YKY.PD.A3

YorkshireWater

Contents

1. Introduction

We submitted our PR19 business plan to Ofwat in September 2018. Ofwat reviewed the plan and published its initial assessment of plans (IAP) in January 2019. The assessment included a series of required and advised actions for us to complete by 1 April 2019, as well as several actions that required completion after 1 April 2019. This document provides our response to IAP action **YKY.PD.A3**. This action was submitted to Ofwat on 15 July 2019.

IAP Action YKY.PD.A3

PR14 Outcome delivery incentives: Yorkshire Water is required to update its forecast for 2019-20 performance to take account of the actual 2018-19 performance for all its performance commitments. We expect the company to pay particular focus where we found the evidence provided in its business plan for the 2018-20 forecasts to be insufficient which was for:

- WB4: Water network stability and reliability factor
- WB1: Leakage
- WA3: Drinking water contacts
- WA4: Water quality stability and reliability factor
- WC1: Length of river improved (note: performance commitment is part of a total commitment at Appointee level - see also SB4)
- SB4: Length of river improved (against WFD component measures) (note: performance commitment is part of a total commitment at Appointee level - see also WC1)
- SB2: Wastewater quality stability and reliability factor

Our actual performance for 2018-19 and our forecasts for 2019-20 are detailed within this document for the measures listed above. In addition, please refer to our updated PR14 reconciliation document, which we have updated in response to IAP action **YKY.PD.A7** 'to refresh its PR14 reconciliations to replace its 2018-19 forecast performance with 2018-19 actual performance and update the evidence for its forecast 2019-20 performance taking into account the actual 2018-19 performance'. This document can be viewed at: https://www.yorkshirewater.com/ourbusinessplan

2. Assurance of our IAP response

Good assurance needs to be provided at the right time, be proportionate to the level of risk identified, ask the right questions and assess the quality of evidence supporting the statements made. Our assurance approach is risk based and aligned to the 'three levels of assurance' framework. This is best practice and is set out in Yorkshire Water's published Assurance Plan for 2018-19 and 2019-20.

In responding to this IAP action, we have used our standard assurance methodology, applying three levels of assurance to ensure that our responses are complete and accurate. Level 1 has been completed by a range of action owners who were assigned based on their knowledge and expertise of the areas raised by Ofwat. IAP action owners, supported by colleagues within Regulation, have reviewed information previously presented to Ofwat as part of the PR19 Business Plan submission to understand potential gaps in the original information and identify opportunities to improve our submission. The IAP action owners have prepared this submission and provided Level 1 assurance sign-off.

Senior managers have carried out Level 2 assurance and provided a signed assurance statement confirming that the information included in this submission is complete, accurate and meets the needs of the IAP action. Level 2 assurance has also included oversight of the submission from colleagues within Regulation to ensure the submission is compliant with the action request.

Level 3 assurance was carried out by Jacobs, our independent assurance providers. Jacobs reviewed Ofwat's request, our responses and the evidence provided to support these responses. Jacobs provided feedback and the action owners updated the submission in response.

This overall IAP response for YKY.PD.A3 has been reviewed and approved by the Head of Regulation.

This response should be read in conjunction with our response to action **YKY.PD.A7**, Accounting for Past Performance PR14 Reconciliation, which presents updated actual performance data for 2018-19 and our updated forecast for 2019-20.

3. WB1: Leakage

Our 2018-19 outturn position for leakage is 289.8 Ml/d. This is lower than our 2018-19 regulatory target of 292.1Ml/d, but above where we wanted to be to achieve our upper quartile ambitions.

In 2019-20 we are forecasting leakage performance of 269.0 Ml/d against a regulatory target of 287.1Ml/d. Our forecast for 2019-20 of 269.0 Ml/d is higher than our original forecast of 235.0 Ml/d, which we previously submitted as part of our September 2018 Business Plan. More detail on how we have reprofiled our leakage targets is detailed in **YKY.OC.A1-A52: Delivering outcomes for customers**. Please also see section 3.3 on AMP7 reporting for further information on our future targets.

Table 3.1 presents actual leakage performance for each year of AMP6 up to 2018-19 of AMP6 and a forecast for year 5 of AMP6. This performance commitment is reported by financial year and has both a financial underperformance penalty payment of £0.100948m per Ml/d and an outperformance reward payment of £0.050507m per Ml/d. We are forecasting an outperformance reward payment of £0.253m.

Leakage	Unit	Starting Level	Actual Performance				Forecast Performance
		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Actual / Forecast Performance	Ml/d	297.1	285.1	295.2	300.3	289.8	269.0
Outperformance value	£m		-	-	-	-	0.253
Performance commitment target	Ml/d		297.1	297.1	297.1	292.1	287.1
Underperformance payment deadband	Ml/d		302.1	302.1	302.1	297.1	292.1
Outperformance payment deadband	Ml/d		274	274	274	274	274

Table 3.1. Leakage performance in AMP6, including the underperformance or outperformance value.

3.1) Upper quartile ambitions

In the PR19 guidance to water companies, Ofwat set an expectation that companies would achieve forecast upper quartile performance (in relation to leakage / property / day and leakage / km of main / day) or achieve at least a 15% reduction in leakage by the end of AMP7.

Based on our estimates of the likely UQ leakage rates in AMP7, we judged that we would have to reduce leakage by 40% from 2016-17 levels to match the future UQ position at the end of AMP7 and we committed to achieving this in our announcement in December 2017. We planned to achieve a 20% reduction in the last two years of AMP6, leaving a further 20% to be delivered over five years in AMP7.

In order to meet our ambitious targets for the current period, additional proactive resources were deployed. The number of leakage technicians was increased from 140 to nearly 300 over the year, with a peak of 370 resources at one point. In addition, repair and maintenance teams were also increased. The increased focus meant that proactive mains repairs increased by 127%, proactive communication pipe repairs by 222% and proactive supply pipe repairs by 318% (April 2018 to February 2019 against the previous three-year average), leading to additional leakage volume saved. However, during the same period, we saw the effects of weather. We saw an increase in bursts of our mains caused by the 'Beast from the East' in February 2018, which continued to impact us at the start of this financial year. We also had an extended hot and dry summer, which resulted in increased customer demand and a significantly reduced soil moisture deficit leading to ground movement and increased burst rate. The effects of this weather caused additional 'reactive' leakage to occur that under an "average year" would not normally be observed, meaning whilst additional volumes of leakage have been saved (compared to an average year), this was offset through the weather-related impacts.

This relationship has created difficulty for the company in achieving our stretching current outperformance targets. Although, we did not meet the stretching outperformance targets we set ourselves in 2018-19, we have rephased our proposed target levels for the next six years and we are still committed to reducing leakage by 40%.

Our leakage reduction strategy recognises that new technologies, working practices and performance management will be needed to enable us to achieve unprecedented low levels of leakage, particularly in the latter stages of planned leakage reductions. There are currently four key programmes of work in progress to support leakage reduction:

- **Increased detection and repair - A programme of activity with a combination of conventional find and fix solutions and technology solutions.**

  At the start of 2018-19, we increased leakage technician capacity across the region and obtained guarantees from our partners that rectifying work would be completed in a timelier manner. Following this, more enabling initiatives have been mobilised. These include the deployment of 38,000 acoustic loggers and the use of satellite imagery to detect leaks.

The technology projects will enable the technicians to be more effective in identifying and detecting leaks. Careful consideration has been given to the locations of the acoustic loggers to target the poorer performing District Metered Areas (DMAs) for leakage. The information provided by acoustic loggers will support the organisation in major incidents and situations of leakage breakout due to severe weather, as well as providing support in more effective active leakage control.

- **Enhanced asset management - A programme of activity focussed on improving assets, performance and monitoring.**

  The primary objective of this work is to investigate the existing metering coverage and performance, identify potential new metering requirements and install new flow meters which will facilitate the production of trunk main leakage reports for mains downstream of distribution input (DI) meters and upstream of DMA inlet meters.

- **Network optimisation - A programme of activity to improve pressure management across the region and reduce the size of DMAs.**

  We aim to reduce leakage on service pipes. Using desktop studies and local experts we will identify key areas. Further investment into pressure release valves (PRVs) and flow loggers across the network will ensure that excess network pressure is reduced with the aim to lower leakage and bursts. The PRVs were used actively to reduce customer impact during the 2018 freeze/thaw event and are now being used to improve water supply resilience through our DMA optimisation programme. We will implement trunk main metering in key areas.

- **Improved quantification and insight - A data improvement programme improving the accuracy and reliability of data is central to our UQ leakage strategy.**

  Another key element of the programme is to improve the way that leakage is reported and measured as part of the annual performance report. This will include validation of the key assumptions used as part of the reporting. We have recruited additional data analysts to ensure that benefits from related projects are realised.

  Enhanced reporting accuracy and the efficient and effective targeting of resource are key elements in our drive to meet our ambitious leakage performance commitment. In order to gain the required insight and to fully understand what our data can tell us, a Data Science team has been created to focus on areas of continuous data improvement right across the

business. One area of focus in 2018-19 has been to identify potential improvements across all elements that contribute to the water balance. The team identified data improvements in the reporting of water consumption and leakage. The data improvements that were considered to be mature and robustly evidenced were shared with the technical auditor, Jacobs, who supported their implementation for 2018-19. Further initiatives, which required additional understanding or consideration were also shared with the technical auditor for information but were not implemented in 2018-19. We will continue to review these and other future opportunities to ensure a robust water balance and increase the accuracy of the resulting reported leakage and consumption volumes. One of the key areas that is being investigated is the effect of soil moisture deficit on leakage. We are constructing a detailed map of our region that will be used to proactively detect areas of raised leakage during prolonged periods of dry weather.

3.2) Customer support

In the last two years of AMP6 we have re-invested totex outperformance from the current period into improving our leakage position. We have tested our customers priorities on the service areas they wish to see the most improvement and have the full support from the Yorkshire Forum for Water Customers, our Board, shareholders and stakeholders for our leakage ambitions. We have publicly announced our performance improvement plans to let our customers know that we have listened and are responding, and to signal that we want to be a leader in both our performance and the decisions that put customers' expectations at the heart of our business.

At the highest level, our customers continue to place greatest priority on a safe and reliable supply of water, now and in the future with more than 95% of customers seeing this as most important priority for us to deliver.

Our customers have also demonstrated very high levels of support for the leakage performance commitment, ranking leakage their third most important performance commitment, only just behind the two drinking water quality performance commitments. There was also very strong support for the ODIs associated with this performance commitment, being ranked fourth of the 50 ODIs researched. Our customers expect to see substantial leakage improvement from us, and it ranked third for investment focus, both in the immediate and long-term.

3.3) AMP7 reporting

In 2018-19, we have observed a greater than expected gap between current reporting and future reporting definitions. It is not immediately evident as to the contribution from our further refinements in reporting and the contribution made by the fact that 2018-19 experienced atypical weather conditions, which will have impacted leakage. We will continue to review and better understand the drivers causing the change that has occurred this year. As a result, we are planning to propose a percentage reduction as a more appropriate way to present our leakage targets in AMP7, in line with Ofwat guidance. This will form part of our draft determination representations.

3.4) Superseded content

Area	Superseded content
Document (s)	This supersedes the leakage section of **'Appendix 20a: accounting for past delivery'**
Chapter (s)	PC WB1 Leakage
Page (s)	12-13

4. WB4: Water network stability and reliability factor

The stability and reliability (S&R) factors enable us to measure how well we are looking after all of the buildings, pipes and equipment which enable us to continue to deliver our services to you. This evaluation is undertaken on an annual and a five yearly basis to confirm whether each S&R factor should be assessed as either improving, stable or deteriorating. A deteriorating assessment means that Yorkshire Water could be penalised. This assessment is a considered judgement of performance based on factors both within and outside the control of Yorkshire Water, including weather, overall business performance, legislative changes, customer views and regulators' views. Each of the S&R factors are built up from several sub-measures. To achieve an overall assessment, we first need to look at each of the sub-measures in turn and assess them as either stable, improving or deteriorating depending on their position in relation to the performance levels agreed with Ofwat and our customers. Each sub-measure has a minimum annual performance level, this is called the reference level, and a maximum or 'high' level which is used to help identify when extreme or continuous poor performance causes that sub-measure to be considered as deteriorating. It is the cumulative performance across each group of these sub-measures which will be used to confirm the performance level of the overall S&R factor.

We achieved stable status for this measure in 2018-19 and we confirm that we expect the overall measure for water network stability & reliability (S&R) to remain at stable at the end of AMP6.

This performance commitment is a penalty only financial outcome delivery incentive and our performance against all sub-measures has been assessed as stable. Therefore, there is no penalty payment to be applied.

This measure is supported by six sub-measures. Of the six supporting sub-measures in 2018-19:

- four have remained below the reference level
- one has moved above the reference but is below the high level
- one measure (total bursts) has moved above the high level.

Throughout AMP6, four of the six sub-measures for water network S&R have remained at or better than the reference levels to date within the 2015-20 period. The two measures that have gone above the reference level are total bursts (mains repairs) and interruptions greater than 12 hours. The reason for the total bursts increase is due to our drive to improve leakage performance and external factors on our network. This performance does not reflect a deterioration of our asset base, as we have proactively looked for, and replaced more leaking

water mains. This has been demonstrated recently during the 'Beast from the East', which was followed by a prolonged hot and dry summer. This is further detailed in **YKY.OC.A1-A52**.

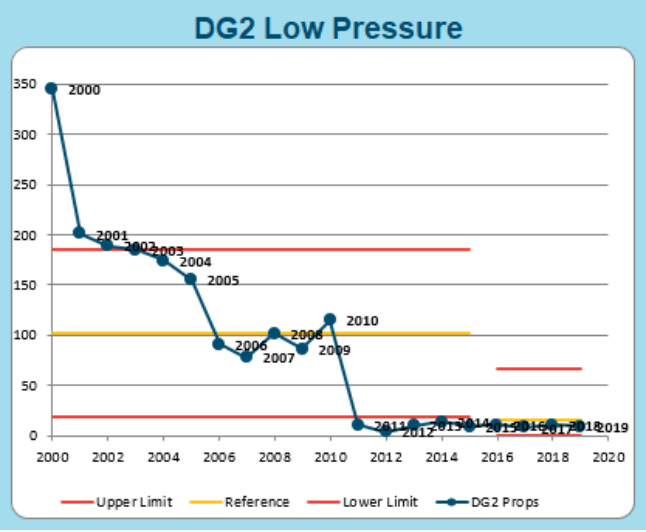
Below we expand on each sub-measure within the Water Network S&R measure.

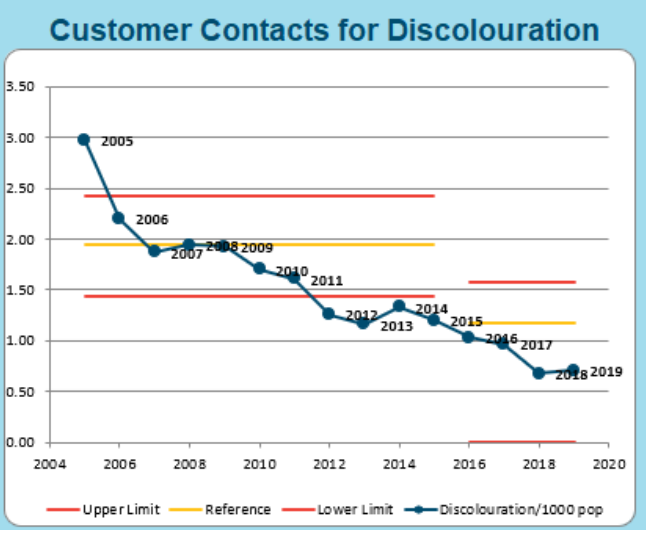
4.1) DG2 Low Pressure

The properties below reference at the end of 2018-19 has decreased from 11 to 9 and is below the reference level of 15. This measure has remained stable for the last two AMPs and continues to perform strongly. In terms of 2019-20 performance, we expect to outturn at a similar number to 2018-19, of 9 properties.

4.2) Customer Contacts for Discolouration

Performance in 2018-19 is well below the reference level of 1.180 per 1000 population. The slight increase from the previous year is related to the warm summer of 2018 and the increased demand, which increased flows around the network, therefore mobilising previously deposited sediment. The targeted DMA flushing programme has enabled strong performance within this measure to be maintained and further focus on trunk main conditioning will also have a positive impact. We expect to out turn 2019-20 at a similar level of 0.700 contacts per 1000 population.





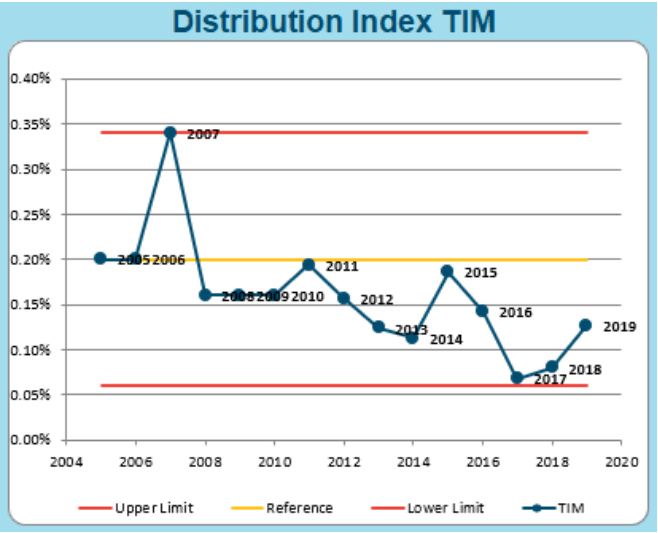
4.3) Distribution Index TIM

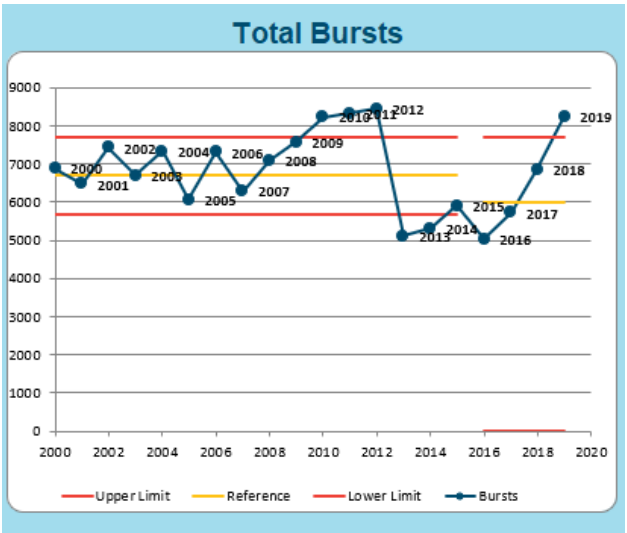
The total number of iron failures for 2018 was 15 and there was one manganese failure. Performance in 2018-19 has remained below reference level. We are continuing with the DMA flushing programme, which has had a positive impact on this measure. We are going to focus more on trunk main conditioning to target the amount of sediment mobilised from trunk mains that settles in the distribution network. There have been 10 iron failures so far in 2019-20. This means that our performance is likely to be nearer to the reference level of 0.200%.

4.4) Total Bursts

Mains bursts have increased in 2018-19 to 8,254. This is above the reference level of 6,000 and the previous high level of 7,710. The increase is due to events such as our response to the Beast from the East and the long hot summer we experienced in 2018, which caused an increase in soil moisture deficit leading to ground movement and more structural failures on our cast iron assets. Also, due to our commitment to reducing leakage, we have significantly increased the number of leakage technicians whose principal job is to find leaks, which inevitably resulted in more mains repairs being carried out. Further detail on this is referenced in our action response **YKY.OC.A1-A52**.

Due to our drive to reduce leakage, we anticipate 2019-20 performance to be similar to the 2018-19 position, which will be above the high level.

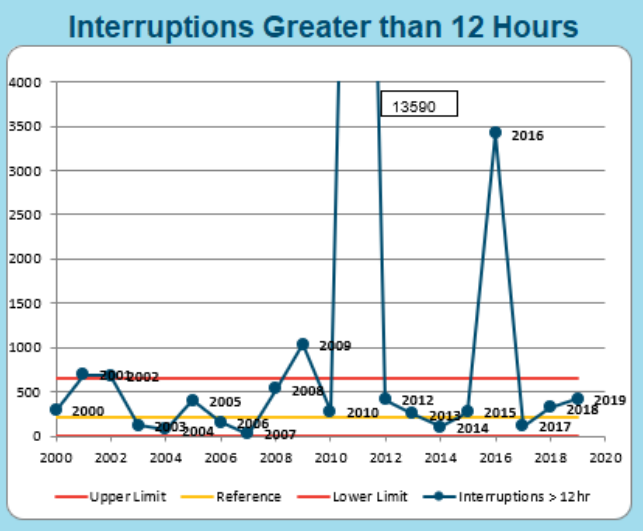




4.5) Interruptions greater than 12 hours

There were 414 properties that had an interruption to supply of greater than 12 hours in 2018-19. This is above the reference level of 220 but below the high level of 659. This is an increase from last year where we out turned at 320.

Overall, when considering this against the number of mains repairs due to events such as the Beast from the East and the long, dry summer, we believe that this shows reasonable performance. Despite a challenging start to the year we anticipate 2019-20 performance to remain below the high level, but above the reference level of 220.



4.6) Superseded content

This commentary supersedes the Water Network S&R section within 'Appendix 20a: Accounting for Past Delivery'.

Area	Superseded content
Document (s)	Appendix 20a: Accounting for Past Delivery
Chapter (s)	Water Networks S&R Factor
Page (s)	16-17

5. WA3: Water quality contacts

Our performance over the AMP is stable and improving steadily. In 2018-19 we had 7,964 contacts against a target of less than or equal to 6,108 contacts. We expect our 2019-20 performance to be in the region of 7,500 water quality contacts. This is above the performance commitment target of 6,108 but would represent our best ever performance for this measure. Since the start of the 2015-20 period, water quality contacts have reduced by over 30% in comparison to the final year of the previous AMP period.

This performance commitment is reported by financial year and has both a financial penalty of £0.003300m per contact per year and a reward of £0.002665m per contact per year outside of the deadband of accepted performance up to the outperformance payment cap or the underperformance payment collar.

Table 5.1 presents the actual number of water quality contacts for each year of AMP6 up to 2018-19 of AMP6 and a forecast for year 5 of AMP6. The table also shows the value of the underperformance penalty payment.

Water quality contacts	Unit	Starting Level	Actual Performance				Forecast Performance
		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Actual / Forecast Performance	Ml/d	12,143	10,007	9,093	8,100	7,964	7,500
Underperformance value	£m		-	-	(6.574)	(6.125)	(4.594)
Performance commitment target	Number		10,131	8,120	6,108	6,108	6,108
Underperformance payment collar			15,000	15,000	8,965	8,965	8,965
Underperformance payment deadband	Ml/d		12,143	12,143	6,108	6,108	6,108
Outperformance payment deadband	Ml/d		6,108	6,108	6,108	6,108	6,108
Outperformance payment cap	Ml/d		2,775	2,775	2,775	2,775	2,775

Table 5.1. Water quality contacts performance in AMP6, including the underperformance penalty value.

Within AMP6 we have embedded a programme of DMA flushing, which has seen our performance improve from 10,570 contacts at the end of year 5 of the previous AMP, to less than 8,000 contacts by the end of year four of AMP6. We aim to improve performance further with a continuation of DMA flushing, as well as rolling out a programme of trunk main conditioning.

More information on these is provided in sections 5.1 and 5.2. We believe our large-scale DMA flushing programme prevented some of the contacts we would have otherwise received.

Delivery of our AMP6 water quality (WQ) targets, set by Ofwat as part of the PR14 Final Determination, has been challenging. In 2017-18 and 2018-19 both the winter and summer weather conditions have resulted in high levels of demand from our customers. This high demand has manifested in disturbance of historic sediment and occurrence of discolouration in areas not previously expected to be significantly impacted. These previously well performing areas provide the focus for our future investments.

The weather has been a driver for the greater use of our interconnected grid distribution mains to support customer demand and prevent large scale interruption to supply. Using our network flexibly in this manner to assure long term security of supply can result in a change in source water type for some supply areas, which we know some customers can identify as a change in taste. These changes were carefully managed, and all customer communication channels were fully utilised to keep customers fully informed.

The extremely dry conditions of 2018 have resulted in increased ground movement and a greater number of mains bursts. These weather conditions and our drive toward UQ levels of leakage have resulted in us carrying out more mains repairs. The nature of mains repairs may result in short periods of air entrained water which presents to customers as ‘milkiness’.

One of our key initiatives to continue to drive performance improvements, is around the information we provide on potential drinking water issues to customers. Around 15% of contacts from customers regarding water relate to ‘milky water’. The milky appearance is simply caused by air bubbles creating a cloudy appearance and milky foam at the surface. In this case, through simple but effective visual content on our website, we can inform our customers and reassure them that their water supply is no risk to health. We believe there is more that can be done to improve our provision of information and we will carefully be monitoring the learning from ongoing campaigns to identify further improvements.

We know we need to reduce mobilisation events where historical deposits of discoloration material is disturbed through increases in flow within our network. One way we will do this is through increasing the awareness and technical capability of our network operators. We have developed a new hydraulic training package which we will roll out to our teams and will continue our calm networks awareness programme for all appropriate Yorkshire Water and service partner teams.

Linked to the additional training, a proactive visible valve status initiative will be undertaken to ensure that all network valves are correctly positioned, recorded and made visible for all operators. We have recently introduced a new emergency risk assessment process that supports operators to risk assess emergency operation of the network. The creation of a new operation engineer team based in our Service Delivery Centre enables us to assess the water quality risk of any potential operation or incident and optimise our response to reduce the impact on customers. The role also provides an authorisation route for our higher risk work. In addition, we are looking to further enhance risk assessment to reduce mobilisation events.

5.1) DMA Flushing

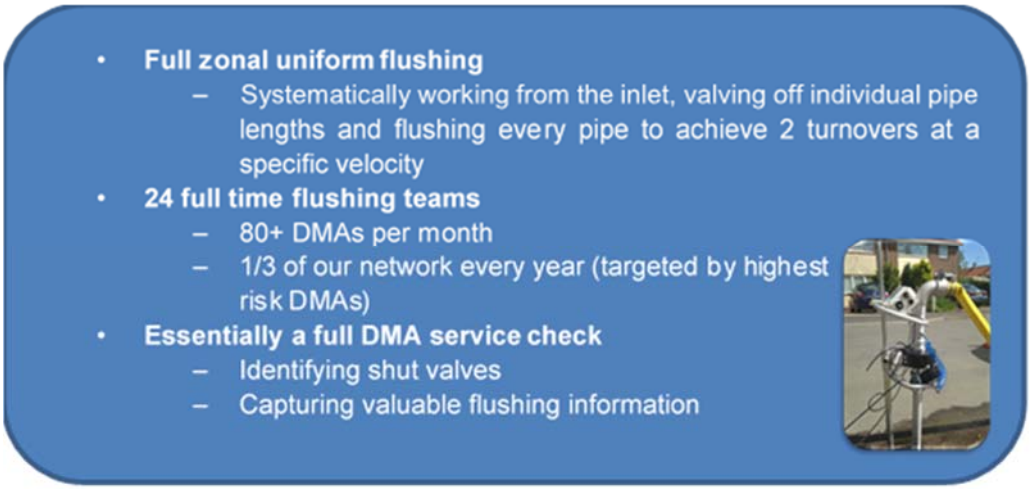
Within AMP6, our approach has adapted from focusing on the traditional capital activity of mains renewal and rehabilitation. We have had to think differently in order to maintain the reduction in discolouration complaints from our customers. Cast iron makes up 52% of our water main asset stock, compared to the western European average of circa 19%. Cast iron is the material with the highest percentage of bursts, accounting for an average of 72% of our bursts on an annual basis, the nature of mains repairs may result in short periods of air entrained water, which presents to customers as ‘milkiness’. To keep our customers’ bills low we have relined as opposed to replaced some mains – particularly between 19950 to 2010. This approach does not mitigate the prevailing risk of iron related discolouration, to manage this risk the network is managed effectively.

DMA flushing is our principle initiative for improving our performance with water quality contacts. We have created of a Distribution Maintenance team to deliver a pro-active DMA flushing programme in our highest risk areas of the network. The team has proactively flushed more than 2000 DMAs since its creation, removing historical sediments that can cause discolouration of water supply. The team has helped to reduce discolouration contacts by nearly 2,000 within the current period. We plan to further optimise our flushing programme at DMA level to improve its effectiveness, working with expert external partners and interested stakeholders.

AMP6 has been a combination of smaller capital activity, complemented by a large uniform DMA flushing programme, as well as the recent introduction of trunk main conditioning. This has worked well and the learning and experiences from the programme will enable our AMP7 programme to be more efficient and effective. Where a network can be cleaned (or suitably conditioned to higher flow rates), there is a benefit from operating pipes at high flow rates at regular intervals to prevent significant re-accumulation of discolouration material.

This reduces the need for capital activity to be a primary solution for decreasing discolouration and is seen as a more effective totex solution when compared to traditional capital asset replacement activity. This approach has shown immediate performance improvements, and this type of investment must be maintained for performance levels to continue at the lower level.

The diagram below summarises our DMA flushing process.



5.2) Trunk Main Conditioning

Throughout 2019-20 of AMP6 and also within AMP7, where it is possible to do so, our approach to addressing discolouration risk in our large diameter mains will be to carry out trunk main conditioning, and where it is appropriate, automate this process. We have trialled this innovative technique in the early years of AMP6 and we aim to roll this out on a much larger scale throughout AMP7. It will give a benefit to stopping large scale 'one-off' incidents, by removing sediment to calculated velocities expected under burst conditions, as well as reducing the amount of sediment transferred from our trunk main system into the DMAs, where any future changes in flow could result in a customer impact.

Manual trunk main conditioning involves field teams to manually condition trunk mains where it is not possible to automate. Automated trunk main conditioning includes:

- Identifying mobilisation potential when flow increases occur
- Build single pipe Prediction of Discolouration in Distribution Systems (PODDS) models for identified high risk pipe lengths
- cyclical reconditioning operations are be designed to increase the safe operating flow as part of an asset care plan

A full water balance calculation can be applied once sufficient telemetry and instrumentation has been installed

5.3) AMP7 reporting

The biggest improvements in performance occurred in years one, two and three of AMP6. As was expected, the better the performance got, the more difficult it has been to continue to improve at the same rate. We believe we have optimised our flushing approach so that we are targeting the right amount of resource in the right areas. Applying even more resource is unlikely to give us even better performance. We expect performance to improve in 2019-20, but at a much lower rate. This will unfortunately leave a gap between our year five outturn figure and where we want to be at our 6,108 target.

Our plans for AMP7 are to continue with our successful DMA flushing programme, optimise our trunk main conditioning programme so that maximum benefit can be achieved, as well as exploring other options that help improve performance (chloramination, calm network training, improved customer communication).

Despite a challenging year due to the weather conditions experienced, a small reduction has been seen in the contacts in 2018-19. We have set a target of 11.3 contacts per 10,000 properties across the majority of the 2020-25 period, a further reduction of 21% in contacts from the reported figure in 2017-18 (based on the normalised PR19 AMP7 performance commitment definition).

5.4) Superseded content

Area	Superseded content
Document (s)	Appendix 20a: Accounting for Past Delivery
Chapter (s)	Drinking Water Complaints
Page (s)	9-11

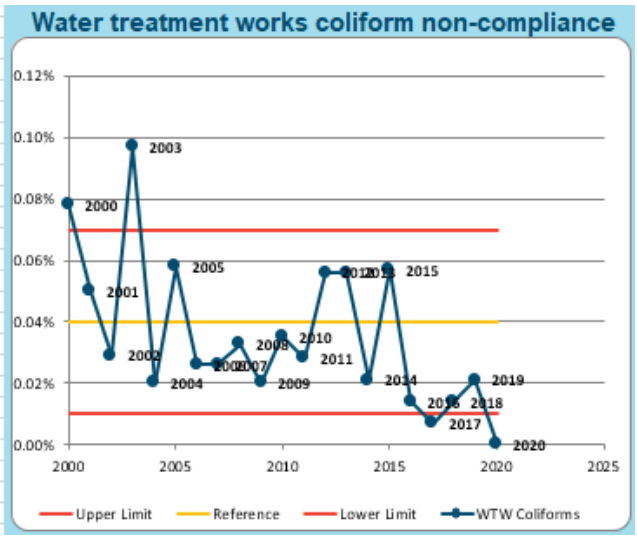
6. WA4: Water quality stability & reliability factor

We achieved stable status for this measure in 2018-19 and we expect our 2019-20 performance to be stable for the water quality stability and reliability performance commitment. AMP6 performance to date is stable with all supporting sub-measures at or below reference level. The 2019-20 Annual Performance Report (APR) will be the last year of this measure as it is not reported for AMP7 as the stability and reliability basket is being replaced by Ofwat's asset health measure.

This performance commitment is a penalty only financial outcome delivery incentive. With performance at, and forecast to remain at stable, no underperformance penalty payment is applicable.

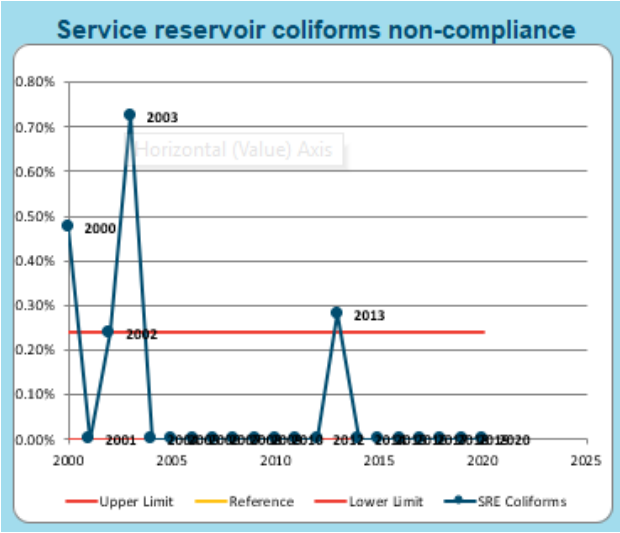
6.1) Water treatment works coliform non-compliance

Yorkshire Water's water treatment work (WTW) non-compliance performance is well below the reference level of 0.040% and has been since 2016. There were three WTWs with coliform exceedances in 2018. Each instance of failure was investigated thoroughly and the learning from the root cause analysis was shared with the business in the form of a water quality bulletin. Investigations demonstrated that upstream treatment processes were well operated at the time of sample collection and contact with chlorine-based compounds were above the disinfection target. A robust programme of contact tank, clear water tank, and treated water tank inspections are included in the enhanced inspection regime. This programme has been further extended to place more emphasis on associated backwash tanks and process tanks at WTWs. Current in year performance is 0.007% supporting the 2019-20 predicted outturn as stable.



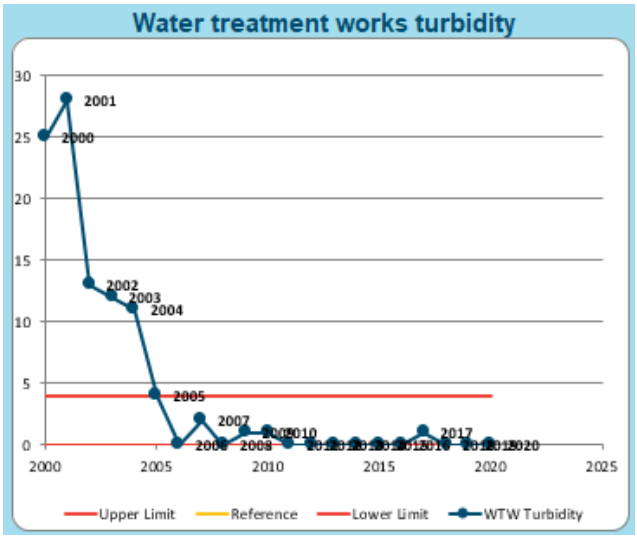
6.2) Service Reservoir coliform compliance

This sub-measure remained at 0.000%, which is at reference level. This performance has been at this level since 2013-14. Current in year performance shows no failures which supports the 2019-20 predicted outturn as stable.



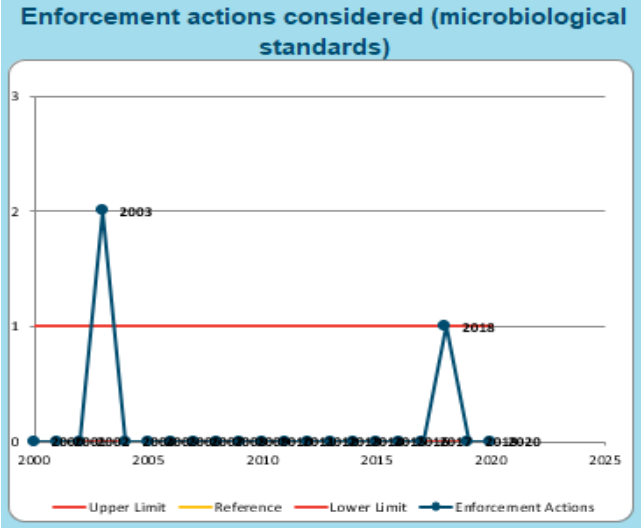
6.3) Water treatment works turbidity

There were no exceedances of the 95-percentile limit and the full year results met the sub-measure standard. Performance has been strong in this area where there has only been one year (2017) where a non-zero result has been reported since 2011. There were no regulatory fails in 2018, compared to four experienced in 2017. Current in year performance supports the 2019-20 predicted outturn as stable.



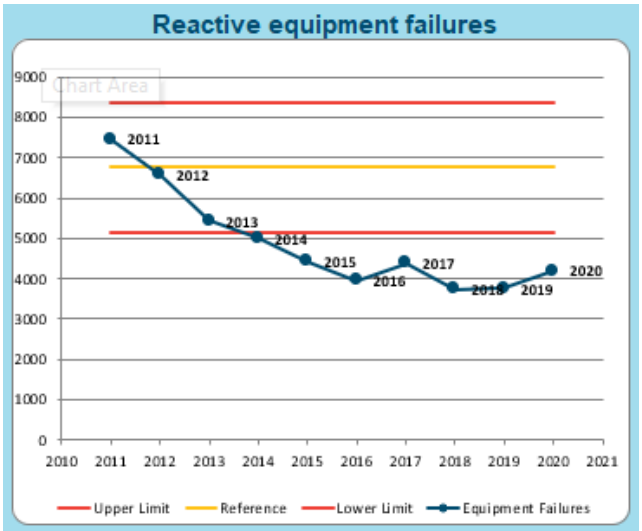
6.4) Enforcement actions considered (microbiological standards)

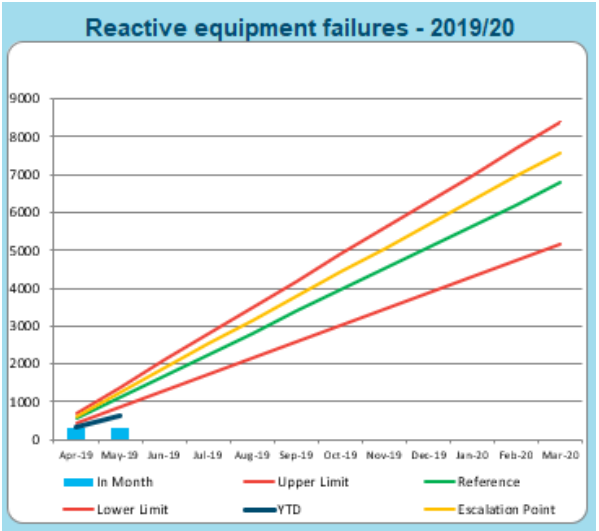
There were no enforcements in 2018-19. Current in year performance is zero supporting the 2019-20 predicted outturn as stable.



6.5) Reactive equipment failures

As current processes continue into the last year of the AMP we expect that figures for failed assets will follow the current trend or stabilise as new investment (capital replacement) slows down. However, there will be a growth in 'proactive' repairs based on condition monitoring which are designed to repair assets based on condition and before the point of failure. The effect of this could see a slight rise in the actual number of recorded equipment failures. Current in year performance is good and on track to remain below the reference level which supports the year five predicted outturn as stable.





6.6) Superseded content

The information provided in Appendix 20a of the September 2018 submission has been included in this IAP response and we confirm that it fully updates and supersedes all previous information.

Area	Superseded content
Document (s)	This supersedes the Water Quality section of **'Appendix 20a: accounting for past delivery'**
Chapter (s)	PC WA4 Water Quality S&R Factors
Page (s)	11-12

7. WC1: Length of river improved

A total of 16.48km of river length was improved in 2018-19 through delivery and Environment Agency (EA) sign off of five improvement schemes confirmed as complete. The cumulative total at the end of 2018-19 (including previous AMP6 years) was 39.61km through delivery and EA sign off of 12 improvement schemes. In 2019-20, we are forecasting to deliver 66.44km of river improvements through a total of 8 improvement schemes. This will bring the cumulative length of river improved to 106.05km (through 20 schemes).

Table 7.1 provides an overview of AMP6 performance to date and forecast performance for 2019-20. In our previous submission we only provided the expected cumulative total for 2019-20 since this performance commitment does not have annual targets, and only has an end of AMP target. We are still expecting to deliver 106.05km (noted as 106km in the Business Plan submission in Appendix 20a (as we report to 0 decimal places)) of river improvements by the end of AMP6.

Year	Schemes delivered	Total Length of River Improved (km)	Cumulative Length of River Improved (km)
2015-16	None	0	0
2016-17	None	0	0
2017-18	N = 7 (Fish Passage = Spruce Gill, Ponden, Strines, Langsett, Fewston. Flow = Rivelin, Damflask)	23.13	23.13
2018-19	N = 5 (Fish Passage = Broomhead, Silsden. Flow = Widdop, Walshaw Dean, Gorple Lower)	16.48	39.61
2019-20	N = 8 (Fish Passage = Tophill Low. Flow = Holme Styes, Digley, Brownhill, Thruscross, Scargill, Grimwith, Kepwick)	66.44	106.05

Table 7.1. WC1 river length improved in AMP6.

Our AMP6 target is 100km, therefore, to 0 decimal places, we are expecting to outperform by 6km. The deadband for this performance commitment is 3km. Therefore, 3km of our outperformance will attract an ODI incentive. The incentive rate is £0.076696m/km/AMP and so the total expected outperformance payment is expected to be £0.2339m (£234k). This outperformance is due to the addition of one scheme 'Kepwick'. This scheme was not outlined or funded in our AMP6 Business Plan. It will deliver 12.69km of river improvement and has been agreed to be eligible for a claim against WC1 by the EA, the Yorkshire Forum for Water Customers and has been audited by our external assurance providers.

7.1) Superseded content

There is no content that is superseded by this response.

8. SB2: Wastewater quality stability & reliability factor

We achieved stable status for this measure in 2018-19 and we confirm that we expect the overall measure for wastewater quality S&R to remain stable in 2019-20.

We have reported six failing works for 2018-19 for the treatment works compliance sub measure (AMP6 definition) and for the discharge permit compliance performance commitment (AMP7 definition), we have reported eight failing works, which equates to 97.5% compliance. Table 8.1 shows our performance against the wastewater quality S&R sub-measure of treatment works compliance compared to the AMP7 discharge permit compliance performance commitment.

Performance Commitment	Unit	18/19 Actual
Waste Water Quality Stability and Reliability Performance Commitment (AMP6 definition) Treatment Works Compliance Sub measure	(nr)	6
Discharge Permit Compliance Performance Commitment (AMP7 definition)	(nr)	8
Discharge Permit Compliance Performance Commitment (AMP7 definition)	(%)	97.5

Table 8.1. Comparison of AMP6 sub-measure performance and AMP7 performance commitment performance in 2018-19.

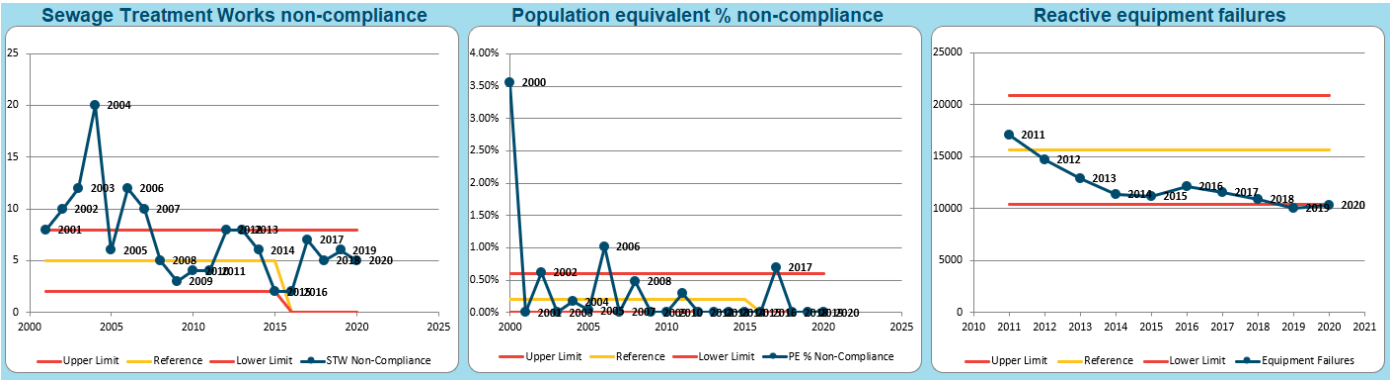
Our forecast performance for the treatment works compliance sub-measure is five failing works. Our forecast performance for the discharge permit compliance performance commitment is six failing works, which equates to 98.09% compliance (as forecast in APP1 in our September 2018 Business Plan submission).

Table 8.2 shows our forecast performance for 2019-20 for the AMP6 wastewater quality S&R performance commitment as well as the AMP7 discharge permit compliance performance commitment as stated in our initial September 2018 Business Plan submission as well as the updated forecast in accordance with action YKY.PF.A3.

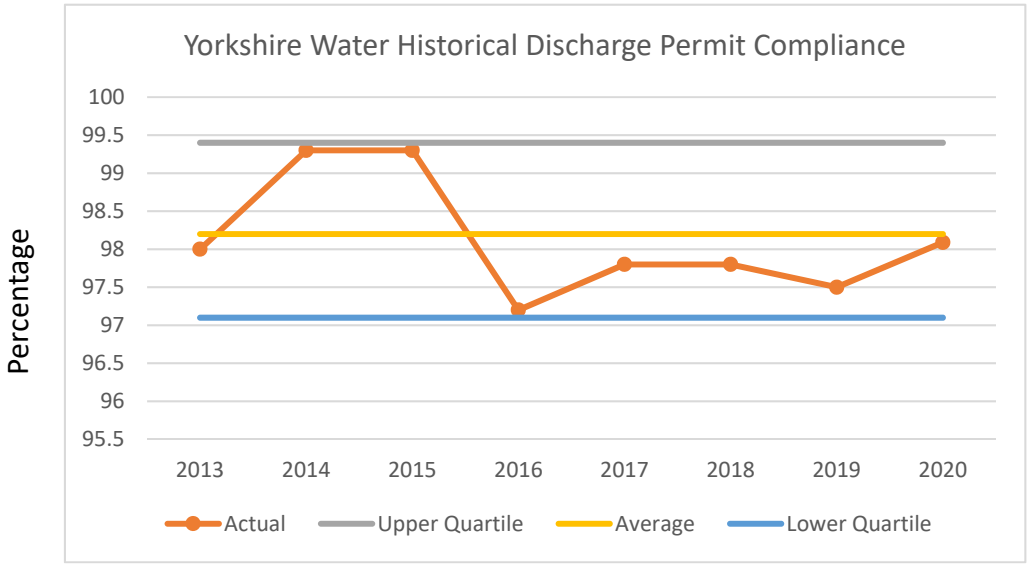
Performance Commitment	Unit	2019-20 Forecast (September Submission)	2019-20 Forecast (IAP Response)
Waste Water Quality Stability and Reliability Performance Commitment (AMP6 definition) Treatment Works Compliance Sub measure	nr	5	5
Waste Water Quality Stability and Reliability Performance Commitment (AMP6 definition) Population Equivalent Non-Compliance	%	0	0
Waste Water Quality Stability and Reliability Performance Commitment (AMP6 definition) Reactive Equipment Failures	nr	12,500	11,000
Discharge Permit Compliance Performance Commitment (AMP7 definition)	nr	6	6
Discharge Permit Compliance Performance Commitment (AMP7 definition)	%	98.09	98.09

Table 8.2. Forecast performance for 2019-20 for the AMP6 wastewater quality S&R performance commitment as well as the AMP7 discharge permit compliance performance commitment as stated in our initial September 2018 Business Plan submission as well as the updated forecast in accordance with action YKY.PF.A3.

The three graphs below show our historical and forecast AMP6 performance for the wastewater quality S&R performance commitment sub measures, which demonstrates continuously improving and stable service.



The graph below shows our historical and forecast performance for the AMP7 discharge permit compliance performance commitment for the remainder of AMP6.



8.1) Explanation of changes in actual and forecasted performance

The following paragraphs provide a summary of the changes in actual and forecasted performance for each of the Wastewater Quality S&R performance commitment sub-measures along with an additional information.

- Our **Treatment Works Compliance** submeasure is reporting one failing works above our target of five. One works is currently under challenge with the EA which is trade effluent related. The compliance failure under review occurred in August 2018 and we submitted all of our evidence to the EA and are awaiting final outcome. If this challenge is successful we will be back on target.

  Of the remaining failing works, three of the six are trade effluent related, this means we have experienced a discharge which is either above permit level or not permitted reaching our works and causing compliance failure. We have increased resources within the trade effluent team within Yorkshire Water, including additional sampling resources to proactively mitigate this from happening and impacting the works. We have also successfully completed an approved business case for increased trade effluent officers, these additional resources will be available to manage and control trade effluent customers and ensure compliance with their discharge permits. This aims to reduce the number of trade effluent incidents which may result in a non-compliance.

- Our **Population Equivalent non-compliance** submeasure is currently on target and we do not expect this to change.

- The **Reactive Equipment Failures** submeasure has significantly improved compared to our forecast in 2018-19 and we have reported 10,035 compared to the forecast 13,000 (nr.). Taking into account this improvement, we have re-forecast this to 11,000 for 2019-20. There has been a year on year improvement which is linked to increased proactive equipment maintenance and budget which increased asset replacement and reduced unplanned failure rates.

- The **Discharge Permit Compliance** submeasure for 2018-19 APR is currently two failing works above forecast (98.09% compliance) however we expect to meet forecast performance in 2019-20 because, as mentioned previously, one works is currently under challenge relating to the Trade Effluent Compliance issues relating to our STW failures. In addition, we have also reported a Water Treatment Works failure which we were not expecting and has contributed to the deterioration in performance. For the 2019-20 period, current performance to date indicates we are on track to meet our forecast with a single failing water treatment works failure.

  There is no change to the intention to retain stable performance throughout AMP6 and AMP7, as endorsed by the Board in the September 2018 submission. As stated in our 2018 business plan submission it is Yorkshire Water's intention to strive for 100% Discharge Permit Compliance in AMP7.

8.2) Superseded content

Area	Superseded content
Document (s)	Appendix 20a Accounting for Past Delivery
Chapter (s)	PERFORMANCE COMMITMENT SB2: Wastewater quality stability and reliability factor
Page (s)	25-26

9. SB4: Length of river improved

This performance commitment is reported by financial year and has both a financial underperformance penalty of £0.146238m per km per AMP and an outperformance payment of £0.076696m per km per AMP calculated in 2018-19 for 2019-20 outturn outside the acceptable deadband performance with no outperformance cap or underperformance collar.

In total there were 52 defined regulatory quality investigations or solutions identified in the PR14 Final Determination (FD14) to target environmental benefits against Water Framework Directive (WFD) component measures, as agreed with the Environment Agency (EA).

These regulatory defined outputs address environmental quality improvements under the EA National Environment Programme (NEP) for the WFD; though not all contribute to the performance commitment. As a result of a final review of the NEP, the number of WFD obligations changed to 110 (including separate obligations for each sampling site under the national Chemicals Investigations Programme (CIP2)). Of these 110 obligations, 28 will result in actual improvements to watercourses, the rest are investigations or no deterioration schemes that maintain, rather than improve, water quality. It is the 28 wastewater improvement solutions that make up the performance commitment under SB4 (356.96km).

To date, one of the 28 obligations has been delivered, with the remaining 27 outputs in delivery and forecast to meet their corresponding compliance dates.

The FD14 funding totalling £193m included outputs that have since been revised as part of the NEP final review. Whilst this has led to timing and site differences to the investment originally identified in FD14 we have been able to target delivery and procurement efficiencies by grouping similar solutions to remove phosphorus at multiple sites.

Whilst not directly related to the length of river improved performance commitment, we have also been able to realise delivery efficiencies on the WFD quality investigations by grouping any modelling required within the quality programme to any base modelling to avoid duplication of costs as well as using internal resources rather than external consultants to deliver time and cost efficiencies whilst still delivering these regulatory outputs.

In total we are now forecasting to invest £148m to meet our regulatory obligations with the reduction in investment of £5m being reallocated to fund other areas of pressure within the wholesale wastewater programme.

Delivery of these regulatory outputs will ensure that 356.96km of river length is improved in total. This meets our performance commitment target and would reflect an outperformance payment position following the rules identified above. However, an error with our target was identified after FD14 had been published, the correct target should have been 357km (356.96km) not 340km. Further to our correspondence with Ofwat on this issue it was advised that the original target would not be changed but a business decision was made to only claim an outperformance payment greater than the revised, internal, target. As such no outperformance payment is expected.

In Appendix 20a and previous APR submissions, we have erroneously reported that we will over-perform by 1km and claim a £77k outperformance payment. An internal investigation suggests that this position has arisen as a result of a rounding down to 356km from the actual target of 356.96km. Since no extra environmental benefit will be realised, we will not be claiming an outperformance payment.

One wastewater treatment scheme (Clayton West) was delivered in 2018-19 but was not claimed as a river length improvement as further improvements on the same and/or downstream waterbody/ies are required before the actual benefit in the river is realised. The 2018-19 improvement will, therefore, be included in the 2019-20 figures.

In 2019-20, we will deliver the remainder of the wastewater schemes (27 schemes) which will result in the full 357km of river length improved. Twelve schemes are due to reach commissioning by the end of September 2019. Table 9.1 shows the SB4 delivery profile:

Year	Schemes delivered or forecast to be delivered	Schemes forecast to be claimed	Total Length of River Improved (km)	Cumulative Length of River Improved (km)
2015-16	None	None	0	0
2016-17	None	None	0	0
2017-18	None	None	0	0
2018-19	N = 1	None	0	0
2019-20	N = 27	28	356.96	356.96

Table 9.1. SB4 river length improved in AMP6.

Late final definition of the NEP meant that the programme had to be profiled as described in Table 9.1. The late and significant changes to the NEP was due to a change in the Environment Agency's policy and meant that pre-work programme planning was delayed.

9.1) Superseded content

Area	Superseded content
Document (s)	Appendix 20a Accounting for Past Delivery
Chapter (s)	SB4: Length of River Improved
Page (s)	26-27

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