C5 B

Cost and Efficiency

C5B Technical Annex 08
Network Ancillaries Investment Case: Technical Approach and Business Case

NTPBP-INV-NET-0533

BRISTOL WATER

Contents

Tables

Figures

1 Foreword

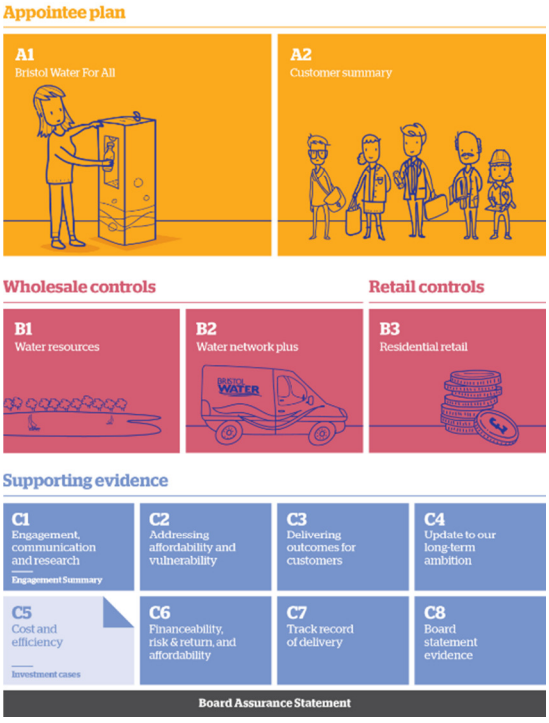
The Network Ancillaries investment case will address specific water quality issues by replacing lead communications pipes and provide a base maintenance allowance for replacement of faulty stop taps at customers' request. Both will contribute to a Safe and Reliable supply to our customers and local community and environmental resilience.

Network Ancillaries relate to a variety of assets including communication pipes, stop taps, boundary boxes, stand pipes, metal covers and frames, and consumption monitors. We currently have 2,076km of communication pipes (684km of which are lead), and 409,706 stop taps.

The purpose of this document is to set out Bristol Water's customer led, outcome focused plan, which will mitigate risks posed by, and associated with, Network Ancillaries.

This investment case, one of 21, will summarise the facts, risks and investment requirements for Network Ancillaries for the next review period for 2020 to 2025. This investment case will also summarise performance for Network Ancillaries for the current review period from 2015 to 2020 and our methodology for determining and delivering the future Network Ancillaries strategy.

This investment case document is a technical annex to section C5B of our overall business plan submission, as illustrated by the diagram below:



This investment case is aligned to the Water Network Plus Wholesale Control aspect of our business plan. It is recommended that this investment case is read in conjunction with the PR19 Investment Case Summary Document[1] which outlines in detail our methodology for defining investment.

[1] Bristol Water PR19 Investment Cases Summary Document NTPBP-INV-PR1-0635

2 Executive Summary

In order to provide customers with a Safe and Reliable water supply, we will focus on improving the quality of the water they receive. In conjunction with this, we will replace faulty stop taps, ensuring they provide a robust means of isolating customer properties from the supply network. We will achieve these intentions by using our totex investment approach which includes investment in base maintenance and capital expenditure of £9.830m. We will deliver four interventions that will improve asset health, and contribute towards the compliance risk index and leakage performance commitments. We will challenge ourselves to deliver more efficiently and apply innovation to the processes we adopt to renew our network assets. When considering our efficient and innovative approach we plan to deliver our Network Ancillaries capital programme for £9.043m.

At Bristol Water we have completed an extensive customer engagement programme which has identified that one of five key priorities for customers is that we keep the water flowing to their tap and one of our four key outcomes is that we provide a Safe and Reliable supply.

This investment case will address specific quality issues by utilising a totex approach to determine necessary capital maintenance investment to improve water quality and to replace faulty stop taps. It will also ensure continued compliance with the Water Supply (Water Quality) Regulations 2016 which are enforced by the Drinking Water Inspectorate (DWI).

To deliver our customers' priorities and meet our compliance obligations we will measure progress via performance commitments for which we have set delivery targets both for the end of AMP6 and for AMP7. In AMP7, the Network Ancillaries measures are water quality compliance which is measured against our target for the compliance risk index (target 0) and leakage (target 36.5Ml/d). Our compliance risk index performance commitment replaces our current water quality measure of mean zonal compliance.

As of July 2018, we are forecasting to meet our AMP6 leakage target of 43Ml/day. In terms of water quality, our current measure is mean zonal compliance, for which we are forecasting to miss our AMP6 target of 100% by just 0.04%.

We have set the level of investment for our Network Ancillaries so that it is sufficient to deliver our performance commitments and to address asset health and deterioration requirements. This will ensure our Network Ancillaries enable us to continue to deliver a safe, high quality, and reliable drinking water supply to our customers.

We will achieve this in a number of ways;

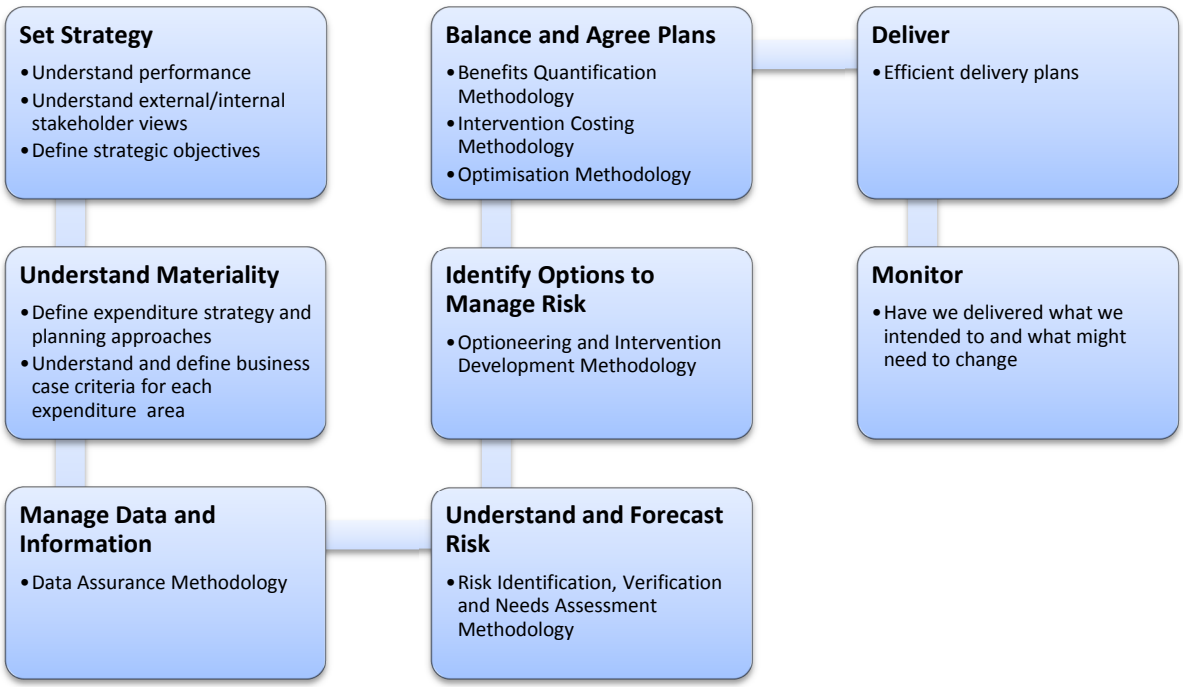
- By replacing faulty and obsolescent stop taps;
- By replacing lead communication pipes on a risk based approach; and
- By targeting the replacement of lead communication pipes serving high risk groups.

Should we fail to invest in Network Ancillaries assets, or not achieve the two associated performance commitments mentioned above, the key risk is that we will not meet our customers' priorities for a Safe and Reliable supply.

Given the function of our Network Ancillaries assets is to supply our customers with a Safe and Reliable supply; we must ensure that they are sufficiently maintained and replaced. Therefore there is a risk that failure to invest in lead communication pipe replacement will see an increase in lead failures – which will lead to poor water quality and an unreliable supply of water for our customers – and also fail to satisfy our statutory obligations. Additionally, should we fail to invest in communication pipe and stop tap replacement, there is a risk that these assets will continue to deteriorate and failure rates significantly increase.

To ensure that we meet customers' priorities and mitigate the risks associated with Network Ancillaries, we have adopted an asset management totex focused approach, as set out in Figure 1.

Figure 1: Approach to meeting customer priorities and Mitigating Risks



This approach enables us to demonstrate full "line of sight" from customer priorities, through risk review, options analysis and investment optimisation, to outcomes and benefits provided for our customers.

We plan to invest £9.830m in Network Ancillaries assets from 2020 to 2025 to achieve the performance commitments associated with the outcomes 'Safe and Reliable Supply' and 'Local Community and Environmental Resilience', as set out in Table 1.

We have set ourselves a challenging target of reducing costs by 8% during AMP7. This will be achieved by delivery of our business transformation programme and result in a post-efficiency investment of £9.043m.

Costs are allocated to the Treated Water Distribution Business Unit. Investment is related to infrastructure assets; 96% is categorised as maintaining the long term capability of our infrastructure assets and 4% as other capital expenditure – infrastructure.

Table 1: Associated performance commitments and percentage contribution

Performance commitment	Unit	2019/20 Baseline	2024/25 Target	Total performance improvement required in AMP7	Network Ancillaries contribution to performance improvement
Compliance risk index	Index	1.27	0	1.27	<0.01%
Leakage	Ml/d	43	36.5	6.5	3.79%

Our AMP7 Network Ancillaries Investment will help ensure our assets are being maintained appropriately to deliver resilient water services to current and future generations.

Full details of our outcomes, performance commitments, and outcome delivery incentives are provided in Section C3 of our business plan.

3 Background To Our Investment Case

3.1 Context

This investment case summarises the investment in AMP7 to meet our customers' expectations for a Safe and Reliable Supply through the investigation, maintenance and replacement of ancillary network assets at the boundary with our customers' properties. Given the function of these assets to supply our customers with a Safe and Reliable supply, we must ensure that they are efficiently maintained and replaced.

Assets considered within this investment case include communication pipes, stop taps, boundary boxes, stand pipes, metal covers and frames, and consumption monitors. These assets require investment to maintain their health and performance through replacement as they deteriorate.

Stop taps are generally replaced reactively on advice from our customers, or in response to our proactive detection of leaks on these assets. It is recognised that a large proportion of reactive work on stop taps supports a benefit of improving leakage from the customer side, where customers seek to replace or repair their supply pipes. In AMP6 we are forecasting to replace approximately 3,500 per year on average.

A risk associated with network ancillary assets is the presence of lead materials, predominantly in communication pipes, which can pass into water supplies. We have 684km of lead communication pipes in our supply area, which accounts for 30% of all communication pipes. The health risks associated with lead are well established, and relate to the way lead can build up in the body. Those at particular risk are infants and children because lead can have an adverse impact on cognitive development and behaviour. We have provided an on-going commitment to reducing lead in the supplies, through the targeted replacement of lead communication pipes, and by supporting our customers to identify lead pipes within their boundary and providing them with advice on replacing these. An example of our customer awareness literature is shown in Figure 2.

Figure 2: Customer focussed literature raising awareness of lead water pipes

The Drinking Water Inspectorate requires water companies to develop plans to reduce the amount of lead that is measured at customers' taps.

One of the four customer priorities is 'Keeping the water flowing to your tap'. Reducing the impact on our customers from water quality and asset failures is a key strand to our strategy for delivering this priority. This investment case will also contribute to the delivery of the compliance risk index and leakage performance commitments for AMP7.

One of the key aims, as set out in our long term strategy, is the provision of a Safe and Reliable Supply for our customers. Reducing the risk from lead concentrations in the water supply is a key element of our plans to achieve this, and is supported by our Drinking Water Safety Plan[2].

We have established minimum levels of expenditure in relation to the base maintenance of Network Ancillaries, as set out in our Infrastructure Base Maintenance investment case. The investment through our Network Ancillaries investment case will contribute towards these minimum levels, as it represents improvements to the performance of our Network Ancillaries above current levels (see Section 5.6).

This investment case is also interdependent with the following investment cases as they share the same performance commitment targets:

- Trunk Mains – shared targets of compliance risk index and leakage;
- Distributions Mains – shared target of leakage;
- Bulk Meters and Pressure Release Valves – shared target of leakage;
- Network Monitoring – shared target of leakage;
- Leakage – shared target of leakage; and
- Treatment Works Strategic Maintenance – shared target of compliance risk index.

3.2 Strategy

Developing the investment needs associated with our Network Ancillaries is underpinned by our long term corporate strategy which has the vision "***Trust beyond water - we provide excellent experiences***". Our Outcomes Delivery Framework together with our Strategic Asset Management Plan provides the strategic framework that supports this vision and enables investment in our Network Ancillaries to clearly focus in delivering against outcomes and performance commitments.

Our long term strategy, as set out in the Outcome Delivery Framework (Section C3 of our Business Plan), has a focus on resilience and a growing need to ensure our assets are, and remain, maintained and effective in meeting our performance requirements. There are three strategic drivers identified, that together, ensure we meet our current and future needs for customers and stakeholders. These are:

- **Operational Resilience** - which have performance commitments to reflect reliability, resilience and quality of water
- **Customer Focused** - performance commitments to reflect customer service and affordability
- **A Sustainable Business** - performance commitments to reflect the environment representing our community and sustainable resources.

[2] Bristol Water, Drinking Water Safety Plan.

Within this strategy there are specific outcomes (Safe and Reliable Water Supply and Local Community and Environmental Resilience) and specific performance commitments (compliance risk index and leakage) that have strategic targets and incentives that will be directly influenced by our investment in Network Ancillaries.

Our Asset Management Strategy has objectives developed in alignment with the long term strategy and delivery of corporate objectives and outcomes. These objectives cover both our short-term needs and longer-term aims, and drive the capability development plan and asset planning activities. Delivery of the investment for our Network Ancillaries will be driven through the Asset Management Framework, which is designed to enable the efficient and effective planning and delivery of all our asset related activities, to successfully deliver our business and customer outcomes. The framework aligns to, and interacts with, our corporate drivers, which in turn are there to deliver the external expectations and requirements placed upon us by our customers and stakeholders.

One of our key aims is to reduce the risk from lead concentrations in the water supply, driven by our Lead Action Plan[3], and supported by our Drinking Water Safety Plan. Our Lead Action Plan[3] identifies strategic lead communication pipe replacement for pre-schools and nurseries as a priority as this will protect a high risk group (young children). Reducing lead water quality failures is also a key strand in our Strategy for achieving the customer priority of keeping the water flowing to their taps.

Our strategy for Network Ancillaries is to:

- Continue our programme of replacing lead communication pipes supplying high risk groups, with a focus in AMP7 on nurseries;
- Reduce the level of lead in our supplies through the targeted replacement of lead communication pipes and supporting our customers to identify lead pipes within their boundary and providing them with advice for replacing those pipes; and
- React in a timely manner to each and every notification of faulty or leaking stop tap.

Specifically, the DWI has supported our intention to develop a Lead Action Plan[3], which will comprise the following:

- Precautionary lead communication pipe replacement (≥8µg/l);
- Strategic lead communication pipe replacement in pre-schools and nurseries;
- Engagement with customers and stakeholders and production of supporting materials; and
- Undertaking an evaluation of lining trials.

3.3 Customer Priorities

Customer priorities relating to our outcomes and performance commitments have been determined through our extensive programme of customer engagement and research. During the development of our business plan we have engaged with over 37,000 customers and conducted over 50 pieces of research. By delivering customer engagement, we have ensured that we can build on the customer insights that we have gained, producing a business plan influenced by our engagement events. This ensures that at Bristol Water, we have engaged effectively with our customers on longer-term issues,

[3] Bristol Water, 2018, DWI Scheme reference: BRL 3 – Lead Action Plan (Strategy) - Lead, Final Decision Letter.

and have taken into account the needs and requirements of different customers including those in vulnerable circumstances and future customers.

Through this process our customers have told us that their top priorities have remained largely unchanged from PR14 and were identified as:

- You can get a bill you can afford
- Keeping the water flowing to your tap
- Help to improve your community
- Save water before developing new supplies
- You get the best possible experience every time you need us

Our engagement with our customers has resulted in the development of four specific outcomes for PR19, which capture what our customers and stakeholders have said; these are as follows:

- Excellent customer Experiences
- Safe and Reliable Supply
- Local Community and Environmental Resilience
- Corporate Financial Resilience

In order to deliver our customers' priorities and outcomes, we will measure progress via twenty six performance commitments for which we have set delivery targets.

There is a clear relationship between our investment in Network Ancillaries and two of our outcomes – Safe and Reliable Supply and Local Community and Environmental Resilience.

We undertook more detailed discussions at phase 2 of our engagement process; gathering evidence (see our business plan **Section C1 – Engagement, communication and research**) which gave us a wealth of information about how our customers' view Bristol Water, our services, and long term issues. We also explored short and long-term trade-offs in decision making and asked customers to tell us how we should approach long term issues of resilience and how we could best respond to service interruptions. When discussing the Safe and Reliable Supply outcome with customers we found that it remains an area which customers think we should focus on as a core element of our business. We asked our customers about investment in water quality and reliability and we asked what areas they felt most comfortable investing in. In our March 2018 customer panel, our customers prioritised reliability above local environment, resilience and customer experience[4]. Detailed analysis of customers' views on this area can be found in **section C3 – Delivering Outcomes for customers.**

We consulted on three potential scenarios in relation to Safe and Reliable Supply:

[4] A4g: Customer online panel March 2018

Service	Performance Commitment	2020 target	2024/25 target		
			Slower improvement plan	Suggested improvement plan	Faster improvement plan
Water quality	Compliance risk A lower score reflects a lower risk of water quality problems	1.22	0.7	0	0
Interruptions to supply	Supply interruptions greater than 3 hours (average minutes per property)	12.2	4.2 66% improvement	1.8 85% improvement	1.5 88% improvement
Water that doesn't look clear	Number of customer contacts about the appearance of tap water (contacts per 10,000 customers)	9.3	9.3	4.3 54% improvement	3.2 66% improvement
Water that doesn't taste or smell right	Number of customer contacts about the taste and smell of tap water (contacts per 10,000 customers)	3.0	3.0	2.5 17% improvement	1.4 53% improvement
Protection against a major water supply event	Risk of a major event - population centre size protected against critical asset failure	Centres over 25,000 people*	Centres over 25,000 people	Centres over 10,000 people (10 year programme)	Centres over 10,000 people (5 year programme)
Forecast increase to the average bill from additional investment			£5	£14	£18

* With 96% customers in these centres receiving at risk

Customers responding to our consultation were evenly split on the investment package for the safe and reliable supply outcome. In the context of our evidence that our customers see this area as a priority this presents a clear challenge to us to deliver improvements at lower cost.

When discussing the Local Community and Environmental Resilience outcome with customers our research shows that leakage is a consistently high priority. 98% of customers in our annual survey, and on our online customer panel, said it is quite important or very important to them[5]. When we talked to customers in detail about how we can address leakage as part of our WRMP deliberative workshops[6], they told us that they favour Active Leakage Control, followed by pressure management. They generally do not favour getting to leaks more quickly. Water meters are also strongly favoured by some customers. Detailed analysis of customers' views on this area can be found in Section C3 of our Business Plan.

We consulted on three potential scenarios in relation to Local Community and Environmental Resilience.

Results from our Draft Business Plan consultation revealed affordability concerns have driven some customers to choose the slower plan, whereas customers also value the service improvements in the suggested plan. In summary, we consider that a plan with a lower bill level with the suggested improvement plan is more likely to be acceptable to more customers (particularly low-income groups). You can see more about how the feedback from our draft business plan consultation influenced each of our performance commitments in document C3, Delivering Outcomes for customers

The level of support for our plan expressed by our customers, both those we have engaged with over a period of time and those we met for the first time, gives us confidence that our final business plan strikes the right balance of delivering service improvements that customers value at a price that is acceptable to the majority.

[5] A5: Annual survey 2018
[6] B23: WRMP demand reduction deliberative events

This investment case describes how we will achieve the suggested improvement plan and level of performance through our investment in Network Ancillaries. Specific details of our planned investment and associated performance can be found in Section 3.4.

3.4 Asset Health, Performance Commitments, AMP7 Performance Commitments & Outcome Delivery Incentives

The health of our assets is a key element in delivering resilient water services to our customers. Our investment in Network Ancillaries will help ensure our assets are being maintained appropriately for the benefit of current and future generations.

This investment case supports the outcomes Safe and Reliable Supply and Local Community and Environmental Resilience, by investing in our Network Ancillaries to provide high quality, reliable supplies for present and future generations.

The Safe and Reliable Supply and Local Community and Environmental Resilience outcomes will be measured through a set of associated performance commitments. Performance commitments associated with Network Ancillaries are set out in Table 2.

Table 2: Associated performance commitments

Performance commitment	Unit	2019/20 Baseline	2020/21	2021/22	2022/23	2023/24	2024/25	Performance improvement required in AMP7
Compliance risk index	CRI Index Score	1.27	0	0	0	0	0	1.27
Leakage	Ml/d	43	42	41	39.5	38	36.5	6.5

Compliance risk index is new performance commitment in AMP7 but we have historical information for this measure and therefore have set a target in line with our forecast of our 2019/20 performance. Network ancillaries will support our ability to sustain this level of performance.

Full details of our outcomes, performance commitments, and outcome delivery incentives are provided in Section C3 of our business plan.

A detailed diagram illustrating the full line of sight between customers, outcomes, performance commitments, and outcome delivery incentives related to this investment case is included in Appendix A.

3.5 Compliance Obligations

Statutory and compliance obligations have influenced the development of interventions in this investment case and the investment for AMP7. Relevant legislation is detailed below.

We have a statutory obligation under the Water Supply (Water Quality) Regulations 2016 to ensure that all water supplied to our customers meets prescribed Water Quality Concentrations or Values. Our obligations are defined as undertakings for the DWI.

Within this investment case there are specific risks that we are seeking to mitigate in order to ensure our continued compliance with these regulations. They are described in section 4.2.1.

3.6 AMP6 Investment and Performance

Our AMP6 investment in Network Ancillaries supports our ability to meet our performance commitment for mean zonal compliance, and also supports our performance against our leakage target. Our investment in AMP6 will also underpin our performance commitments for compliance risk index and leakage in AMP7.

Our AMP6 capital expenditure (capex) investment related to Network Ancillaries is summarised in Table 3 below. We have re-categorised data used in line with the scope of our investment cases. For historic data we have used the 2016/17 wholesale cost assessment data (data tables 1 and 2). Forecast data has been derived from PR19 data (data tables WS1 and WS2).

Table 3: AMP6 capital investment

Year	Network Ancillaries capex (£m)
2015/16 actual	1.878
2016/17 actual	2.029
2017/18 actual	2.325
2018/19 forecast	2.437
2019/20 forecast	2.667
AMP6 forecast	**11.337**

Our AMP6 investment delivers particular improvements to our Network Ancillaries to address specific asset health risks and lead compliance obligations.

The AMP6 performance commitments that are related to Network Ancillaries investment, and our performance, are given in Table 4.

Table 4: AMP6 performance related to Network Ancillaries investment

Performance Commitment		2015/16	2016/17	2017/18	2018/19 (Forecast)	2019/20 (Forecast)
Mean zonal compliance (%)						
Bristol Water	Target	99.96	99.96	100	100	100
	Company Performance	99.93	99.97	99.93	99.96	99.96
Compliance risk index						
Bristol Water	Target	-	-	-	-	-
	Company Performance	3.17	1.53	0.03	1.27	1.27
Industry	Average	3.20	4.53	2.85	-	-
	Upper Quartile	0.96	2.34	1.30	-	-
	Frontier	0	0.27	0.03	-	-
Leakage (Current Leakage) (Ml/d) (annual)						
Bristol Water	Target	48.0	47.0	45.0	44.0	43.0
	Company Performance	44.2	46.4	46.6	44.0	43.0

Mean zonal compliance is included as it has been used throughout AMP6 to assess water quality. It will be replaced by water quality compliance (as measured through the compliance risk index) in AMP7. There is no historical target for compliance risk index performance commitment because it is a new commitment for PR19. Compliance risk index performance takes into account how serious the failures are. During 2017 we had our best ever compliance risk index performance score of 0.032. We expect this to be one of the best water quality performance levels in the industry.

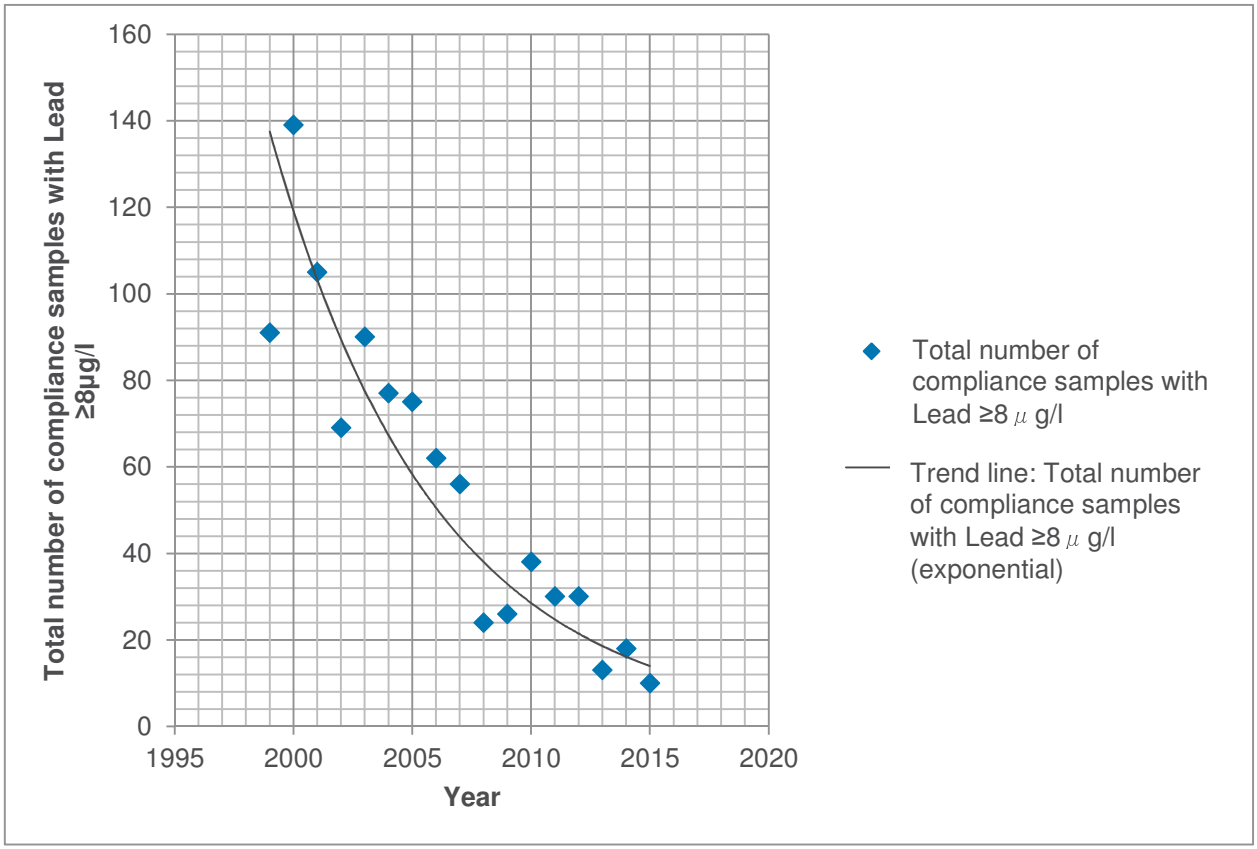
There are no targets in AMP6 for the compliance risk index performance commitment. However, we have undertaken an evaluation of our performance against these measures for the AMP6 period. Our AMP6 compliance risk index performance forecasts (1.27 in 18/19 and 19/20) are based on expected underperformance against our target for the final two years of this AMP. We have worked with Ofwat and the rest of the industry to align the reporting definition to help customers understand comparative performance in AMP6. See Section C3 of our Business Plan for full details.

With regard to leakage, at PR14, we set ourselves challenging leakage targets; to reduce leakage by 12% between 2015 and 2020. Our 2017/18 performance was below target due to a number of factors primarily the exceptional weather at the beginning of 2018. We underperformed against our target for 2017/18 due to the exceptional weather in 2017/18. Excluding our estimate of a 1.7Ml/day impact of the cold weather in March 2018, our actual current leakage performance after technical data adjustments improves from 46.6Ml/day to 44.9Ml/day. This would have been in line with our target of 45Ml/day.

Towards the end of 2017/18 we began to see benefits from our deployment of additional resource and the impact of improving the effectiveness of our leakage response. We have implemented an action plan to improve on our Leakage performance to ensure we meet our AMP6 target. We are currently forecasting to achieve the final year AMP6 target of 43 Ml/d. Our investment in AMP6 will also underpin our performance commitment for Leakage in AMP7. Full commentary on our Leakage performance is provided in our 2017/18 Annual Performance Report.

Lead failures in our area of supply have reduced markedly as a result of historic investment. This is demonstrated in Figure 3 below. This demonstrates that the benefit achieved will begin to reduce as the number of lead mains reduce, while the proportion of lead that remains in our customers' properties increases proportionally.

Figure 3: Number of Lead Sample Failures between 1999 to 2015



4 Developing Our Investment Plan

As we have discussed earlier, the starting point for investment case development is to understand our customers' priorities and determine associated performance commitments. We have adopted totex principles to determine how we should invest in order to deliver these priorities and associated commitments. The totex approach we have adopted considers which the best solution is because it is the lowest cost over the whole life of the asset, regardless of whether it is operational or capital expenditure.

Whilst we do not currently have health and risk indices across our asset groups, we do have a wealth of data. In some cases, analytical models such as the mains deterioration model, provides us with a view of how our assets are performing, as well as a view on their deterioration. The following section describes the process we have created and followed in order to develop our investment cases.

4.1 Investment Case Development Process

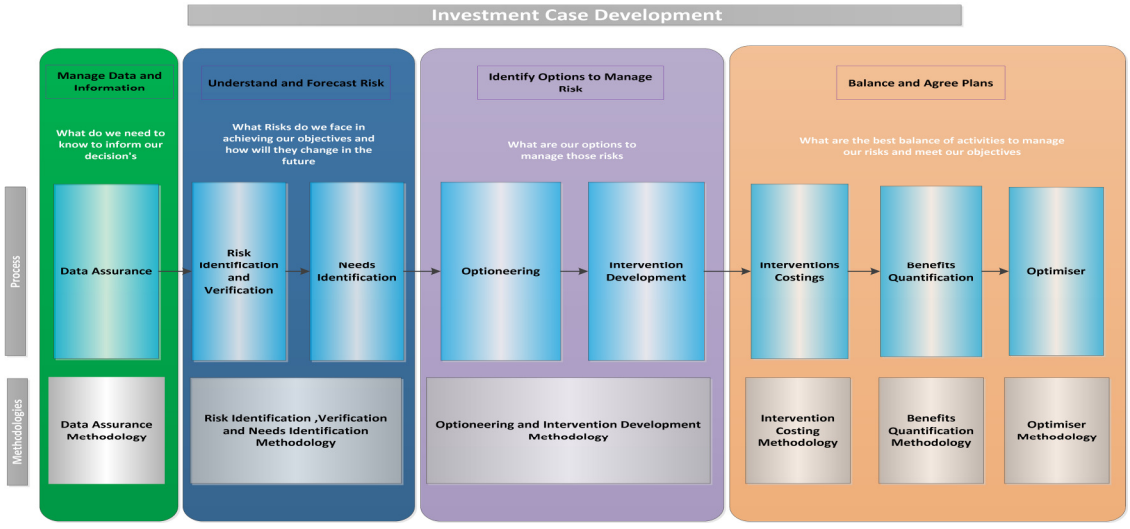
We have created and implemented a process that is supported by a set of six methodologies. When developing the methodologies, we wanted to ensure that they:

- Deliver what the customers have asked for;
- Satisfy our business needs; and
- Deliver a high quality business plan in accordance with Ofwat's Company Monitoring Framework.

The collective application of these methodologies has enabled us to develop investment proposals that are well evidenced through a line of sight approach, ensuring our investment plan achieves the required targets at the optimal cost.

Figure 4 illustrates, at a high level, the process required to identify risks that require addressing in AMP7, and the subsequent development of appropriate interventions.

Figure 4: Investment case process overview - level 1 diagram



An overview of each of the key stages is described below and all of the methodologies are provided in the PR19 Investment Cases Summary Document.

4.1.1 Data & Data Assurance

The development of our investment cases is dependent on having consistent, accurate and assured data. We therefore recognise that we must be able to demonstrate the quality of the data and information used in the development of our investment cases.

Wherever possible, we have utilised data from our core company systems in order to undertake our analysis and we have sense checked the quality of data as we have used it.

However, in addition we have applied a data assurance methodology. We have assessed data quality in terms of completeness, accuracy and reliability. In addition, the methodology also assesses whether data is used as part of the Annual Performance Report process to Ofwat, and hence already subject to existing Annual Performance Report process assurance mechanisms.

In total we have developed twenty one investment cases. The values of these investment cases range from less than £1m to over £37m. Our overall capital investment plan totals circa £212m.

We have selected a sample of nine investment cases, and have applied detailed data assurance based on their value and complexity. The total value of these nine investment cases represents 66% (circa £140m) of the total capital investment plan, and represents 286 individual data types. We have evaluated all 286 data types and we have evaluated them for quality and their use in the annual performance review process. The overall data quality assessment identified 93% of the data as being good quality, and 55% as having been used and assured through the annual performance review process.

The following sections detail the results of the data assurance and Annual Performance Report assessments undertaken for this investment case.

Quality Assessments

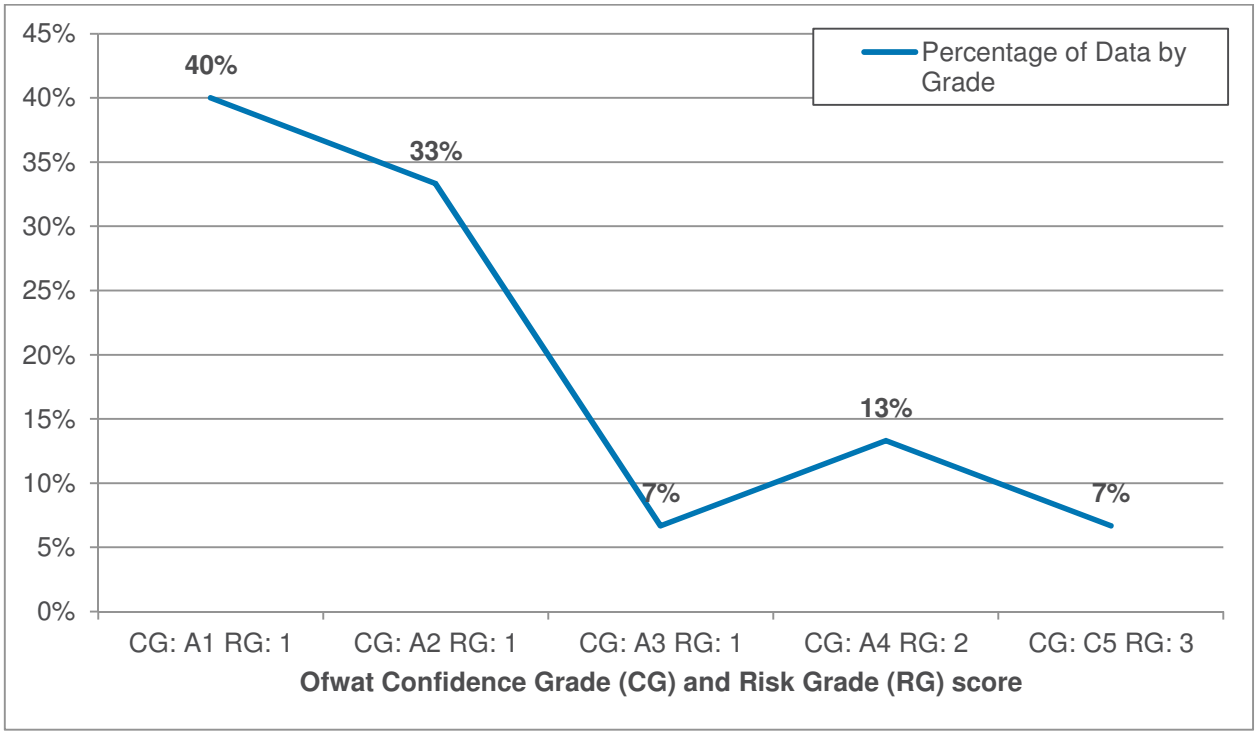
For each data point used in this investment cases, it has been assured for completeness, accuracy, and reliability, and has been given an overall score for quality in terms of a Risk Grade (RG) score between 1 and 5 (1 being good quality, 5 being poor quality). The risk grade has subsequently been aligned to the equivalent OFWAT Confidence Grade (CG) scores A1-D6 (A1 being highest confidence, D6 being lowest confidence).

A list of data used is provided in Appendix B (actual data sets can be provided upon request). A total of 15 specific data types were identified of which 14 (93%) have been assessed as having good quality (Confidence Grade A1-B4 and Risk Grade 1-3).

Following a review it was found that the remaining 7% of data was mainly text or qualitative assessments rather than quantitative. This data will be included for enhancement as part of our business as usual approach to improve the quality of our data, which is outlined in our data and information strategy.

Figure 5 summarises the number of data types scored against Ofwat Confidence Grades and Risk Grades.

Figure 5: Percentage of Data Types by OFWAT Confidence Grade and Risk Grade



Annual Performance Report Assessments

The 15 data types have also been assessed in their utilisation in the Annual Performance Report. This process is subject to both internal and external assurance and has governed methodologies that are applied in the provision of Annual Performance Report data tables. The assessment of the Annual Performance Report submission and application of the methodologies are formally governed and recorded.

Of the 15 data types, 10 (77%) were assessed as having already been required for Annual Performance Report reporting and therefore subject to the assurance requirements as set out in Annual Performance Report Methodologies.

4.1.2 Risk Identification, Verification & Needs Assessment Methodology

The purpose of our risk identification, verification and need assessment is to ensure that:

- The risks that we are currently facing are captured in a single risk register; and
- Each risk is assessed and verified to determine details about the nature and magnitude of the risk and whether any mitigation is currently planned in this AMP period; and
- Each risk is scored on a common basis to allow risks to be compared; and
- The most significant risks are identified, and that for each a clear and uniquely referenced statement of need is produced to define the problem as clearly as possible, and to identify what benefits or performance commitments mitigation of this risk will achieve.

The risk score is the product of the likelihood and consequence, each is scored 1 to 5 and then multiplied together to provide a potential maximum risk score of 25.

Risks scoring 15 to 25 are the most significant strategic risks, and these were developed into needs statements.

Those scoring 10 or 12 were subject to a further round of review and where it was considered that mitigation of the risk will enhance our ability to meet our performance commitments, the risk was selected and developed into a needs statement.

The risks scoring 1 to 9 were considered to be risks of a lower priority and were therefore not considered further as part of the PR19 investment planning process.

Unselected risks will continue to be monitored and assessed as part of the live business and on-going business as usual risk management process. Where there is a need to mitigate these risk within the AMP, we will respond with appropriate action, i.e. base maintenance.

Further development of our business as usual risk management process is on-going and we are looking to innovate by developing smarter systems to optimise this process.

We developed need statements for all selected risks.

4.1.3 Optioneering & Intervention Development Methodology

The next stage in our process is to develop options of how we could meet the needs of the selected risks.

To generate the options, data was gathered from a number of sources (see Appendix B). This included meetings with stakeholders and historical records, including reviews following operational events, previous scheme proposal reports and previous options assessment reports.

We then progressed to data assimilation, analysis and consultation with key stakeholders. Multiple options were developed and recorded. These options were reviewed and all options identified as not viable were discarded.

All viable options were identified as proposed interventions with a unique reference number and were taken forward for further scope development, benefits calculation and costing.

4.1.4 Intervention Costing Methodology

In order to provide assurance of our investment costs and to ensure standardisation, we engaged ChandlerKBS as our costing partner. They were selected in part due to their ability to provide us with industry comparable cost data, often at intervention level. They supported us in several ways:

- In some instances development and analysis of intervention costs, and
- Support of build our cost database

Indirect overheads, such as contractor costs, design costs, contract management, and our overheads have been applied at intervention level. Wherever possible we used our data or if unavailable, we used industry average costs.

Therefore we have to assess the expected capital cost of each intervention.

Expected Capital Cost (capex after)

If we deliver the capex intervention in a planned way, we have labelled it as 'capex after'. This is the expected capital cost of the intervention.

Cost estimates were usually based on high level scopes, which contained activity schedules, and were developed using the cost model we procured from ChandlerKBS.

4.1.5 Benefits Quantification Methodology

The benefits for each intervention are those which are considered to affect company performance during subsequent AMP periods.

Benefits can be assessed as either being:

- Direct – savings in reactive capex or savings in operational expenditure (opex); or
- Indirect – improvement in performance commitments or other resultant effects on the company's performance.

Both direct and indirect benefits are considered and quantified.

Direct Benefits

We have a totex approach which considers both capex and opex.

Expected Capital Cost (capex before)

If we deliver the capex intervention in an unplanned way, we have labelled it as 'capex before'. This is the reactive cost that would potentially arise if we had to deliver the intervention in an unplanned way.

We could respond to this scenario in one of two ways:

- 'Patch and Repair' or
- Implementation of the intervention in an un-programmed accelerated manner.

The capex before was determined for each intervention. For most interventions the estimate is site specific. A risk factor, taken from the likelihood score recorded in the risk register, was applied to the initial capex value to produce the final capex before value.

Where a 'patch & repair' solution would not be appropriate, should the risk materialise, this would lead to the immediate implementation of the intervention. The cost of the intervention in this scenario is the expected capital cost of the intervention (capex after), with the application of a suitable uplift to cover the costs associated with fast-tracking the intervention, for example, the cost of labour at premium rates.

The expected capex before effectively formed the 'Do Nothing' option.

Expected Opex Before & Opex After

In most cases we have made an estimate of the opex levels either with investment - opex after or without investment - opex before. Opex includes power, chemicals, materials, contract hire and in house labour.

Opex before represents the opex expenditure associated with not mitigating a risk through capital investment, for example, increased maintenance visits or replacement of components.

Opex after represents the additional opex cost to the business after the implementation of an intervention. These could include negative values associated with predicted savings associated with increased plant efficiency or performance, or positive values where there is an operational cost increase, for example greater inspection levels.

Indirect Benefits

To measure our performance against our customers' priorities and the associated performance enhancements associated with interventions; we measure the impact that each intervention had on the performance commitment measure.

Other Benefits

In addition to the performance commitments described above, other indirect benefits which do not relate to performance commitments were calculated and recorded in the benefits calculations where appropriate. This includes avoidance of health and safety penalties, customer compensation payments, and environmental penalties. These benefits have been monetised.

Once the benefits were prepared, the interventions were put forward for investment optimisation.

4.1.6 Investment optimisation & Intervention Selection

The investment optimisation process determines which interventions are selected to provide the optimal AMP7 investment plan, by delivering the targeted performance commitment improvements, at the lowest cost. We have utilised a water industry standard system (Servelec 'Pioneer') to optimise our AMP7 investment plan. Pioneer provides the functionality for us to assess all interventions developed across all of the investment cases. It will assess the interventions both individually and in comparison to other interventions. It is a decision support tool that produces an optimal investment plan to meet the targeted performance commitment improvements required in AMP7.

The Pioneer investment investment optimisation model assesses interventions primarily on the overall benefit, which takes account of performance and whole life costs. The investment investment optimisation calculates the whole life cost as the net present value (NPV) over 40 years. This determines if an intervention is cost beneficial.

We will select interventions for one or more of the following reasons:

- The intervention is mandated (i.e. Drinking Water Inspectorate - water quality requirement).
- The intervention is cost-beneficial
- The intervention is required to achieve the performance commitment targets.

Any performance commitment improvement obtained from mandated or cost-beneficial interventions will contribute to overall performance improvement.

A series of business reviews and sense checks of the investment investment optimisation results have been undertaken prior to finalising the AMP 7 investment plan.

We can of course model any number of scenarios, and during the process of engaging our customers we ran three scenarios as described in Appendix C1 (slower Improvement plan, suggested improvement plan and faster improvement plan)

4.2 Applying the investment process to Network Ancillaries

Each of the following sections describes the specific details associated with the application of the investment case development process for Network Ancillaries.

4.2.1 Risk Identification, Verification & Needs Assessment

There were three risks identified in the strategic risk register associated with this investment case. Every risk went through a process of assessment, scoring and review

All of the three identified risks were selected and developed into need statements. The details of the selected risks are provided in Appendix C.1

4.2.2 Optioneering & Intervention Development

Three risks were selected and developed into need statements. Multiple options were developed and recorded for each of the three needs statements. These options were peer reviewed and all options identified as not viable were discarded.

For example, against the selected risk regarding lead communication pipes, five options were identified and all five of these were developed into interventions, as shown in Table 5.

Table 5: Example of options selection

SRR Revised Risk Description	Need Description	Proposed Option Name	Proposed Option Description	Option Viability?	Option to be Developed into an Intervention?	Ref. No.	Intervention Title
SRR648 There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN Bristol Water may not meet Drinking Water Inspectorate water quality standards and customers will be at risk in the long term.	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the Drinking Water Inspectorate - Reduce the risk of harm to Bristol Water customers through the long term exposure to lead.	Reactive lead communication pipe replacement	Reactive replacement of lead communication pipes across BW network based on customer requests. Replace approx. 12000 across the AMP.	Superseded by intervention 08.001.06	Y	Superseded by intervention 08.001.06	-
		Targeted lead communication pipe replacement-Small	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Small programme of works - approx. 3000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable	Y	08.001.03	Targeted lead communication pipe replacement - Small
		Targeted lead communication pipe replacement-Med	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Medium programme of works - approx. 6000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable	Y	08.001.04	Targeted lead communication pipe replacement - Med
		Targeted lead communication pipe replacement-Large	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Large programme of works - approx. 12000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable - number matches the total number of lead CP replacements in AMP5 proving it can be achieved.	Y	08.001.05	Targeted lead communication pipe replacement - Large
		Lead communication pipe replacement-maintenance or other (inc customer driven and in conjunction with new supplies).	Replace 3688 lead communications pipes across the AMP.	Drinking Water Inspectorate Commitment	Y	08.001.06	Lead communication pipe replacement - maintenance or other (inc customer driven and in conjunction with new supplies).
		Lead communication pipes replaced for quality (where lead > 8 microg/l)	Replace 208 lead communications pipes across the AMP.	Drinking Water Inspectorate Commitment	Y	08.001.07	Lead communication pipes replaced for quality (where lead > 8 microg/l)

All viable options were identified with a unique reference number as proposed interventions and were taken forward for further scope development, benefits calculation and costing. A total of seven interventions were identified in this way. These included in some cases, multiple interventions against a single selected risk and these were identified as mutually exclusive during investment optimisation so that only one of these intervention was selected. A summary of all selected risks and their associated options is included in Appendix D.

Replacement of stop taps

An intervention has been developed to address the base maintenance requirement for replacement of faulty stop taps at customers' request. The intervention developed is based on AMP6 volumes. The AMP6 years' 1-3 average stop tap replacement rate is 3,040/year. The required replacement rate has recently been reviewed, and has been revised to 4,000/year for AMP6 year 4 and 4,500/year for AMP6 year 5, to start to clear the backlog that has built up. An assessment of required AMP7 stop tap replacement rate concluded that 4,500-4,600/year rate is needed, on evidence that the requested replacement rate has demonstrated a 500/year increase from 2015 to 2018.

Replacement of lead communication pipes

Interventions have been developed to address the risks of lead communication pipes in the network and the following sections describe these in more detail:

Lead Communication Pipes Supplying High Risk Group

This intervention continues our programme of replacing lead communication pipes supplying high risk groups. In AMP6 we replaced all lead communication pipes supplying primary schools and in AMP7 we are prioritising nurseries.

GIS data was analysed[7] to determine the locations of nurseries and pre-schools and then cross referenced against the material of the communication pipes serving these to determine a total length. This analysis identified the total number of nurseries served by lead or unknown communication pipes, their lengths and diameters as follows:

- Total number of communication pipes to nurseries of lead or unknown material: 145
- Total length of communication pipes to nurseries of lead or unknown material: 727m
- Average Length of each: 5m
- Median diameter of each: 25mm

[7] 'Nursery Schools' and 'Pre and After School Care' under level 3 of the Ordnance Survey's Points of Interest Classification Scheme

Targeted replacement of lead pipes based on the output of Hotspot analysis:

This intervention considers the lead communication pipes present throughout our network due to historical practices and materials selection. Any replacement will reduce lead concentrations to some degree. However, the full benefits of lead communication pipe replacement are difficult to quantify due to a complex interaction of factors, including:

- The length of lead pipework (communication and supply);
- Stagnation time of water within the lead pipework / pattern of water use at the property;
- Localised impacts of pipe vibration, movement, and condition;
- Quality of lead pipe used;
- Water chemistry and water temperature;
- Plumbosolvency control; and
- Sampling methodology.

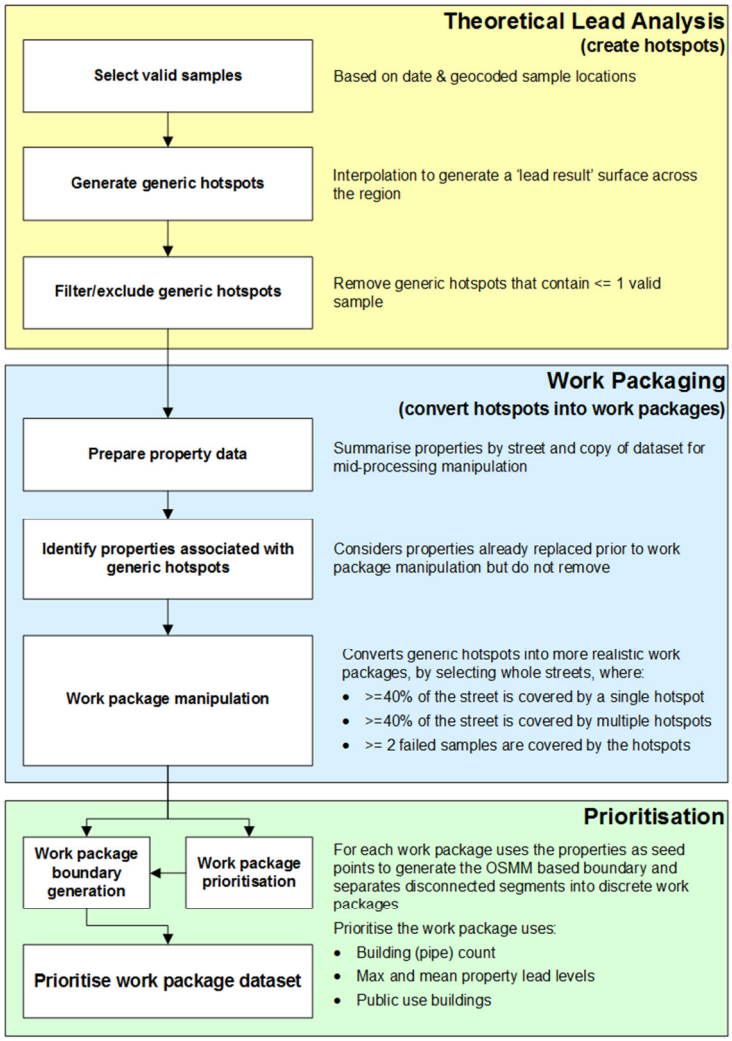
This leads to difficulties of where to focus efforts in replacing these pipes, as a scattered approach will not yield efficient deployment of resources. Therefore, a robust methodology has been developed to identify lead Hotspots, which is a recognised approach within the industry and which has demonstrated improved cost benefit results from investment.

The application of a spatial analytical approach to identify, select, prioritise and recommend hotspots for further expert review and boundary delineation, has been developed and is described in more detail below.

The methodology of analysis[8] uses a data-driven process to identify areas of poor compliance with respect to lead concentration based on the lead sampling data from 2000 – 2017 inclusive, and to create lead replacement work packages. These work packages are then ranked to identify the highest priority work packages (and their associate pipes) for replacement using appropriate property and lead concentration-based criteria. Figure 6 below shows the process work flow for generating the prioritised lead replacement work packages.

[8] Black and Veatch, 2017, Managing The Risk of Lead in Drinking Water - Hot Spot Analysis - Methodology

Figure 6: Prioritised Lead Replacement Work Package Generation Work Flow



The methodology also includes two additional sub-processes;

- **Non-work package sample locations** – these are sample locations that were on a street which failed the 40% covered by a Hotspot and less than 3 lead samples per street, but are in close proximity to one another and of high lead values.
- **Cold spot locations** – these are property locations where no lead sample has occurred in the past. Typically these will highlight where clusters of properties occur within our area but outside of the Hotspot analysis.

In practice, the greatest benefit arises from lead communication pipe replacement activity where the customer also replaces their own private lead supply pipes. Interventions have been developed on the basis of prioritisation of investment in such areas during AMP7.

Once interventions were developed, costs could be prepared which are discussed in Section 4.2.3.

4.2.3 Intervention Costing

In this investment case, costs for most interventions were calculated in collaboration with ChandlerKBS, based on activity schedules supplied by us. Indirect overheads (contractor on-costs including preliminaries, design costs, contract management) and Bristol Water overheads were then applied at intervention level. These overheads were on Bristol Water data where available, or using industry average data, where Bristol Water data was not available. In one case, 08.002.01 Replacement of Stop Taps, the costs were derived from the base maintenance costing approach, which is further explained in Section 5.1.

For each of the seven interventions, high level scope documents were developed including an activity schedule. ChandlerKBS utilised a water industry unit cost data base to complete estimation in accordance with their own assured methodology.

The costed activity schedules were returned to us for peer review, and found to be acceptable.

As stated above, costs for 08.002.01 Replacement of Stop Taps were derived from the Base Maintenance costing approach.

The cost for each intervention is presented in Appendix E. An example of how those costs have been developed is outlined below:

Cost Example: Nurseries - Lead Communication Pipe Replacement

We are obliged to replace lead communication pipes for pre-schools and nurseries in accordance with our proposed Lead Action Plan. Investment is needed as a priority to ensure we meet our compliance risk index target of zero failures for this vulnerable group.

We have established a cost of undertaking the works of £0.131m; this includes labour and materials as well as contractual costs. The latter includes items such as (but not limited to) contractor accommodation, contractor management, contractor overhead and profit, and design. We have then applied Bristol Water's overhead of £0.025m for internal activities associated with the intervention, such as project management, land & compensation, legal, environmental costs, commissioning/handover, contract management, operations & system support, consultants and administration.

All of the direct costs above gave us an intervention cost of £0.156m to implement the intervention in a planned way (the capex after).

We have established that if we undertook the above intervention in a planned or reactive way, there would be no change in operational expenditure (opex after).

Once interventions were costed, benefits could be calculated which are discussed in Section 4.2.4.

4.2.4 Benefits Quantification

Seven Network Ancillaries interventions were assessed for direct and indirect benefits. These are presented in Appendix E.

In terms of indirect benefits the performance commitments that relate to this investment case are discussed below.

Compliance risk index

Replacing lead communication pipes has a beneficial impact on CRI where replacement is targeted in response to compliance sampling failures. With customer pipes not being replaced fully, there is a residual risk of CRI failures and the intervention cannot have a 100% benefit. As this is a water quality scheme driven by legislative requirements, and for which we have received instruction from the DWI, the following interventions were set as mandatory:

- Lead communication pipes replacement in nurseries and pre-schools
- Lead communication pipes replacement – maintenance, customer driven, and in conjunction with new supplies.
- Lead communication pipes replaced for quality (where lead > 8 microg/l)

Leakage

A further benefit of replacing communication pipes is that it will reduce leakage by small amounts.

The leakage benefit has been calculated using industry average figures for leakage per communication pipe at 3 litres per connection per hour[9].

Once the benefits were prepared, the interventions were put forward for investment optimisation.

[9] Brandt et al., 2017, Twort's Water Supply.

5 Outcome

5.1 Selected Interventions

The eight interventions developed within the Network Ancillaries investment case were assessed through the investment optimisation process. Of these eight interventions, four were selected.

When it comes to delivering our programme of works we know that we must continue to be innovative and efficient. We have set ourselves a challenging target of reducing our costs by 8% during AMP7. This will be achieved by delivery of our business transformation programme.

We see innovation as integral to our everyday working at Bristol Water: We have deliberately embedded it within the business-as-usual processes of our asset management teams, by embracing the full flexibility that totex and outcomes enables. We will look to be innovative in the following ways:

- **Open Innovation**: We have defined our strategic innovation challenges and run events such as our "Innovation Exchange" that invite suppliers to present their innovative solutions to predefined challenges that we set
- **Market Scanning**: We conduct market scanning for cutting edge technology against our strategic innovation challenges and feed this into our optioneering process. In particular, we subscribe to the Technology Approval Group which regularly scans and meets with water companies to unearth the most promising innovations for the sector
- **Partnering**: we undertake leading research into areas that we provide effective solutions for the future.

We will specifically look for innovations that mean we can contribute to our 8% efficiency challenge and keep our customers' bills low into the future.

The four selected network ancillaries interventions are set out in Table 6, along with details of the associated costs and contribution to performance improvement.

Table 6: Selected interventions, costs, and % performance contribution

ID	Intervention Title	Capex (£)	Change in opex per annum (£)	Compliance risk index	Leakage
08.001.02	Nurseries lead communication pipe replacement	£155,431	£0	<0.01%	0.14%
08.001.06	Lead communication pipe replacement - maintenance or other (including customer driven and in conjunction with new supplies).	£3,477,932	£0	<0.01%	3.46%
08.001.07	Lead communication pipes replaced for quality (where lead greater than 8 microg/l)	£196,152	£0	<0.01%	0.20%
08.002.01	Replacement of Stop Taps	£6,000,000	£0	-	-
Network Ancillaries capital investment (pre-efficiency)		**£9,829,515**	**£0**	**<0.01%**	**3.79%**
Network Ancillaries capital investment with 8% capex efficiency		**£9,043,154**			

The following interventions are selected because they are required to fulfil asset health base maintenance investment requirements:

- Replacement of Stop Taps; and
- Lead communication pipe replacement - maintenance or other (including customer driven and in conjunction with new supplies).

The remaining two interventions are selected because they are **mandatory** to meet DWI obligations and provide additional contributions to achieving the compliance risk index and leakage performance commitment targets (see Appendix G for the Drinking Water Inspectorate letters of support):

- Nurseries Lead communication pipe replacement; and
- Lead communication pipes replaced for quality (where lead greater than 8 microg/l)).

The selected interventions are described in detail in the following sections.

Replacement of Stop Taps

This is a base maintenance allowance for replacement of faulty stop taps at customers' request. The intervention developed is based on AMP6 volumes. An assessment of required AMP7 stop tap replacement rate concluded that 4,500-4,600/year rate is needed, on evidence that the requested replacement rate has demonstrated a 500/year increase from 2015 to 2018. Hence, intervention 08.002.01 captures the AMP7 replacement volume of 4,550/year (approximately £6.0m at a unit rate of £262.75).

Table 7: Stop tap replacement volumes summary

AMP Period	Year	Number of Stop taps	Actual / forecast	Investment summary
AMP6	2015/16	2530	Actual	17.6k total (3,525/yr average)
	2016/17	3098	Actual	
	2017/18	3500	Actual	
	2018/19	4000	Forecast	
	2019/20	4500	Forecast	
AMP7	2020/21	4550	Forecast	22.75k total (4,550/yr average)
	2021/22	4550	Forecast	
	2022/23	4550	Forecast	
	2023/24	4550	Forecast	
	2024/25	4550	Forecast	

Replacement of communication pipes

Lead communication pipe replacement - maintenance or other (including customer driven and in conjunction with new supplies) – asset health base maintenance

We will continue to replace lead communication pipes to support our proposed Lead Action Plan[10]. Where customers request that we replace the communication pipes feeding their properties, or where new connections are requested, we will take the opportunity to replace the lead pipes within these areas. The Hotspot analysis discussed in section 4.2.2 will be used to support this investment. Our compliance risk index target is for zero failures. This intervention will install 3,688 new communication pipes in our supply region and ensure future water quality compliance. This has been assessed based on historic volumes between 2010 and 2015 and includes customer driven and in conjunction with new supplies, but excludes replacement arising from the mains rehabilitation programme.

Nurseries lead communication pipe replacement – mandatory obligation

We are obliged to replace lead communication pipes in accordance with our proposed Lead Action Plan[10]. This identifies strategic lead communication pipe replacement for pre-schools and nurseries as a priority, as this will protect a high risk group (young children). Our compliance risk index target is for zero failures. This intervention will install 145 no. new communication pipes at nurseries in our supply area ensuring future water quality compliance, which will replace all known communication pipes serving nurseries that are of lead or unknown material.

Lead communication pipes replaced for quality (where lead > 8 microg/l) – mandatory obligation

We are obliged to replace lead communication pipes in accordance with our proposed Lead Action Plan[10]. This identifies precautionary lead communication pipe replacement where samples ≥8 μ g/l are recorded. The Hotspot analysis discussed in section 4.2.2 will be used to support this investment. Our

[10] Bristol Water, 2018, DWI Scheme reference: BRL 3 – Lead Action Plan (Strategy) - Lead, Final Decision Letter.

compliance risk index target is for zero failures. This intervention will install 208 no. new communication pipes in our supply region and ensure future water quality compliance.

With the above three communication pipes replacement interventions, 150,959 of the 155,000 lead and unknown communication pipes will remain in our network.

The total Network Ancillaries investment, including Water Service and Business Unit Allocation, is summarised in Table 8. This investment case is aligned to the Water Network Plus Wholesale Control category of our Business Plan. Costs are allocated to the Treated Water Distribution Business Unit. Investment is all related to infrastructure assets and is a mixture of maintenance and other capital expenditure.

Table 8: Water Service and Business Unit Allocation

Wholesale Control	**Water Network Plus**	**Total (Pre-Efficiency)**
Business Unit Allocation	***04 Treated Water Distribution***	
Network Ancillaries capital investment (%)	**100.0%**	**100%**
Network Ancillaries capital investment	**£9.830m**	**£9.830m**
Maintaining the long term capability of the assets - infra	£9.478m (96%)	**£9.478m (96%)**
Other capital expenditure – infra	£0.352m (4%)	**£0.352m (4%)**
Network Ancillaries - capital investment with 8% capex efficiency	**£9.043m**	**£9.043m**

5.2 Contribution to Performance Commitment

Table 9 set outs the percentage contribution to performance commitment improvement provided by the selected Network Ancillaries interventions.

Table 9: Network Ancillaries – contribution to performance commitment targets from selected interventions

Performance Commitment	Unit	2019/20 Baseline	2020/21	2021/22	2022/23	2023/24	2024/25	Total Performance Improvement Required in AMP7	Network Ancillaries Contribution to Performance Improvement
Compliance risk index	Index	1.27	0	0	0	0	0	1.27	<0.01%
Leakage	Ml/d	43	42	41	39.5	38	36.5	6.5	3.79%

Asset Health

Our AMP7 investment in Network Ancillaries will help ensure our assets are being maintained appropriately to deliver resilient water services to current and future generations

Compliance risk index

This investment case contributes <0.01% towards our compliance risk index target. Approximately half of our performance improvement will be achieved through investment case interventions. We will achieve the remaining performance improvement by enhancing management of our assets, reducing risk with proactive interventions (such as flushing mains), and improving operational procedures to quickly resolve problems.

Leakage

Our AMP7 target is to achieve a 6.5Ml/d performance improvement by 2025. Our investment in Network Ancillaries will provide a 3.79% contribution towards this target.

5.3 Non-Selected Interventions

Of the eight interventions developed within this investment case, four were not selected because they did not provide the most cost beneficial way of meeting performance commitment targets compared to other interventions available. The risks associated with these interventions represent residual risks that will be carried during AMP7. We will continue to monitor these residual risks throughout AMP7, and where this process requires these risks to be mitigated, we will respond with appropriate action. Details of the four non-selected interventions are given in Table 10.

Table 10: Non-selected intervention and residual risk

SSR ID	Risk & Need Statement	Non-Selected Intervention	Residual Risk
SRR648	There are some 155,000 lead communication pipes within the Bristol Water supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the Drinking Water Inspectorate - Reduce the risk of harm to Bristol Water customers through the long term exposure to lead.	08.001.03 Targeted lead communication pipe Replacement- Small. Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Medium programme of works - approx. 3,000 lead communication pipes identified in 'Lead Hotspot Analysis'.	There remain a considerable number of lead communication pipes in our network, which may lead to unacceptable exposure to lead for our customers and compliance risk failures arising from lead in our network.
		08.001.04 Targeted lead communication pipe Replacement- Med. Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Medium programme of works - approx. 6,000 lead communication pipes identified in 'Lead Hotspot Analysis'.	
		08.001.05 Targeted lead communication pipe Replacement- Large. Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Medium programme of works - approx. 12,000 lead communication pipes identified in 'Lead Hotspot Analysis'.	
SRR168	If failure of lead standards in Water Supply Zone 401 continue then we will fail to meet Drinking Water Inspectorate water quality standards and place our customers at risk in the long term.	02.004.01 Replace all lead services in WZ401. Improve water quality in supply zone 401 to mitagte risk of lead stand failures, ensure compliance with current legislation and long term customer health issues	

The proposed approach mitigates the risk of sample failures detected in the network as and when they arise, but does not go further to proactively replace lead pipes. Historical reductions in the number of sample failures are demonstrating a diminishing benefit, as shown in Figure 3 in section 3.6.

While the targeted lead communication pipe replacement interventions have not been selected, our infrastructure base maintenance investment case considers minimum investment requirements for communication pipes replacement for maintenance/deterioration and quality drivers, as set out in Section 5.6. It is expect that additional lead communication pipe replacement will be achieved through this base maintenance investment, therefore will work towards the mitigation of the residual risk described in Table 10.

Additionally, it is still intended that in AMP7 we will trial innovative lining approaches in the areas identified as part of the Hotspot analysis. This commitment is set out in the proposed Lead Action Plan[10], and is supported by the Drinking Water Inspectorate. We have developed a data-driven work package to identify areas with a record of reduced compliance against the lead standard. This data has been used to provide us with lead hotspot mapping. This information will be used to target pilots relining at customer's properties and the effect on the levels of lead at consumer's taps can be assessed accordingly.

5.4 Assumptions

There are a number of general assumptions that have been made in the development of our investment cases. These are discussed in detail the PR19 Investment Cases Summary Document[11]. Assumptions specific to this investment case are discussed below.

The Lead Hotspot analysis includes a number of assumptions which are presented as part of this study. However, the most notable assumption is that one property represents one communication pipe.

The Leakage benefit attributed to the replacement of communication pipes cannot be measured effectively, but is assumed to be that shown in industry research, as stated in Section 4.2.4.

5.5 AMP8

We anticipate that the strategic replacement and renewal of our network ancillary assets will follow a similar pattern in AMP8 as proposed for AMP7.

There are a number of risk items that have developed into interventions which have not been selected for inclusion in the AMP7 investment plan (as given in the Appendix F), which will be reappraised for investment in AMP8.

5.6 Network Ancillaries Base Maintenance

We have established minimum levels of investment in relation to the base maintenance of network assets, as set out in the infrastructure base maintenance investment case. These minimum levels provide investment for routine and reactive maintenance, to ensure the continuation of 'business as usual'. The minimum investment for communication pipe replacement driven by quality (Drinking Water Inspectorate) requirements is £5.0m, while replacement driven by maintenance and deterioration requirements is £5.5m. The minimum investment for stop tap replacement is £4.5m. These minimum levels have been determined through a combination of analysis of historical activity and costs, deterioration modelling to establish underlying asset deterioration, and investment planning analysis. Full details are provided in the infrastructure base maintenance investment case.

The investment planned through this investment case contributes towards the minimum investment levels, as the selected interventions improve the condition and performance our commination pipes and stop tap assets above current levels.

In relation to this investment case, the infrastructure base maintenance investment case defines minimum levels of expenditure for commination pipe and stop tap replacement. The minimum investment levels are summarised in Table 11.

[11] Bristol Water, 2018, PR19 Investment Cases Summary Document, NTPBP-INV-PR1-0635

Table 11: Contribution to minimum infrastructure base maintenance investment

Infrastructure Base Maintenance Asset Group	Minimum AMP7 investment to maintain asset health (£m)	AMP7 investment provided through Network Ancillaries interventions (£m)	AMP7 investment provided through all interventions (£m)	Additional investment requirement as Base Maintenance (£m)
Stop Tap Replacement	4.5	6.0	6.0	0
Communication Pipes (maintenance/deterioration)	5.5	3.63	3.63	1.867
Communication Pipes (quality)	5.0	0.196	0.196	4.808

The communication pipe replacement investment planned through this investment case contributes towards the minimum investment levels, as the selected interventions improve the performance our communication pipe assets above current levels

The stop tap replacement investment planned through this investment case exceeds the identified minimum base maintenance investment level. As described in Section 5.1, we propose to spend more than this minimum level, as we are looking to increase volume of stop taps replaced to provide additional performance improvement.

5.7 Historic & AMP7 Investment Comparison

A summary of historical investment in Network Ancillaries is provided in Table 12 along with the planned AMP7 investment value from Network Ancillaries interventions. We have re-categorised data used in line with the scope of our investment cases. For historic data we have used the 2016/17 wholesale cost assessment data (data tables 1 and 2). Forecast data has been derived from PR19 data (data tables WS1 and WS2).

Table 12: Historical & AMP7 Investment

AMP	Capital investment values	Investment (£m)
AMP5	AMP5 actual	10.219
AMP6	2015/16 actual	1.878
	2016/17 actual	2.029
	2017/18 actual	2.325
	2018/19 forecast	2.437
	2019/20 forecast	2.667
	AMP6 forecast	**11.337**
AMP7	AMP7 pre-efficiency	**9.830**
	AMP7 8% capex efficiency applied	**9.043**

Taking into account the base maintenance investment in communication pipe replacement, our AMP7 investment in communication pipe replacement will be comparable overall to that in AMP5 and AMP6. In AMP7, we will undertake targeted investment in lead communication pipe replacement to meet Drinking Water Inspectorate requirements and performance commitment targets, and also undertake base maintenance replacement of communication pipes to address asset health deterioration. Our AMP7 investment in stop taps is greater than in AMP6, and we will increase our investment to replace a greater volume of faulty or leaking stop taps.

6 Conclusions

To ensure our network ancillary assets continue to deliver our customers' priorities and meet our compliance obligations we will measure progress via performance commitments for which we have set delivery targets.

In AMP7, the Network Ancillaries measures are water quality compliance, which is measured against our target for the compliance risk index (target 0), and leakage (target 36.5Ml/d).

An initial list of three risks was developed into seven potential interventions. These interventions were developed and assessed through our asset management totex focused approach and put forward for investment optimisation. Of these a total of four interventions were selected on the basis that they are cost beneficial interventions that meet our customer priorities and associated performance commitments, and they meet our statutory obligations.

We plan to invest a pre-efficiency total of £3.830m on lead communication pipe replacement and £6.000m on stop tap replacement, resulting in a total Network Ancillaries investment of £9.830m. We have set ourselves a challenging target of reducing out costs by 8% during AMP7. This will be achieved by delivery of our business transformation programme, resulting in a post-efficiency investment of £9.043M.

The interventions proposed contribute to ensuring our assets are maintained appropriately for the benefit of current and future generations. The interventions proposed are also expected to contribute 3.79% of the leakage target (36.5Ml/d) and contribute towards compliance risk index. They also support compliance with our obligations in relation to the Water Supply (Water Quality) Regulations 2016.

If we fail to invest in our Network Ancillaries assets, there is a risk that we will see an increase in lead failures which will lead to poor water quality and an unreliable supply of water for our customers and a failure to satisfy our statutory obligations. Our Network Ancillaries assets will also continue to deteriorate to unacceptable levels. Consequently we will not provide our customers with the Safe and Reliable supply.

Our Business Plan provides assurance to both deliver and monitor the delivery of its outcomes, it will meet relevant statutory requirements and licence obligations imposed by the DWI and the UK Government.

7 Appendices

Appendix A: Line of sight diagram

Appendix B: Datasets

Appendix C.1: Selected Risks

Appendix C.2: Non-Selected Risks

Appendix D: Options Considered

Appendix E: Interventions Developed

Appendix F: Non-Selected Interventions

Appendix G: Drinking Water Inspectorate Letter of Support

7.1 Appendix A: Line of Sight

Network Ancilliaries- Line of Sight

Investment Case
NTPBP-INV-NET-0533

Customer Priorities

Top Quality Water Supplies

Quality

Saving Water

Leakage

Performance Commitments

Optimiser Input Form Reference

NTPBP-CAL-DIS-0346

Slower Plan

Suggested Plan

Faster Plan

Based on Lockdown 5

Safe and Reliable Supply of Water

Compliance Risk Index

0 | 0 | 0

Customer High Priority

ODI

Common Penalty Only

Local Community Resilience

Leakage

41 | 36.5 | 36

Customer High Priority

ODI

Common Reward and Penalty

Interventions

08.001.02
08.001.03
08.001.04
08.001.05
08.001.06
08.001.07

OFWAT Initial Assessment Tests

Test Area

What is the quality of the Company's customer engagement and participation and how is it incorporated into the companies business plan and ongoing operations → Engaging Customers

How well has the company used the best available evidence to objectively assess and prioritise the diverse range of risks and consequences of disruptions to its systems and services and engaged effectively with customers on its assessment of the risks and consequences

How well has the company objectively assessed the full range of mitigating options and selected the solutions that represent the best value for money over the long term and support from customers → Securing long term resilience

To what extent has the company clearly demonstrated that it has considered whether all relevant projects are technically suitable for direct procurement for customers. Where it has one or more such projects, to what extent has the Company provided a well reasoned and well evidenced value for money assessment → Targeted controls , markets and innovation

To what extent does the company have a good track record of producing high quality data, taking into account the company's data submission, assurance process and statement of high quality , and our 2018 assessment of the company under the Company Monitoring Framework → Securing Confidence and Assurance

Board Requirements

Assurance that the company's business plan has been informed by customer engagement and feedback from the company's CCG about the quality of its customer engagement and how this has been incorporated into the plan → Customer Engagement

Assurance that the company's business plan has been informed by a robust and systematic assessment of the resilience of the company's systems and services; customer views on managing resilience and a comprehensive and objective assessment of interventions to manage resilience in customers long term interests → Resilience

How has it challenged an satisfied itself that the overall strategy for data assurance and governance processes delivers a high quality data

How has it challenged and satisfied itself that the business plan will enable the company to meet its statutory and licence obligations , now and in the future and take account of the UK and Welsh governments strategic policy statements. → Business Planning

How has it challenged and satisfied itself that its plan will deliver operational financial and corporate resilience over the next control period and the long term through its governance and assurance processes, taking into account of its track record of performance

Performance Commitment Key

- Common Performance Commitment
- Bespoke Performance Commitment
- Common New Performance Commitment
- Bespoke New Performance Comittment

Document Number: NTPBP-MET-NET-0722

7.2 Appendix B: Datasets

This appendix show the data used in this investment case and where and how it has been applied.

Dataset File Name	Data Summary	Process In Which Data Has Been Used			
		Risk Identification, Verification and Needs Assessment	Optioneering	Intervention Costing	Benefits Quantification
NTPBP-CAL-ABA-0221 Abandoned Removed CPs_24082017_results_200mm buffer - Pivot analysis 2.xlsx	Pivot analysis of Lead communication pipes removed/abandoned	-	-	-	✓
NTPBP-CAL-COM-0169 Communication pipes - pivot analysis.xlsx	Pivot analysis of number of lead communication pipes in service	-	-	-	✓
NTPBP-CAL-NET-0226 Communication pipe replacement costing analysis.xlsx	Costs of pipe replacement	-	-	✓	-
PR19 Key Data.xlsx	Total company population served	-	-	-	✓
REQ-0206 Lead Work Package Prioritisation Details P1 1710 - 122677-BVL-Z0-04-RP-J-00003.xlsx	Output of the lead hotspot analysis	-	-	-	✓

7.3 Appendix C.1: Selected Risks

This appendix shows the 2 selected risks of the 2 relevant risks.

SRR ID	Location/Zone	Revised Risk Description	Likelihood	Human Health / Environment	Ease to Resolve	Publicity & Reputation	Regulatory Impacts	Customers Impacted	Max Impact	Risk Score
SRR3	Non Site Specific	**IF** the latest tools and equipment for detecting and monitoring leakage are not employed **THEN** BW will fail to meet its AMP7 leakage target	5	4	3	3	5	2	5	25
SRR648	All Water Supply Zones	Failure of the lead standard at targeted properties.	3	4	3	3	5	2	5	15
SRR168	Alderley TW	IF failure of lead standards in Water Supply Zone 401 continue THEN we will fail to meet DWI water quality standards and place our customers at risk in the long term.	5	3	4	3	5	3	5	25

7.4 Appendix C.2: Non-Selected Risks

Not applicable - there are no non-selected interventions for this investment case.

7.5 Appendix D: Options Considered

This appendix shows the 7 options considered from the 3 selected risks

Strategic Risk Register (SRR) Reference	SRR Revised Risk Description	Risk Need		Identification & Viability of Options			
		SRR Need ID	Need Description (from SRR)	Proposed Option Name	Proposed Option Description	Option Viability?	Option to be Developed into an Intervention?
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Reactive Lead CP Replacement	Reactive replacement of lead communication pipes across BW network based on customer requests. Replace approx. 12000 across the AMP.	Superseded by intervention 08.001.06	Y
SRR3	IF failure of lead standards in the 145 nurseries served by lead communication pipes continues Then we will fail to meet DWI water quality standards and place some of our customers most vulnerable to lead, namely young children, at risk in the long term.	SRRN26	There are 145 lead communication pipes serving nurseries within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to some of the most vulnerable BW customers, namely young children, through the long term exposure to lead.	Nurseries - Lead CP Replacement	Planned replacement of 145 lead communication pipes at nurseries distributed across the BW supply area.	DWI Commitment	Y
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Targeted lead CP Replacement-Small	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Small programme of works - approx. 3000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable	Y
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Targeted lead CP Replacement-Med	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Medium programme of works - approx. 6000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable	Y
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Targeted lead CP Replacement-Large	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Large programme of works - approx. 12000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable - number matches the total number of lead CP replacements in AMP5 proving it can be achieved.	Y
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Lead CP replacement-maintenance or other (inc customer driven and in conjunction with new supplies).	Replace 3688 lead communications pipes across the AMP.	DWI Commitment	Y
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Lead communication pipes replaced for quality (where lead > 8 microg/l)	Replace 208 lead communications pipes across the AMP.	DWI Commitment	Y

7.6 Appendix E: Interventions Developed

This appendix shows the 7 interventions developed from the 7 options and includes 1 mandatory intervention.

Strategic Risk Register (SRR) Reference	SRR Revised Risk Description	Risk Need		Identification & Viability of Options			Proposed Interventions		Costs	Benefits		
		SRR Need ID	Need Description (from SRR)	Proposed Option Name	Proposed Option Description	Option Viability?	Ref No	Intervention Title	Capex After (£M)	Change in Opex (£k)	Water Quality Compliance	Leakage
SRR3	IF failure of lead standards in the 145 nurseries served by lead communication pipes continues Then we will fail to meet DWI water quality standards and place some of our customers most vulnerable to lead, namely young children, at risk in the long term.	SRRN26	There are 145 lead communication pipes serving nurseries within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to some of the most vulnerable BW customers, namely young children, through the long term exposure to lead.	Nurseries - Lead CP Replacement	Planned replacement of 145 lead communication pipes at nurseries distributed across the BW supply area.	DWI Commitment	08.001.02	Nurseries - Lead CP Replacement	0.155	0	8.23E-06	0.01044
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Targeted lead CP Replacement- Small	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Small programme of works - approx. 3000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable	08.001.03	Targeted lead CP Replacement- Small	2.546	0	1.36E-05	0.216
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Targeted lead CP Replacement- Med	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Medium programme of works - approx. 6000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable	08.001.04	Targeted lead CP Replacement- Med	5.092	0	2.73E-05	0.432
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Targeted lead CP Replacement- Large	Planned replacement of lead communication pipes in clustered areas targeted by the lead hotspot analysis. Large programme of works - approx. 12000 lead communication pipes identified in 'Lead Hotspot Analysis'.	Option is viable - number matches the total number of lead CP replacements in AMP5 proving it can be achieved.	08.001.05	Targeted lead CP Replacement- Large	10.184	0	5.45E-05	0.864
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Lead CP replacement-maintenance or other (inc customer driven and in conjunction with new supplies).	Replace 3688 lead communications pipes across the AMP.	DWI Commitment	08.001.06	Lead CP replacement-maintenance or other (inc customer driven and in conjunction with new supplies).	3.477	0	1.68E-05	0.265536
SRR648	There are some 155,000 lead communication pipes within the BW supply zone. IF lead communication pipes remain in service THEN BW may not meet DWI water quality standards and customers will be at risk in the long term.	SRRN25	There are some 155,000 lead communication pipes within the BW supply zone. Investment is need to replace these lead communication pipes in order to: - Reduce the risk of lead compliance failure and the risk of a subsequent notice from the DWI - Reduce the risk of harm to BW customers through the long term exposure to lead.	Lead communication pipes replaced for quality (where lead > 8 microg/l)	Replace 208 lead communications pipes across the AMP.	DWI Commitment	08.001.07	Lead communication pipes replaced for quality (where lead > 8 microg/l)	0.196	0	9.45E-07	0.014976
N/A	N/A	N/A	N/A – base maintenance need and intervention	N/A	Base maintenance replacement of Stop Taps	N/A	08.002.01	Replacement of Stop Taps	6.000	0	0	

7.7 Appendix F: Non-Selected Interventions

This appendix shows the 4 non-selected interventions. See appendix D for costs or performance commitments.

Ref No	Intervention Title	Expected Capex after (£)	Change in Opex (£)	Residual Risk
08.001.03	Targeted lead CP Replacement- Small	2,546,21 0	0	There remain a considerable number of lead communication pipes in our network, which may lead to unacceptable exposure to lead for our customers and CRI failures arising from lead in our network
08.001.04	Targeted lead CP Replacement- Med	5,092,420	0	
08.001.05	Targeted lead CP Replacement- Large	10,184,830	0	
02.004.01	. Replace all lead services in WZ401	£3,060,000	£0	There remain a considerable number of lead communication pipes in our network, which may lead to unacceptable exposure to lead for our customers and compliance risk failures arising from lead in our network

7.8 Appendix G: Drinking Water Inspectorate Letter of Support

Letter of support from the Drinking Water Inspectorate for the Lead Action Plan (Strategy)

DRINKING WATER INSPECTORATE
Area 1A
Nobel House
17 Smith Square
London
SW1P 3JR

Enquiries: 030 0068 6400

E-mail: milo.purcell@defra.gsi.gov.uk
DWI Website: http://www.dwi.gov.uk

30 May 2018

Mr Graham Williams
Director of Water Quality
Bristol Water Plc
PO Box 218
Bridgwater Road
Bristol
BS99 7AU

Dear Mr Williams

PERIODIC REVIEW 2019: Bristol Water Plc
DWI Scheme reference: BRL 3 – Lead Action Plan (Strategy) - Lead

FINAL DECISION LETTER

The Inspectorate has completed its detailed assessment of the scheme proposed by Bristol Water Plc to provide a package of measures to secure or facilitate compliance with the lead standard for drinking water quality reasons across the Bristol Water area.

The detailed assessment also took in to consideration the outcome of the risk assessment report submitted to the Inspectorate as required by regulation 28(1) of the Water Supply (Water Quality) Regulations 2016 for lead across the Bristol Water area.

A summary of the outcome of our assessment of this scheme is attached. Based on the information submitted by the Company, the Inspectorate supports the need for a scheme to reduce lead concentrations in treated water for water quality reasons, and the supported scheme shall be included by the Company in its Final Business Plan, subject to the caveats listed in the attachment.

In this instance the Inspectorate intends to issue a Notice under Regulation 28(4) of the Water Supply (Water Quality) Regulations 2016, as amended, that requires the Company to mitigate the risk of lead that has been identified as a potential danger to human health in the Bristol Water's area.

It is expected that the Company will continue to monitor treated water lead concentrations, and that it will take all reasonable steps to prevent contraventions of the lead standard.

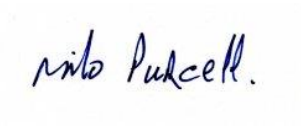
I am copying this letter to:

- Jon Ashley and Kevin Ridout at Ofwat;

- Elinor Smith and John Collins at the Environment Agency;
- David Heath (CCW Chair, Western)
- Peaches Golding (Chair of Water Challenge Panel)

Please contact Sue Pennison (Sue.Pennison@defra.gsi.gov.uk) with any queries relating to this letter.

Yours sincerely



Milo Purcell
Deputy Chief Inspector

PERIODIC REVIEW 2019

SUMMARY OF DWI ASSESSMENT – LETTER OF SUPPORT

Comment	
Water company:	Bristol Water Plc
DWI scheme reference(s):	BRL3
Scheme name:	Lead Action Plan (Strategy) Water – Lead
Proposal:	Provision of a package of measures to secure or facilitate compliance with the lead standard for drinking water quality reasons across the Bristol Water area.
Supporting evidence:	- Letter dated 22 December 2017 from Iain McGuffog to Milo Purcell. - Review of risk assessments included within Appendix 1 of the Annex A template document 'Lead Action Plan (Strategy) report' submitted with the Letter dated 22 December 2017.
Conclusion:	Subject to the caveats listed below, the Inspectorate supports the need for the following scheme: Lead Action Plan (Strategy) Overview: - Precautionary lead communication pipe replacement (≥8µg/l) - Strategic lead communication pipe replacement (pre-schools & nurseries) - Engagement with stakeholders and production of materials - Lining trial
Timescale:	Completion date: ongoing throughout AMP7
Estimated cost:	Estimated total costs: £325,891
Legal Instrument Required:	Notice under Regulation 28 (4)
Caveats:	1. Continuation and continuous development of the Company's Lead Strategy in line with the Inspectorate's guidance. 2. Comply with regulations 18(1), 18(6), 18(11) and 30 with regards to lead; and in the case of public buildings (with reference to Regulation 19A), the requirements of S75 of the Water Industry Act 1991.
Comment:	DWI has no role in determining proportional allocation of expenditure. Where DWI technical support is given,

	this should not be taken by the company to imply that the scheme will be partially or wholly funded as a Quality item. Schemes that require a legal instrument are considered necessary to meet statutory drinking water quality requirements. These schemes will be transposed to formal programmes of work by DWI as soon as possible and their implementation and completion will be monitored, audited and closure confirmed by DWI.