DD Supporting Evidence: EJP03

Filters on Offtakes and PRS

1 Contents

1 Executive Summary

We note Ofgem's draft determination feedback indicating they recognise the need for investment on our filtration assets; however, a full engineering assessment was not possible and have requested further data sources to support the assessment along with a more substantial narrative, therefore currently grading this investment case as unjustified.

In our response we will:

- Provide the global data deposit requested along with a SOP (standard operating procedure) that provides line of sight to our preferred option.
- Provide a more detailed engineering narrative for chosen option, focusing on compliance, detailing the number of inspection and past failure rates.
- Clarify how asset health scores have been derived and how they have been used in our modelling

For clarity, the feedback provided by Ofgem for EJP03 – Filters on offtakes and PRS is shown below (**Error! Reference source not found.**)

Feedback Source	Needs Case	Optioneering	Scope Confidence	Comments
RIIO-3 Draft Determinations – Cadent **Table 34: Summary of Cadent Engineering Recommendations**	Partially Justified	Partially Justified	Low confidence	Proposed Outcome: Unjustified Cadent did not provide the requested global repository asset health data, therefore we were unable to undertake a detailed engineering analysis of the investments proposed in the EJP, to determine if optioneering, scope and costs are justified. Multiple options were proposed, 3 of which would remove all 4-5 health scoring assets. The chosen option had the highest capex, but there was insufficient justification as to why this option is the optimal solution. To allow for a complete assessment of the investment to be undertaken, we would expect to see the following global asset data as a minimum: installation date, NARM score, health condition score beginning of price control, health condition score at the end of price control, intervention mode, date of inspection, size of filter, historical investment, NDT inspection to justify the investment case and accompanying narrative to support proposed optioneering.
22nd July Ofgem Engineering – Cadent Bilateral	• Provide information on LTR (long term risk) definitions • Provide average condition scores and stacked bar charts for programme options			

Table 1: Specific EJP03 feedback from the RIIO-3 Draft Determinations Cadent Annex

2 Introduction

This document provides additional information in response to Ofgem's engineering review comments in Table 34 of the Draft Determination (July 2025) and feedback received at the bilateral on 22nd July 2025. It addresses concerns regarding asset data reconciling to the preferred engineering option, (S08), Whole life net benefit and asset health with RIIO-2 spend cap and the ned for a more substantive engineering justification narrative for the preferred option. This response outlines our methodology for forecasting intervention volumes, clarification of asset health scoring and re-framing our preferred option in the context of asset risk.

3 Draft determination responses

3.1 Global data

For this EJP, Ofgem deemed it partially justified due to insufficient data, as per table 34 of the Cadent annex in the draft determination. Cadent is committed to providing further information and clarification through our Draft Determination response and through the ongoing bilateral discussions, and as such will provide the requested data.

This assessment and comment form Ofgem was common across the mechanical assets. We therefore have provided a unified response on the process for modelled investment, a procedure for the interpretation of the asset workbook, and the workbook containing asset data. Please refer to the other documents submitted within this DDQ response for the specific documents:

1. DD – Mechanical process narrative
2. DD – Mechanical – SOP
3. EJP15 – DD – DATA – Filters on Offtakes and PRS', which includes a summary tab where asset health score can be found, and a tab for LTR (Long Term Risk) definitions can be found.

It is worth noting that the total filter population does not directly match the population stated within table 4 of EJP03. Within EJP03, we are presenting the total population above 7 bar filters including those that aren't within a filtration system but instead are ancillary equipment to other asset classes. However, our investment case prioritises investment only on filters that are part of a filtration system a "filter bank", and ancillary filters will be modelled and selected through the other investment cases, as part of the wider system.

3.2 Supplementary Engineering Narrative

Within the problem statement of EJP03 – Filters on offtakes and PRS, we explain that our strategy is to hold asset health stable, ensuring security of supply to our customers and how we must comply with the PSSR (pressure system safety regulations).

As filters are classed as pressure vessels, they must comply with PSSR and are inspected every 6 years through a visual inspection, as per ES/94/part 1, carried out by our internal work force, and every 12 years they must undertake a more invasive inspection called NDT (Non-destructive testing), as per ES/94/part 2. This is completed by a specialist third party engineer using a magnetic particle inspection test to identify any defects.

Note: Only filters that have a MOP (maximum operating pressure) of above 7 bar and have a pressure volume capacity of 250 bar litres or greater, are in scope for these inspections.

As these pressure vessels have set inspection frequencies, we are able to forecast how many inspections are to take place within the RIIO-3 period. These inspections are an ongoing activity; therefore, we have good data from within the RIIO-2 period that allows us to predict a workload, based on the failure rates we have seen, validated by our engineering department. These failure rates are based on the number of A2[1] failures we have seen from years 19/20 to 23/24. The below tables shows the number of inspections between 1st April 2026 and 31st March 2031, average failure rates and forecasted workload for RIIO-3.

Choosing any programme option that does not allow for the forecasted workload, will put Cadent at risk at not complying with our PSSR and licence obligations. Second to this, having filters out in our network with known defects that we cannot replace, therefore meaning they would have to be isolated and not utilised, would seriously increase the risk of supply interruptions to our customers, as we would have little to no redundancy on our filtration systems. The below tables show the forecasted workload for the RIIO-3 period, split between visual and NDT inspections. Also, with this comes the failure rates we have experienced and the derived forecasted workload.

[1] A2 (Significant Fault) – This is where a significant fault is found that will not give rise to immediate danger but where action is required to prevent system failure prior to the date of next examination. Issue should be resolved within a year

3.2.1 ES/94/15 Part 1 - (visual) inspections

	EA	EM	NL	NW	WM	Total
2026	63	57	55	51	48	274
2027	52	54	24	60	32	222
2028	29	40	24	51	38	182
2029	49	36	40	39	47	211
2030	11	11	18	16	15	71
Grand Total	**204**	**198**	**161**	**217**	**180**	**960**

Table 2: Forecasted volume per network of part 1 (visual) inspections

	EA	EM	NL	NW	WM	Yearly average
19/20	3.90%	11.10%	0.00%	8.90%	13.60%	7.5%
20/21	2.30%	0.00%	0.00%	0.00%	0.00%	0.46%
21/22	5.30%	0.00%	2.40%	1.50%	0.00%	1.84%
22/23	0.00%	0.00%	0.00%	0.00%	3.90%	0.78%
23/24	1.80%	3.40%	2.60%	0.00%	0.00%	1.56%
Network average	2.66%	2.88%	1.0%	2.08%	3.50%	2.43%

Table 3: Average failure rates per network for part 1 inspections

	EA	EM	NL	NW	WM	Total
Forecast workload	5	6	2	5	6	24

Table 4: Forecasted volume per network for part 1 inspections

3.2.2 ES/94/15 part 2 - (NDT) inspections

	EA	EM	NL	NW	WM	Total
2026	23	20	23	39	23	128
2027	24	22	20	35	18	119
2028	3	30	21	41	25	120
2029	45	31	20	32	31	159
2030	23	28	30	31	25	137
2031	16	38	10	30	21	115
Grand Total	**134**	**169**	**124**	**208**	**143**	**778**

Table 5: Forecasted volume per network of part 2 (NDT) inspections

	EA	EM	NL	NW	WM	Yearly average
19/20	5.30%	24.10%	38.90%	8.30%	13.50%	18.02%
20/21	4.80%	0.00%	0.00%	40.00%	11.80%	11.32%
21/22	18.80%	50.00%	0.00%	0.00%	37.80%	21.32%
22/23	7.70%	0.00%	0.00%	0.00%	31.60%	7.86%
23/24	20.00%	20.00%	15.40%	20.00%	7.70%	16.62%
Network average	11.32%	18.82%	10.86%	13.66%	20.48%	15.03%

Table 6: Average failure rates per network for part 2 inspections

	EA	EM	NL	NW	WM	Total
Network average	15	32	13	28	30	118

Table 7: Forecasted volumes per network for part 2 inspections

What the above tables demonstrate is that from our PSSR inspections, we can anticipate a total workload of replacing 142 filters within the RIIO-3 period. As per table 16 within EJP03 – filters on offtakes and PRS, a copy of which has been provided below, all modelled programme options with the exception of options 0, 1, 5 and 7 allow for this volume of compliance based replacements.

Your Gas Network

[redacted]

Table 8: Summary of programme options

However, furthermore to these interventions, we also state within the problem statement of EJP03, that we are looking to remove all assets that are condition grade 4 and 5. There are 22 filters that by the end of RIIO-3 would be above a health grade 4 should we not invest. We note in a statement above figure 5 within EJP03, a copy of which is provided below, that only programme options 1,3,5 and 8 facilitate this need.

“The following graph shows the average system health score by the end of RIIO-3 for each of the programme options, noting only 4 of the programme options (Options 1, 3,5 and 8) are in line with our strategy of removing health score 4-5’s, to ensure compliance as we have set this as our minimum acceptable standard”

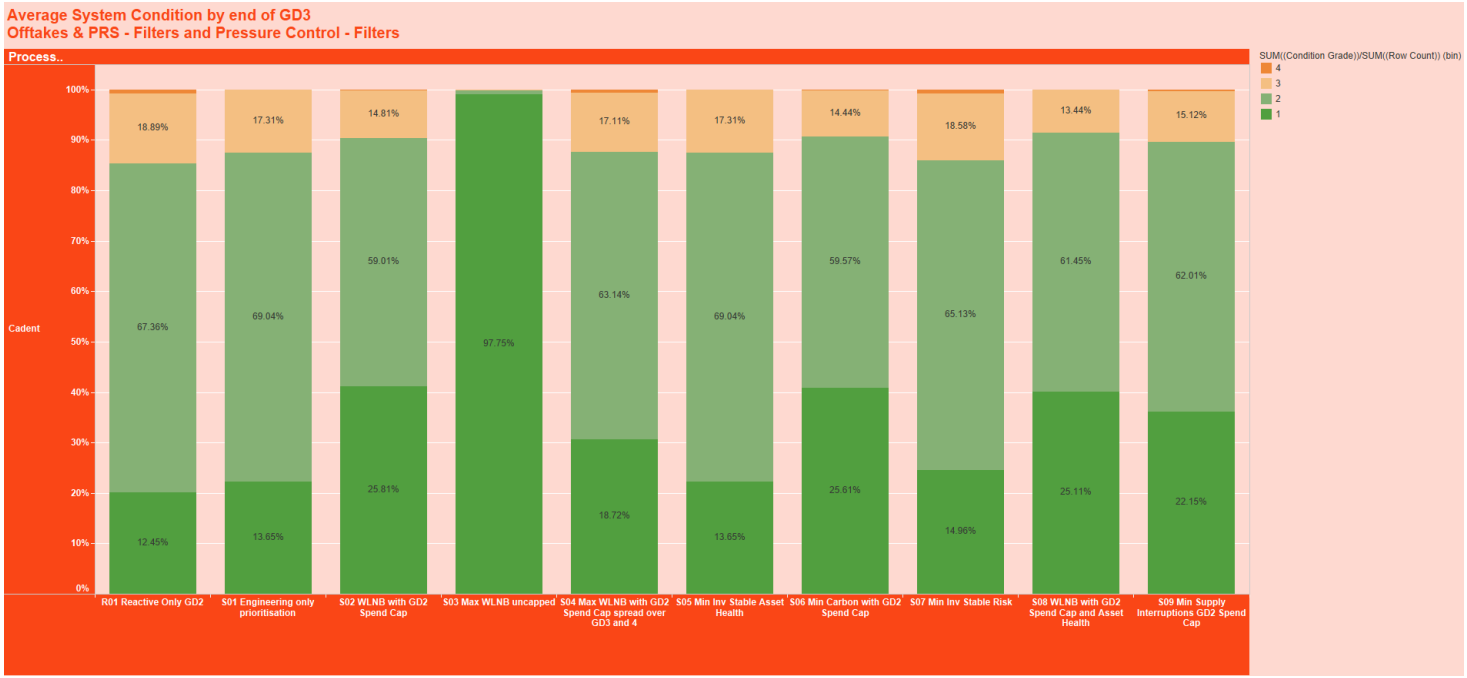

Figure 1: Condition score of each Programme option by end of RIIO-3

With all of the above explained, we are able to demonstrate that the only programme option that allows us to meet our statuary licence obligations through replacing filters that fail PSSR inspections AND replace those assets outside the maintenance programme that are condition grade 4 and 5, is programme option 8.

4 Bilateral Responses

4.1 Asset health and risk

Table 9 compares how the three programme options vary through the application of different constraints (see DD – Mechanical process narrative, section 4.5 – scenario definition and optimisation).

Investment Scenario (Constraint)	Scenario Description	How the scenario / constraint works in the model	CAPEX (£m)
(R01) Reactive only	No proactive investment in our filtration systems	Used as baseline for volume and cost of repairs, and monetised risk position	[redacted]
(S08) WLNB with RIIO-2 spend cap and asset health	Selects asset investments that are most cost beneficial to undertake in RIIO 3 whilst also improving the health of assets that are at health score 4 or 5, ensuring overall network average health remains stabilised to 2024/5 levels up to a spend cap equivalent to outturn spend in RIIO-2.	The model prioritises system replacements or refurbishments that deliver the highest Net Present Value (NPV) and those projected to exceed a condition grade of 3.9 by the end of GD3 without intervention. It also enforces a constraint to keep the network-wide average health score at or below 3.0. All requirements must be met within a spend cap equivalent to RIIO-2 outturn. NPV is calculated as the difference between discounted benefits and costs over the period 2027–2050.	[redacted]
(S05) Maintain Asset Health Levels	Target poor health assets (score 4 or 5) and stabilise network health to 2024/25 levels.	Selects assets forecasted to exceed score 3.9 by RIIO-3 end; maintains average health baseline at lowest capex.	[redacted]
(S07) Maintain Asset Risk Levels	Keep overall monetised risk (safety, supply, carbon, repair) at or below RIIO-2 levels.	Invests in cost-effective interventions to prevent monetised risk increase, while recognising ongoing asset deterioration.	[redacted]

Table 9: Programme options comparison

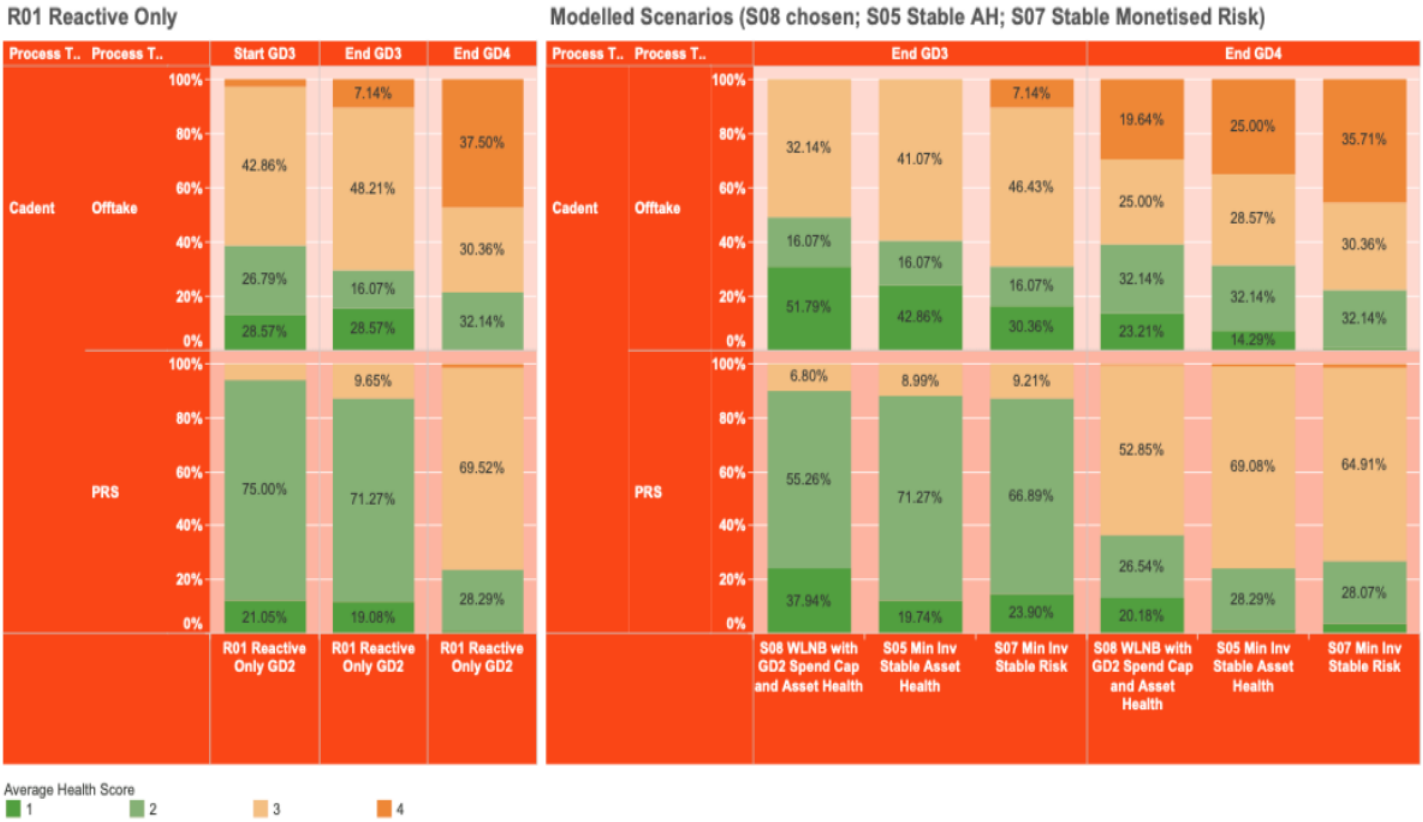

Figure 2: Average condition scores for selected programme options, across regulatory periods

The above graphic shows how the distribution of asset health grades (1–5), which are explained further on the summary page of EJP03 – DD – DATA – Filters, for filtration systems changes across the RIIO-3 and RIIO-4 periods, under four of our programme scenarios. Under the reactive only scenario, there is a noticeable shift from assets with better health grades (grades 1 and 2) moving to the poorer health grades (3, 4, and 5), highlighting the natural deterioration that occurs without any proactive investment, over a 10 year period, out to the end of RIIO-4. Therefore, the CAPEX that would be required to stabilise asset health or return to RIIO-2 end health position would be significant.

Our S08 programme scenario (WLNB and asset health within a RIIO-2 spend cap), demonstrates a more balanced health distribution, with a slower rate of declining health and a greater proportion of assets remaining in health grades 1-3.

The stable asset health scenario (S05) shows that even though it also reduces all filters that are condition grade 4 and 5, there is a much larger distribution of assets in condition grade 3, 4 and 5 by the end of RIIO-4. As discussed in supplementary narrative of this document, this programme option also does not provide the necessary volume for forecasted workload.

The stable risk scenario (S07), although maintaining overall monetised risk, allows asset health to degrade in a similar way to the reactive only approach (R01), demonstrating that stabilising monetised risk does not equate to maintaining physical asset health.

Overall, the graphic supports the case that targeted investment, as seen in our preferred S08 scenario, helps slow deterioration. It also underlines that stable monetised risk strategies may obscure underlying asset deterioration, leading to future spikes in capital expenditure to restore asset health and integrity.

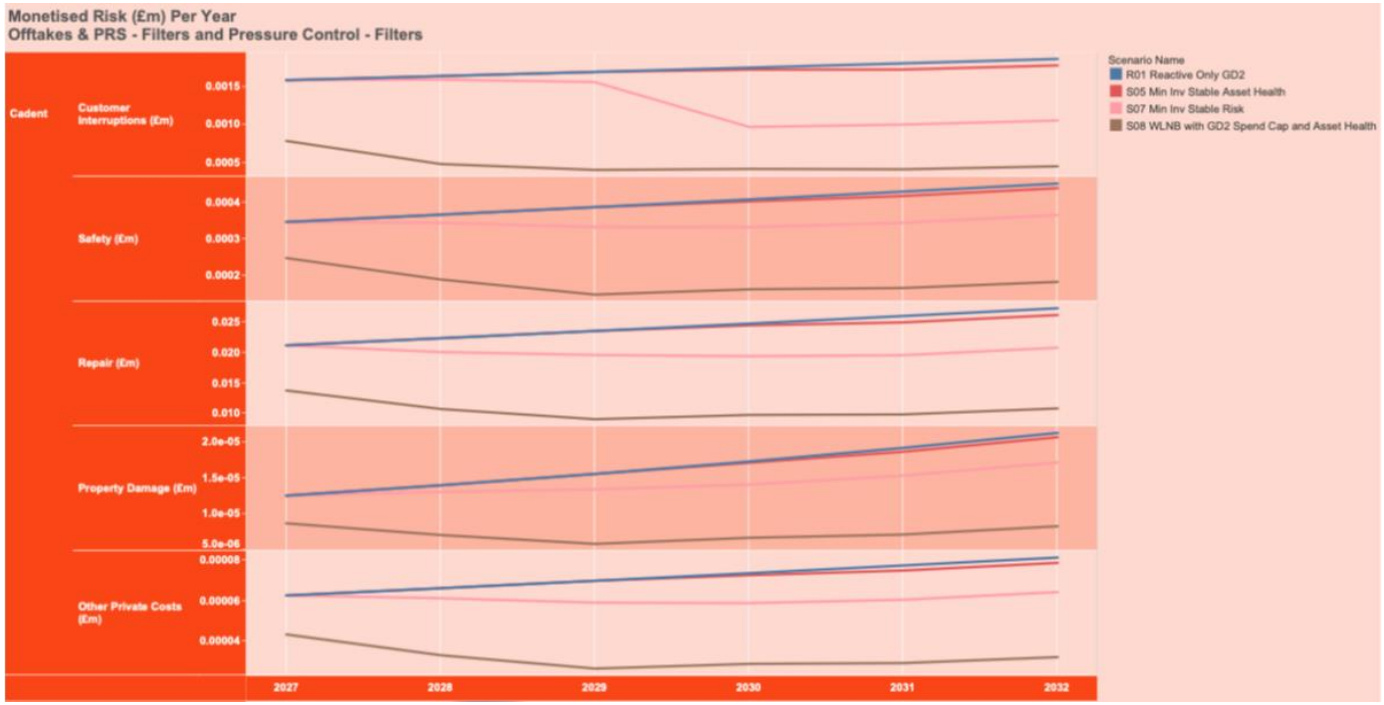

Figure 4: Monetised risk per programme option

Average Network Asset Health Score
Offtakes & PRS - Filters and Pressure Control - Filters

Process Type L1	Scenario Name	Start GD3	End GD3	End GD4
Cadent	R01 Reactive Only GD2	2.13	2.53	3.00
	S08 WLNB with GD2 Spend Cap and Asset Health	2.06	2.20	2.68
	S05 Min Inv Stable Asset Health	2.13	2.46	2.94
	S07 Min Inv Stable Risk	2.13	2.45	2.93

Figure 3: Average condition score per programme option

Our preferred filter strategy (S08) delivers lower risk and better asset health by end of RIIO-3 compared to other scenarios. The above chart illustrates the monetised risk over time for the impact to safety and security of supply as a result of the four programme scenarios. It demonstrates that focusing on stabilising monetised risk isn't enough to keep our assets from physically deteriorating and is broadly comparable to the reactive investment only scenario (R01). Asset risk levels can be influenced by things like downstream impacts or larger sites, which means the physical condition of assets can still deteriorate even if the overall monetised risk looks stable. Over time, this can lead to more faults, increased reactive spending, and bigger capital investments down the line to fix the network and bring it back to an acceptable level. S08 reduces monetised risk within the bounds of RIIO-2 expenditure.

That's why our approach looks at striking a balance between reducing risk, maintaining asset health, and delivering long-term value. Looking at the other scenarios, (R01) reactive only case shows a sharp drop in average asset condition, falling from 2.13 to 3.00 due to no RIIO-3 investment. Our preferred S08 scenario also sees some decline, but it's far less severe. The S05 Stable Asset Health scenario proves that with the right investment, we can keep asset condition steady through RIIO-3, however our preferred scenario performs better. And the S07 monetised risk stable scenario, despite aiming to manage risk, ends up with similar deterioration to R01, reinforcing the point that managing risk alone doesn't protect asset health

5 Conclusion

In summary, our preferred filters strategy (S08) offers a balanced and sustainable approach to managing asset health and risk across the RIIO-3 and RIIO-4 periods. The evidence provided demonstrates that while alternative scenarios such as S07 may maintain monetised risk, they fail to prevent physical asset deterioration, ultimately leading to increased future costs and reduced network resilience.

Our preferred option provides workload volume that supports the forecasted workload based on the number of PSSR inspection in period and associated fault rates seen during RIIO-2.

Through the submission of detailed global asset data, a supporting SOP, and a comprehensive process narrative, we have addressed Ofgem's concerns regarding scope confidence and investment justification. Our modelling shows that targeted investment under S08 slows deterioration, maintains a healthier asset base, and delivers long-term value within the RIIO-2 spend cap.

We believe this response reinforces the engineering rationale behind our preferred option and provides the necessary transparency and data to support a fully justified investment case for filter assets on offtakes and PRS.