south east water

Water resource management plan annual review and data return

June 2022

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What does this Annual Review do?

This report, along with its accompanying data table, represents South East Water's annual review of water resources performance compared with the forecasts contained in our Water Resources Management Plan 2019 (WRMP) during the 2021-22 regulatory year (from April 2021 to March 2022).

It is accompanied by an Annual Review data table showing the required information for each of our eight water resource zones under annual average and critical peak conditions during the year.

Need further information?

Please email wre@southeastwater.co.uk if you require further information or wish to clarify anything in this report.

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1.0 Introduction

This report, along with its accompanying data table, represents South East Water's annual review of performance. The assessment is comparison with those forecasts included in our Water Resources Management Plan 2019 (WRMP), relative to that which was delivered during the 2021-22 regulatory year (from April 2021 to March 2022).

The regulatory year 2021-22 is the second year of the Water Industry's seventh Asset Management Period (AMP7).

During AMP7 we have set ourselves a programme of schemes to deliver security of supply through a twin-track approach of demand reductions and development of new water sources.

This programme was developed with strong engagement and input from both our customers and stakeholders. We have also committed to carrying out several feasibility studies during AMP7 for some of the larger long-term schemes in our preferred plan, including new impounding reservoir developments and alternative water re-use schemes.

In accordance with the guidance issued by the Environment Agency, this report summarises South East Water's annual performance against our commitments set out within WRMP, as published in August 2019.

Water companies have a statutory requirement to produce an annual review and submit this to the Environment Agency and Defra as part of the WRMP process. In complying with this requirement we follow the Environment Agency's WRMP Annual Review Guidance (issued March 2021).

This commentary covers the content required by the guidance and the data table includes annual average day and average day peak week outturns in the reporting period for the Company's eight Water Resource Zones.

All data presented in this report and accompanying data table are consistent with the WRMP and/or actual outturn data for the 2021-22 reporting year. Both leakage and PCC figures have been assessed, and reported in line with the Ofwat leakage consistency methodology (as per our approach adopted last year for Annual Review 2021). All data sets have been subjected to internal review, and approval has been independently audited as part of South East Water's annual performance reporting quality assurance process.

As in previous reviews, we have sought to improve our Annual Review by reviewing feedback received last year from the Environment Agency, and addressing any issues raised.

2.0 Summary of the supply-demand situation for our supply area during 2021-22

During the reporting year we received 95% of long term average (LTA) rainfall across our supply area. The winter months were drier than normal recording just 84% of LTA rainfall while summer months were slightly wetter than normal with 107% of LTA rainfall.

Our water resources position moving into 2022-23 is healthy, with conditions remaining close to normal expected levels for the time of year, ahead of summer 2022.

Demand patterns during 2021-22 represented something of a 'transition' from the high demand impacted by COVID19 restrictions experienced in 2020-21, as demands decreased progressively month on month throughout the year as restrictions were lifted and people became more mobile again.

Compared to the previous reporting year (2020-21) we have seen a 4.4% decrease in PCC during 2021-22.

Household consumption during 2021-22 was position close to midway between the high demands seen during COVID-19 during 2020-21 and demand levels we might have expected pre COVID-19 in 2021-22 as per our WRMP.

The latter few months of 2021-22 potentially provided an early indication of the levels of demand we might expect post Covid19 i.e. the 'new normal' with no restrictions and full movement of people, but expected higher levels of working from home than pre COVID-19. This change in working from home patterns is of particular interest to South East Water due to a large proportion of our customer base commuting beyond our supply area to work (and use water) each day.

We will continue to closely track demand during 2022-23.We plan to commission Artesia to investigate how customer demand continues to evolve, and the intention is to publish their findings as part of our Annual Review 2023.

Our Customer Metering Programme concluded in March 2020, and we can report that over 90% of homes are now metered across the South East Water supply area. During the report year we have installed a further 395 meters at household properties, where customers have directly requested a meter (optant).

Total reported leakage was 88.7 Ml/d, which is lower than the regulatory leakage target for 2021-22 of 94.4 Ml/d. This means we have now met our leakage target for 20 consecutive years.

During the reporting year we proactively contributed and engaged with the WRSE regional modelling work, and following agreement by Defra we published our Final Drought Plan.

We successfully delivered a Security of Supply Index of 100%, with no deficits recorded in any of our eight Water Resource Zones. WRZ?

This is the second consecutive year we have adopted leakage and PCC values using an independently audited year-end water balance fully aligned with the new Ofwat's consistency methodology approach.

We have continued to review and progress our existing abstraction flow meter replacement and verification programme. As well as improving the auditability of licence compliance and abstraction data, this also supports annual reporting and the WRMP process.

This assurance process is being undertaken in parallel to continuing improvements to the company telemetry reporting and data archiving system. To further demonstrate our regulatory abstraction compliance we have continued to implement an internal process of producing pre-audit packs for each abstraction site collating all relevant documentation in a single folder ready to share with the Environment Agency abstraction auditors at site.

Overall we have seen improvements in compliance in 2021-22 compared to 2020-21, with further improvements expected in 2022-23.

2.1 Rainfall

During 2021-22 we received 95% of long term average (LTA) rainfall. Across our supply area an average of just 84% of LTA rainfall was received during the winter months, with 107% LTA rainfall received during the summer months.

Spring and early summer were particularly wet with May, June and July 2021 all seeing above average rainfall, recorded at 151%, 180% and 166% respectively. The consequence of which was that the winter 2020-21 recharge season was extended, which helped ensure healthy groundwater conditions were in place for the start of the summer period.

Drier conditions prevailed throughout August and September, with both months receiving less that the LTA rainfall. September 2021 recorded just 58% of the LTA values. The strong recharge event over the previous winter meant that groundwater levels remained in a healthy place throughout the summer.

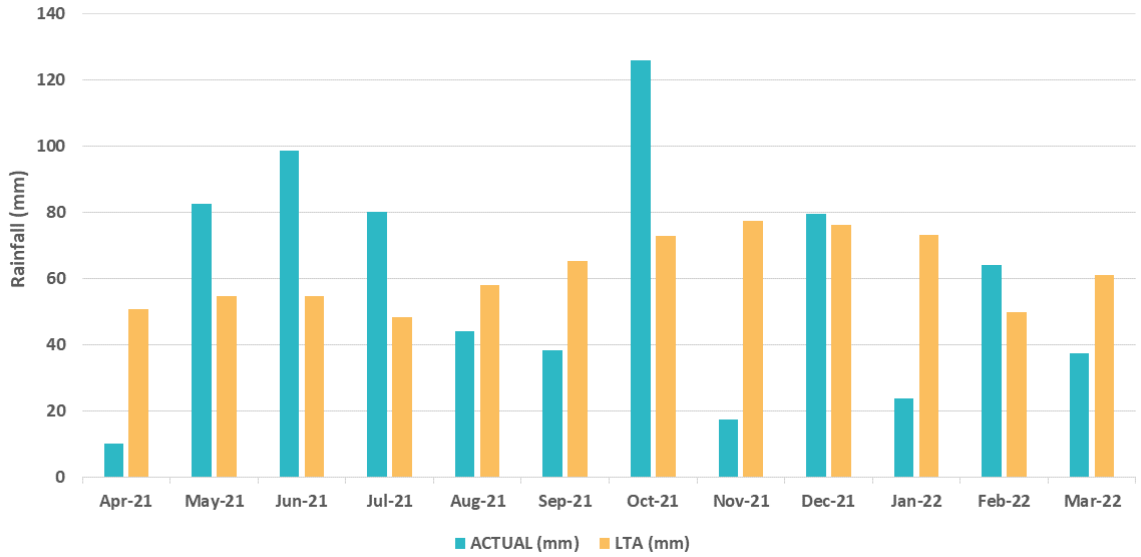
October was something of an anomaly, where we the catchments experienced a marked change in the weather, recording 173% of the LTA rainfall. However after October 2021 conditions were notably dry, and that was typified by November 2021 and January 2022's rainfall, which was 23% and 32% of the LTA, respectively. Only December 2021 and February 2022 witnessed above average rainfall, with February recording 129% of the LTA. . This reporting year ended in March 2022, with61% of the LTA being recorded.

At the end of March 2022, and ahead of summer 2022, our water resources remain in a healthy position, due predominantly to the strong groundwater position seen leading up to the summer of 2021. Last year's winter recharge season was below normal. The majority of groundwater resources, as of June 2022, are considered to be at or just below normal expected levels.

We continue to monitor rainfall, aquifer groundwater levels, reservoir storage levels and customer demand carefully throughout the year. In response we convene regular water resources review

meetings to implement and co-ordinate actions, as appropriate, and in line with good practice and our Drought Plan normal monitoring and reporting requirements.

Figure 1: Monthly average rainfall through 2021-22 compared to long term average



2.2 Demand

During 2021-22 distribution input, and in particular household demand and PCC, decreased compared with 2020-21 (when we experienced unusually high demands caused by COVID-19 restrictions, combined with dry weather conditions).

Demand patterns during 2021-22 represented something of a 'transition' from the high demand impacted by COVID19 restrictions in 2020-21, decreasing progressively month on month throughout the year as restrictions were lifted and people became more mobile again.

The latter few months of 2021-22 potentially provided an early indication of the levels of demand we might expect post Covid19 i.e. the 'new normal' with no restrictions and a more mobile population, but higher levels of working from home than experienced pre COVID-19. This change in working from home patterns is of particular interest to South East Water due to a large proportion of our customer based commuting outside of our supply area to work (and use water) each day.

In summary, household consumption during 2021-22 was close to midway between the high demands seen during COVID-19 during 2020-21 and demand levels we might have expected pre COVID-19 in 2021-22, as per our WRMP.

For the Annual Review 2021 we commissioned Artesia Consulting to undertake a detailed assessment and modelling exercise to evaluate the COVID-19 impact on demand and PCC (the outputs from this work were reported as part of our annual return 2021)

The transitional nature of household demand patterns during 2021-22 has meant the work completed by Artesia has not been repeated. Instead we propose commissioning Artesia to undertake a detailed review and further modelling at the end of 2022-23, based on outturn data to evaluate the change from pre COVID19 demand to the 'new normal'.

In the interim, we recently completed a preliminary assessments of working from home impacts on PCC – these data have been included in the regional plan modelling used by Water Resources in the South East for the South East Water demand forecast.

Using a combination of data from Artesia's work in 2020-21 and recent working from home data from the Office for National Statistics (ONS) we have estimated that 'new normal' working conditions will result in an additional 1.13 litres per person per day of demand added onto our baseline PCC forecast for WRMP24.

This offers an indicative best estimate of the potential longer term effect of more people working from home, and spending less time each week commuting to offices and places of work outside of our area of supply.

We will revisit and update our assessment at the end of 2022-23, at which time we will have more post COVID-19 outturn data to test and verify whether our current assumptions are reasonable.

We will continue to closely track demand during 2022-23 and will report on the further work we will commission with Artesia as part of our Annual Review 2023.

We continued undertaking customer surveys to gain a better understanding of how our customers were using water and how many were staying at home during summer 2021. This research revealed that a third of customers had reported an increase in their water usage over the last year. The top reason that customers reported for this was that they had more people working from home.

Similar to our assessment included in our Annual Review 2021 we confirmed that demand changes did not occur uniformly across our water resource zones. The extent changes in demand varied between water resource zone, and more locally too. This is best illustrated in Table 1 and 2 below.

Table 1: reporting year average day demand compared to WRMP dry year forecast

Annual Average 2021-22	RZ1	RZ2	RZ3	RZ4	RZ5	RZ6	RZ7	RZ8	Total
Dry year distribution input (Ml/d)	32.2	65.9	54.9	158.2	36.8	61.7	21.5	85.5	516.9
Reporting year distribution input (Ml/d)	34.5	66.4	55.6	166.8	36.6	64.9	23.8	88.1	536.7
Difference (Ml/d)	2.3	0.4	0.6	8.6	-0.2	3.2	2.3	2.6	19.8
Difference (%)	7.1%	0.7%	1.2%	5.5%	-0.6%	5.2%	10.8%	3.0%	3.8%

Table 2: reporting year summer peak week demand compared to WRMP dry year forecast

Summer Peak Week 2021-22	RZ1	RZ2	RZ3	RZ4	RZ5	RZ6	RZ7	RZ8	Total
Dry year distribution input (Ml/d)	41.0	84.6	64.5	207.1	42.3	78.2	28.4	93.0	639.2
Reporting year distribution input (Ml/d)	39.2	76.2	61.0	199.4	42.7	76.7	26.0	98.7	620.0
Difference (Ml/d)	-1.8	-8.4	-3.5	-7.7	0.4	-1.6	-2.4	5.7	-19.2
Difference (%)	-4.5%	-10.0%	-5.4%	-3.7%	0.9%	-2.0%	-8.4%	6.1%	-3.0%

The wide variability in demand at local level has highlighted ‘pinch points’ in our sub water resource zone systems that have potential to occur now and into the future.

As part of our WRMP24 pre-consultation with the Environment Agency and Ofwat we have set out our proposals to assesses and present further detail about our sub water resource zone systems and local supply demand balance challenges and solutions. We will be presenting and promoting this work as part of our WRMP24 consultation with customers and stakeholders.

Average demand for the year was 536.68 Ml/d. This is lower than demand experienced in 2020-21, but still 3.8% higher than the WRMP dry year average demand figure for 2021-22 of 516.89 Ml/d.

The average day peak week demand was 620.0 Ml/d, and was recorded during the period of the 09 June 2021 to 15 June 2021. This is lower than the dry year average day peak week figure in our WRMP for 2021-22 of 639.19 Ml/d.

As illustrated by Figure 3 below, we continued to experience a higher level of variability in daily demand patterns throughout the spring and summer period, but as above, to a lesser extent to that experienced during 2020-21.

Higher than normal demand was experienced during the months of June and July, we expect due to a COVID-19 impact and movement of people, and very warmer and dry weather. Demand in August was lower than normal with the onset of school holidays (and large portions of the population we serve leaving our area each week to holiday in other parts of the UK and abroad) and cooler weather conditions.

Figure 2: Daily Distribution Input for 2021-22

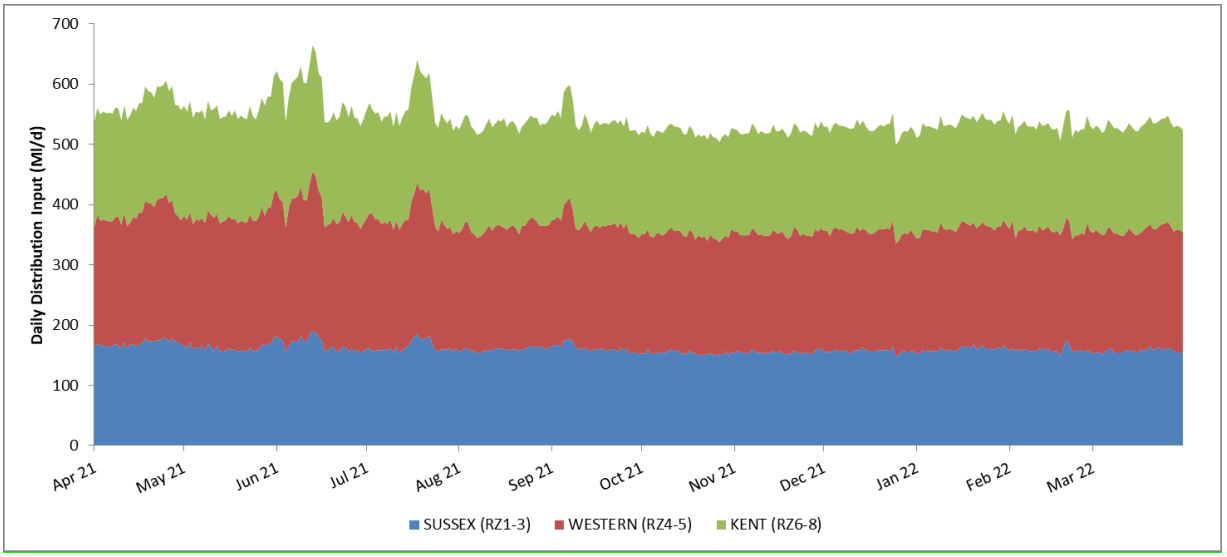
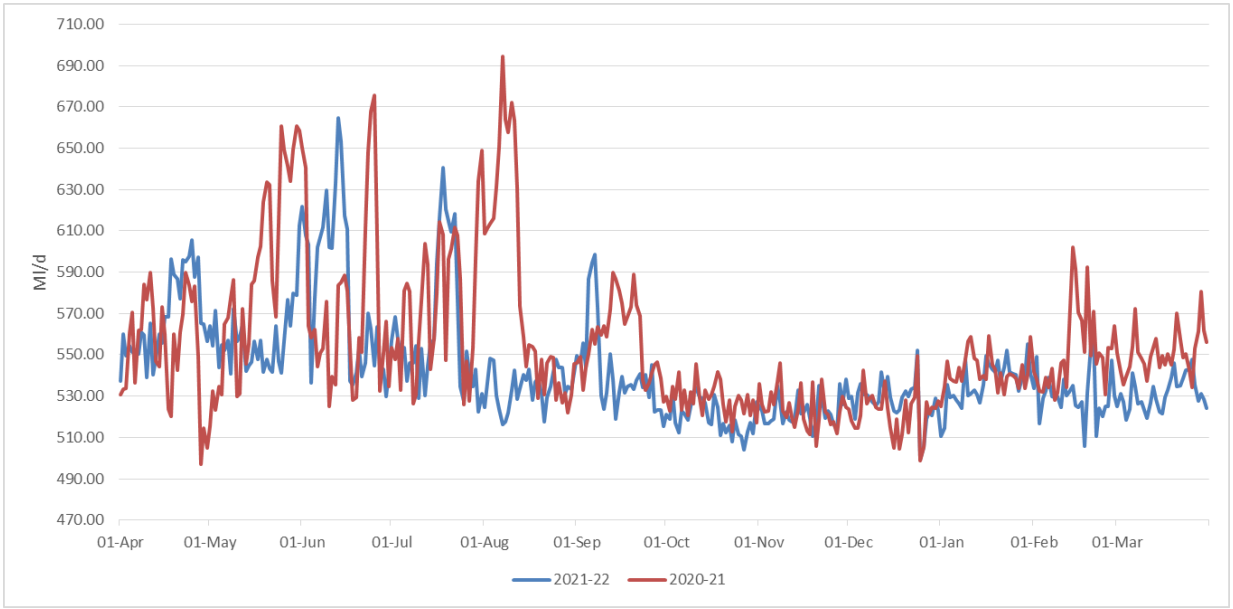


Figure 3: Daily Distribution Input for 2021-22 vs 2020-21



2.3 Water Resource Zones

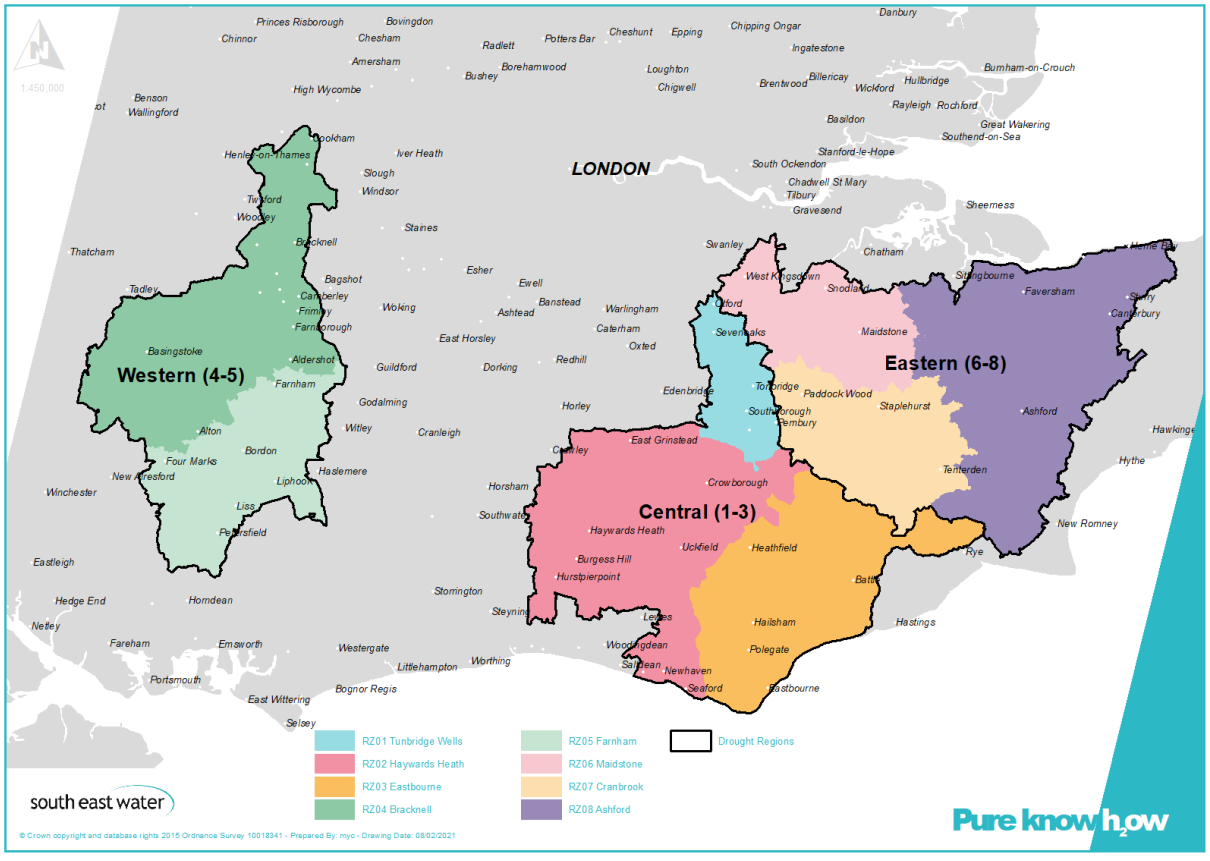
Our operating area comprises of eight resource zones within three separate regions – the Central Region, the Western Region and the Eastern Region.

As we approach our publishing date for our WRMP24, we have completed a review of our Water Resource Zone integrity, and confirmed that the current setup of each zone remains compliant with the latest Environment Agency's guidelines for resource zone integrity.

Several small sub zones were identified at WRMP within WRZ2, WRZ3, WRZ5 and WRZ6 and these sub-zones are highlighted in our review for WRMP24. Due to the de-minimus threshold rule the sub-zones in WRZ2, WRZ5 and WRZ6 fall outside of the assessment criteria. The remaining subzones identified in WRZ2 and WRZ3 were also reviewed to see if these should be merged into a larger zone - the conclusion reached was it was not considered appropriate to merge them due to seasonal based resource availability.

In summary, following recent assessment work there have been no adjustments to resource zone boundaries during the reporting year; these remain the same as reported in WRMP. The locations of these zones are displayed in **Error! Not a valid bookmark self-reference.**4 below.

Figure 4: South East Water's Resource Zones



As described earlier in section 2.2, part of our WRMP24 pre-consultation with the Environment Agency and Ofwat has included discussions related to our approach for presenting sub water

resource zone system supply demand balances. This work will be essential in helping explain the local challenges and solutions we will require at a sub water resource zone level in the future, to maintain the integrity of, and updates to, our water resources zones.

2.4 Levels of Service

Our levels of service are unchanged. Our declared Level of Service adopted in WRMP remain at:

- 1 in 10 years for Temporary Use Ban
- 1 in 40 years for Non Essential Use Restrictions
- 1 in 50 years for Deployable Output

3.0 Progress in achieving customer outcomes and performance commitments of the business plan relevant to the delivery of the WRMP

The company successfully delivered a Security of Supply Index (SoSI) of 100% across all eight water resource zones under annual average and summer peak conditions.

3.1 Security of supply (SoSI)

Tables 3 and 4 below provide a summary of reporting year available headroom compared with planned target headroom.

Table 3: reporting year average day available headroom compared to WRMP target headroom forecast

Annual Average 2021-22	RZ1	RZ2	RZ3	RZ4	RZ5	RZ6	RZ7	RZ8	Total
Target headroom (Ml/d)	2.0	8.0	4.6	10.4	1.8	4.4	1.9	4.3	37.4
Dry year available headroom (Ml/d)	2.0	8.6	4.8	41.4	15.8	5.4	1.9	11.3	91.32
Difference (Ml/d)	0.0	0.6	0.2	31.0	14.0	1.0	0.0	7.0	53.87

Table 4: reporting year summer peak week available headroom compared to WRMP target headroom forecast

Summer Peak Week 2021-22	RZ1	RZ2	RZ3	RZ4	RZ5	RZ6	RZ7	RZ8	Total
Target headroom (Ml/d)	2.7	11.1	4.6	10.6	1.8	4.2	2.6	4.7	42.16
Dry year available headroom (Ml/d)	4.6	17.4	8.4	20.7	16.2	7.4	2.7	16.7	93.97
Difference (Ml/d)	2.0	6.2	3.8	10.1	14.4	3.2	0.1	12.0	51.81

There are a number of new resource developments that have been completed or are near completion during the reporting year 2021-22:

- The upgrades to our Forest Row source are partially complete and currently able to provide an additional 2Ml/d of water for the summer peak week period across water resources zones 1, 2 and 3.

- Further test pumping is required before the maintenance work undertaken at our Coggins Mill WTW can be fully commissioned.

- We have made good progress fast tracking our work to test the new Butler WTW for public water supply (formerly the Aylesford Newsprint source). We have installed a temporary treatment works and completed a Section 32 test pumping programme of the existing source boreholes during 2021.

- An application has been made to the Environment Agency to licence 8 Ml/d of new water from the old Aylesford Newsprint site, to treat and put into supply during summer 2022, with interim arrangements to permit abstraction already in place providing more resilience across water resources zones 6, 7 and 8 than has been available in recent years.

4.0 Progress against WRMP

The regulatory year 2021-22 was the second year of the Water Industry's seventh Asset Management Period (AMP7).

During AMP7, we have set ourselves a programme of schemes to deliver security of supply through a twin-track approach of demand reductions and development of new water sources. This programme was set out in our WRMP and developed with strong engagement and input from customers and our other stakeholders. We also committed to carry out feasibility studies during AMP7 of some of the larger long-term preferred schemes and alternative scheme in our plan including reservoir development and water re-use.

Our WRMP builds upon work done in AMP6 and sets out a forward programme of schemes to deliver security of supply between 2020 and 2025.

In accordance with the guidance provided for this annual review by the Environment Agency, this review reports our annual performance against the WRMP, published in August 2019.

4.1 Supply

4.1.1 Outage

The actual average reported outage during the 12 month period was 11.49 Ml/d (compared to 8.56 Ml/d in 2020-21), which remains lower than the 18.36 Ml/d reported in our WRMP, however this will fall closer in line with our proposed WRMP24 reported value of 15.42 Ml/d.

The peak reported outage in this period was 7.12 Ml/d (compared to 10.39 Ml/d in 2020-21). This is lower than our WRMP reported figure of 20.07 Ml/d, but is more closely aligned to our proposed WRMP24 reported value of 11.96 Ml/d.

The outage used in the calculations stems from operational sites only where genuine events have occurred that have interrupted output, either as planned or unplanned events. These include major power failures, treatment and quality failures, control and process failures, and other emergency situations and follows our methodology set out for WRMP supporting appendices.

The control room logs provide information to understand these events, and also allow for the company to improve the management and control of such occurrences. The company considers that the controls in place through the control room protocols have demonstrated an improvement in our systems to manage and reduce these events. The level of outage being recorded is a reasonable reflection of the normal operational condition of our supply system.

In order to align with the ambitions of the regional planning objectives, WRSE have carried out work to develop a new outage methodology to provide a regionally consistent and improved approach for assessing outage and calculating suitable planning allowance. The figures produced from this will feed into our WRMP24 and support the regional modelling for WRSE.

The data below shows a breakdown of South East Water's outages by resource zone and each classification of outage. The most significant outage type is a system outage which accounts for 6.42Ml/d of the average outage and 3.14Ml/d of Peak outage. The least impactful category of outage is water quality which only accounts for 0.03Ml/d of average outage and 0Ml/d for peak.

Information from the annual outage assessment is being used by the Assets department to assess which sites are most vulnerable, and which outages have resulted in the greatest impact on the network; and this is informing our prioritisation of future planned maintenance activities on all assets.

AVERAGE OUTAGE	RZ1	RZ2	RZ3	RZ4	RZ5	RZ6	RZ7	RZ8	Total
System	0.29	0.62	0.31	1.45	0.31	0.53	0.05	2.85	6.42
Planned	0.29	1.55	0.03	0.33	0.83	0.71	0.02	0.54	4.29
Turbidity	0.00	0.02	0.01	0.01	0.00	0.02	0.00	0.00	0.06
Power	0.07	0.24	0.05	0.09	0.01	0.06	0.04	0.12	0.68
Water Quality	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.03
TOTAL	0.65	2.45	0.41	1.88	1.16	1.33	0.11	3.51	11.49

PEAK OUTAGE	RZ1	RZ2	RZ3	RZ4	RZ5	RZ6	RZ7	RZ8	Total
System	0.35	0.15	0.00	1.39	0.23	0.05	0.00	0.98	3.14
Planned	0.00	0.00	0.00	0.00	0.00	0.24	0.00	1.58	1.82
Turbidity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Power	0.11	0.40	0.00	1.57	0.00	0.00	0.07	0.00	2.15
Water Quality	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.46	0.55	0.00	2.96	0.23	0.30	0.07	2.55	7.12

Following our last annual review report, the Environment Agency requested we included further source level detail regarding our annual outturn outage rates. These data have bene provided in Annex 1.

4.1.2 Sustainability changes

No sustainability changes were planned or implemented during the 2021-22 year.

South East Water has 22 schemes on our RSA WINEP3 programme for AMP7. In the first year of AMP7, seven of these schemes have been closed out and signed off by the Environment Agency that provided there is no growth of the source a no deterioration investigation is not required (Sheet, Greatham, Coombe, Clayton, Whitelands, East Meon, Waterworks Road) and another scheme had been closed out and signed off by the Environment Agency as there was no evidence of the abstraction impacting on the Environment (Goudhurst).

Eight schemes had a completion deadline of 31 March 2022, of these two schemes have been delivered this year (East Kent Chalk and Great Stour). The other six schemes have had the deadlines extended as they are complex and further investigation is required to understand any impacts and to ensure the right options are taken forwards for our customers. The CSMG scheme has a deadline of 30 September 2022, the other five have a deadline in the final year of AMP7. Two of these schemes (Candover and Wey) have been classified as non-delivery by the Environment Agency. We have worked closely with the Environment Agency throughout this year to ensure that we consider any future sustainability changes that will be required in WRSE regional scenarios and our next WRMP.

Two other schemes not on our RSA WINEP 3 programme for AMP7 are Greywell and Little Stour.

An investigation in AMP5 concluded that the abstraction was having an impact on the SSSI Fen at Greywell and that the abstraction will cease when this does not present an undue risk to security of supply. Progress has continued towards ceasing abstraction at our Greywell site this year and new pipelines have been laid. We have agreed with the Environment Agency and Natural England that we will continue to abstract at this site until 31 March 2023 to ensure a reliable water supply for our customers in the area.

We worked jointly with Southern Water and Affinity Water in AMP6 to deliver several work packages associated with river restoration on the Little Stour. The scheme was agreed with the Environment Agency to be extended into AMP7 for delivery for work package 2 (alteration to a mill structure to improve fish passage and low flows) to the end of November 2021. A further extension was granted by the Environment Agency until September 2022 due to working under flood risk conditions.

4.1.3 Deployable output

We have continued to make progress with two supply schemes during 2021-22: Coggins Mill and Forest Row.

Forest Row was available throughout the 2021-22 year, albeit at a slightly reduced rate. The site was also only run during week days to ensure manning of the site should issues arise. The site was unable to be fully utilised for most of the final quarter of the reporting year and requires some

further maintenance to realise the full output. Further monitoring and adjustments are expected during 2022-23 to improve performance and confirm reliability.

Work at Coggins Mill has continued during the report year, although planned test pumps to identify the full output have not yet been completed. A new raw main has provided some benefit of yield from the Sharnden borehole, further work is required to clean and remediate the existing onsite boreholes before a final revised deployable output is confirmed.

The reporting year assessment of the Security of Supply Index took account of the necessary adjustments to Forest Row and Coggins Mill.

The expansion of the Bray (Keleher) water treatment works is now mostly complete, with some further maintenance work still required before being fully commissioned. This will be completed during the early part of the 2022-23 reporting year.

For the reporting year - Deployable Outputs of our sources are consistent with our WRMP Appendix 4, net of adjustments for Forest Row and Coggins Mill as discussed above.

We have progressed with a full and detailed review and update of our deployable outputs to include in WRMP24. The outputs from the review will shared and discussed with the Environment Agency during the first half of 2022-23.

As noted earlier, good progress has been made to fast track the new Aylesford Newsprint sources for public water supply. We have installed a temporary treatment works and completed a Section 32 test pumping programme of the existing source boreholes during 2021. We have made an application to the Environment Agency to licence 8 Ml/d of new water to treat and put into supply on a permanent basis from summer 2022.

4.1.4 Existing bulk supply agreements –

There have been no major changes to the bulk supply agreements with neighbouring companies during the 2021-22 reporting year.

However, work to modernise the format, content and structure of bulk supply agreements was progressed during the reporting year. In September 2021 two of the existing bulk supply import agreements from Southern Water were modernised and updated namely the Bewl-Darwell and Weirwood (now renamed the Crawley bulk supply).

We are continuing to work with Southern Water to review and modernise the remaining bulk supply agreements and ensure they reflect current best practice. We anticipate several of these will be agreed with Southern Water using the new format during 2022-23.

In parallel we have implemented work that will enable the cessation of the Bewl to Darwell transfer, driven by INNS regulations, on time in 2025. We have also started discussions with Affinity Water and Southern Water regarding exports from our Water Resources Zone 8 to their neighbouring supply areas, in line with WRMP.

Changes to bulk supplies planned for the future are documented in our WRMP Section 9.

4.1.5 Other changes to our supply forecast, including any changes to assessment of impacts of climate change to supply

To date, the Water Resources in the South East (WRSE) regional simulation model has been used to produce deployable output values to feed into the WRSE Investment Model and to inform the regional emerging plan.

The tables 5 below provide a summary of the deployable outputs derived from the regional simulation model across all drought scenarios, and also a comparison against our company derived outputs from WRMP, table 6.

Table 5: Proposed WRMP24 SEW Baseline D.O (without CC or Bulk Supplies)

WRZ	500A	200A	100A	500P	200P	100P
RZ1	42.38	45.18	45.45	47.90	50.18	50.45
RZ2	64.59	70.99	73.32	82.90	91.45	101.20
RZ3	63.79	65.65	67.42	74.79	76.94	79.10
RZ4	174.79	176.24	179.67	215.28	216.55	217.15
RZ5	53.97	54.12	54.22	61.90	62.05	62.20
RZ6	74.22	75.62	77.65	84.77	86.05	88.16
RZ7	14.71	16.28	17.25	17.46	18.18	19.15
RZ8	111.32	111.37	111.37	127.07	127.22	127.32
Total	**599.77**	**615.45**	**626.35**	**712.07**	**728.62**	**744.73**

Table 6: WRMP SEW Baseline D.O (without CC or Bulk Supplies)

WRZ	500A	200A	100A	500P	200P	100P
RZ1	43.24	45.16	45.35	48.75	50.11	50.40
RZ2	62.44	67.99	71.36	82.85	91.41	99.15
RZ3	64.95	67.68	67.68	77.19	80.90	80.90
RZ4	179.91	180.91	182.09	221.35	221.60	223.10
RZ5	53.91	53.92	53.97	61.85	61.90	62.00
RZ6	53.91	56.10	57.39	61.87	64.46	64.46
RZ7	12.76	13.91	13.96	18.56	23.27	23.07
RZ8	110.77	110.82	110.87	126.87	126.97	127.22
Total	**581.89**	**596.49**	**602.67**	**699.28**	**720.62**	**730.30**

At a company level, it can be seen that there is no significant impact in our overall proposed deployable output derived using the regional simulation model for WRMP24, compared to our WRMP. The key highlights and changes being:

- 1 in 500 leads to DO reductions in 4 WRZs ~5% of respective WRZ DO. Primarily driven by surface water drought impacts.
- Groundwater only WRZs DO are largely unchanged.
- The adjustments to our baseline D.O due to AMP7 interventions are:
    - RZ4 - 8.8Ml/d reduction in D.O at Greywell and Itchel.

- RZ6 - 20Ml/d increase in D.O with delivery of a new WTW source at Aylesford Newsprint.

Alongside the regional work, HR Wallingford have been supporting South East Water with a update of our source level Deployable Output (DO) assessment for WRMP24, and to support and align with the work undertaken for Water Resources in the South East group and the latest Environment Agency Water Resource Planning Guidelines. The work completed in the last year has included:

Hydrology Update

In the past, SEW have used the Hysim hydrological model to undertake hydrological flow simulation in the River Ouse and River Cuckmere. During the work undertaken for WRMP and more recently for WRSE, a number of issues have been found with the current Hysim calibrations and their input data. In RZ2 (River Ouse) the stochastic hydrological simulation was found to have a dry bias, potential caused by the Hysim calibration and model response. In both RZ2 and RZ3 Hysim has been a cumbersome model to use with newer stochastic and climate change datasets which have greater computational demands than those which Hysim was original designed for. There are also some uncertainty around the source of the input climate data which are therefore not readily updatable. The recent release of national, freely available climate datasets present an opportunity to address this issue. Therefore, to improve our data to inform WRMP24, we have updated our hydrological modelling approach to underpin our current DO assessments and are taking the opportunity to reassess all the assumption which underpin the hydrological assessment.

WRMP24 DO Assessment

A new Pywr water resources model has been developed for SEW's WRZs as part of the WRSE work. These models were developed to replicate SEW's existing RZ2 and RZ3 Kestrel-WRM water resources models used in WRMP. The Pywr model and subsequent DO assessment focussed on the WRZ level resource and did not provide source level DOs which are required for the WRMP24 assessment. In order to provide an independent comparison to the WRSE work SEW have decided to continue using the Kestrel-WRM models for RZ2 and RZ3 to underpin our WRMP24 DO assessment.

Groundwater Source DO

The DO assessment described above only considers RZ2 and RZ3 and additional work is required in order to provide source level DO for all groundwater sources and summarised at WRZ levels in RZs 1, 4 to 8. The work undertaken for WRSE has undertaken a lot of the modelling work that is required to underpin this DO assessment, but was undertaken at the total WRZ DO scale. This work is ongoing and will provide the DO information required for our WRMP24 on a source level for each WRZ for different design drought return periods.

This will use the existing stochastic modelling undertaken for WRSE and new historic modelling undertaken for this task to determine the source level DO for different design return periods. The will be provided for each source and WRZ for ADO and PDO.

Source DO Constraints

As a further assessment into the reliability of the deployable output an investigation took place whereby the actual output of each site during the summer 2021 high peak demand period was compared with the peak deployable output figure in WRMP.

Overall this exercise has been helpful in confirming that the peak deployable outputs for our sources remain largely representative and robust. There were a very small number of sites that will require some further investigation to verify their full outputs are reliable at all times. Work will be completed during the next year and the final outcomes reported as part our Annual Review 2023.

A summary of the proposed changes being considered are highlighted in the table below. Those listed have been agreed within the business, however a further selection of sites remain under review and will require further discussion and agreement between Water Resources, Asset Management, and Operations.

Resource Zone	Site	Published WRMP PDO	Proposed WRMP24 PDO
RZ1	Kemsing	4.20	3.70
RZ4	Itchel	3.00	1.00
	Greywell	6.80	0.00
RZ5	Britty Hill	5.00	3.50
RZ8	Ford	2.50	1.50
	Stockbury	4.50	3.50

4.2 Demand

For the Annual Review 2021 we commissioned Artesia Consulting to undertake a detailed assessment and modelling exercise to evaluate the COVID-19 impact on demand and PCC (the outputs from this work were reported as part of our annual return 2021)

The transitional nature of household demand patterns during 2021-22 has meant the work completed by Artesia has not been repeated. Instead we propose commissioning Artesia to undertake a detailed review and further modelling at the end of 2022-23 based on outturn data to evaluate the change from pre COVID19 demand to the 'new normal'.

In the interim, we recently completed a preliminary assessments of working from home impacts on PCC – these data have been included in the regional plan modelling and regional demand forecast.

Using a combination of data from Artesia's work in 2020-21 and working from home data from the Office for National Statistics (ONS) we have estimated PCC to increase by 1.13 litres/person/day due to new agile patterns of working from home, This equates to an increase in demand compared to pre COVID-19 of 2.56 Ml/d. Increasing to 1.65 l/person/day and 4.05 Ml/d during summer peak period conditions (average day peak week).

This offers an indicative best estimate of the potential longer term effect of more people working from home, and spending less time each week commuting to offices and places of work outside of our area of supply.

We will revisit and update our assessment at the end of 2022-23, at which time we will have more post COVID-19 outturn data to test and verify whether our current assumptions are reasonable.

Following the response received to our Annual Review 2021, we have met the Environment Agency to present and explain the process we have followed to convert our WRMP forecast for leakage and PCC to the new Ofwat leakage consistency methodology.

The adjustments made result in PCC values reducing and leakage increasing compared to WRMP, although importantly distribution input is unchanged compared to WRMP i.e. the method has re-apportioned demand across these two components rather than caused a material change to the total distribution input overall.

As part of the Annual Review 2022, for comparative purposes, the changes we have discussed and presented to the Environment Agency and to Ofwat as part of our pre-consultation for WRMP24 is summarised in the tables below.

All our annual review data is complaint with the Ofwat leakage consistency methodology.

WRMP Baseline plan household PCC

Litres per head per day (l/h/day)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Dry year annual average	148.6	146.7	146.2	145.6	145.1	144.6
Summer peak period	197.7	195.4	194.7	194.2	193.6	193.0

WRMP Baseline plan household PCC – Adjusted to new methodology

Litres per head per day (l/h/day)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Dry year annual average	146.3	143.5	141.9	140.3	138.8	137.2
Summer peak period	195.2	192.0	190.4	188.8	187.2	185.7

WRMP Final plan household PCC

Litres per head per day (l/h/day)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Dry year annual average	148.6	145.5	143.7	142.0	140.3	138.6
Summer peak period	197.7	194.1	192.3	190.5	188.7	187.0

WRMP Final plan household PCC – Adjusted to new methodology

Litres per head per day (l/h/day)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Dry year annual average	146.3	142.9	140.6	138.5	136.3	134.1
Summer peak period	195.2	191.4	189.1	186.9	184.7	182.6

WRMP Total leakage

Megalitres per day (Ml/day)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Total leakage	86.40	87.69	86.95	83.20	79.08	75.08

WRMP Total leakage – Adjusted to new methodology

Megalitres per day (Ml/day)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Total leakage	94.24	95.20	94.40	89.90	86.70	81.00

4.2.1 PCC

For the reporting year we have provided PCC figures that are consistent with our full alignment to the new Ofwat leakage consistency methodology approach. Measured household PCC for the reporting year was 145.8 l/head/d, unmeasured household PCC was 236.4 l/head/d and average PCC 158.6 l/head/day.

Compared to the previous reporting year (2020-21) we have seen a 4.4% decrease in PCC during the current reporting year.

In comparison to our revised WRMP 2021-22 PCC figure we have seen a number 12.8% higher than included within our WRMP forecast.

During the summer peak demand period, measured household PCC was 169.6 l/head/d, unmeasured household PCC was 319.7 l/head/d with an average PCC of 190.9 l/head/d.

In comparison to our revised WRMP 2021-22 PCC figure we have seen a number 0.8% lower than included within our WRMP forecast.

4.2.2 Customer Metering Programme (CMP)

In 2018/19 we completed our compulsory metering programme and achieved our aim of having 90 per cent of our household customers on a water meter (not including voids). This has resulted in an average 16 to 18 per cent reduction in water used for those properties moved onto the new charges.

While this has been a good result, we are now progressing our ongoing water efficiency strategy to help raise customers awareness of their water use and behaviour, and to save water at home and work – we aim to reduce customer demand by a further seven per cent between 2020 and 2025.

During the 2021-22 reporting year, we installed 395 optant meters at household properties.

4.2.3 Developing a water saving culture

In our WMRP19 we forecast water savings of 5.51 Ml/d during year 2 of AMP7. As reported in APR22 Table 6C we estimate savings based on the water efficiency activities we have delivered to be 2.27 Ml/d.

Covid19 has had a significant impact on household demands and therefore PCC figures during years 1 and 2 of AMP7, and on the roll out of our planned water efficiency strategy required to meet our PCC ODI too.

This is largely due to our water efficiency strategy being heavily reliant on the roll out and establishment of water use reports and behavioural change initiatives with customers – these activities were very difficult to implement at a time when many household increased their water usage for hygiene and wellbeing reasons, and were also using more water at home due to restrictions of movement.

Our Year 1 programme therefore was focused on enabling the core structures for the delivery programme to be progressed and be put in place in readiness for the lifting of COVD-19 restrictions. This involved increasing water efficiency device ordering, implementing new business system processes, researching customer priorities and extending communications.

With the progressive lifting of COVID-19 restrictions, our Year 2 programme has delivered across four key work streams:

1. Behavioural change Initiatives
2. Free water saving devices for customers
3. Partnership and community campaigns
4. Communications campaigns

As part of our additional measures to reduce PCC, we have taken the decision to add home and virtual audits as another key work stream from Year 3 onwards.

Years 3, 4 and 5 Savings

Many of the initiatives that have been developed and progressed in Year 2 will continue to extend to additional activities in the period 2022-23 to 2024-25. This will ensure our activities, and the savings they deliver are in line with the percentage reductions included in the PCC ODI target we have forecast to meet by the end of AMP7. The key initiatives that will extend include:

- Extending our Household Neighbour Comparison report to non-digital customers
- Actively promoting the Household Neighbour Comparison report to ensure customers are prompted which will increase our engagement.
- We anticipate saving will increase as customers become more familiar with this report over the AMP and we will use internal data to continually review, refine and improve the targeting of our messaging to deliver maximum benefits for our customers increasing our customer journeys including a full review of current approaches and calls to action supported by the Behavioural Insight Team known colloquially as the 'Nudge Unit'
- Implementing home and virtual household audits from Year 3 onwards
- Increasing community partnerships Continuation and expansion of our free water efficiency devices and tackling internal plumbing losses campaigns
- This approach ensures, after taking account of necessary adjustments to our baseline starting position (e.g. to take account of 'new normal' working from home impacts) we will achieve the 7.6% reduction in PCC from the final baseline position necessary to meet our PCC ODI target.

At the same time we have continued with our focus on improving customer perception of leakage. This is often a customer perception that is heavily influenced through external media but we have continued to improve our 'In your area' messaging and specific communications with customers about leaks in their area. This will remain a high priority area for improvement but the work we have done has informed our plans in this area and enables us to track the success of future work.

These and similar activities contribute to achieving the long term reductions in water use.

We continue working in collaboration with Waterwise, alongside other water companies, to encourage water saving nationally and develop a stronger culture of water saving behaviour in the United Kingdom.

4.2.4 Progress with leakage management and reductions

For the reporting year we have provided leakage figures that are consistent with our full alignment to the new Ofwat leakage consistency methodology approach.

Total reported leakage for 2021-22 is 88.7 Ml/d, which is lower than our regulatory target of 94.4 Ml/d. This means we have now met our leakage target for 20 consecutive years.

During the second year of AMP7 we have achieved our leakage reduction target. This was achieved by further distribution network pressure optimisation, identifying network pressure transients leading to bursts, delivered in conjunction with a large scale planned maintenance and repair programme. Alongside, we continue to invest in network pressure reducing valves, introduction of Leakage Analysts who further improve the targeting of leaks in the field. This work is supported by the use of satellite technology to identify leaks in urban areas, supporting customers to repair their supply pipe leaks through a new process and surveying our larger distribution trunk mains for leaks and meter data availability.

The data presented has been audited as part of our Annual Performance Reporting assurance process and is the same data as is submitted to Ofwat and used by Discover Water.

4.3 Headroom

Target headroom offsets uncertainty in the Water Resources Management Plan. For the year 2021-22 as modelled in the WRMP, headroom was 37.78 Ml/d for DYAA and 42.61 Ml/d for DYCP.

Revisions to the target headroom were modelled as part of the WRMP process and is documented in Appendix 6A of the WRMP (available on our website).

The work to update this model for WRMP24 and the WRSE regional planning is currently in progress and on track to be published as an appendix in the latest WRMP, later in 2022. This will highlight updates to the methodology and data changes in the model, which we will report upon in our Annual Review 2023.

4.4 Options

4.4.1 Options selection:

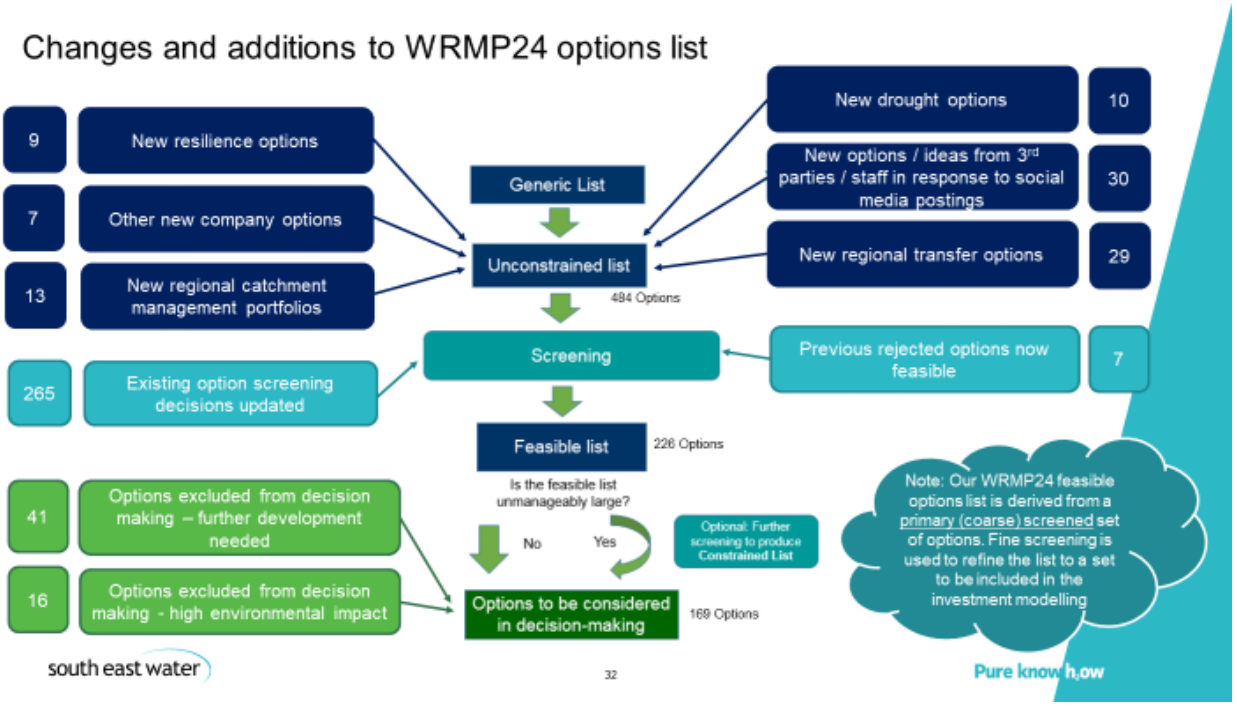
The options appraisal process for WRMP24 is now completed and has built largely on work progressed under WRMP. We continue to proactively identify new options, develop existing options, seek third party opinion and work collaboratively with WRSE to seek new regionally derived opportunities.

SEW identification of new options:

- Internal and external engagement to raise awareness of the need for new ideas and options, updating of the website to support this process.
- Internal workshops to review resilience needs and issues for each WRZ
- Review of Aquifer Storage and Recovery (ASR) options
- Emergency drought options
- Development of 3rd party / BAF options
- Collaboration with SWS to review "shared benefit" options i.e. effluent re-use. Further development and new options associated with the Peacehaven recycling scheme.

WRSE collaborative identification of new options:

- Resilience – review of drought options / screening tool for "wider benefit" resilience options
- Catchment management – stakeholder engagement and storyboard mapping tool
- Transfers – strategic regional grid
- Multi-sector – stakeholder engagement tool



4.4.2 The delivery of options during 2021-22:

Table 7: our WRMP preferred plan supply side options for the period 2020 to 2025:

WRMP Option Title	1:200 Yield	Yield Available*
Aylesford Newsprint - use of existing groundwater sources	18.2Ml/d	2023
Catchment Management Interventions at Woodgarston	3.0Ml/d	2035
Bewl WTW expansion and transfer to Hazards Green	8.0Ml/d	2025

*Note: This is yield available date as included in our final WRMP. Actual completion dates for schemes may change to fit our AMP7 delivery programme.

4.4.3 Butler WTW (formerly Aylesford Newsprint) groundwater scheme:

A new Licence authorising an abstraction of 8.12Ml/d from two boreholes at Butler WTW is being finalised by the Environment Agency, with the expectation that the Licence will be issued towards the end of July. A further programme of test pumping is scheduled for later this summer, which has been configured to determine the achievable yield from an additional three boreholes as the output from the Butler Well Field is optimised.

The results obtained from the test pump will then be analysed to determine the sustainable aggregated yield, which will be the evidence supporting a future application to modify the Butler Abstraction Licence. The phased approach is by intention. The approach has allowed 8.12Ml/d to enter into supply, via a temporary WTW to support customer demand across RZ6, whilst also providing the opportunity to better understand the performance of the Butler Well Field and how to realise the desired maximum output of circa 20Ml/d.

In conjunction with the investment that is currently taking place across the Butler Well Field work continues on finalising the design of the new WTW. It is anticipated that this work will be completed in September, and the ambition to issue the design and build contract in November. The target date for when the full Butler WTW will be commissioned is March 2025.

With the 8Ml/d available from the new temporary WTW we are able to maintain a positive supply demand balance for remainder of AMP7, and the delivery of the full new WTW and output by 2025 will not impact our supply demand balance.

4.4.4 Woodgarston Catchment Management:

Agricultural engagement in the Woodgarston catchment continued during 2021-22. An additional 103 hectares of farm land was engaged and contributed to our Ofwat ODI performance commitment. In total, over 1,387 hectares of farm land, out of 2,553 hectares, has been engaged in the first two years.

This targeted catchment management scheme focused upon communication with landowners and nitrate use in field systems, which is considered to be the largest contributor in the catchment for nitrates found in the groundwater. On the ground advice around Nitrate Vulnerable Zone Regulations and best nutrient management practices was undertaken using catchment advisors. We piloted trials and incentives for cover crops in the catchment resulting in a reduction of 14,684 kg of nitrate leaching to groundwater in 2021/22.

In addition we have also trialled a number of innovative projects in this catchment such as arable reversion, no fence, companion cropping, alternative crops trials (millet and sorghum, no-till potatoes, borage), and bio-inoculants.

4.4.5 Bewl / Darwell Replacement - Bewl WTW expansion and transfer to Hazards Green:

We have continued our work to allow the replacement the existing Bewl-Darwell bulk supply scheme and remedy the existing INNS risk that the current bulk supply presents. The Bewl-Darwell scheme is still planned to be completed by the end of the AMP. During 2021-22 we have been carrying out work at Bewl to fully understand what is required to increase the output at the site. We have also issued a number of main laying schemes to our engineering team for design, mitigations and delivery over the next few years. This will allow the transfer between Bewl and Darwell to be turned off, but also allows us to move water around that area of our network more effectively.

4.4.6 Long-lead scheme investigations – Broad Oak Reservoir:

The key tasks planned and completed during the reporting year for Broad Oak Reservoir were:

<u>Yield Assessment</u>

We are working with our consultant HR Wallingford to finalise an updated yield assessment for the reservoir that can inform our WRMP24. The work has concluded that there is likely to be a higher available dry year yield than previously reported for the more severe 1:200 and 1:500 drought scenarios.

We have updated the scheme dry year yields with these latest outputs, retaining the peak output for the scheme at 22Ml/d as the max to inform WRSE and our draft WRMP24. However, the yield assessment has identified the potential to be able to operate at higher outputs during certain times of year and when conditions are appropriate. We therefore intend to ask our consultant to review a larger version of the scheme for a max outputs of 30Ml/d. We will feed this back into the process once complete, possibly to inform our revised WRMP24.

<u>Planning</u>

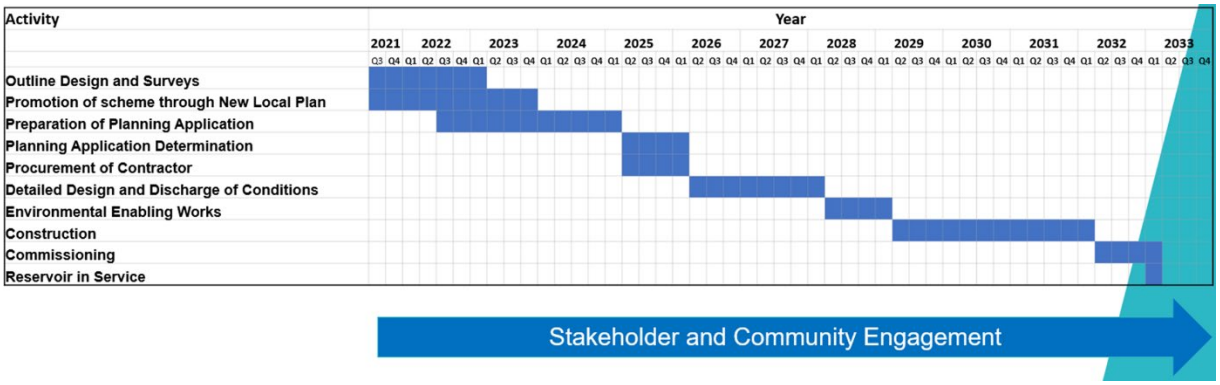
We are continuing to work with our planning consultant WSP, to identify key tasks and programme to support our planning application and EIA, and completion of some early start surveys to fill the critical data gaps.

We have had on-going positive dialogue, liaison and meetings with Canterbury City Council, including a meeting with members on 1st December 2021.

We have, and continue to work with Canterbury City Council, and planning officers to develop and gain agreement for a Planning Performance Agreement (PPA) to deliver our planning application.

Design Development

We have appointed Atkins as our new consultant to continue the AMP7 design development tasks for the scheme. This year has been a period of familiarisation for Atkins to review and interpret all existing information previously developed for the scheme. This is now complete, and Atkins have prepared a report that sets out their review findings, and recommendations for further work to progress during AMP7, which includes a programme for the overall delivery of the scheme.



4.4.7 Long-lead scheme investigations – Arlington Reservoir

Whilst we await the outputs from the latest regional modelling work (noting that Arlington Reservoir was not selected in the emerging regional plan), we have chosen not to make substantial design development progress on this scheme during the reporting year, however we have continued to:

- Work with our consultant Adams Hendry to support our liaison with the District Council and respond to their local plan consultant process.
- Maintain on-going positive dialogue, liaison and meetings with Wealden District Council.

In the reporting year, having seen the selection of Peacehaven recycling scheme featuring in the emerging regional plan, we have carried out further development work on this scheme as part of our planning for WRMP24. This assessment has been completed in collaboration with Southern Water Services (SWS).

The development work looked at the potential for alternative options where the water could be best utilised, the location of the water recycling facility, the location of the treated effluent

discharge, distribution of the treated water from SEW to SWS and the maximum yield of the scheme.

4.5 WRSE and Regional Work

As part of the development of our WRMP24, we are collaborating in an integrated way with the WRSE regional group to develop processes, methodologies and outputs that will allow us to achieve the requirements of the National Framework to produce a single regional plan that builds resilience to a range of uncertainties and future scenarios. The regional plan will deliver a set of options that present the best value to customers, society and the environment, rather than simply least cost.

On January 17th, WRSE published an "emerging" draft regional plan for public consultation. The WRSE emerging draft regional plan is an adaptive plan focussed on meeting all legal and regulatory requirements, and policy expectations, at the most efficient cost.

It provided early insight of the challenges and issues the region is facing and the emerging solutions that could be needed. It also explained how we will make the transition to a draft best value regional plan over the coming months, which will be published for consultation in November 2022, and how the best value criteria and assessment are likely to change from the "most efficient" assessment of options to a best value set of solutions.

The emerging plan consultation achieved 1,150 responses. 719 online questionnaire responses (approx. 400 related to GARD – standard response used to bring up the numbers), and 435 email and postal responses.

For SEW, a summary of the key outputs and highlights from the regional emerging plan are provided below:

- In the first 15 years, the single adaptive branch is solved using a combination of demand reduction, internal transfers and new bulk supplies. No significant resource development is required.
- The reduction in PCC driven by government interventions is key to achieving the policy target of 110l/p/d by 2050. The WRSE work has identified that companies cannot achieve the target efficiency without government support.
- The most challenging futures which are driven by the regulators view of abstraction reduction, require more effluent re-use and a desalination schemes to solve the problem
- The most likely futures are fairly well aligned with the schemes selected in our WRMP preferred plan
- The optimal solutions continue to utilise our existing bulk supplies, we have tested a reduction in the Egham (RZ4) bulk supply from 36Ml/d to 26Ml/d.
- Two new bulk supplies from SES Water into our RZ1 and RZ2 are consistently selected.
- There are changes from our WRMP, i.e. Broad Oak Reservoir was consistently selected in 2041, and Arlington Reservoir was not being selected in any adaptive branches. However, the outputs presented are an "emerging cost-effective regional plan", we expect

there to be changes once we introduce the best value criteria to the decision making process to inform the draft plan.

- In WRMP we overlaid our (non-optimal) leakage reduction on top of our final solution. This generated more resource development and a resilience buffer in the event of not achieving our ambitious demand reduction targets. We strongly advocate a similar approach to be taken by WRSE, as identified within in our WRMP24.

6.0 Progress with feedback made in response to last year's annual review

Following our 2021 Annual Review the Environment Agency recommended two measures by which to improve, in addition to three significant actions. These are shown in Figure 8, along with the response provided to the Environment Agency at that time and in follow up meeting and discussion.

Figure 8: 2021 Annual Review recommendations from the Environment Agency

Significant issue and action(s)	SEW Response
Supply Interruptions 2020 During peak demands in 2020 some of your customers experienced supply interruptions in your resource zone 2 (Haywards Heath). We appreciate SEW has reviewed these events and taken actions to mitigate the risk of re-occurrence. SEW should update the Environment Agency (EA) by the end of the 2021 calendar year on the actions it has taken, and their effect in addressing the causes of its 2020 supply interruptions. The company should also detail any further actions it is looking to implement, including the timescales for these.	As referenced, we published our summer demand response 2020 report in October 2020, a copy of the report was shared with the Environment Agency at that time. A copy of the report can be found here: https://corporate.southeastwater.co.uk/news-info/publications/summer-demand-response- 2020/ The report set out a number of actions, and those most relevant to your request are summarised below. 1. During summer 2021 we successfully implemented our proposed red/amber/green reporting system for customers to keep them regularly informed of demand levels during the summer period and alert them to any potential issues caused by high demand should they occur 2. During summer 2021 we successfully implemented a new demand led triggers and tiered actions framework that sets out how we can better manage customer messaging and reduce customer demand before and during high demand events associated with heatwaves – the framework is innovative and embeds demand led TUBS as a back stop option within an overall demand and customer messaging framework. This is a new approach developed following customer research. It has been presented to stakeholders and regulators including the Environment Agency – whom at the most recent National Drought Group recognised the work as best practice and urged other water companies to develop similar approaches.

	3. While difficult to assign an accurate savings figure to the two initiative above, we believe very modest savings of 1-2% of the ADPW dry year demand forecast is not unreasonable. This equates to 0.85Ml/d to 1.7 Ml/d savings in RZ2. 4. We have successfully accelerated work to bring Forest Row into operation (this provides an additional 4Ml/d of supply that was not available during summer 2020) and borehole cleaning and rehabilitation work at Coggins Mill treatment works will be completed shortly (this will provide 0.7 Ml/d of water that was not available during summer 2020) Taken together the net gain in water available, compared to 2020, is between 5.6 Ml/d and 6.4 Ml/d. This is adequate to resolve the interruptions experienced in 2020.
Supply demand balance – Headroom Deficit Under the Dry Year Annual Average (DYAA) scenario, resource zone 7 (Cranbrook) has a reported SDB deficit of 1.1 Ml/d and resource zone 8 (Ashford) has a reported SDB deficit of 1.8 Ml/d. We acknowledge that these are headroom deficits where there is available headroom but it is less than the target headroom. We expect SEW to set out the actions it is taking to regain a surplus SDB in its zones 7 and 8 by the end of the 2021 calendar year. This should particularly consider additional actions to target customer demand, and the benefits of the Aylesford Newsprint scheme to mitigate the present headroom deficits.	Following approval by the Environment Agency of a Section 32 application made by SEW, we have test pumped two existing boreholes at the former Aylesford Newsprint site, and installed a temporary treatment works with the capacity to provide an additional 8 Ml/d of water to supply RZ6, RZ7 and RZ8. On the 3rd December 2021 we submitted a detailed test pumping report with a formal licence application to the Environment Agency's Permitting Support Centre. The application is to license the two existing boreholes, and the objective was to provide 8 Ml/d of additional water by Spring 2022. Once the Environment Agency is satisfied with the licence application and provides a new licence to SEW, the deficits reported in AR21 will be fully resolved.

Average Household PCC (PCC) Company-wide average PCC (166 l/h/d) is 20.5 l/h/d over SEW's WRMP forecast of 145.5 l/h/d. This compares with an average PCC of 149.5 l/h/d reported in 2019/20, meaning a year on year increase of just under 10%. The uplift in PCC has been seen in all resource zones, however this is most apparent in resource zones 1 (Tunbridge Wells) and 7 (Cranbrook). These zones have reported average PCC figures that are 31% and 36% above forecast, respectively. The rises in PCC are the key cause of supply demand balance headroom deficits in zones 7 (Cranbrook) and 8 (Ashford) under the DYAA scenario, and zone 7 under Dry Year Critical Period. SEW should investigate why such high rises have been seen in zones 1 and 7, and what actions can be taken to counter this. It should update the EA by the end of the 2021 calendar year. Whilst PCC is significantly over forecast, the company has presented a strong case to demonstrate how this is primarily a result of the impacts of the Covid-19 pandemic on demand and dramatic shifts in customer behaviour. We acknowledge that 2020/21 was a very unusual year and understand that the COVID-19 pandemic had significant impacts on demand and PCC. However, we expect the company to enhance efforts to deliver their WRMP plans, to reduce PCC and mitigate the impacts of COVID-19. The company should provide regular updates with the EA regarding PCC at the quarterly directors meetings and set out its action plan to reduce PCC. In addition, it is likely that COVID-19 will cause a permanent shift in working arrangements and customer behaviours.	The 165.9 l/h/d figure cannot be compared to the 145.5 l/h/d figure or the 149.5 l/h/d figure. The former figure of 165.9 l/h/d is derived using the new Ofwat leakage consistency methodology, whereas the two latter figures are derived using the previous methodology used for our WRMP. Using the new Ofwat leakage consistency methodology the 2019/20 figure for PCC is 143.1 l/h/d (rather than 149.5 l/h/d – see page 18 of our annual return submission). The resulting year on year increase is 15.9% reported in our submission, rather than the 10% quoted in your letter. We have previously shared with the Environment Agency the finding of the work completed for SEW by Artesia. The variability in demand observed during summer 2020 has been carefully analysed and modelled by Artesia – making it possible to identify and quantify the factors that have caused the observed changes in demand at RZ level. SEW now has robust data necessary to make sensible adjustments to existing RZ household demand forecasts, and we plan to explain and include those adjustments in our WRMP24. In the shorter term, once the Environment Agency approves our licence application at the former Aylesford Newsprint site, we will immediately see our available headroom across Kent return to a positive position that exceeds our planned target headroom. We support the proposal to include a regular update and discussion on PCC as part of the quarterly directors meeting Agenda.

There will be long term impacts on water demand, particularly on the split between household and non-household demand. SEW should outline further how it is assessing the likely long-term impacts and using the outputs to inform its WRMP24.	An important area to agree with the Environment Agency is how we adjust the current PCC forecast in our WRMP to take account of the permanent 'new normal' effects brought about by Covid19. We will work with the Environment Agency to reach an agreed position during 2022. At this stage we are not proposing this work will include an alteration to the percentage reduction targets we have for AMP7.

Environment Agency recommended improvements	Recommended water company progress to be demonstrated at the next annual review	South East Water commitment / response
Total Leakage SEW has not met its WRMP leakage reduction forecast but it has indicated that it has met its Ofwat leakage reduction target for 2020/21. Total leakage reported was 92.7 Ml/d compared with its WRMP forecast of 87.7 Ml/d. SEW has not provided the WRMP forecast recalculated to the "consistent reporting" methodology but has set out its existing forecasts and outturn data in a clear and auditable manner. We appreciate that under the new reporting methodology, leakage appears to have fallen from the previous year. Nevertheless, the company should continue to focus on leakage reduction and bringing total leakage down to forecast levels in its WRMP	We expect SEW to take action to reduce leakage to WRMP forecast levels. You should continue to report leakage using the latest methodology and provide updated WRMP leakage forecasts for AMP7 through next year's annual review, applying the impact of the methodology change. We expect companies to explain any implications of the methodology change on your supply demand balance through the annual review narrative.	The changes in leakage reported compared to WRMP are due to a methodological change. This methodological change **has not** materially altered the overall supply demand balance - the increases observed in leakage are rebalanced by reductions made to PCC. South East Water has still met the percentage reduction in leakage it committed to meet in WRMP. We have also met the percentage reduction in leakage required using the new leakage consistency methodology too. For the annual return 2021-22 we will provide more information to explain how the numbers for leakage and for PCC included for WRMP have been adjusted (and replaced) by adopting the new Ofwat leakage consistency methodology. SEW will ensure it continues to deliver the percentage reductions in leakage included in its WRMP.

		Although those reductions will be related to figures derived using the new Ofwat leakage consistency methodology.
Outage Reporting We appreciate that SEW reported considerably lower outage that the WRMP outage allowance. However, the level of detail on outages was below what we expect through the annual review. A full breakdown of outage events should be provided through the annual review.	Include a detailed breakdown of the outages which have contributed to SEW's reported outage for future annual reviews, including for 2021/22. Through regular water resources liaison meetings keep the EA updated around any major outages impacting the company.	As part of our existing annual reporting to Ofwat, South East Water undertakes a very detailed outage assessment of actual outage events at source level – this assessment is independently assured by Atkins. We will share a copy of the latest assessment completed for 2020-21 with the Environment Agency, to confirm whether the existing report meets its requirements.

All the commitments made to the Environment Agency, as above, have been completed through further meeting and discussions, and outputs reported as appropriate as part of this Annual Return for 2021-22.

7.0 Data table

The Reporting data tables are contained as a separate Appendix A to this report.

8.0 Forward look

During 2022-23, we continue with the delivery of our AMP7 programme supporting WRMP.

We will continue to work with the Environment Agency throughout the year and find our open dialogue both with our key contacts at the regional and national levels a positive and constructive way of ensuring we have a shared understanding of the challenges, opportunities and specifics of our sources and supply area.

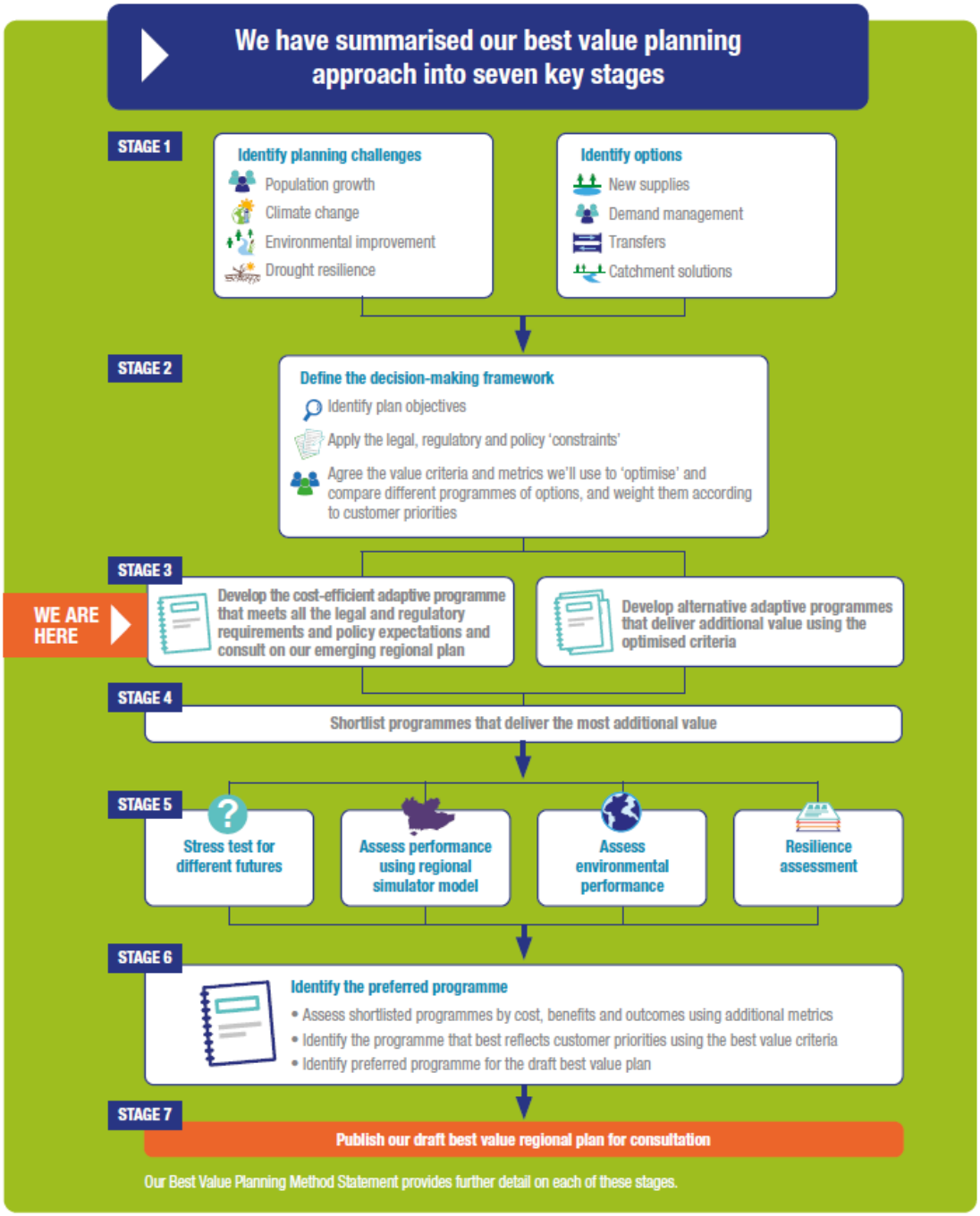
We are committed to and engaged with the work programme being developed during 2022-23 for the WRSE group.

8.2 WRSE and Regional Work

Figure 9 below sets out how WRSE are developing the best value regional plan, during 2021-22 they have completed as far as stage 3 to publish the emerging plan, over the next year, the work will continue from stage 4 to stage 7 to complete and publish the best value plan.

Once completed, we will adopt the outputs from the regional best value plan within our draft WRMP24.

Figure 9: WRSE Programme



8.2 Working from home impact

As reported in earlier sections of this annual review, we have updated our assumptions in relation to the 'new normal' life pattern and adjusted our proposed demand forecast for WRMP24 accordingly.

We will continue working on our demand forecasting ahead of the publication of our draft Water Resources Management Plan 2024 later in 2022, and will update our forecasts using 2021-22 as the base year for our revised draft WRMP24.

8.3 Delivery of WRMP Options

8.3.1 Supply Side Options

During 2022-23, work will continue to develop our major new groundwater scheme on the former Aylesford Newsprint site, near Maidstone, this is due for completion in 2025.

We will continue our targeted catchment management in the Woodgarston area, it is hoped that this will help reduce nitrate seasonal peaks and improve raw water quality in the longer term, allowing us to retain our current yield of 3.0 Ml/d without the need for the future renewal of our new nitrate removal plant at Woodgarston WTW when it reaches the end of its life in around 2035.

We will continue our work to allow the replacement the existing Bewl-Darwell bulk supply scheme and remedy the existing INNS risk that the current bulk supply presents. The work programme during 2021-22 will remain focussed on progressing the planning and delivery of improvements to our existing water treatment works at Bewl (to abstract and deliver an additional 8.0 Ml/d) alongside network improvements necessary to support demand where it is needed.

We will continue our work during 2022-23 to progress our long lead strategic schemes at Broad Oak and Arlington Reservoirs alongside the alternative Peacehaven recycling scheme.

For both Broad Oak and Arlington, this will involve finalising our yield assessments for the schemes and continuing our on-going positive dialogue, liaison and meetings with Canterbury City Council, and Wealden District Council as we work to develop our planning applications.

For Broad Oak, in particular, which has the earliest delivery date, we have identified a number of priority tasks to progress in the next year that include;

- Terrestrial Ecology: completion of priority surveys required and high-level assessment of potential options for SSSI area to the west of reservoir, potentially negating the requirement for the secondary embankment in this area;
- Watercourse diversion: high-level assessment of potential options for the Sarre Penn diversion between the existing pylon and embankment, including review of options with a lower TWL (requiring a smaller embankment, creating space for Sarre Penn), potentially including initial aquatic ecology walkover surveys / WFD assessment of the Sarre Penne; and
- Water Quality: review and scoping of monitoring programme of water quality to provide a solid period of monitoring data, both at the Stour, Sarre Penn and to include the coal authority water source.

8.3.2 Demand Management

During 2022-23 it is essential we continue the acceleration of our AMP7 water efficiency strategy post the impact COVID-19 on our programme, as experienced during 2020-21 and early parts of 2021-22.

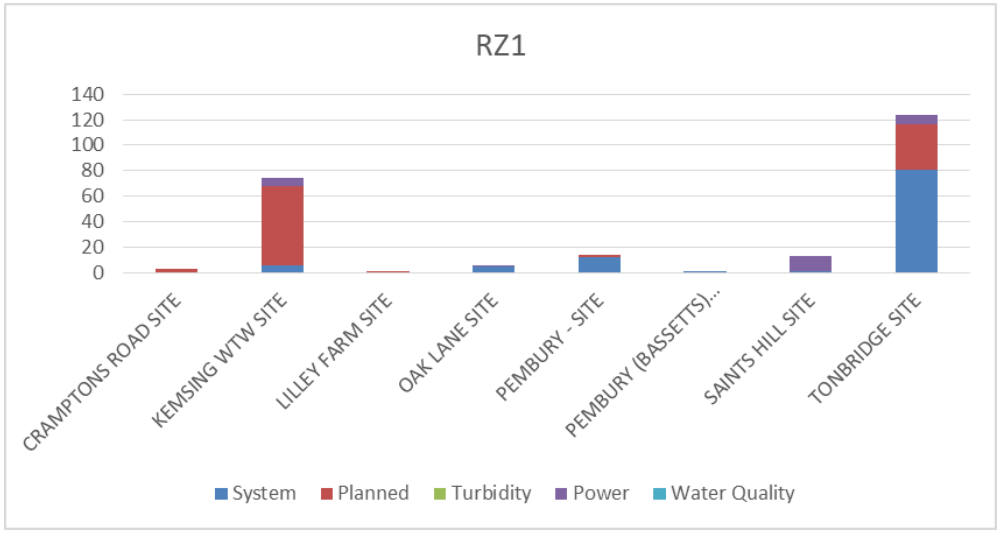
This approach ensures, after taking account of necessary adjustments to our baseline starting position (e.g. to take account of 'new normal' working from home impacts) we will achieve the 7.6% reduction in PCC from the final baseline position necessary to meet our PCC ODI target. Table 8 below describes the activities we will continue to implement during 2022-23.

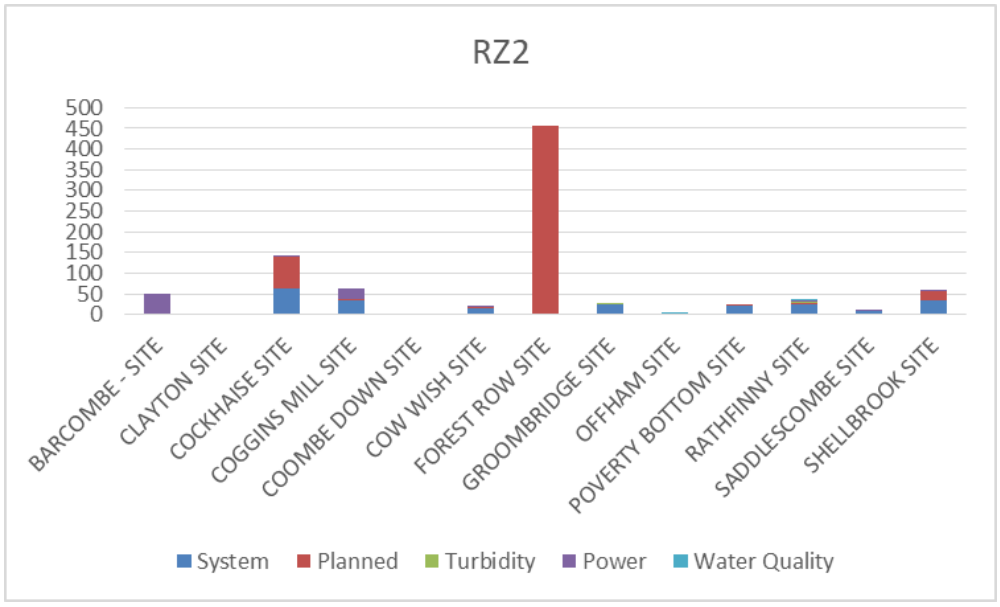
Table 8: AMP7 water efficiency strategy

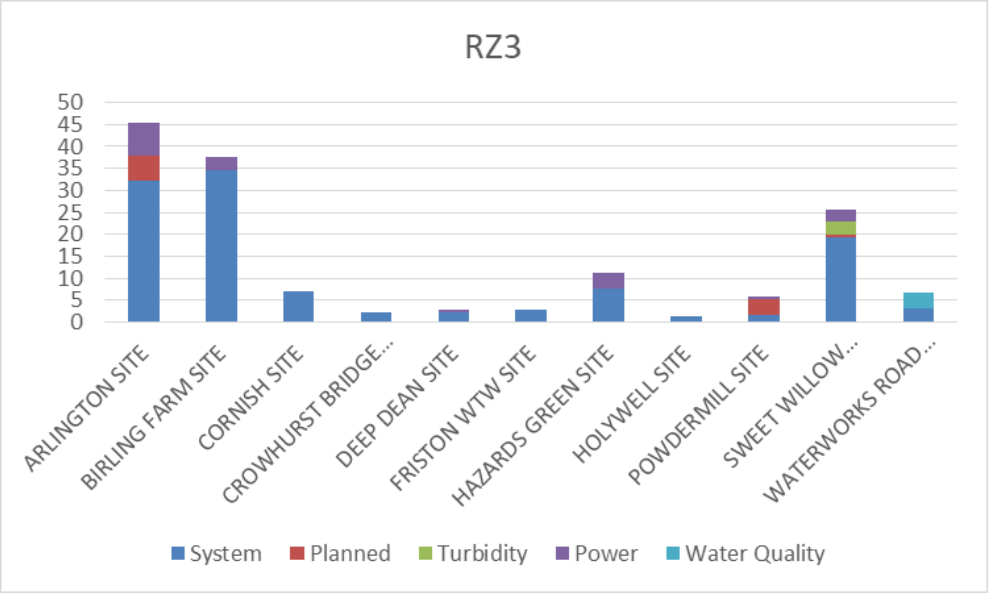
Activity	**Activity type**	**Planned volume by end of 2021-22**
Behavioural Report	Behavioural	800,000 properties
Free water devices	Water Devices	130,000 issued
New home packs and devices	Water Devices	4,800 issued
Leaky loo strips	Water Devices	200,000 issued
Efficiency audits	Efficiency Audit	(small volume)

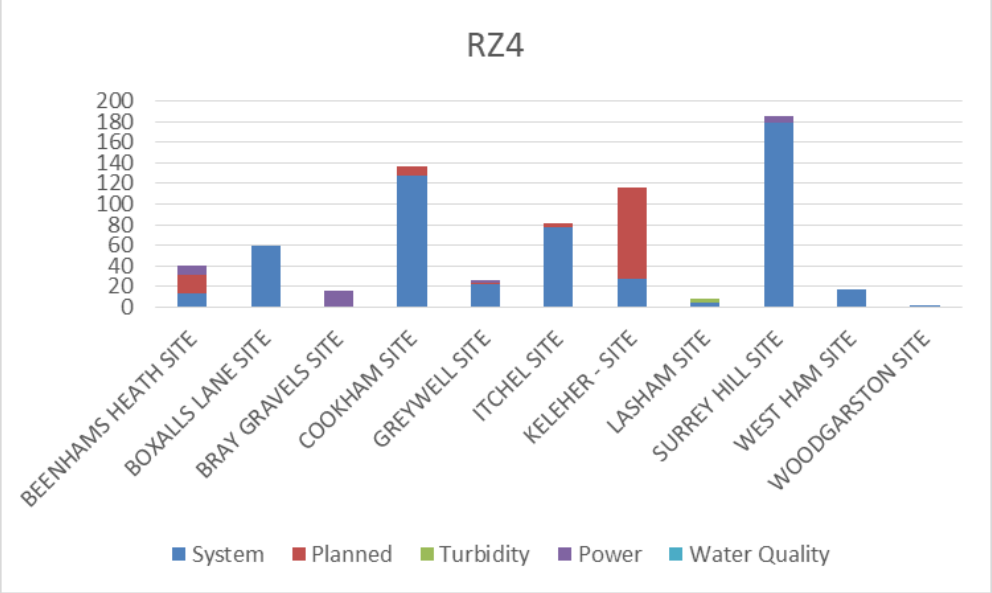
We are progressing with a range of leakage management options. We will provide updates on progress to the Environment Agency though year at our normal progress meetings.

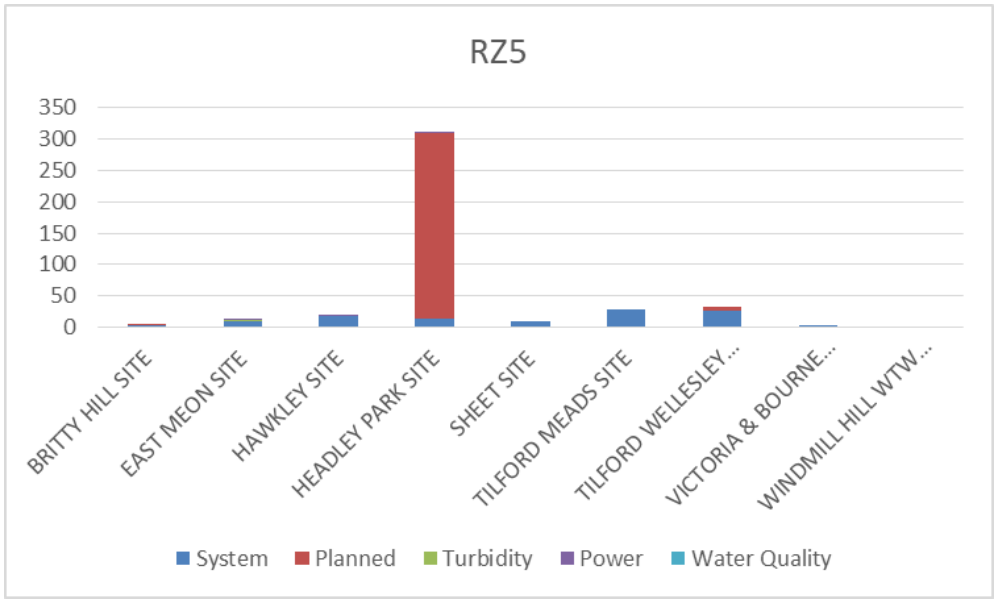
Annex 1 – Outage Charts

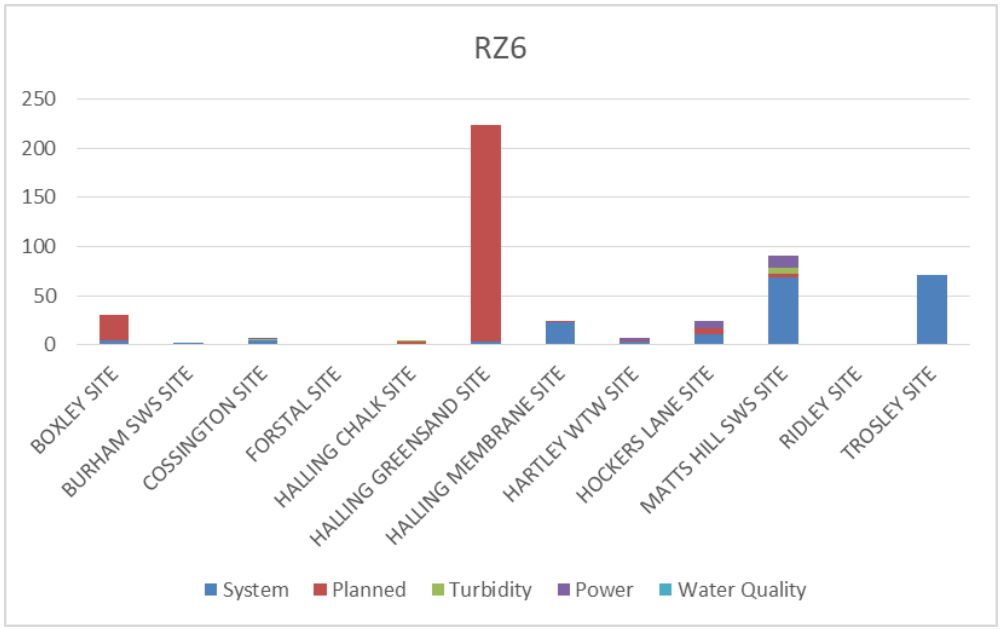





RZ3
50
45
40
35
30
25
20
15
10
5
0
ARLINGTON SITE
BIRLING FARM SITE
CORNISH SITE
CROWHURST BRIDGE...
DEEP DEAN SITE
FRISTON WTW SITE
HAZARDS GREEN SITE
HOLYWELL SITE
POWDERMILL SITE
SWEET WILLOW...
WATERWORKS ROAD...
System
Planned
Turbidity
Power
Water Quality


RZ4
200
180
160
140
120
100
80
60
40
20
0
BEENHAMS HEATH SITE
BOXALLS LANE SITE
BRAY GRAVELS SITE
COOKHAM SITE
GREYWELL SITE
ITCHEL SITE
KELEHER - SITE
LASHAM SITE
SURREY HILL SITE
WEST HAM SITE
WOODGARSTON SITE
System
Planned
Turbidity
Power
Water Quality


RZ5
350
300
250
200
150
100
50
0
BRITTY HILL SITE
EAST MEON SITE
HAWKLEY SITE
HEADLEY PARK SITE
SHEET SITE
TILFORD MEADS SITE
TILFORD WELLESLEY...
VICTORIA & BOURNE...
WINDMILL HILL WTW...
System
Planned
Turbidity
Power
Water Quality


RZ6
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100
50
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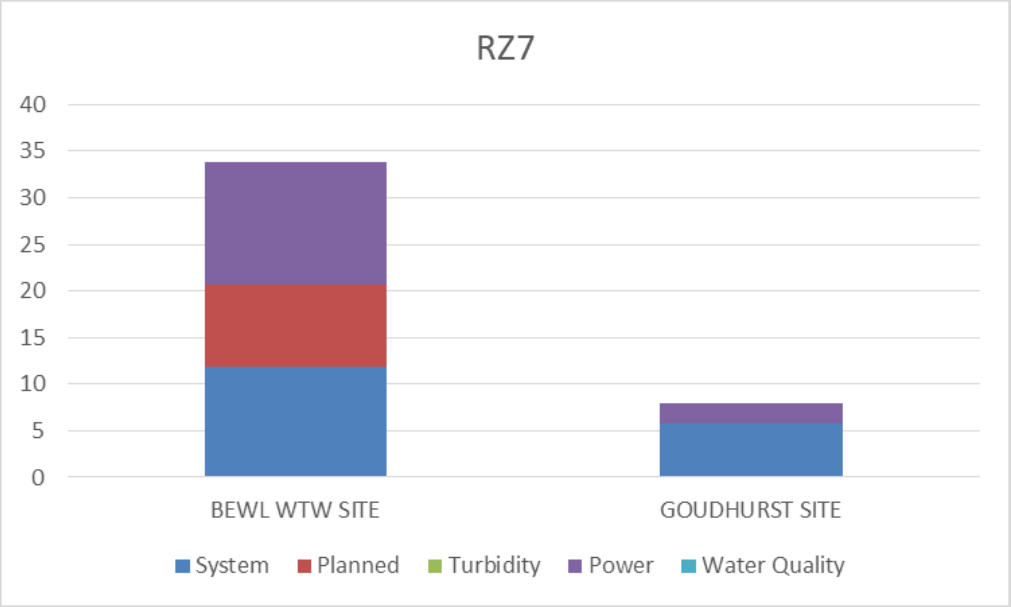
BOXLEY SITE
BURHAM SWS SITE
COSSINGTON SITE
FORSTAL SITE
HALLING CHALK SITE
HALLING GREENSAND SITE
HALLING MEMBRANE SITE
HARTLEY WTW SITE
HOCKERS LANE SITE
MATTS HILL SWS SITE
RIDLEY SITE
TROSLEY SITE
System
Planned
Turbidity
Power
Water Quality


RZ7
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35
30
25
20
15
10
5
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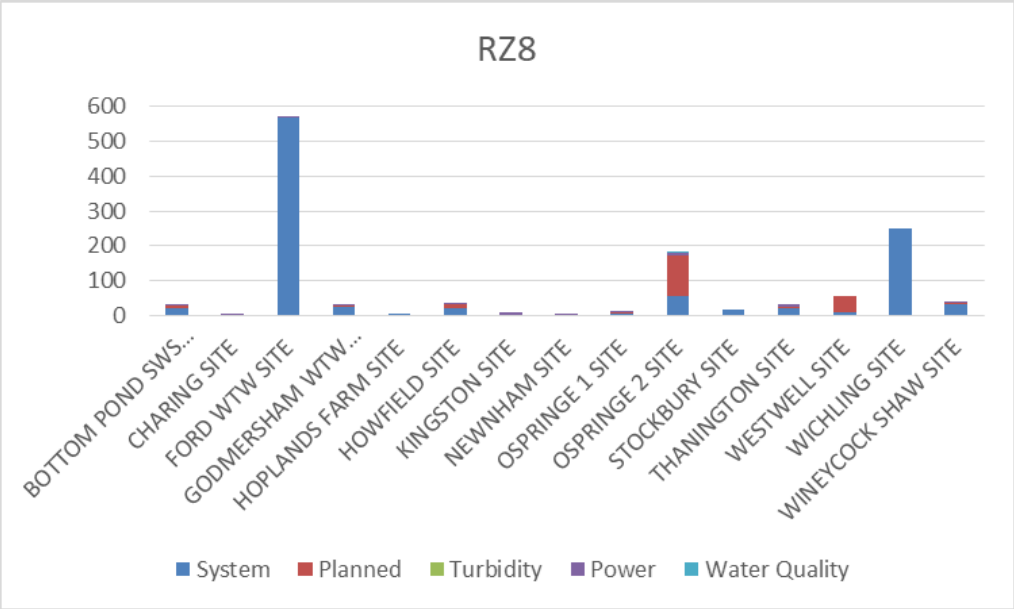
BEWL WTW SITE
GOUDHURST SITE
System
Planned
Turbidity
Power
Water Quality


RZ8
600
500
400
300
200
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BOTTOM POND SWS...
CHARING SITE
FORD WTW SITE
GODMERSHAM WTW...
HOPLANDS FARM SITE
HOWFIELD SITE
KINGSTON SITE
NEWNHAM SITE
OSPRINGE 1 SITE
OSPRINGE 2 SITE
STOCKBURY SITE
THANINGTON SITE
WESTWELL SITE
WICHLING SITE
WINEYCOCK SHAW SITE
System
Planned
Turbidity
Power
Water Quality