will be entered on the year of scheme completion e.g. 31 March 2030 is entered as 2029-2030 for end of AMP8 completion

Capex will be phased throughout the construction period.
Enhancement OPEX has been included for those schemes which are planned for delivery before the end of the AMP.
TOTEX is the sum of CAPEX and OPEX.

The storm overflow costs do not include screens.

NETWORK
2. Expenditure Analysis
Line reference(s):
Planning Objectives delivered by Tables 1A and 1B (multiple benefits)

- Reduced number of category 1-3 pollution incidents
- Improvement in WwTW compliance
- Percentage of properties at risk of sewer flooding in a 1 in 50 storm
- Storm overflow average spill reduction
- Reduced number of overflows spilling 10 or more per year
- Reduction in high priority overflows causing ecological harm per year
- Reduction in overflows causing ecological harm per year
- Reduction in sewer collapses
- Reduction in households with internal sewer flooding (PC measure)
- Reduction in forecast risk of internal hydraulic modelled flooding incidents/year
- Reduction in forecast risk of external hydraulic modelled flooding incidents/year

Calculation method:
The benefits discussed below are populated based on:

- All solutions for storm overflows within the network
- All solutions associated with modelled and extrapolated flood clusters
- Blue-green catchment strategies for flood risk mitigation
- Living with Water

We have only populated information relating to:

- Percentage of properties at risk of sewer flooding in a 1 in 50 storm – based on profile for line 3c
- Storm overflow average spill reduction – calculated based on change in linear interpolation of spill frequency used in line 4a and 4c and 7a and 7c. It should be noted that this line is reporting the overall reduction in the average spill frequency for all network overflows (following the description), as opposed to reporting the overall reduction in spills (stated in the additional line definition). This includes all overflows, i.e. no exclusion of bathing waters, or no ecological harm storm overflows (it is noted that there is no separate line on table 2 for only bathing waters to be reported).
- Reduced number of overflows spilling 10 or more per year – based on profile for line 4c and 7c. This includes all overflows, i.e. no exclusion of bathing waters, or no ecological harm storm overflows (it is noted that there is no separate line on table 2 for only bathing waters to be reported).
- Reduction in forecast risk of internal hydraulic modelled flooding incidents/year
- Reduction in forecast risk of external hydraulic modelled flooding incidents/year

Whilst we await further guidance on assessment of no local ecological harm from storm overflows, we have completed the following lines as TBC:

- Reduction in high priority overflows causing ecological harm per year
- Reduction in overflows causing ecological harm per year

We do not believe the investment will have a substantial or calculable benefit on the other planning objectives listed.

The reduction in households with internal sewer flooding has been left blank as the generated solutions are to mitigate modelled hydraulic risk and this performance commitment covers other causes flooding as well. There is no currently available correlation between modelled risk and observed risk. Utilisation of our bespoke metrics affords us the opportunity to highlight the risk reduction offered to both internal and external sewer predicted flooding.

WWTW
2. Expenditure Analysis
Line reference(s):
2A - Additional WwTW storage
TRADITIONAL GREY INTERVENTIONS

- Additional grey storage volume required at WwTW (enhancement) 1000m3
- Number of individual schemes
- Projected spend on grey WwTW storage - CAPEX
- Projected spend on grey WwTW storage - OPEX
- Projected spend on grey WwTW storage - TOTEX

Calculation method:

This includes overflows at WwTW, including bathing water and no ecological harm sites identified.

The storm overflow costs do not include screens.

Volumes & Costs are the summation of values from:

- Grey only storage solutions for storm overflows
- The grey element of the blue-green storage solutions for storm overflows

The number of schemes is a count of:

- Grey only storage solutions for storm overflows

The volume and scheme count will be entered on the year of scheme completion e.g. 31 March 2030 is entered as 2029-2030 for end of AMP8 completion.

CAPEX will be phased throughout the construction period.

Enhancement OPEX has been included for those schemes which are planned for delivery before the end of the AMP.

TOTEX is the sum of CAPEX and OPEX.

WWTW
2. Expenditure Analysis
Line reference(s):
2B - BLUE/GREEN Interventions at WwTWs

- Number of individual blue/green interventions (schemes) required at WwTW to increase storm storage/reduce need for storm tanks on site
- Projected spend on green WwTW interventions - CAPEX
- Projected spend on green WwTW interventions- OPEX
- Projected spend on green WwTW interventions – TOTEX

Calculation method:

This includes overflows at WwTW, including bathing water and no ecological harm sites identified.

The storm overflow costs do not include screens.

The number of schemes is a count of:

- storm overflow with a blue-green solution

The costs are the summation of values from:

- Blue-green storm overflow solutions

The scheme count will be entered on the year of scheme completion e.g. 31 March 2030 is entered as 2029-2030 for end of AMP8 completion

Capex will be phased throughout the construction period.

Enhancement OPEX has been included for those schemes which are planned for delivery before the end of the AMP.

TOTEX is the sum of CAPEX and OPEX.

WWTW
2. Expenditure Analysis
Line reference(s):
Planning Objectives delivered by Tables 2A and 2B (multiple benefits)

- Reduced number of category 1-3 pollution incidents
- Improvement in WwTW compliance
- Percentage of properties at risk of sewer flooding in a 1 in 50 storm
- Storm overflow average spill reduction
- Reduced number of overflows spilling 10 or more per year
- Reduction in high priority overflows causing ecological harm per year
- Reduction in overflows causing ecological harm per year
- Reduction in sewer collapses
- Reduction in households with internal sewer flooding
- Reduction in forecast risk of internal hydraulic modelled flooding incidents/year
- Reduction in forecast risk of external hydraulic modelled flooding incidents/year

Calculation method:
The benefits discussed below are populated based on:

- All solutions for storm overflows at WwTWs

We have only populated information relating to:

- Storm overflow average spill reduction – calculated based on change in linear interpolation of spill frequency used in line 4a and 4c and 7a and 7c. It should be noted that this line is reporting the overall reduction in the average spill frequency for all network overflows (following the description), as opposed to reporting the overall reduction in spills (stated in the additional line definition). This includes all overflows, i.e. no exclusion of bathing waters, or no ecological harm storm overflows (it is noted that there is no separate line on table 2 for only bathing waters to be reported). Overflows addressed through increasing treatment capacity are excluded from this assessment.
- Reduced number of overflows spilling 10 or more per year – based on profile for line 4c and 7c. This includes all overflows, i.e. no exclusion of bathing waters, or no ecological harm storm overflows (it is noted that there is no separate line on table 2 for only bathing waters to be reported).
- Reduction in forecast risk of internal hydraulic modelled flooding incidents/year
- Reduction in forecast risk of external hydraulic modelled flooding incidents/year

Whilst we await further guidance on assessment of no local ecological harm from storm overflows, we have completed the following lines as TBC:

- Reduction in high priority overflows causing ecological harm per year
- Reduction in overflows causing ecological harm per year

We do not believe the investment will have a substantial or calculable benefit on the other planning objectives listed.

The reduction in households with internal sewer flooding has been left blank as the generated solutions are to mitigate modelled hydraulic risk and this performance commitment covers other causes flooding as well. There is no currently available correlation between modelled risk and observed risk. Utilisation of our bespoke metrics affords us the opportunity to highlight the risk reduction offered to both internal and external sewer predicted flooding.

WWTW
2. Expenditure Analysis
Line reference(s):
3 - Interventions at WwTWs - additional treatment capacity
Schemes at sewage treatment works to increase flow to full treatment capacity.

- Additional FFT treatment capacity required at WwTWs ML/day
- Number of individual schemes
- Projected spend on additional WwTW capacity - CAPEX
- Projected spend on additional WwTW capacity - OPEX
- Projected spend on additional WwTW capacity - TOTEX

Calculation method:

The table lines have been compiled from the following data sources:

1. AMP8 PR24 growth programme & prediction of AMP9-12 growth requirements
2. Selected elements of the submitted AMP8 PR24 WINEP.

Growth

The PR24 growth programme has been developed utilising more recently available data than was available during the development of the draft DWMP. This includes new population forecast data and more recent WwTW DWF compliance data. An initial list of sites for review was identified through an assessment of average Q90 against the DWF consent for all MCERTs works, with those within 10% of the consent flagging for further investigation. A secondary review of the sites flagged in this initial list has been completed to assess the 2030 risk position, considering an increase in population based on the ONS population forecasts, a reduction in consumption and potential variation between consented and measured trade flows. Where the predicted 2030 DWF is within 5% of the consent, the site has been selected for investment.

Where consultation with local authorities has flagged areas of particular concern from a development point of view, risk to compliance at the relevant WwTW has been assessed individually and investment proposed where necessary.

Additional FFT treatment capacity required at WwTWs has been determined from the projected increase in population, combined with consumption and infiltration rates used within the growth assessment.

CAPEX / OPEX / TOTEX - Solutions have been costed individually for each site using either the DAVE tool or a bespoke solution developed by our strategic planning partner.

For AMPs 9-12, the assessment completed for AMP8 has been carried forward, assessing projected compliance at 5-year intervals: 2035, 2040, 2045 and 2050. Where a risk is identified, a PE adjusted unit cost has been derived from planned AMP8 schemes and applied for each of the sites.

WINEP

All expenditure associated with WINEP schemes that incorporate an increase in FFT have been included for AMP8. This is limited to bathing water storm overflow solutions that have included a requirement for increased FFT at the downstream WwTW.

Expenditure associated with monitoring and investigation drivers has not been included in this line.

As discussed above the investment reflected here is linked to the WINEP submissions in November 2022 and January 2023.

For all data sources:

Increase in treatment capacity is provided upon scheme completion.

One scheme is considered to be one works.

WWTW
2. Expenditure Analysis
Line reference(s):
Planning Objectives delivered by Table 3 (multiple benefits)

- Reduced number of category 1-3 pollution incidents
- Improvement in WwTW compliance
- Percentage of properties at risk of sewer flooding in a 1 in 50 storm
- Storm overflow average spill reduction
- Reduced number of overflows spilling 10 or more per year
- Reduction in high priority overflows causing ecological harm per year
- Reduction in overflows causing ecological harm per year
- Reduction in sewer collapses
- Reduction in households with internal sewer flooding
- Reduction in forecast risk of internal hydraulic modelled flooding incidents/year
- Reduction in forecast risk of external hydraulic modelled flooding incidents/year

Calculation method:

Reduced number of category 1-3 pollution incidents, Percentage of properties at risk of sewer flooding in a 1 in 50 storm, Reduced number of overflows spilling 10 or more per year, Reduction in sewer collapses, Reduction in households with internal sewer flooding, Reduction in forecast risk of internal hydraulic modelled flooding Incidents/year, Reduction in forecast risk of external hydraulic modelled flooding incidents/year – Zero

Whilst we await further guidance on assessment of no local ecological harm from storm overflows, we have completed the following lines as TBC:

- Reduction in high priority overflows causing ecological harm per year
- Reduction in overflows causing ecological harm per year

Improvement in WwTW compliance - The improvement in WwTW compliance equates to the cumulative number of works that have required investment due to risk of final effluent compliance failure due to growth (not through WINEP drivers), as a percentage of the reported number of numeric works in APR.

Storm Overflow Average Spill Reduction (nr) - The 2050 spill reduction offered by each scheme has been estimated. For modelled SOs this is based on the difference between 2050 predicted spill frequency and the target spill frequency for the asset. An average spill reduction has been calculated for the storm overflows that are not modelled. The proportion of the reduction in the average that is attributed to storm overflows addressed through increasing treatment capacity is reported here.

Storm overflows screening interventions
2. Expenditure Analysis
Line reference(s):

4 - Interventions at storm overflows – screening
Interventions at storm overflows to provide screening required to meet the SODRP

Calculation method:

Total number of storm overflows: Our DWMP storm overflow data, flatlined and will remain unchanged.

Number of new screens required on overflows where the overflow has an existing screen (i.e. replacement screens): A replacement screen is defined as any site with an existing screen that now requires a new screen to be installed as part of the SODRP to meet perceived additional requirements screenings guidance, that should be provided as part of the SODRP definitions and this will differ to existing requirements.

Number of new screens required on overflows where the overflow has not had a screen installed previously. A new screen is defined as any site that does not currently have any screening provision.

Projected spend on storm discharge screening for SODRP – CAPEX: This represents a profile of spend in line with our preferred plan to deliver the SODRP.

Projected spend on storm discharge screening for SODRP- OPEX: OPEX is presented where a site is delivered before the end of the AMP.

Projected spend on storm discharge screening for SODRP – TOTEX: a sum of CAPEX and OPEX.

Reduction in GHG emissions
2. Expenditure Analysis
Line reference(s):
5 - Reduction in OPERATIONAL GHG emissions

- Total operational GHG emissions tCO2/e

Calculation method:

Operational carbon associated with the proposed OPEX of the new assets detailed in Table 2: line 1A, 1B, 2A, 2B and 3, has been calculated and is included here for each year following completion of the scheme to the end of the planning period.

Reduction in GHG emissions
2. Expenditure Analysis
Line reference(s):
5 - Reduction in EMBODIED GHG emissions

- Total embodied GHG emissions tCO2/e

Calculation method:

Embodied carbon associated with the proposed CAPEX of the new assets detailed in Table 2: line 1A, 1B, 2A, 2B and 3, has been calculated and is included and phased to our delivery plan.

This line has been redacted.

This line has been redacted.

3. Adaptive Plans
Line reference(s):

AP0 - Adaptive Plan - Whole DWMP Plan
Company L1 adaptive plan and alternative pathways

TOTEX values have been provided by AMP for the scenarios detailed below. These costs incorporate the component parts included in the subsequent lines, in addition to other WINEP costs including investigations and monitoring. Additional lines detailing individual components have only been included where variations exist between the scenarios. We have included enhancement expenditure only and not base expenditure in these totals to maintain consistency with the other lines of the data tables.

Pathway	Delivery Ambition	Climate Change Scenario		Demand Scenario	
		Storm Overflows / Flooding	WwTW	Storm Overflows / Flooding	WwTW
Core	Delivers regulatory requirements (SODRP, WINEP). Delivers the company blue-green ambition.	UKCP09 RCP8.5	Not included in assessment	High	Low growth, low PCC
Preferred	Delivers regulatory requirements (SODRP, WINEP). Delivers flooding ambition. Delivers the company blue-green ambition.	UKCP09 RCP8.5	Not included in assessment	High	Low growth, high PCC
AP1 - Least Cost	Delivers regulatory requirements (SODRP, WINEP). Delivers least cost.	UKCP09 RCP8.5	Not included in assessment	High	Low growth, low PCC
AP2 - High Climate Change	Delivers regulatory requirements (SODRP, WINEP). Delivers flooding ambition. Delivers the company blue-green ambition.	High -UKCP18 RCP8.5	Not included in assessment	High	Low growth, high PCC
AP3 - High Growth	Delivers regulatory requirements (SODRP, WINEP). Delivers flooding ambition. Delivers the company blue-green ambition.	UKCP09 RCP8.5	Not included in assessment	High	High growth, high PCC

There are a number of influencing factors and trigger points which could result in a change between the presented alternative pathways, or potentially the introduction of other alternative pathways where new information becomes available, these include but are not necessarily limited to:

- Subsequent cycles of the DWMP bringing about changes based on the latest information and data sets available to apply to our models and assets.
- Changes introduced by regulators or the government, including new requirements and drivers through the WINEP.
- The outcomes of the SODRP investigations into no local ecological harm.
- The 2027 government review into the targets of the SODRP.
- Data provided by EDM (including real-time EDM) and continuous water quality (WQ) monitoring around storm overflow and WwTW discharges as required by the Environment Act.
- Increased certainty and confidence in the delivery and success of blue-green solutions and other innovation projects.

- The materiality of partnership and co-funding opportunities.
- The release of new ONS growth forecasts and local authority local plans.
- The release of new climate change science and/or best practice, including future iterations of UK Climate Projections and the influence of global emissions.

3. Adaptive Plans Line reference(s): AP1 - Adaptive Plan Component 1 Reducing the operation and impact of Storm Overflows (incl. screening)
TOTEX values provided for the storm overflow elements of the scenarios detailed above. No adjustment has been made to the screening costs for the high climate change scenario.

3. Adaptive Plans Line reference(s): AP2 - Adaptive Plan Component 3 Reduction in Risk of Forecast Hydraulic Modelled Flooding
TOTEX values provided for the flood risk reduction elements of the scenarios detailed above.

3. Adaptive Plans Line reference(s): AP3 - Adaptive Plan Component 3 Interventions at WwTWs - additional treatment capacity
TOTEX values provided for the WwTW capacity increase elements of the scenarios detailed above.