



Government
Actuary's
Department

Firefighters' Pension Schemes (Scotland)

Valuation Results

Actuarial valuation as at 31 March 2020

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26 January 2024



Highlights

Employer Contribution Rate



34.1%*

of pensionable pay expected to be paid from
1 April 2024 to 31 March 2027

£47.6m**

in 2020 monetary terms

Core and Economic Cost Cap Costs



Core

11.6%

of pensionable pay which is

4.2% below

the 15.8% employer cost cap

Economic

18.9%

of pensionable pay which is

3.1% above

Comparison to current Employer Contribution Rate

+5.6%

increase from 28.5%

£7.8m** in 2020 monetary terms

The core cost cap cost of the scheme lies outside the 3% cost cap corridor.

However, when the wider economic situation is taken into account through the economic cost cap cost of the scheme, **the cost cap corridor is not similarly*** breached.**

As a result, there is no requirement for Scottish Ministers to consult on changes to the scheme.

Next steps: There will not be any change to the Employer Contribution Rate as a result of the cost control mechanism at this valuation. Scottish Ministers should therefore make arrangements for implementing the revised Employer Contribution Rate of 33.3%* of pensionable pay from 1 April 2024.

* After allowing for ill-health retirement charges, which are expected to equate to 0.8% of pensionable pay, the rate effective over the implementation period is 33.3%.

** Monetary amounts are annual, based on pensionable pay at the valuation date.

*** In the same direction as the core cost cap cost breach

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Any terms that are described in the Glossaries are underlined the first time they appear on a page within this report.

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Introduction

Who is this report for?

This report is addressed to, and was commissioned by, Scottish Ministers. It sets out the results of the actuarial valuation of the Firefighters' Pension Schemes (Scotland) (the 'scheme') as at 31 March 2020.

What are the outcomes of the valuation?

The key results of the valuation relate to the Employer Contribution Rate and the cost control mechanism. These show:

- **An increased Employer Contribution Rate**
- **No cost control mechanism breach.**

How have the results been prepared?

The results have been prepared in accordance with the:

- Benefits as set out in the scheme regulations.
- Methodology as described in the Public Service Pensions (Valuation and Employer Cost Cap) Directions 2023 ('the Directions').
- Data and other information supplied by the administrators of the Firefighters' Pension Schemes (Scotland), as described in our report titled 'Membership data' dated 26 January 2024. This is summarised on page 12.
- Assumptions, some of which are set by Scottish Ministers as described in our Advice on assumptions report dated 26 January 2024 (the 'scheme-set assumptions'); and some of which are specified by the Directions (the 'directed assumptions'). These are summarised on pages 13 and 14.

Results

Results, including the Employer Contribution Rate and cost cap costs of the scheme, are calculated using the data and assumptions

Assumptions

Data

Setting the Employer Contribution Rate

What is the process?

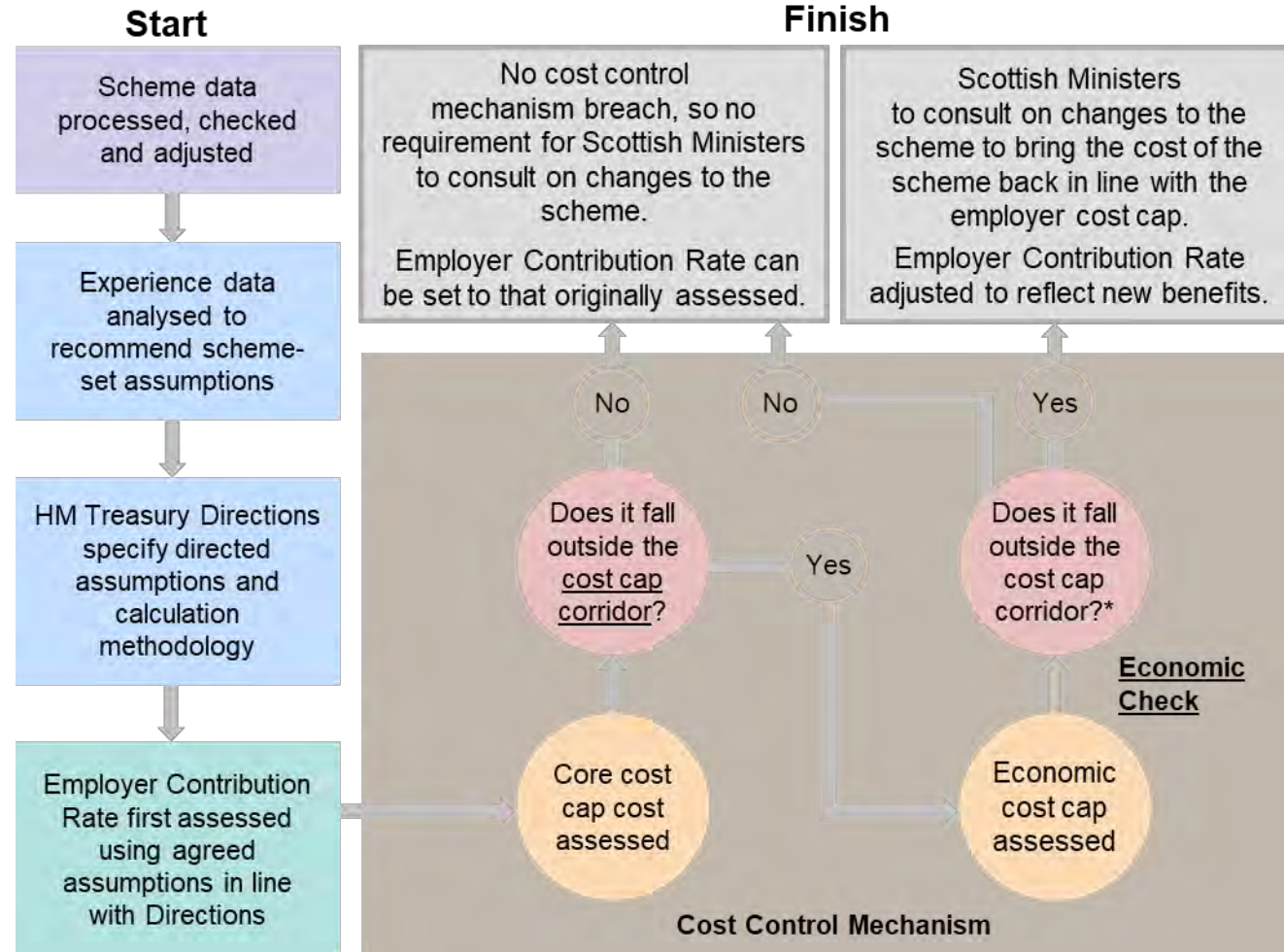
The diagram to the right illustrates the steps of the valuation process.

This begins with the receipt of scheme data as at 31 March 2020, followed by assumption setting and the assessment of the Employer Contribution Rate.

It then details the various steps involved in the implementation of the cost control mechanism.

If there has been a breach of the cost control mechanism*, Scottish Ministers need to consult on changes to the scheme to rectify this. The originally assessed Employer Contribution Rate would then need to be updated to reflect the impact of any benefit or contributions changes.

If there is no breach, then no consultation is required and no changes would be required to the Employer Contribution Rate in this regard.



* A breach of the cost control mechanism occurs only if both the core and economic cost caps lie outside the cost cap corridor and in the same direction.

Key Results



Employer Contribution Rate

What are the key results

The Employer Contribution Rate result is summarised below. As there is no breach of the cost control mechanism, there is no requirement for Scottish Ministers to consult on changes to the scheme. As a result, there will not be any adjustment to the rate in respect of the cost control mechanism.



34.1%

of pensionable pay expected to be paid from
1 April 2024 to 31 March 2027

£47.6m*

in 2020 monetary terms

Comparison to current Employer Contribution Rate

+5.6%

increase from 28.5%

£7.8m*

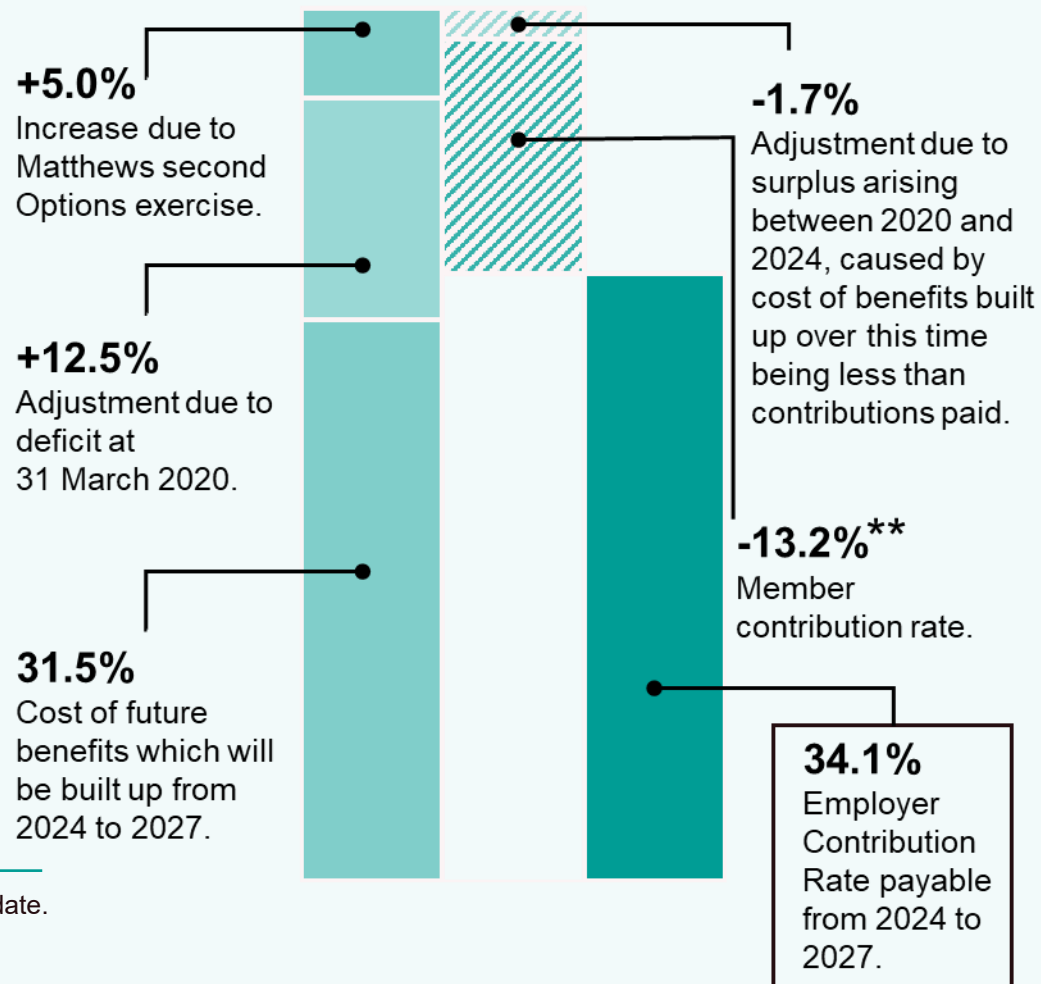
in 2020 monetary terms

* Monetary amounts are annual, based on pensionable pay at the valuation date.

** On average, calculated in accordance with the scheme's target yield.

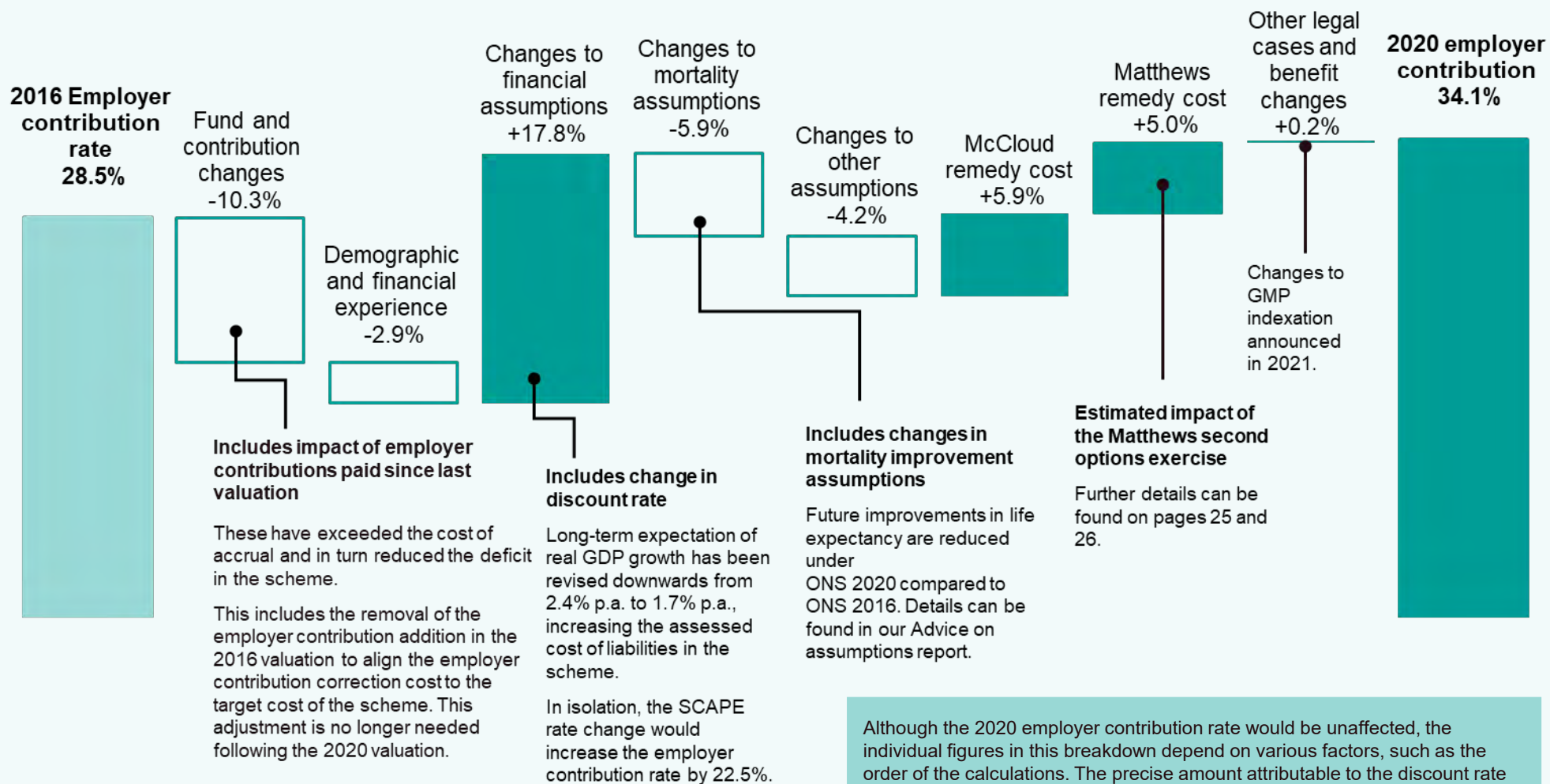
All percentages shown are of pensionable pay per annum.

Breakdown of contribution rate



Changes since 2016

The chart below shows the main factors contributing to the change in the Employer Contribution Rate since the last valuation in 2016.




All percentages shown are of pensionable pay per annum and are approximate.

Although the 2020 employer contribution rate would be unaffected, the individual figures in this breakdown depend on various factors, such as the order of the calculations. The precise amount attributable to the discount rate change therefore depends on the method. Further details can be found on page 58.

Testing the cost control mechanism

What are the key results

The results of the assessments of the core and economic cost cap costs of the scheme are summarised on this page. Their values are assessed to identify whether both breach the cost cap corridor in the same direction. This would result in a requirement for Scottish Ministers to consult on rectifying the breach through changes to benefits or member contribution rates. Any such changes would impact on the Employer Contribution Rate.



<p>Core cost cap cost</p> <p>11.6%</p> <p>of pensionable pay which is</p> <p>4.2% below</p>	<p>Economic cost cap cost</p> <p>18.9%</p> <p>of pensionable pay which is</p> <p>3.1% above</p>
<p>the 15.8% <u>employer cost cap</u></p>	

As there is no breach of the cost control mechanism, there is no requirement for Scottish Ministers to consult on changes to the scheme.

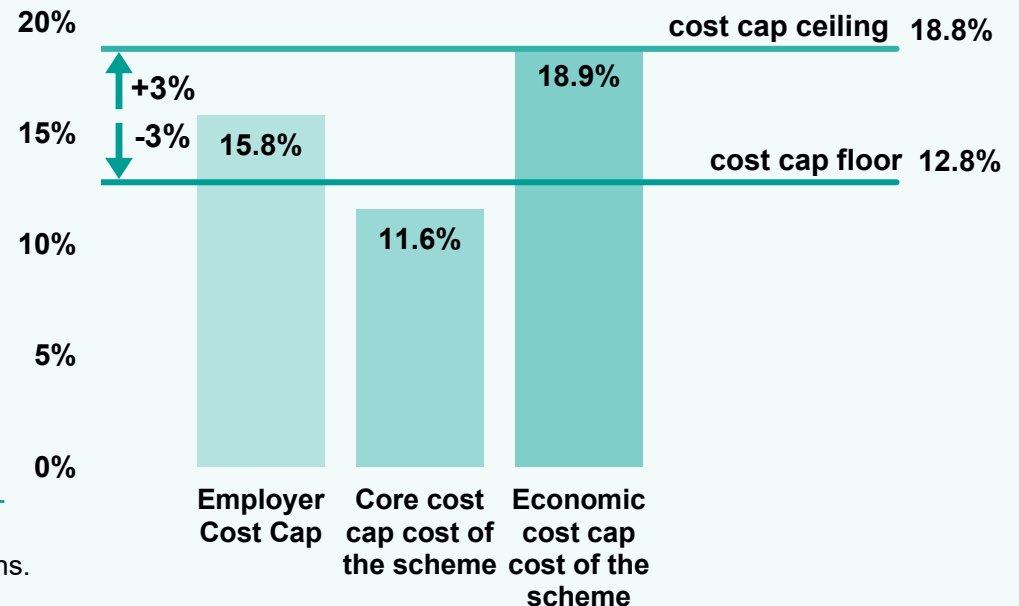
All percentages shown are of pensionable pay per annum. See Appendix A and Glossaries for cost control definitions and explanations.

Position within cost cap corridor

The chart below illustrates the position of the core cost cap cost of the scheme and the economic cost cap cost of the scheme against the cost cap corridor.

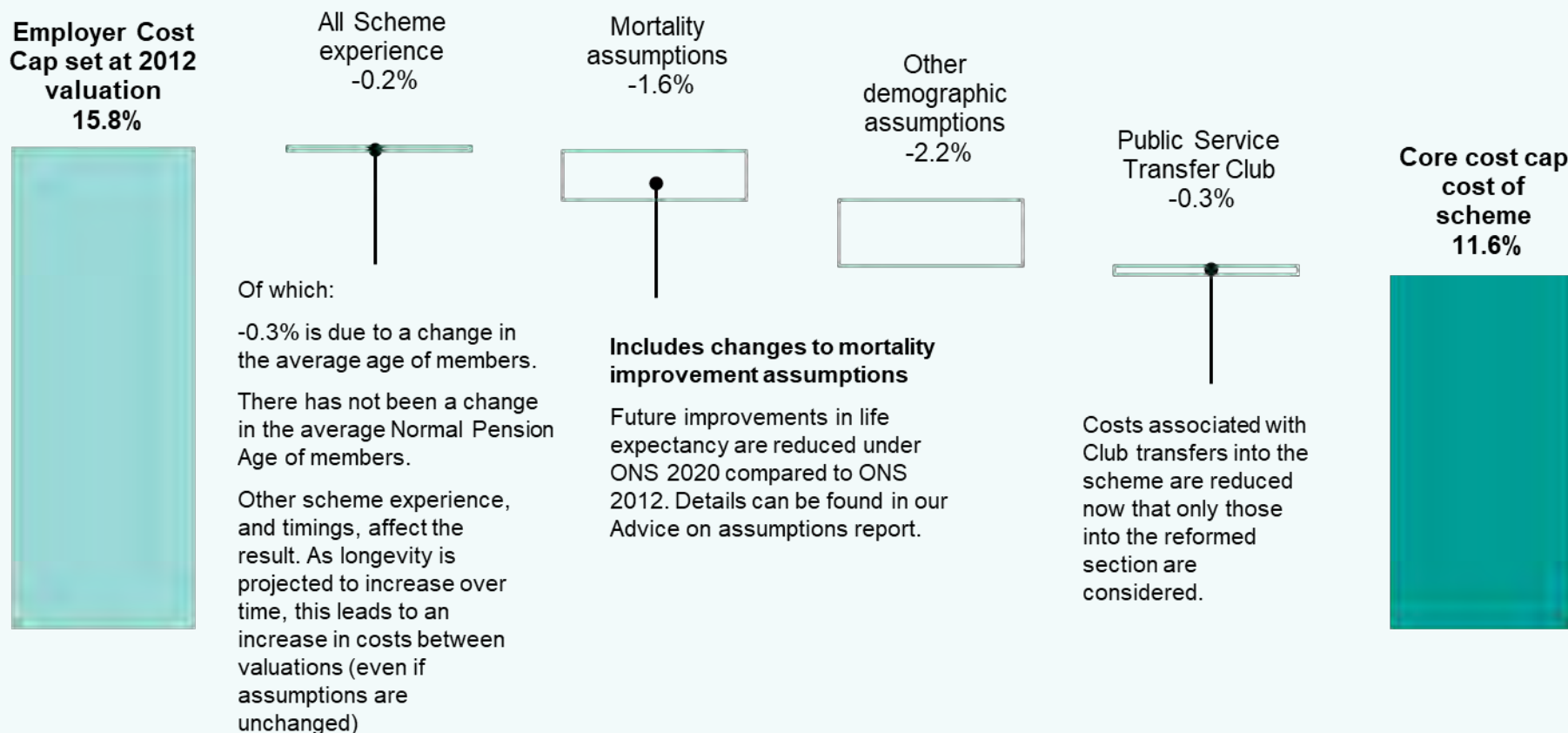
As the core cost cap cost of the scheme falls below the cost cap floor, the wider economic situation needs to be taken into account through the economic cost cap cost of the scheme.

As the economic cost cap cost of the scheme does not fall below the cost cap floor, there is no requirement for Scottish Ministers to consult on any changes to the scheme.



Changes since 2012

The chart below shows the main factors contributing to the difference between the core cost cap cost of the scheme and the employer cost cap, which was set at the 2012 valuation.



All percentages shown are of pensionable pay per annum.
Due to rounding, numbers may not sum to the total

From 2020, the cost cap mechanism considers 2015 Scheme benefits only, hence the Matthews second options exercise does not impact this calculation.

Data & Assumptions



Scheme data as at 31 March 2020

The results in this report have been based on the data described in our Membership data report dated 26 January 2024 and summarised below. Appendix F describes the checks, adjustments and reconciliations carried out in preparing this data as well as the approximate impact of any data uncertainty which may still exist.

Information on the data used in the calculation of the estimated additional liability from the Matthews second options exercise can be found in Appendix E of our Membership data report.

Summary statistics



14,550

Scheme members

+17.3% vs. 2016



89 : 11

Male : Female

vs. 90 : 10 in 2016



£139.6m

Total actual pay

+7.2% vs. 2016



£5.0m

Deferred pension

+20.6% vs. 2016



£94.6m

Total pension

+20.2% vs. 2016

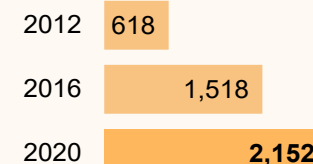
Pension amounts include the April 2020 pension increase.

Membership over time

Actives



Deferreds



Pensioners



Scheme-set assumptions

The results in this report have been based on assumptions, some of which are 'scheme-set' as described in our Advice on assumptions report dated 26 January 2024 and some of which are 'directed', as summarised on page 14.

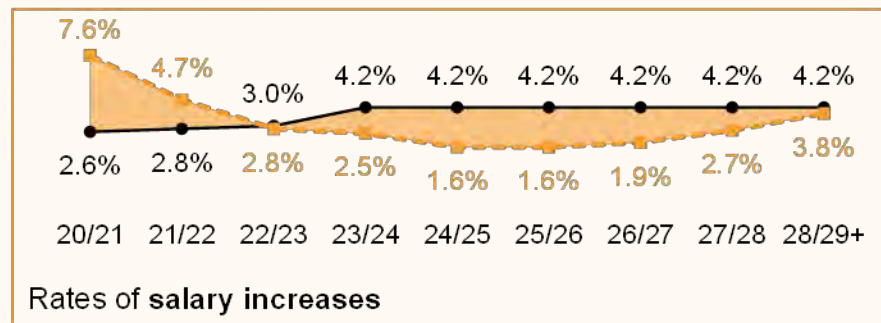
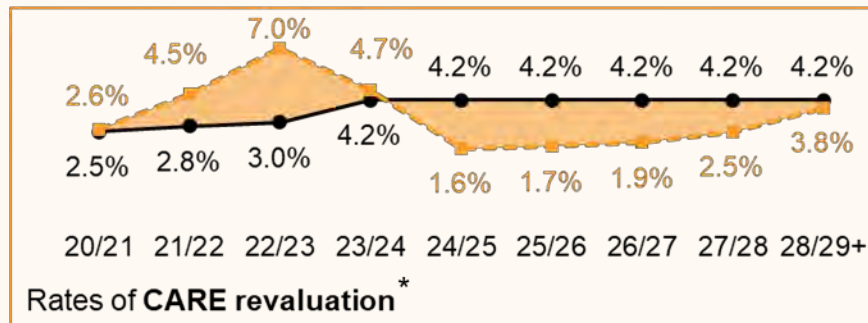
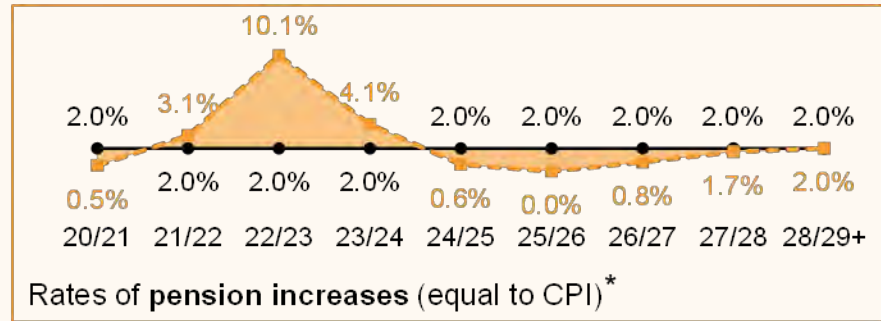
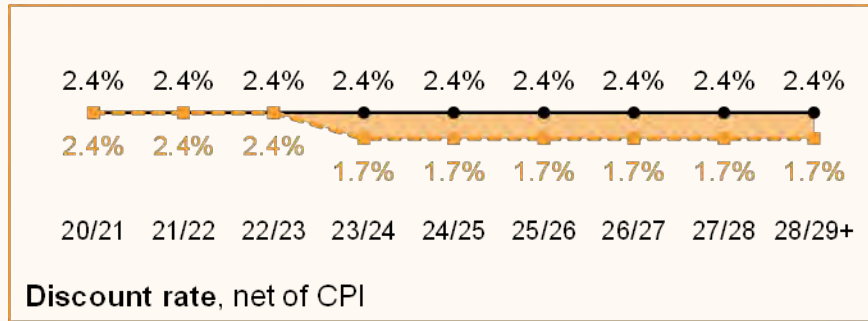
The table below provides a summary of the changes in scheme-set assumptions since the last valuation in 2016. It also sets out the directional impact of the changes on the results. Scottish Ministers and the Scottish Firefighters' Pension Scheme Advisory Board have agreed that the scheme-set assumptions are reasonable and appropriately reflect scheme experience where available.

Assumption	Change in assumption adopted	Impact of change on scheme costs
Mortality after retirement	Move to S3 tables and inclusion of 2016-2020 experience	↓ Lower costs
Proportion commuted	Increase in amount of pension exchanged for cash for some members	↓ Lower costs
Retirement ages	Change to assumption for unprotected members in 1992 Scheme	↓ Lower costs
Rates of leaving service	Increase in rates of withdrawal at all ages for regular members	↓ Lower costs
Promotional pay increases	None	⊘ No impact
Rates of ill-health retirement	None	⊘ No impact
Mortality before retirement	None	⊘ No impact
Family statistics	None	⊘ No impact

Information on the assumptions used for the calculation of the estimated additional liability from the Matthews second option exercise can be found on page 25 and also in Appendix C3 of our Advice on assumptions report dated 26 January 2024.

HM Treasury Directed Assumptions

Annual financial assumptions



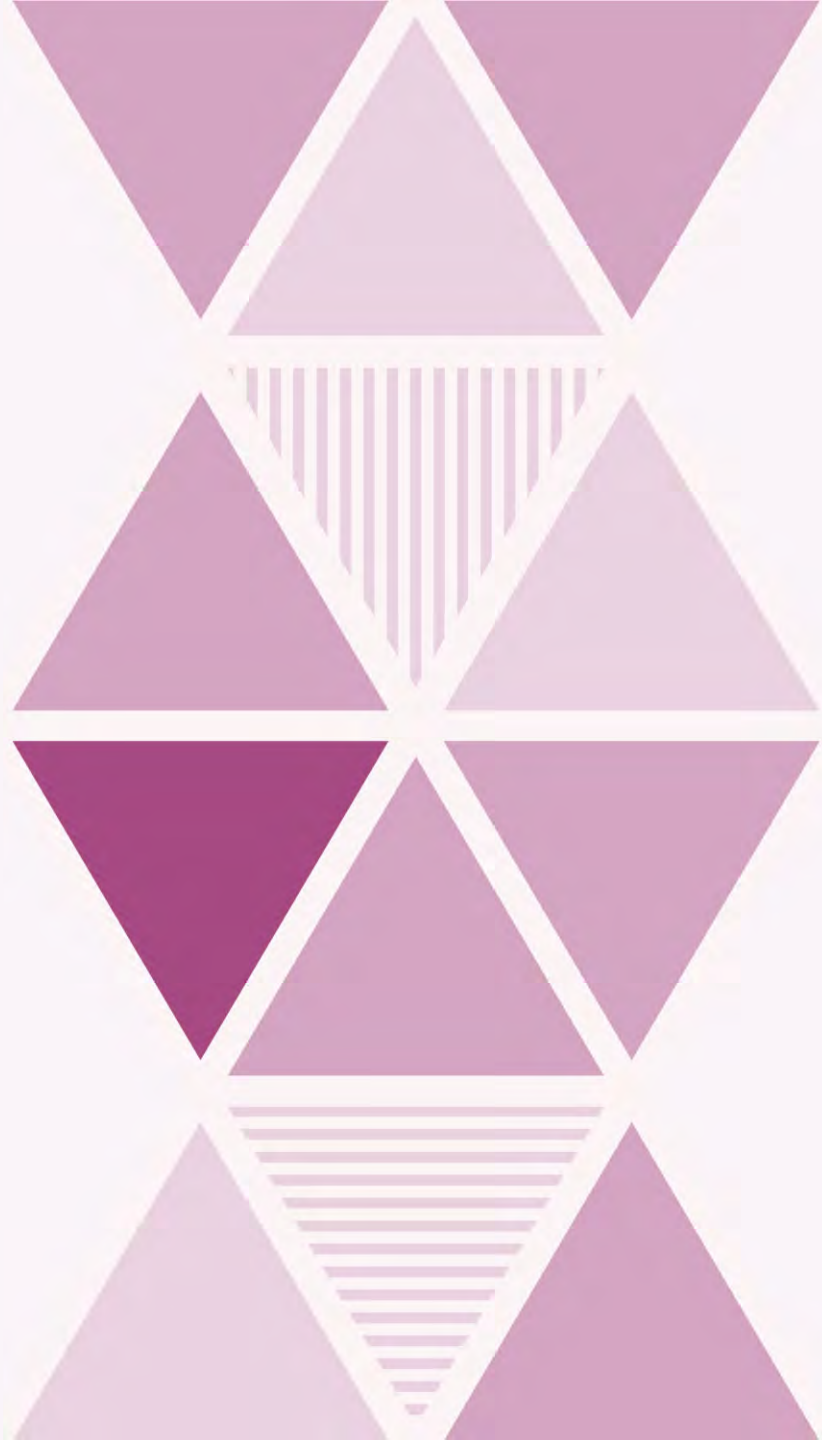
2016 assumptions
 2020 assumptions (dotted line) and difference from 2016 assumptions (shaded area)

* Increases applicable at end of financial year indicated. Financial assumptions allow for corrected CARE revaluations for 2020/21 and 2021/22.

Other directed assumptions

	2016 assumption	2020 assumption
Deficit spreading periods		15 years
Future mortality improvements	In line with 2016-based ONS projections	In line with 2020-based ONS projections
State Pension age	As legislated for in the Pensions Act 1995, Pensions Act 2007, Pensions Act 2011 and Pensions Act 2014	

**Sensitivities &
Potential future impacts**



Sensitivities – Employer Contribution Rate

Which assumptions are the Employer Contribution Rate most sensitive to?

The chart to the right shows the sensitivity of the Employer Contribution Rate to specified changes in a number of key directed and scheme-set assumptions.

The chart shows that:

- some assumptions are more significant than others.
- the more significant assumptions tend to be directed.

It should be noted that:

- The sensitivities have been calculated in isolation for each assumption, leaving all others unchanged.
- Sensitivities are not a prediction of future changes and are not minimum or maximum possible impacts.
- Changes to the assumptions in the opposite direction to illustrated here will produce approximately equal and opposite changes in the valuation results.

Sensitivity to the key assumptions used in calculating the estimated liability arising from the Matthews second options exercise can be found on page 26.

Full details of the sensitivities can be found in Appendix A.

Employer Contribution Rate sensitivity



All percentages shown are of pensionable pay per annum.

Sensitivities – Core cost cap cost

Which assumptions are the core cost cap cost most sensitive to?

The chart to the right shows the sensitivity of the core cost cap cost of the scheme to specified changes in a number of key directed and scheme-set assumptions.

Under each scenario, the position of the resulting cost cap cost within the cost cap corridor is also illustrated.

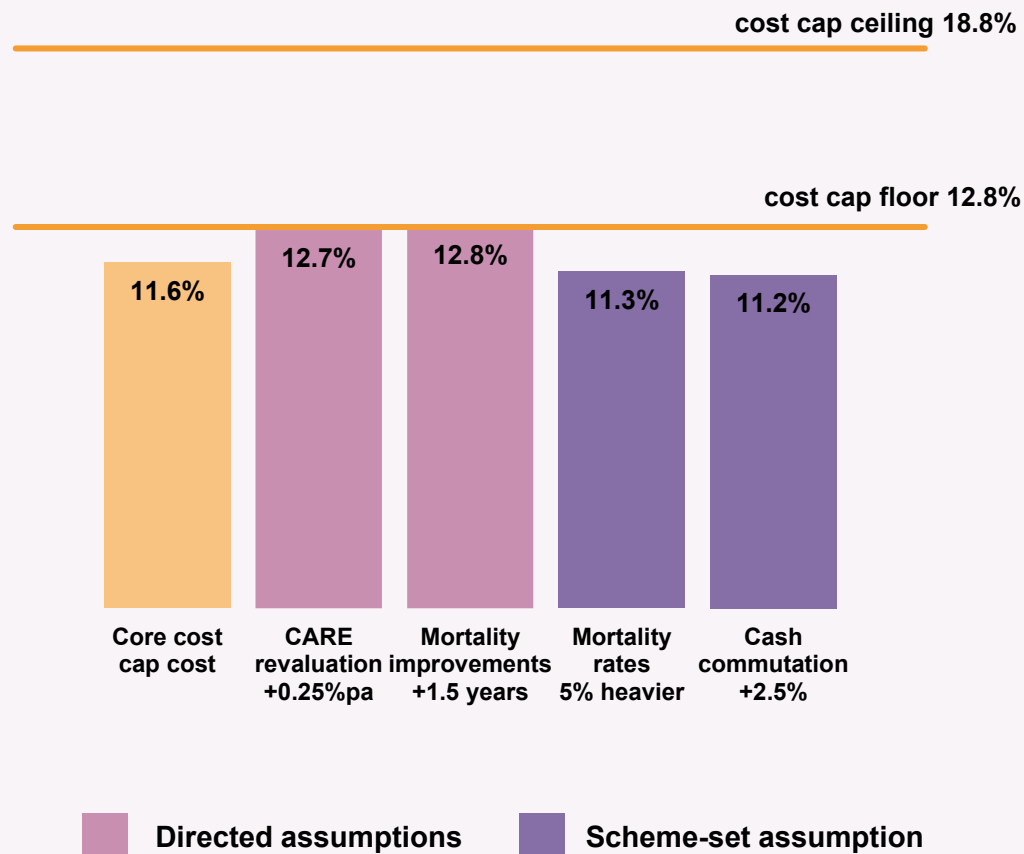
Unlike the Employer Contribution Rate, the core cost cap cost of the scheme is not sensitive to the main CPI linked directed assumptions of discount rate, pension increases and long-term salary.

It should be noted that:

- The sensitivities have been calculated in isolation for each assumption, leaving all others unchanged.
- Sensitivities are not a prediction of future changes and are not minimum or maximum possible impacts.
- Whilst a change in discount rate would not impact on the core cost cap cost, a 0.25% p.a. reduction would increase the economic cost cap cost of the scheme by 2.4%.
- Changes to the assumptions in the opposite direction to illustrated here will produce approximately equal and opposite changes in the valuation results.

Full details of the sensitivities can be found in Appendix A.

Core cost cap cost sensitivity



All percentages shown are of pensionable pay per annum.

Factors affecting future valuations

The previous two pages illustrate the impact on the **current** valuation results of changes to a number of key assumptions. It is useful to also consider which factors will potentially impact **future** valuation results. These are summarised in the following table:

Factor	Potential impact
Deficit repayment	The Employer Contribution Rate includes an amount to reduce the size of the deficit. All else being equal, the deficit contribution rate will be lower at the next valuation, as a portion of the existing deficit will have been paid off.
Mortality improvements	<p>Recent evidence is that the UK is continuing to experience more deaths than expected based on pre-pandemic levels.</p> <p>The ONS 2020 projections made an adjustment to mortality rates to allow for expert views on the impact of the Covid-19 pandemic on mortality rates up to 2024.</p> <p>It is not yet possible to tell whether the projections used for the 2024 valuations will show further reductions in life expectancy, but recent evidence points to that being the trend. This would reduce the costs of the scheme.</p>
Scheme demographic experience	<p>Actual demographic experience will differ from assumptions and this could have a large impact on results, both directly and in the way it influences scheme-set assumptions at future valuations.</p> <p>The most significant such assumptions are baseline mortality, withdrawals from the scheme, and commutation. Appendix A shows the impact on the results of changes in these assumptions.</p>
Directed assumptions	These have the potential to have the largest impact on the contribution rate, but the direction and magnitude of any such change is unknown.

Factors affecting future valuations

Factor	Potential impact
Age profile	Any change in the age profile of the scheme, e.g. a recruitment freeze meaning that fewer younger members join, will impact the results, with a higher average age generally leading to an increase in the contribution rate.
Legal cases	Any further cases that extend scheme benefits could have a large upward impact on costs.
Legislative and policy changes	Any legislative or policy changes could impact on the benefits provided under the schemes, with the impact dependent on the change that is implemented.
Matthews second options exercise outcome	At the 2024 valuation, we expect to have data relating to the outcome of the Matthews second options exercise. At that stage, the members who chose to participate in the exercise and the benefits that they purchased will be known. If the volume of members who decide to opt into the exercise, and/or their individual characteristics differ from the assumptions made, the Employer Contribution Rate could be significantly lower or higher than that included in this valuation.
Membership data	The valuation results are heavily dependent on the accuracy of the membership data. If the data is later shown to be materially incorrect or inconsistent with future datasets then a further cost or saving will emerge.
Membership profile	As time goes on, fewer members will have legacy scheme accrual and this is expected to lead to differences in behaviour around retirement patterns.

As well as affecting future valuation results, the factors above may impact future benefits paid, and contributions received, by the scheme.

At present, benefits paid from the scheme exceed contributions received from employees and employers. Scottish Government meet the remainder of the cost. However, any balancing payments with Scottish Government will change over time depending on the above factors - in particular, the scheme's membership profile and the relative numbers of members accruing and receiving benefits.

Appendices



Appendix A: Additional Valuation Results



Employer Contribution Rate components

Key components

The chart on this page shows the components of the initially assessed Employer Contribution Rate payable from 2024 to 2027. These are the:

a. Cost of benefits accruing over the period 2024 to 2027 which represents the bulk of the rate. This is calculated to be 31.5% of pensionable pay per annum and is arrived at by using the methodology set out on page 54.

b. Adjustment due to deficit at 31 March 2020
(see pages 23 and 24)

c. Matthews second options exercise
(see pages 25 and 26)

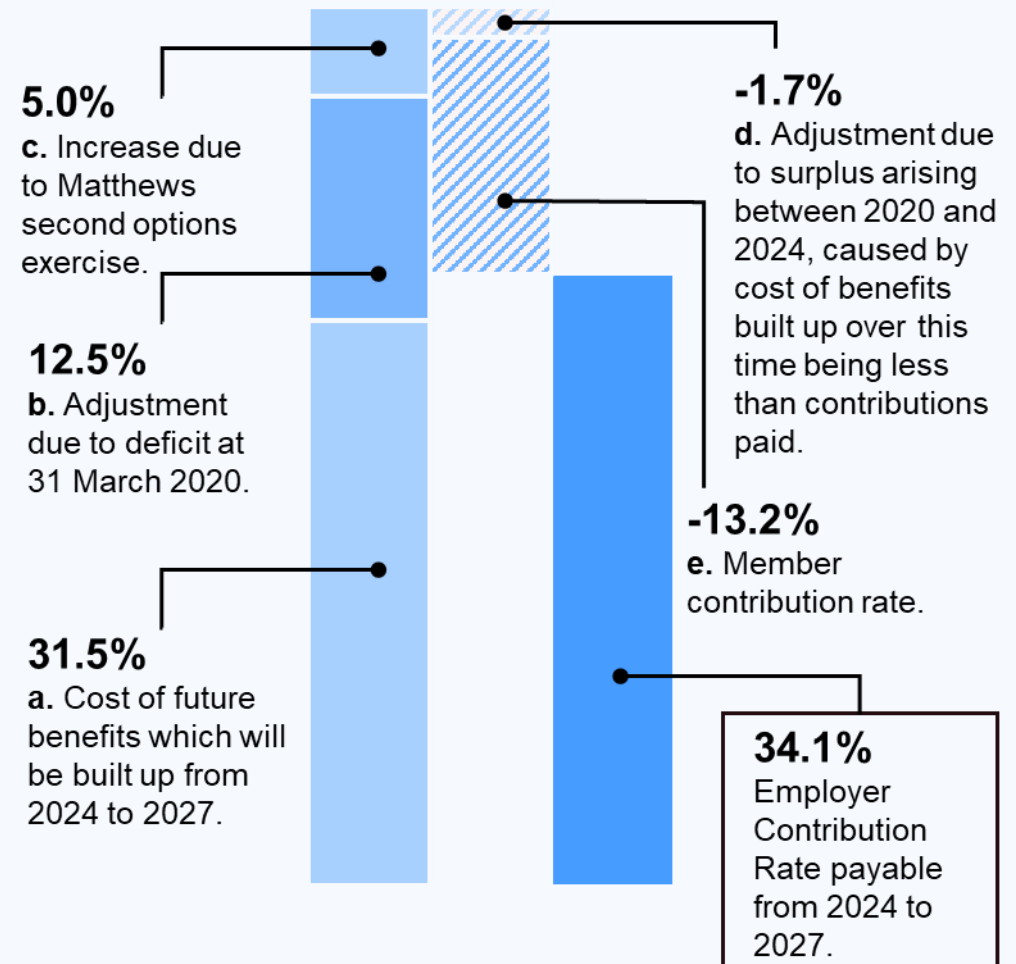
d. Adjustment due to surplus arising between 2020 and 2024 (see page 27)

e. Member contribution rate (see page 28)

The initially assessed Employer Contribution Rate of 34.1% is calculated as $a + b + c - d - e$.

The following six pages provide further information relating to the derivation of items b, c, d and e. Detailed information relating to the methodology employed is set out in Appendix D.

Breakdown of contribution rate



All percentages shown are of pensionable pay per annum.

b. Adjustment due to deficit at 31 March 2020

Adjusting for deficit

The Employer Contribution Rate is adjusted to allow for the deficit in the scheme as at 31 March 2020. This deficit is spread over a period of 15 years from 1 April 2024 and is identified on page 22 as item b, 'adjustment due to deficit', of +12.5%.

To assess scheme deficit, we subtract the value of past service liabilities from notional assets. The calculation of each of these items is summarised on this page.

Past Service Liabilities

The value of the scheme's past service liabilities is the capital sum needed at the effective date to meet the stream of future cashflows in respect of benefits earned. The split of these liabilities between active, deferred and pensioner members is set out below:

Liabilities (£bn)	31 March 2016	31 March 2020
Actives	0.99	1.04
Deferreds	0.06	0.08
Pensioners	1.38	1.68
Total	2.43	2.80

Income and benefit payments have been derived from scheme accounts and the notional investment returns are calculated by compounding interest using the prevailing SCAPE discount rate and relevant changes in the Consumer Price Index.

Notional assets

Notional assets (see page 56) are calculated by 'rolling up' their value at the last valuation in line with notional investment returns and adjusting for income and outgo over the period. This is summarised in the table below, followed by a breakdown over the intermediate years:

	£bn
Notional assets at 31 March 2016	2.35
+ Income Received	0.20
- Benefits Paid	-0.43
+ Notional Investment Returns	0.46
Notional assets at 31 March 2020	2.57

	2016-17	2017-18	2018-19	2019-20	Total
Income Received (£bn)	0.05	0.05	0.05	0.06	0.20
Benefits Paid (£bn)	0.10	0.11	0.11	0.12	0.43
Notional Investment Returns (£bn)	0.09	0.14	0.13	0.11	0.46
	3.8%	5.9%	5.3%	4.1%	

Scheme Deficit

	31 March 2016	31 March 2020
Liabilities (£bn)	2.43	2.80
Notional assets (£bn)	2.35	2.57
(Deficit)	(0.08)	(0.23)

All percentages shown are to the nearest 0.1%, all figures are rounded to 2 decimal place and due to rounding, numbers may not sum to the total.

b. Adjustment due to deficit at 31 March 2020

Contributory factors	£bn	
	Surplus (deficit) at 31 March 2016	
	Notional Assets minus Liabilities (£2.35bn minus £2.43bn)	(0.08) i
	Interest on surplus (deficit)	(0.02)
	Excess of contributions paid against cost of benefits accruing 2016-2020	0.00 ii
	Repayment of deficit	0.01 iii
	Experience effects	(0.07) iv
	Change in financial assumptions	(0.21) v
	Change in demographic assumptions	0.12 vi
	Unattributed	0.02 vii
	Surplus (deficit) at 31 March 2020:	
	Notional Assets minus Liabilities (£2.57bn minus £2.80bn)	(0.23)

All figures are rounded to 2 decimal places.

- i. The Notional Assets are described on pages 23 and 56; 'Liabilities' represent Past Service Liabilities.
- ii. Assessed using financial assumptions at the 2016 valuation. Includes allowance for payment of the corrected Employer Contribution Rate since 1 April 2019.
- iii. As anticipated at the 2016 valuation, representing 5.0% of pay expected to be paid towards the deficit in the year preceding 2020.
- iv. The impact of scheme experience over the period 2016-2020 diverging from that which was expected at the 2016 valuation. Also includes the impact of the McCloud judgment on service accrued by 31 March 2020.
- v. Pages 13 and 14 summarise the financial assumptions at the current and previous valuations. The change with the greatest financial significance is the discount rate fall from CPI+2.4% to CPI+1.7% p.a.
- vi. This is the net result of a number of demographic changes including mortality and rates of voluntary exits from service.
- vii. Balancing item.

c. Matthews second options exercise

What is the Matthews second options exercise?

The Matthews second option exercise (or “M2”) is a programme to enable certain members to elect to buy historic service in the 2006 (Special) Scheme. M2 is expected to commence in early 2024.

It arises because of a November 2018 ruling in a legal case involving part-time judges (“O’Brien v MoJ”) that effectively broadened the scope of an earlier ruling in the equivalent case for retained firefighters (“Matthews”) and which had previously led to the first Matthews options exercise.

Directions require that all relevant liabilities are included within the valuation. Additional liabilities arising as a result of M2 are considered to be relevant.

The Employer Contribution Rate is adjusted to allow for the estimated additional liability by spreading this over a period of 15 years from 1 April 2024. This is shown on page 22 as item ‘increase due to Matthews second options exercise’.

The additional liability is estimated using the assumptions summarised on pages 13 and 14 of this report in conjunction with the M2 specific assumptions summarised opposite.

Based on these assumptions, we estimate the impact on the employer contribution rate to be an increase of 5.0% of pensionable pay.

Sensitivities to the key assumptions are shown on page 26.

Assumptions used in calculating the liability

Until the options exercise is complete, the quantum of additional benefits that are to be valued is unknown. Accordingly, assumptions are made about the number, age and service profile and pay history of members who are eligible together with assumptions about the take-up rate of the option. Where possible, these are based on an analysis of relevant available evidence.

Assumption	Value used	Availability of evidence
Eligible firefighters	2,250	Available evidence
Firefighter profile	Employment data from first Matthews exercise	Available evidence
Pay history	25% of reference pay	Available evidence
Take-up rate	First exercise optants - 100% Other eligible over age 55 - 70% Other eligible under age 55 - 20% Overall: ~65% members ~65% pension	Limited evidence

Full details of these assumptions can be found in Appendix C3 of our Advice on assumptions report dated 26 January 2024.

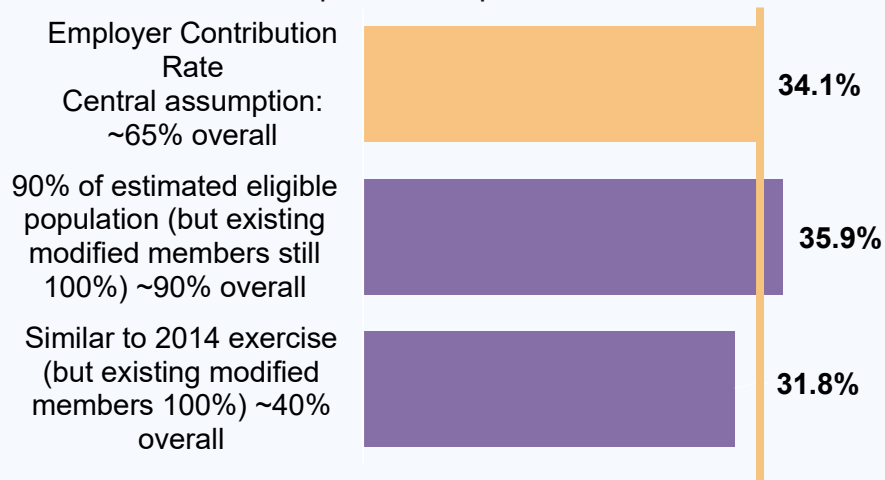
c. Matthews second options exercise

Sensitivities

Take-up rate

The take-up rate for M2 is currently highly uncertain. The second options exercise is expected to commence in early 2024 and is a substantially different offer, in different circumstances, when compared with the 2014-15 exercise. Scottish Ministers have set the assumption based on first exercise take-up patterns, plus a reasonable allowance for the M2 circumstances. Scottish Ministers have also considered the take-up assumption to be adopted for the 2020 valuation of the Firefighters' Pension Schemes (England).

The chart below shows the impact on the Employer Contribution Rate of potential higher and lower M2 take-up rate scenarios. Other assumptions are unchanged and these scenarios are not minimum or maximum possible impacts:

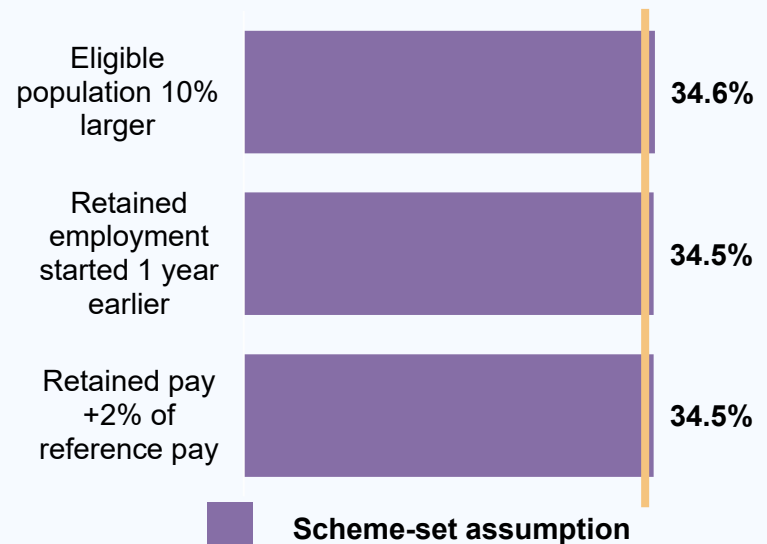


All percentages shown are of pensionable pay per annum.

Other Matthews specific assumptions

The assumptions were informed by the employer data from the first exercise. The actual population of eligible firefighters may differ in practice.

The chart below shows the sensitivity of the Employer Contribution Rate to specified changes in these assumptions. For each, other assumptions are unchanged and a change in the opposite direction will produce approximately equal and opposite changes in the Employer Contribution Rate. These scenarios are not minimum or maximum possible impacts



d. Adjustment due to surplus arising between 2020 to 2024

Why does this surplus arise

The Employer Contribution Rate calculated as part of the 2020 actuarial valuation comes into payment at the start of the implementation period on 1 April 2024.

However, over the prior period, 1 April 2020 to 31 March 2024, the current Employer Contribution Rate of 28.5% remains payable.

It is expected that the cost of benefits accrued during the 2020 to 2024 period will be different from the currently payable contribution rate and as such, a surplus (or deficit) will arise.

This extent of this surplus is quantified in the table to the right.

Spreading of surplus

The Employer Contribution Rate is adjusted to allow for this surplus (or deficit) by spreading it over a period of 15 years from 1 April 2024.

This is identified on page 22 as item d 'adjustment due to surplus arising between 2020 and 2024'.

Level of surplus

2020-2024	% p.a.
Employer Contribution Rate actually paid	28.5%
+ Member contribution rate actually paid	13.0%
- Cost of benefits accruing	-35.0%
Net contribution surplus 2020 - 2024	6.5%

Adjustment to contribution rate

Spreading the net contribution surplus described above over a period of 15 years results in a deduction to the Employer Contribution Rate of 1.7% of pensionable pay.

All percentages shown are of pensionable pay per annum.

Note that, although the cost of benefits accruing over the 2020-2024 period is higher than those accruing over the 2016-2020 period, a net contribution surplus still arises. This is because the Employer Contribution Rate actually paid includes both the cost of benefits accruing over the 2016-2020 period *and* an addition for deficit as at 31 March 2016.

e. Member Contributions

Members contribute to the cost of their pensions by paying a proportion of their pensionable salaries to the scheme. The contribution rates paid by members are determined by the band in which their full time equivalent annual earnings lie. The current contribution bands are summarised in the table to the right.

The target member contribution rate of the scheme, on average, is 13.2% of pensionable pay.

Scottish Ministers plan to consult with stakeholders about the structure of member contributions payable to the scheme. For the purposes of the 2020 valuation, we have been instructed by Scottish Ministers to assume that contributions received into the scheme will align with the target member contribution rate.

To determine the Employer Contribution Rate, the target member contribution rate is deducted from the overall cost of the scheme. It is identified on page 22 as item e ‘member contribution rate’.

The target member contribution rate is also used in the cost control mechanism assessment, where it is designated as the cost cap contribution yield.

Annual earnings band	Member contribution rate
Up to £27,818	11.0%
£27,819 to £51,515	12.9%
£51,516 to £142,500	13.5%
£142,501 or more	14.5%

Percentages shown are applied to annual pensionable pay.

Cost Control

What are the aims of the cost control mechanism?

The cost control mechanism was introduced following the recommendations of the Independent Public Pension Commission in 2011. Its aims were to:

- Ensure a fair balance of risk between members of public service pension schemes and taxpayers with regard to the costs of these schemes.
- Maintain the value of such schemes to their members.
- Provide stability and certainty of member benefit and contribution levels, with changes only being triggered by 'extraordinary, unpredictable' events.

How does the mechanism work?

In the first instance, a measure of the cost of providing reformed scheme benefits, known as the core cost cap cost of the scheme, is assessed. If this cost changes by more than 3% of pensionable pay compared to its original level (known as the employer cost cap), a 'breach of the cost cap corridor' is said to have occurred.

An 'economic check', using what is known as the economic cost cap cost, is then carried out. This is a new introduction at this valuation and assesses whether a breach would also have occurred if the impact of long-term economic assumptions had also been considered.

If both the core cost cap and economic cost cap costs result in a breach in the same direction, a cost control mechanism breach is deemed to have occurred. In that case, Scottish Ministers are required to consult on changes to the scheme to bring the cost of the scheme back to the employer cost cap. Any such changes would impact the Employer Contribution Rate.

Full details of the cost control mechanism and examples of the interaction between the core and economic cost cap costs can be found in HM Treasury's document: [Public Service Pensions: cost control mechanism consultation](#)

Terminology relating to the cost control mechanism is defined in Appendix H, Glossary 2

Results for the 2020 valuation

Pages 30, 32 and 33 cover the core cost cap cost of the scheme. This has been assessed to be more than 3% below the employer cost cap.

Pages 31, 34 and 35 cover the economic cost cap cost of the scheme. This has been assessed to be more than 3% above the employer cost cap.

As these two cost control mechanism measures do not produce a breach of the cost cap corridor in the same direction, there is therefore no requirement for Scottish Ministers to consult on changes to the scheme.

Core cost cap cost of the scheme

What is the assessment process?

As explained on page 29, the cost control mechanism begins with the assessment of the core cost cap cost of the scheme against the employer cost cap. We need to determine whether the former lies within a $\pm 3\%$ corridor of the latter. Based on the outcome of this, action may need to be taken to bring costs back to the target cost.

The core cost cap cost of the scheme is a calculated measure of the cost of benefits being provided from the reformed scheme. This excludes the impact of changing long-term economic assumptions. The employer cost cap is the previously determined 'target cost' of the scheme and is set to 15.8%.

Core cost cap cost of the scheme components

The component parts of the core cost cap cost of the scheme are:

a: Cost cap future service cost – contribution rate required to cover the expected cost of benefits accrued by members during the cost cap implementation period.

b: Core cost cap past service cost – difference between the cost cap liabilities and core cost cap fund as at the effective date, as a percentage of pensionable pay. More details can be found on page 32.

c: Cost cap contribution yield – the contributions expected from members during the cost cap implementation period.

d: Cumulative future service technical immunity adjustment – the future technical immunity adjustment at this valuation (4.4%) plus the cumulative future service technical immunity adjustment from the reconstructed 31 March 2016 cost cap valuation of the scheme (2.6%).

Core cost cap cost calculation

	% p.a.	
Cost cap future service cost	32.0%	a
+ Core cost cap past service cost	-0.2%	b
- Cost cap contribution yield	-13.2%	c
- Cumulative future service technical immunity adjustment	-7.0%	d
Core cost cap cost of the scheme	11.6%	a+b-c-d

Comparison with employer cost cap

	% p.a.
Core cost cap cost of the scheme	11.6%
- Employer cost cap	-15.8%
Difference	-4.2%

Which lies outside the +/-3% corridor, therefore the economic check is required (see page 31).

All percentages shown are of pensionable pay per annum to the nearest 0.1%.

Economic cost cap cost of the scheme

What is the assessment process?

If the core cost cap cost of the scheme breaches the cost cap corridor, an economic check is required. In the case of the Firefighters' Pension Schemes (Scotland), **a breach has occurred**.

The economic check assesses the economic cost cap cost of the scheme against the employer cost cap. It determines whether the former lies within a $\pm 3\%$ corridor of the latter. If this comparison has the same outcome as the core cost cap cost assessment, action is needed to bring costs back to target.

The economic cost cap cost of the scheme is another measure of the cost of benefits provided from the reformed scheme. It is similar to the core cost cap cost but allows for the impact of a change in long-term economic assumptions - the difference is known as the total cumulative technical immunity adjustment.

As set out on the previous page, the employer cost cap is set to 15.8%.

How is it calculated?

A summary of the calculations that form the assessment of the economic cost cap cost is set out in the tables to the right. Its component parts are:

a: Cost cap future service cost – the contribution rate required to cover the expected cost of benefits accrued during the cost cap implementation period.

b: Economic cost cap past service cost – the difference between the cost cap liabilities and economic cost cap fund, as a percentage of pensionable pay at the effective date. More details can be found on page 34.

c: Cost cap contribution yield – the contributions expected from members during the cost cap implementation period.

Economic cost cap cost calculation

	% p.a.	
Cost cap future service cost	32.0%	a
+ Economic cost cap past service cost	0.1%	b
- Cost cap contribution yield	-13.2%	c
Economic cost cap cost	18.9%	a+b-c
- Employer cost cap	-15.8%	
Difference	3.1%	

The economic cost cap cost of the scheme lies above the 3% corridor. As this is not the same outcome as for the core cost cap cost of the scheme, there is no requirement for Scottish Ministers to consult on changes to the scheme.

Comparison with core cost cap cost

	% p.a.
Core cost cap cost of the scheme	11.6%
Economic cost cap cost of the scheme	18.9%
Difference (Total cumulative technical immunity adjustment)	7.3%

All percentages shown are of pensionable pay per annum to the nearest 0.1%.

Core cost cap fund balance

Why is it calculated?

In order to calculate the core cost cap past service cost, we are required to calculate the core cost cap fund balance – that is the difference between the cost cap liabilities and core cost cap fund – and then divide this by pensionable pay.

How is it calculated?

The core cost cap fund is a notional amount of money, building up from 1 April 2015 when the reformed scheme was introduced. It has been estimated at 31 March 2020 using data at this date; we do not expect any approximations inherent in this estimate to have a material impact on the outcome of the cost control mechanism.

The Directions require an illustration of the development of the core cost cap fund between 2015 and 2020. The table to the right covers the period from 2016 (a) to 2020, with a description of each component item set out below. The change from 2015 to 2016 is detailed on the following page.

b: Core cost cap income – income received by the scheme, including contributions. The employer portion of this is that which would have been paid if the core cost cap rate had been in effect (see page 33).

c: Cost cap benefits paid – benefits paid, for example pensions.

d: Core cost cap notional investment returns – notional amount of growth of the core cost cap fund.

e: Past service technical immunity adjustment – adjustment made to the core cost cap fund to exclude the impact of a change in long-term economic assumptions.

Core cost cap fund balance

The table below summarises the calculation of the cost cap fund balance at 31 March 2020.

	£m	
Reconstructed core cost cap fund at 31 March 2016	3.3	a
+ Core cost cap income	24.2	b
- Cost cap benefits paid	0.0	c
+ Core cost cap notional investment returns	2.6	d
+ Past service technical immunity adjustment	5.8	e
Core cost cap fund at 31 March 2020	35.8	a+b-c+d+e
- Cost cap liabilities at 31 March 2020	32.6	
Core cost cap fund balance at 31 March 2020	3.2	

All figures shown are calculated to 1 decimal place and due to rounding, numbers may not sum to the total.

It should be noted that items a, b, c, d and e have been estimated and are shown for illustrative purposes only, in accordance with Directions requirements. They do not have any impact on the outcome of the cost control mechanism.

Core cost cap fund

Core cost cap fund 2015/16 development

	£m	
Core cost cap fund at 31 March 2015	0.0	a
+ Core cost cap income	3.3	b
- Cost cap benefits paid	0.0	c
+ Core cost cap notional investment returns	0.0	d
Reconstructed core cost cap fund at 31 March 2016	3.3	a+b-c+d

All figures shown are calculated to 1 decimal place.

It should be noted that the core cost cap fund contribution rate and items b, c, and d in the table to the right have been estimated and are shown for illustrative purposes only, in accordance with Directions requirements. They do not have any impact on the outcome of the cost control mechanism.

Core cost cap fund contribution rate

The core cost cap fund contribution rate is the contribution rate required from the employer to cover the cost of benefits accruing to members over the period 1 April 2016 to 31 March 2020, with an adjustment to reflect any surplus or deficit at 31 March 2016.

It is used to calculate the employer contribution component of the core cost cap income (see page 32, item b) and its component parts are set out below:

	% p.a.	
Expected cost of benefits accrued 2016 to 2020	26.1%	a
Core cost cap past service cost at 2016	0.0%	b
Member contributions paid 2016 to 2020	-13.2%	c
Core cost cap fund contribution rate	12.9%	a+b-c

All percentages shown are of pensionable pay per annum to the nearest 0.1%.

Economic cost cap fund balance

Why is it calculated?

In order to calculate the economic cost cap past service cost, we are required to calculate the economic cost cap fund balance – that is the difference between the cost cap liabilities and economic cost cap fund – and then divide this by pensionable pay.

How is it calculated?

The economic cost cap fund is a notional amount of money, building up from 1 April 2015 when the reformed scheme was introduced. It has been estimated at 31 March 2020 using data at this date; we do not expect any approximations inherent in this estimate to have a material impact on the outcome of the cost control mechanism.

The Directions require an illustration of the development of the economic cost cap fund between 2015 and 2020. The table to the right covers the period from 2016 (**a**) to 2020, with a description of each component item set out below. The change from 2015 to 2016 is detailed on the following page.

b: Economic cost cap income – income received by the scheme, including contributions. The employer portion of this is that which would have been paid if the economic cost cap rate had been in effect (see page 35).

c: Cost cap benefits paid – benefits paid, for example pensions.

d: Economic cost cap notional investment returns – notional amount of growth of the economic cost cap fund.

Economic Cost Cap Fund Balance

The table below summarises the calculation of the economic cost cap fund balance.

	£m	
Reconstructed economic cost cap fund at 31 March 2016	3.3	a
+ Economic cost cap income	24.2	b
- Cost cap benefits paid	0.0	c
+ Economic cost cap notional investment returns	2.6	d
Economic cost cap fund at 31 March 2020	30.0	a+b-c+d
- Cost cap liabilities at 31 March 2020	-32.6	
Economic cost cap fund balance at 31 March 2020	(2.6)	

All figures shown are calculated to 1 decimal place and due to rounding, numbers may not sum to the total.

It should be noted that items a, b, c, and d have been estimated and are shown for illustrative purposes only, in accordance with Directions requirements. They do not have any impact on the outcome of the cost control mechanism.

Economic cost cap fund

Economic cost cap fund development 2015/16

	£m	
Economic cost cap fund at 31 March 2015	0.0	a
+ Economic cost cap income	3.3	b
- Cost cap benefits paid	0.0	c
+ Economic cost cap notional investment returns	0.0	d
Reconstructed economic cost cap fund at 31 March 2016	3.3	a+b-c+d

All figures shown are calculated to 1 decimal place.

It should be noted that items b, c, and d in the table above and the economic cost cap fund contribution rate to the right have been estimated and are shown for illustrative purposes only, in accordance with Directions requirements. They do not have any impact on the outcome of the cost control mechanism.

Economic cost cap fund contribution rate

The economic cost cap fund contribution rate is the contribution rate required from the employer to cover the cost of benefits accruing to members over the period 1 April 2016 to 31 March 2020 with an adjustment to reflect any surplus or deficit at 31 March 2016.

This is calculated in a similar manner to the core cost cap fund contribution rate.

It is used to calculate the employer contribution component of the economic cost cap income (see page 34, item b) and its component parts are set out below:

	% p.a.	
Expected cost of benefits accrued 2016 to 2020	26.1%	a
Economic cost cap past service cost at 2016	0.0%	b
Member contributions paid 2016 to 2020	-13.2%	c
Economic cost cap fund contribution rate	12.9%	a+b-c

All percentages shown are of pensionable pay per annum to the nearest 0.1%.

Sensitivities

The tables below contain further information on the sensitivity of each of the Employer Contribution Rate and core cost cap cost of the scheme to the assumptions adopted. Also shown is the sensitivity of the economic cost cap cost of the scheme to the discount rate. It should be noted that both the cost of future service and adjustment for past service deficit/surplus elements of these rates are affected by the sensitivities.

The assumptions are split between directed and scheme-set. Details of the baseline directed short-term and long-term assumptions can be found on page 14.

The sensitivities shown in brackets relate only to the change in assumption described. The impact of a combination of assumption changes will not necessarily equate to the sum of those individual rows.

Furthermore, they refer only to the results of this valuation and are expected to change materially over time. It is important to note that these sensitivities are not intended to reflect the possible variation in assumptions at future valuations. Opposite changes in the assumptions will produce approximately equal and opposite changes in the valuation results.

Increase in

Directed assumptions	Employer Contribution Rate	Core cost cap cost
Discount rate in excess of CPI (-0.25% p.a.)	10.8%	The core cost cap cost of the scheme is not sensitive to the main CPI linked directed assumptions of discount rate, pension increases and long-term salary.
Pension increases applied to deferred pensions and those in payment (+0.25% p.a.)	8.2%	A 0.25% p.a. reduction to the discount rate is estimated to increase the economic cost cap cost of the scheme by 2.4%.
Long-term rate of public service earnings growth in excess of CPI (+0.25% p.a.)	0.2%	

Sensitivities

Directed assumptions	Increase in	
	Employer Contribution Rate	Core cost cap cost
Short-term rate of public service earnings growth (+0.25% p.a. to each short-term rate)	0.8%	0.0%
CARE revaluation rate (+0.25% p.a.)	1.1%	1.1%
Future mortality improvement assumption (changing improvements, from ONS 2020 to ONS 2016, which increases life expectancy by broadly 1.5 years)	8.3%	1.2%
State Pension age for 2015 Scheme (one year later than under current Directions)	0.0%	0.0%
Deficit spreading period (increased by 5 years)	-4.0%	0.0%

Scheme-set assumptions	Increase in	
	Employer Contribution Rate	Core cost cap cost
Mortality rates (5%* heavier rates of baseline pensioner mortality)	-2.6%	-0.3%
Cash commutation (additional 2.5% of pension assumed to be commuted)	-0.7%	-0.4%

* Represents a multiplicative increases to rates, i.e. 5% means rates 1.05 times higher.

Sensitivities

Scheme-set assumptions	Increase in	
	Employer Contribution Rate	Core cost cap cost
Ill-health retirement (5%* increase in number of retirements)	0.0%	0.0%
Proportions married / partnered (5%* more members assumed to have qualifying partners at death)	1.1%	0.1%
Resignations and opt outs (10%* more pre-retirement voluntary leavers assumed, net of rejoiners)	-0.5%	-0.2%
Promotional pay increases (+0.25% p.a.)	1.2%	0.0%
Age retirement (All members with 2015 Scheme service only retire at age 55)	-0.2%	-0.1%

* Represents a multiplicative increases to rates, i.e. 5% means rates 1.05 times higher.

Sensitivities

Scheme-set assumptions (Matthews)	Increase in	
	Employer Contribution Rate	Core cost cap cost
Take up rate - ~90% of members overall (25% higher than central assumption of 65% of members)	1.8%	0.0%
Take up rate - ~40% of members overall (25% lower than central assumption of 65% of members)	-2.3%	0.0%
Eligible population – 10% larger	0.5%	0.0%
Firefighter profile – Retained employment started 1 year earlier	0.4%	0.0%
Pay history - +2% of reference pay (Assume 27% of references pay rather than 25%)	0.4%	0.0%

**Appendix B:
Climate Change**



Climate Change – risks

Why consider climate risk?

- Public service pension scheme valuations tend to have long-term horizons, over which climate change can have a significant impact.
- Climate change may affect scheme experience as well as the prevailing economic and societal landscape. These may all impact on the assumptions required for valuations.
- Climate change may also have material implications for departmental spending reviews/plans and the cost of benefits now and in the future.
- In the wider UK pensions sphere, requirements to consider and disclose the potential impact of climate change are increasing.
- The Financial Reporting Council, which sets technical standards for actuarial work in the UK, requires the impact of climate change to be reflected and reported on in pension scheme valuations. The UK government has announced plans to implement TCFD* recommendations in the annual reports and accounts of central government departments by 2025-26.

Assessment challenges

- Climate change is unprecedented and so past data cannot be relied upon to predict future experience.
- Climate risk analysis and modelling techniques are still in their infancy compared with many other pensions risks.

Climate risk types

Physical risks

Arising due to the changes in temperature and extreme weather events.

Transition risks

Arising from moves to a greener, low carbon economy. These risks are primarily due to policy and financial market changes.

Widespread impacts including on:

Life expectancy
Government spending priorities
Economic growth

Future outlook

Climate change and the steps to mitigate it are already underway. Risks relating to this are expected to emerge in the scheme's valuation results over the short to medium-term.

It should be noted that depending on the success and efficiency of our transition to a low carbon world, there may be potential for an improved economic outlook and scheme experience compared with the 2020 valuation assumptions.

* <https://www.fsb-tcf.org/>

Climate Change – scenario analysis

Climate scenarios

- The assumptions used in the 2020 valuation of the scheme are required to be best-estimate, including allowing for expected future GDP growth and life expectancy progression.
- In the remainder of this Appendix, we consider three climate scenarios, their potential impact on valuation assumptions, and how these in turn might impact on the cost of future benefits payable from the scheme.
- The high degree of uncertainty surrounding climate change means that actual climate outcomes may be very different to the scenarios considered. However, the themes illustrated should still be useful for understanding and planning for potential risks.
- The scenarios cover a range of outcomes. No probability is assigned to the likelihood of each scenario.

Analysis process

- Drawing upon the climate impact analysis shared by, and our discussions with, relevant bodies (e.g. the Office for Budget Responsibility ('OBR'), IFoA and NGFS*); for each scenario, we have considered how expectations of key valuation assumptions may have changed by 2040.
- It has been assumed that by 2040, it is clear what climate pathway the world is on. Hence, the valuation assumptions at this time would fully reflect the expected implications of that pathway.
- These assumptions have then been used to consider the potential cost of future benefits at 2040.
- For each intermediate valuation date between 2020 and 2040, we have then considered how the cost of future benefits might progress under each scenario.
- Note that the scenario analysis makes no allowance for potential future pension policy or membership changes.

An overview of the three climate scenarios we have considered is shown on the next page – these are described in terms of the changes anticipated over the period to the end of the century. The potential impact of these scenarios on key valuation assumptions is shown on page 47, along with consideration of their impact on the cost of future benefits payable from the scheme on pages 45 and 46.

Climate Change – scenario overviews

Orderly Transition

- An orderly transition to manage climate risk, where actions are planned, and adaptation is methodical.
- Short-term **transition risk** impacts from policy / regulation changes.
- Medium and long-term growth and stabilisation of risk, with less **physical risk** overall due to early transition.



Estimated +1.5°C
at 2100 vs pre-
industrial
temperatures

Disorderly Transition

- Similar long-term warming outcome to an orderly transition, but achieved in an uncoordinated and disorderly fashion.
- Short-term disruption avoided until pressure to meet targets mounts in the medium-term leading to significant **transition risk**.
- Long-term stabilisation of risk.



**Estimated
+1.5°C to +2.0°C**
at 2100 vs pre-
industrial
temperatures

Failed Transition

- Failure to adapt and mitigate climate change at a global level*.
- No transition to a low carbon economy, hence limited **transition risk**.
- However, significant and increasing amounts of **physical risk** lead to severe direct and indirect financial consequences.



Estimated +4.0°C
at 2100 vs pre-
industrial
temperatures



- Caution, these are illustrative scenarios and should not be used to make specific decisions.
- To consider specific climate change related risks please seek further advice.
- For details of the limitations of our scenarios and analysis, please see page 47.

* The UK only represents a small proportion of global emissions, hence, even if transition plans are met in the UK, climate change will continue to occur unless the rest of the world also takes appropriate actions.

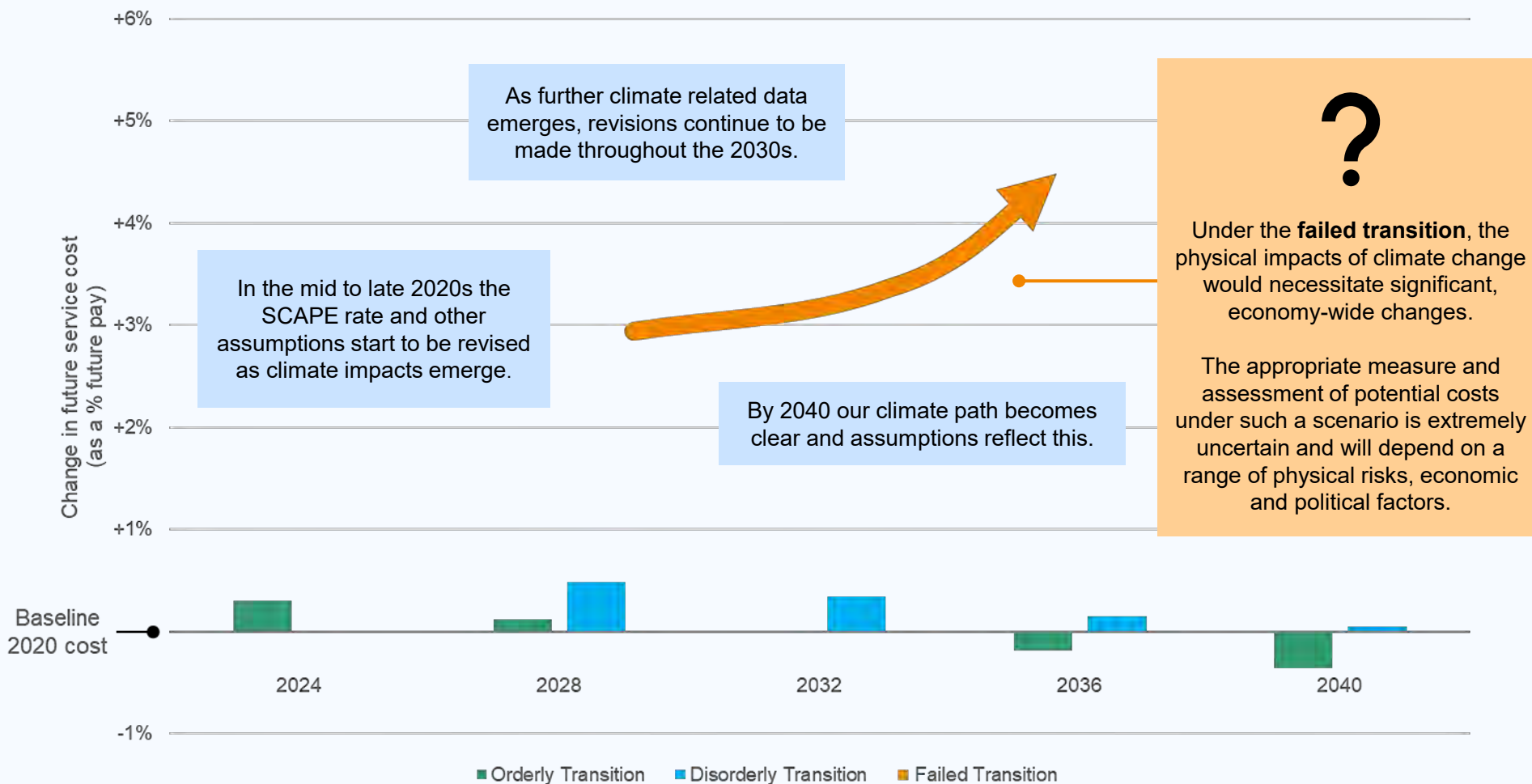
Climate Change – scenario assumptions

Under each scenario below, we set out how expectations of key valuation assumptions may have changed by 2040. The changes in the SCAPE discount rate have the most significant impact on the results. This is in line with the sensitivities shown on page 36. For further details on these and the methodology adopted in our analysis, please refer to page 53.

Assumption at 2040	Orderly Transition	Disorderly Transition	Failed Transition
Inflation rate	No change. We have assumed that the Bank of England takes action to keep long term inflation in line with its 2% target under all scenarios.		
SCAPE discount rate	Increases due to higher long-term growth enabled by an early transition.	Decreases slightly due to the higher costs of mitigation and transition risk.	Decreases significantly due to the financial implications of severe physical risks.
Life Expectancy	Improves due to significant reduction in air pollution, better diet and positive economic outlook.	Worsens overall, as improvements due to reduction in air pollution are more than offset by somewhat worse economic outlook.	Worsens primarily due to secondary impacts of a long-term worsening economic outlook.
Salary Increases	Increases due to higher long-term growth.	Decreases slightly due to disorderly nature of transition.	Decreases due to worse economic outlook.
Other scheme experience and member option assumptions	On the grounds of materiality and the high level of uncertainty, we have not made explicit assumptions for potential changes to member behaviour under each scenario.		

Climate Change – scenario impact comparison

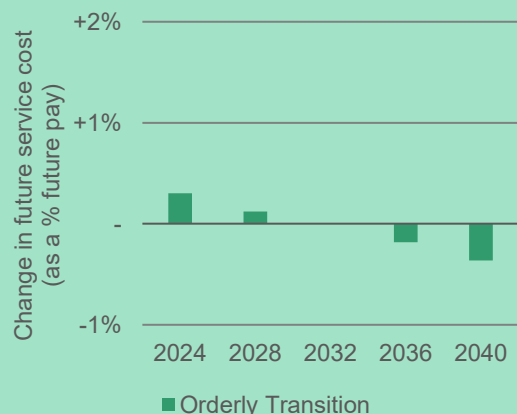
The chart below compares the estimated change in the cost of future benefits at each valuation up to 2040 under each scenario. The next page sets out the rationale for the progression of future valuation costs under each scenario.



Climate Change – scenario impacts

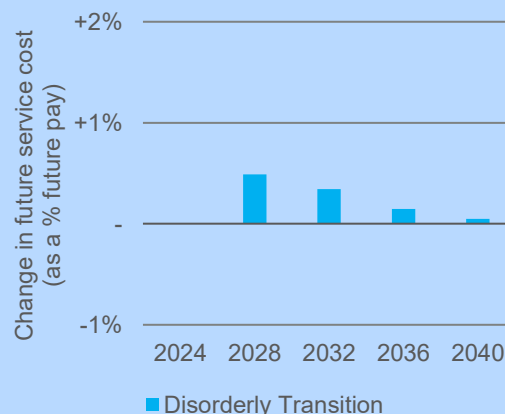
Orderly Transition

- Cost increases initially due to transition risk and the associated costs of implementing policies.
- This falls as successful transition occurs, expectations of economic growth improve and cost of future benefits returns to c2020 levels.
- Continued increases to economic growth expectations reduces the cost of future benefits despite longer life expectancies.



Disorderly Transition

- Limited short-term action means there is no impact by 2024.
- A sudden rush to take action to meet climate targets leads to transition risk that increases the cost of future benefits.
- The rapid progress made starts to reduce the cost of future benefits; however, the reduced expectations of future economic growth keeps the cost above the 2020 level.



Failed Transition

- In the short-term, there would be no successful global action.
- As this continues into the medium term there will likely be shock realisations of the significant physical risk developing on the climate pathway.
- Under a failed transition any global action to mitigate this would be insufficient and physical risk would continue to mount resulting in non-linear and potentially irreversible worldwide impacts.
- Under the adopted methodology the results are sensitive to changes in expectations of economic growth through the SCAPE rate - see sensitivity on page 36.
- Assuming pension costs continue to be measured in the same way as currently, costs would increase substantially as the SCAPE rate decreases.

Climate Change – assumptions and limitations

Limitations of climate scenario analysis

Modelling climate change involves understanding and estimating: future physical climate risk impacts; transitional costs; and how macro-financial variables are affected.

The uncertainty in our assumptions and results in part comes from the uncertainty in existing climate models. In particular, a number of known shortcomings are listed below:

- **Tipping points:** These are thresholds that once crossed may cause irreversible changes in the earth's system. Anticipating the point at which a tipping point would be reached and its consequences is challenging. As a result, tipping points are often excluded from climate models.
- **Speed of realising climate impacts:** Due to the various levers acting over a range of timescales, the timing of the emergence of different climate change impacts is uncertain.
- **Geographical spread of impacts:** Whilst the climate change impacts under any scenario are generally expected to be less severe on the UK relative to the world average, the geographical spread is still uncertain. Ultimately the climate outcome will be determined by overall global emissions (of which the UK contributes a small part).
- **Potential future climate policies:** These are also very difficult to model, if at all, due to their subjective nature.

Assumptions and limitations

A summary of the key long-term valuation assumptions that we have used to consider the impact on the cost of benefits at 2040 under each climate scenario is set out below. The scheme membership profile is assumed to be unchanged from the 2020 valuation with future accrual in the CARE scheme.

Assumption vs baseline	Orderly Transition	Disorderly Transition	Failed Transition
SCAPE discount rate (in excess of CPI)	+0.10%	-0.05%	-1.20%
Non-pensioner life expectancy	+0.5 years	-0.4 years	-1.6 years
Salary Increases	+0.10%	-0.05%	-1.20%

It should be noted that the climate change scenarios and impacts shown in this report are purely illustrative and no decisions should be made on their basis.

They are based on a consideration of the cost of future benefits at 2040, combined with the knowledge we would have at that point regarding the climate pathway being followed.

For intermediate valuation dates between 2020 and 2040, the cost of future benefits has been considered based on the scenario narratives.

Appendix C: Benefits



Benefits Summary

The benefits provided to members of the pre 2015 and 2015 schemes are set out in regulations, The Firemens' Pension Scheme Order 1992 ([SI 1992/129](#)), The Firefighters' Pension Scheme (Scotland) Order 2007 ([SSI 2007/199](#)) and The Firefighters' Pension Scheme (Scotland) Regulations 2015 ([SSI 2015/19](#)) (as amended by subsequent legislation). The main provisions are summarised over the next four pages.

The 2015 scheme was introduced from 1 April 2015. From 1 April 2022, all members accrue benefits in the 2015 scheme. McCloud eligible members will have the choice of reformed scheme (2015 Scheme) or legacy scheme (1992 Scheme/ 2006 Scheme) benefits for the period 1 April 2015 to 31 March 2022.

	1992 Scheme	2006 Scheme (Standard)	2006 Scheme (Special)	2015 Scheme
Basis of provision		Final salary		Career average revalued earnings
Normal Pension Age (NPA)	55 (or from age 50 after completion of 25 years' service) NB: Deferred pension age 60	60 Early retirement from age 55 subject to benefits being actuarially reduced NB: Deferred pension age 65	55 NB: Deferred pension age 60	60 Early retirement from age 55 subject to benefits being actuarially reduced NB: Deferred pension age equal to State Pension Age or 65 if later
Pension accrual rate	1/60th for first 20 years of actual service plus 2/60 per year of service in excess of 20 years, subject to a maximum of 30 years of actual service.	1/60th per year of actual service subject to a maximum of 45 years.	1/45th per year of pensionable service. Includes additional service purchased by contributions.	1/61.6th of earnings in each year, revalued in line with earnings as made by Treasury order (expected to be AWE) on 1 April each year. No cap on service

Benefits Summary

	1992 Scheme	2006 Scheme (Standard)	2006 Scheme (Special)	2015 Scheme
Retirement lump structure	By commutation, using rates based on an underpin to the Firefighters' Pension Scheme (England) rates. Generally option to commute up to 25% of pension.	By commutation at £12:£1. Limit of 25% of full pension.	By commutation at fixed age related factors. Limit of 25% of full pension.	By commutation at £12:£1. Limit of 25% of full pension.
Pensionable Pay (PP)	Basic Salary plus other permanent emoluments.	Basic Salary plus other permanent emoluments. For retained members, this is Reference Pay: whole time equivalent pensionable pay of a regular Firefighter employed in a similar role and with equivalent qualifying service.	Whole time equivalent pensionable pay of a regular Firefighter employed in a similar role and with equivalent qualifying service.	Basic Salary plus other permanent emoluments, including APB payments.
Final Pensionable Pay (FPP)	PP received in the last 12 months. Calculated as at date of leaving or retiring from the 2015 Scheme for those who move to the 2015 Scheme. Either of the two previous 12 month periods may be used if this results in a higher FPP.			Not required.
Spouse's benefits	50% of member's pre-commutation pension.	50% of member's pension after commutation.		

Benefits Summary

	1992 Scheme	2006 Scheme (Standard)	2006 Scheme (Special)	2015 Scheme
III Health Retirement	<p>Two tier – payable after 2 years' service.</p> <p>Lower tier – capable of undertaking alternative employment</p> <p>2-5 years' service: 1/60th per year of service (subject to a minimum of 1 years' service)</p> <p>5 or more years' service: unreduced accrued benefits</p> <p>Higher tier – incapable of undertaking other employment</p> <p>2-5 years' service: same as lower tier</p> <p>5-10 years' service: service doubled</p> <p>10-20 years' service: service enhanced by an additional 7 years, subject to a minimum enhanced total service of 20 years</p> <p>Over 20 years' service: service enhanced by an additional 7 years plus the period in years by which service exceeds 20 years</p>		<p>Two tier – payable after 3 months qualifying service.</p> <p>Lower tier – capable of undertaking alternative employment</p> <p>Unreduced accrued benefits</p> <p>Higher tier – subject to 5 years' qualifying service and incapable of undertaking other employment.</p> <p>Service calculated as: Actual service plus an enhancement of 2% for each year of past service multiplied by prospective service to age 60</p>	<p>Two tier * – payable after 3 months qualifying service.</p> <p>Lower tier – capable of undertaking alternative employment</p> <p>Unreduced accrued benefits</p> <p>Higher tier – subject to 5 years' qualifying service and incapable of undertaking other employment.</p> <p>Pension calculated as: Lower tier pension plus an enhancement of 2% of the lower tier pension (excluding any amount in respect of added pension and before any commutation) for each year of prospective service to NPA</p>

* In addition to the 2015 Scheme benefits, former members of the 1992 Scheme or the 2006 Scheme will receive ill health benefits under those schemes (based on service until they joined the 2015 Scheme) and so, the ill health benefits will be the sum of the benefits from the two arrangements.

Benefits Summary

	1992 Scheme	2006 Scheme (Standard)	2006 Scheme (Special)	2015 Scheme
Pension increases	Governed by Pensions (Increase) Act 1971 (currently CPI, but deferred to age 55 for normal health retirements prior to age 55 and some ill health retirements from preserved status)	Governed by Pensions (Increase) Act 1971 (currently CPI)		
Contracted out/in prior to 2016		Contracted out		

Appendix D: Methodology, Assumptions and Notional Assets



Methodology

Employer Contribution Rate

One of the key outputs of valuation process is the Employer Contribution Rate. To assess this, we:

- Calculate the percentage of total projected pensionable pay needed to meet the benefits accrued over the implementation period (**cost of future benefits**).
- Assess whether there is any deficit/surplus at the effective date and add to this any arising between the effective and implementation dates (**past service position**).
- Spread this total deficit/surplus over 15 years (**adjustment due to deficit/surplus**) and express it as a percentage of total projected pensionable pay. Then add/subtract this resulting percentage from the cost of future benefits.
- Assess the estimated increase in liabilities expected from the Matthews second option exercise. This liability is also spread over 15 years and added to the Employer Contribution Rate. More information can be found on page 25.
- Subtract member contributions expressed as a percentage of total **projected pensionable payroll**.
- Assess whether any further adjustments are required to the resulting Employer Contribution Rate in respect of the cost control mechanism. This process is described on page 5.

The items in **bold** are considered in turn in further detail.

Cost of future benefits

To assess the cost of future benefits, we:

- Estimate the benefits that are accrued by each scheme member (and their dependants where applicable) over the implementation period.
- Express these as a stream of future projected cashflows.
- Calculate the capital sum needed at the effective date to meet this stream of future cashflows. This is done by discounting the cashflows using the discount rate.
- Divide this capital sum by the 'present value' of total pensionable pay over the implementation period.

This methodology is known as Projected Unit and is specified by the Directions.

The Directions also specify that benefits should be attributed to periods of service in accordance with the requirements of International Accounting Standard 19: Employee Benefits.

In carrying out the above steps, we need to make assumptions about the future service and salaries of scheme members, and the length of time over which they will receive benefits. These assumptions are summarised on pages 55 and 56.

We also make a number of more minor assumptions, and these are summarised on pages 57 to 60.

Methodology

Past Service Position

To assess the surplus/deficit at the effective date, we:

- Estimate the benefits accrued by each scheme member (and their dependants, where applicable) in respect of service accrued prior to the effective date (past service).
- Express these as a stream of future projected cashflows.
- Calculate the capital sum (past service liabilities) needed at the effective date to meet this stream of future cashflows. This is done by discounting the cashflows using the discount rate.
- Subtract from this capital sum the value of the notional assets at the effective date. The assets are described as notional as there is no actual fund set aside to pay benefits (see page 56 for more details).

We then need to calculate any surplus/deficit arising **between the effective and implementation dates** caused by benefits built up over this time being less/more than contributions paid. When added to the surplus/deficit at the effective date, this gives the **past service position**.

As per the assessment of the future service position, in carrying out the above steps, we need to make assumptions about the future service and salaries of scheme members, and the length of time over which they will receive benefits.

Adjustment due to deficit/surplus

If the scheme's notional assets are less than the past service position, the fund is said to be in deficit. This deficit needs to be met by an adjustment (addition) to the contribution rate, over a 15 year period.

Conversely, if the scheme's notional assets are more than the past service position, the fund is said to be in surplus. This surplus needs to be met by an adjustment (reduction) to the contribution rate, over a 15 year period.

The adjustments due to deficit/surplus at the effective date and that arising between the effective and implementation dates, were identified separately on pages 7 and 22 of this report.

Projected Pensionable Payroll

In order to carry out our calculations, pensionable payroll is projected from the effective date to the start and end of the implementation period. These projections are shown in the table below.

Date	Pensionable Payroll (£bn)
Effective date (31st March 2020)	0.14
Start of implementation period (1 April 2024)	0.16
End of implementation period (31 March 2027)	0.17

Pensionable payroll is also projected over the above-mentioned 15-year deficit spreading period. The approach taken is detailed further on page 57.

Assumptions and Notional Assets

Assumptions

In assessing the cost of past and future service benefits, we have made assumptions about the future service and salaries of scheme members, and the length of time over which they will receive benefits.

In doing so, we have assumed that a largely stable active population will be maintained.

Our calculations therefore assume that over the period from the effective date to the end of the implementation period, the overall profile of the membership in terms of distribution of headcount and pay by age and gender will remain stable.

The implied expected future pensionable service and length of time over which members receive benefits (duration of liabilities) are summarised in the table below.

Member Type	Average expected future pensionable service	Duration of liabilities
Active Member	6.6	22.5
Current Pensioner	N/A	12.1

Notional Assets

The benefits paid to scheme members are not met from a ring-fenced fund set aside for this purpose. Instead, they are financed by contributions from employers and current members which fall into general government revenues.

An account is maintained of these contributions and they are 'rolled up' from year to year using pre-determined notional rates of return and reduced by benefits as and when they are paid.

The resulting amount is known as the notional assets and stood at £2.57bn as at the effective date. Page 23 provides further information on the development of the notional assets since the previous valuation as at 31 March 2016.

Core and Economic Cost Cap Funds

In a similar way to which the notional assets are required to assess the past service position of the scheme, core and economic cost cap notional funds are required to assess the core cost cap and economic cost cap past service costs respectively.

These notional funds have been estimated at 31 March 2020 using data at this date. The estimate is equivalent to 'rolling up' the values of the notional funds at the previous valuation using pre-determined notional rates of return, and adjusting for income received, benefits paid and other technical adjustments.

Full details can be found in pages 32 to 35.

Minor assumptions

Deficit spreading

The scheme's projected pensionable payroll over a 15-year period is required to spread deficits. An estimate has been calculated using payroll data at the valuation date, projected forward with the earnings increases described on page 14.

SPPA have directed that this payroll estimate be amended to reflect payrolls up to 2022/23, derived from employer contributions in the scheme accounts, but with 2022/23 payroll adjusted for the backdated 2022 pay award. This increases the Employer Contribution Rate by 0.4% p.a.

Public Sector Transfer Club (PSTC)

Transfers into the scheme on a PSTC basis can result in liabilities in excess of the transfer values received. We have analysed recent transfer data in order to estimate the potential impact on the future costs of the scheme.

In setting the Employer Contribution Rate, we have allowed for a 0.2% p.a. addition over the implementation period (this was 0.3% p.a. at the 2016 valuation).

The cost control mechanism requires that only transfers of reformed scheme benefits are considered. No allowance over the cost cap implementation period has been made at the 2020 valuation (as our estimate of the impact is smaller than 0.05% p.a.). The Directions require that this is compared against the PSTC allowance of 0.3% p.a., which was included within the employer cost cap set at the 2012 valuation.

Guaranteed Minimum Pensions (GMPs)

For pensioners reaching State Pension age (SPa) prior to 6 April 2016, certain increases on the GMP part of pensions are not the responsibility of the scheme. This is reflected through an overall adjustment to the past service liabilities. The adjustment is equivalent to a reduction in the employer contribution rate of 0.3% p.a.. There is no impact on the cost control mechanism.

During the inter-valuation period, the Government announced that members reaching SPa after 6 April 2021 will receive full indexation of public service pensions. This follows previous similar announcements covering earlier periods. This acts to increase the past service liabilities and is shown as part of the reconciliation on page 8 of the employer contribution rate with that set at the 2016 valuation.

Timing of increases

Pension increases and reformed scheme in-service revaluations are assumed to occur annually in April.

General salary increases are assumed to occur annually on 1 July, reflecting typical practice of scheme employers.

Progression / promotional increases are assumed to occur evenly throughout the year (so on average halfway through).

Minor assumptions

Final Pensionable Pay

Members' legacy scheme final salary benefits have been valued by projecting salary data at the valuation date up to the point of their assumed retirements. No explicit allowance has been made for the impact of prior years' earnings resulting in higher final pensionable pay for particular members as the impact is not expected to be material.

Actuarial factors

Certain benefit options available to members of the scheme are determined using tables of factors. These are typically generated following advice from the actuary, and are generally set to be broadly cost-neutral against the assumptions used for a valuation. The exception to this are the 1992 Scheme commutation factors (see page 50). In our calculations, we have assumed that, where material, the factors used at a particular point in time in our calculations are reflective of those that were / are expected to be in force at that date.

Income tax and National Insurance

The valuation framework considers cash amounts into and out of the pension scheme. Calculated liabilities therefore reflect full payments and do not, for example, allow for any deductions applicable prior to receipt by members.

Goodwin judgment

A case ('Goodwin') brought in the Employment Tribunal against the Teachers' Pension Scheme in 2020 highlighted the potential for the form of dependants' benefits to result in direct sexual orientation discrimination. The Government [announced](#) that it will make amendments to the public service schemes, where appropriate, to address this discrimination.

SPPA has advised us that, due to the historic equal benefit structure in the 1992 Scheme, they do not believe there is a similar situation in the Firefighters' Pension Schemes in Scotland and therefore, there is no requirement to allow for this legal challenge in the valuation.

Impact of change to discount rate allocation

We have estimated the impact on the employer contribution rate of the 0.7% p.a. reduction in the [SCAPE discount rate](#) since the previous valuation. Various approaches could be justified, depending on the objectives of the assessment. We have assumed:

- The SCAPE discount rate change occurs prior to all other changes in the contribution rate reconciliation.
- The impact includes costs related to future benefit accrual, past service liabilities, and also any shortfall / surplus occurring over the period 2020 to 2024.

Minor assumptions

CARE revaluation

The Government [announced](#) that it would amend benefits provided to members of [reformed schemes](#) which link in-service revaluations to an earnings index. Changes to scheme regulations have not yet been made.

SPPA has therefore instructed that the resulting [past service liabilities](#) are included in the valuation under the provisions of Direction 27. As such, the financial assumptions shown on page 14 reflect the amended in-service revaluations applicable following that instruction.

Ill-health charges

The Directions require the scheme actuary calculates a single [Employer Contribution Rate](#) reflecting the cost of all scheme benefits. This report reflects that requirement.

However, a system is in operation where employers also pay charges where employees retire on ill-health grounds. Page 2 outlines the reduction to the employer contribution rate that could be applied to reflect these additional contributions the scheme expects to receive.

We have calculated the deduction by considering the number of ill-health retirements projected over the [implementation period](#), and the resulting ill-health charges due.

Booth legal judgment ('Booth v Mid and West Wales')

In March 2019, the High Court ruled in favour of a member challenging the exclusion of certain pay allowances (paid to firefighters in addition to basic pay) from the definition of Pensionable Salary used in relation to their benefit entitlement in the Schemes. As a result of this judgment, it was decided that certain pay supplements awarded to Instructors and Fire Investigation Officers should be pensionable for the purposes of calculating benefit entitlements in the Schemes.

Based on information provided by SPPA, we do not expect that pensionable salary changes due to this ruling to have a material impact on the valuation results and therefore have made no allowance.

Part 8 refund of contributions

This exercise was to refund members who had paid contributions to the 1992 Scheme between reaching the service cap of 30 years and reaching age 50 (the youngest permitted retirement age in the 1992 Scheme). Members impacted were paid a refund of contributions and interest which totalled £1.1m.

The refund of these contributions has led to a small increase in the [Employer Contribution Rate](#).

Minor assumptions

The impact of the factors set out on this page have been considered in aggregate. Overall we have determined that no material adjustments are required in respect of them, when setting the Employer Contribution Rate, or as part of the cost control mechanism.

Children and dependants' pensions

The cost to the scheme of paying existing and future pensions to children, or short-term dependants' pensions, on the death of a scheme member.

'Pension debits' for active / deferred members

Savings arising from 'pension debit' deductions to be applied to divorcing members' retirement pensions as a result of a pension sharing order.

'Scheme pays' deductions for active / deferred members

Savings arising from 'scheme pays' debits to be applied to retirement pensions as a result of the scheme having previously paid pension tax charges on behalf of members.

Additional voluntary contributions

The cost of additional pension benefits secured through the payment of additional voluntary contributions through the scheme's regulations.

Earnings Cap

Savings to the scheme arising from members whose pensions at retirement are restricted by the Earnings Cap. This cap limits the final pensionable pay which can be used to calculate the final salary benefits payable in certain legacy schemes.

Expenses

The costs of administering the scheme are outside the framework set by the Directions and so are not directly included in our valuation calculations.

Appendix E: Inter-valuation events



McCloud

What is McCloud?

In December 2018, the England and Wales Court of Appeal upheld claims of age discrimination brought by some firefighters and members of the judiciary against transitional protection rules. This became known as the McCloud judgment, so called after one of the claimants' names. These rules determined the date on which some members would move between the legacy schemes and the reformed scheme.

Why does it matter?

The outcome of the remedy required to address the judgment is twofold:

- When benefits become payable, eligible members can select to receive them from either the reformed or legacy schemes for the period 1 April 2015 to 31 March 2022.
- All active members still in the legacy schemes were transferred to the reformed scheme from 1 April 2022.

Members are likely to choose the option that provides them with the highest benefits. To allow for the McCloud remedy in our calculation methodology, we have valued the 'greater value' benefits for groups of member when comparing their legacy and reformed service.

Who is affected?

The McCloud judgment typically affects those who were in active service on both 31 March 2012 and 31 March 2015. These members are said to be **in scope**.

Where can I find out more?

Full details of the [government's consultation](#) on the McCloud remedy are available online.

GAD allowed for impact of McCloud in the 2016 cost cap valuation of the scheme. Details of these calculations can be found in [this](#) report.

The 2016 cost cap valuation included the full impact of McCloud remedy on the cost control mechanism. Under the reformed mechanism there is no further McCloud impact on the 2020 cost cap valuation of the scheme.

2020 valuation approach

The assessment of McCloud costs in the 2020 valuation will impact on the Employer Contribution Rate. Due to the greater significance of the result, we have adopted a more accurate approach, by assuming that all eligible members in the 31 March 2020 data were in the legacy scheme over the period 2015 to 2020 (or earlier leaving) for this calculation. We have also allowed for revised demographic and financial assumptions that apply at 31 March 2020.

Other events since the 2016 valuation

Member contributions

Page 28 sets out the approach to member contributions expected to be paid during the implementation period 1 April 2024 to 31 March 2027.

The tables below show the contribution rates payable over the period 2016 to 2020. During this period, member contribution rates were dependent on the salary level and scheme the member was accruing benefits in.

Pensionable pay*	1992 Scheme and 2006 (special) Scheme		2006 (standard) Scheme
	Up to £15,609	11.0%	
£15,610 - £21,852	12.2%		9.4%
£21,853 - £31,218	14.2%		10.4%
£31,219 - £41,624	14.7%		10.9%
£41,625 - £52,030	15.2%		11.2%
£52,030 - £62,436	15.5%		11.3%
£62,436 - £104,060	16.0%		11.7%
£104,060 - £124,872	16.5%		12.1%
£124,872 and above	17.0%		12.5%
	2015 Scheme		
Pensionable pay*	2016/2017	2017/2018	From 2018
Up to £27,818	10.0%	10.5%	11.0%
£27,819 to £51,515	12.5%	12.7%	12.9%
£51,516 to £142,500	13.5%	13.5%	13.5%
£142,501 and above	14.5%	14.5%	14.5%

* Pensionable pay bands from 1 April 2018 shown. Bands increased by 1% in each of 2015/2016 and 2017/2019.

Employer contributions

Regular employer contributions were paid at the rate of 29.6% of pensionable pay in respect of 1992 Scheme members (and Special retained members of the 2006 Scheme), 16.9% of pensionable pay in respect of 2006 Scheme members and 15.7% of pensionable pay in respect of 2015 Scheme members until 31 March 2019. From 1 April 2019, the respective rates changed to 39.1%, 24.5%, 26.8%

In addition, ill-health retirement charges were paid by employers when awarding immediate payment of an ill-health pension.

Legal Cases

A number of legal challenges, have been brought against public service (and other) pension schemes since the 2016 valuation of the scheme. This report describes the allowances that we have included at this valuation in respect of those cases.

In some cases, final determinations are outstanding, or impacts have yet to be agreed. Such determinations could impact on future valuations, however prior to their outcomes being known we have not made any allowance for them in the current valuation.

Other events since the 2016 valuation

Pension increases

The rates of increase applied to pensions in payment since the 2016 valuation are set out in the table below.

Year commencing	Pension increase
April 2016	0.0%
April 2017	1.0%
April 2018	3.0%
April 2019	2.4%
April 2020	1.7%
April 2021	0.5%
April 2022	3.1%
April 2023	10.1%

In-service revaluations

The rates of CARE revaluation applied to the accrued pensions of those members of the 2015 scheme who were in-service between the 2016 and 2020 valuation dates, are set out in table below.

Year commencing	In-service revaluation
April 2016	2.0%
April 2017	2.6%
April 2018	3.0%
April 2019	2.8%
April 2020	4.0%
April 2021*	2.6%
April 2022*	4.5%
April 2023	7.0%

* The rates for April 2021 and April 2022 shown are the corrected CARE revaluations which will be applied to member benefits, as explained in page 59.

Other events since the 2016 valuation

Cost Control Mechanism Review

Following the provisional results of the 2016 valuation, HM Treasury questioned whether the cost control mechanism, in its then current form, was too volatile. Following this, at HM Treasury's request, the Government Actuary conducted a review of the cost control mechanism. The Government Actuary's final report to HM Treasury containing his findings and recommendations was published in June 2021.

Full details of the consultation, the proposed changes to the cost control mechanism and the Government's response can be found in HM Treasury's document:

[Public Service Pensions: cost control mechanism consultation](#)

HM Treasury has implemented the changes to the cost control mechanism for the 2020 valuation. Further details of the cost control mechanism can be found on page 29.

SCAPE rate review

From June to August 2021, the Government held a public consultation into the methodology for setting the SCAPE discount rate, the discount rate used in the valuation of public service pension schemes to set the employer contribution rates.

In March 2023, the Government issued its consultation response full details of which can be found at the link below:

[Public Service Pensions: Consultation on the discount rate methodology](#)

Details of the level of the SCAPE discount rate used for the 2020 valuation can be found on page 14.

Appendix F: Compliance, Limitations and Data Uncertainty



Compliance

Purpose

GAD has been appointed as scheme actuary, by Scottish Ministers, to carry out an actuarial valuation of the Firefighters' Pension Schemes (Scotland) as at 31 March 2020 (the effective date), as required by Regulation 140 of The Firefighters' Pension Scheme (Scotland) Regulations 2015.

This report has been prepared for the use of Scottish Ministers and SPPA.

Its purpose is to set out the results of the 31 March 2020 valuation, namely:

- The calculated Employer Contribution Rate payable in respect of the period 1 April 2024 to 31 March 2027.
- The costs of the scheme and how these compare to the employer cost cap.

It has been prepared in accordance with the Public Service Pensions Act 2013, the Directions and scheme regulations.

The information and advice in this report should not be relied upon or assumed to be appropriate for any other purpose, or by any other person.

Throughout this report, the totals given for summed data may not be exactly the same as the sum of the components shown due to rounding effects.

Sharing

This report will be published as part of completing the 2020 valuation of the scheme, and we are content for Scottish Ministers to release this report to third parties, provided:

- It is released in full
- The advice is not quoted selectively or partially;
- GAD is identified as the source of the report, and;
- GAD is notified of such release

Third parties whose interests may differ from those of Scottish Ministers should be encouraged to seek their own actuarial advice where appropriate. GAD has no liability to any person or third party for any act or omission taken, either in whole or in part, on the basis of this report.

Compliance statement:

This report has been prepared in accordance with the applicable Technical Actuarial Standards: TAS 100 and TAS 300 issued by the Financial Reporting Council (FRC). The FRC sets technical standards for actuarial work in the UK.

Reliances, Limitations and Data Uncertainty

Reliances and Limitations

In preparing this report, GAD has:

- Relied on the data and other information supplied by the administrators of the scheme, as described in our Membership data report, dated 26 January 2024. The limitations set out in that report apply equally here.
- Used directed and 'scheme-set' assumptions.

HM Treasury have consulted with the Government Actuary on the directed assumptions. These are reasonable in our opinion, as they meet the Government's policy objectives.

The scheme-set assumptions were determined by Scottish Ministers following GAD's recommendations. These were discussed with the Scottish Firefighters' Pension Scheme Advisory Board and are summarised in our Advice on assumptions report dated 26 January 2024. The limitations set out in that report apply equally here.

Checks, Adjustments and Reconciliations

GAD carried out a significant review of the data supplied to us and excluded records deemed to be unreliable, or not usable due to missing data. Certain processing adjustments were also made to the data received to prepare it for the calculations.

At the final checking stage, the adjusted data was used to calculate liabilities which were reconciled approximately against the 2016 valuation results, adjusted for accounting cashflows.

Can data issues cause uncertainty?

Our checks, adjustments and reconciliations aim to ensure that the data is appropriate for use in valuation calculations.

The more confidence we have that the dataset adopted reflects that of the true scheme, the more confidence we have in the accuracy of the valuation results.

However, our checks do not constitute a full data audit and our adjustments, although reasonable in our view, may not mean that the dataset adopted accurately reflects the scheme reality.

As a result, residual **data uncertainty** exists, however this is normal in large, complex data sets and isn't usually concerning.

Is data uncertainty a significant issue?

We are comfortable that the checks and adjustments that have been made are reasonable and the data is appropriate for the purpose of the 2020 valuation. In our opinion, the potential impact of data uncertainty on the Employer Contribution Rate and member outcomes (via the cost control mechanism) is:

- **Employer contribution rate:** The uncertainty will be captured together with other experience and changes through the 2024 (or subsequent) valuations and the impact could be of the order of $\pm 2\%$ of pensionable pay. This is largely due to the uncertainty surrounding the data for M2. We anticipate that the uncertainty in the data excluding M2 would be of the order of $\pm 0.25\%$ of pensionable pay.
- **Member Outcomes:** No impact expected.

Appendix G: Directions locations



Location of material required by Directions

Direction 22 outlines the reporting requirements for the demographic analysis of the scheme.

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
22 (1), (3), (4)	Summary of demographic analysis		Assumption Report
22 (2)	Statement where scheme membership data not sufficient to carry out analysis		Assumption Report

Direction 23 outlines the reporting requirements for information about the scheme and data.

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
23 (1) (a)	Information regarding scheme membership		12 and Data Report
23 (1) (b)	Average age of scheme members on effective date		Data Report
23 (1) (c)	Average expected future pensionable service of scheme members in service at the effective date		Appendix D
23 (1) (d)	Total projected payroll at i) effective date, ii) the <u>implementation date</u> and iii) last day of implementation period		Appendix D
23 (1) (e)	Statement that valuation results have been prepared in accordance to with the requirements		4 and Appendix F
23 (1) (f)	A summary of regulations, Directions and professional standards relating to the valuation		Appendix F

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
23 (1) (g)	A summary of the main provisions of the scheme		Appendix C
23 (1) (h)	An analysis of the demographic experience	22	13 and Assumptions Report
23 (1) (i)	A statement of the assumptions used by the scheme actuary in preparing the report		13, 14, Appendix D and Assumptions Report
23 (1) (j)	Other liabilities of the scheme		n/a
23 (1) (k)	Any other matters the scheme actuary considers to be relevant		n/a
23 (2) (a)	Sensitivity to the number of years used to spread costs	14	Appendix A
23 (2) (b)	Sensitivities to assumptions specified in the Directions	15, 16, 17, 18, 19a, 19d	16, 17, 36 and Appendix A

Direction 24 outlines the reporting requirements for information about Employer Contribution Rate.

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
24 (a)	Liabilities as at effective date	27	Appendix A
24 (b)	Notional assets as at effective date	28	Appendix A
24 (c)	Information about notional assets	29	Appendix A

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
24 (d)	Contribution rates calculated in accordance with direction 30	30	7, Appendix A
24 (e)	Contribution yields calculated in accordance with direction 31	31	7, Appendix A
24 (f)	Employer Contribution Rate calculated in accordance with direction 32	32	7, Appendix A

Direction 25 outlines the content requirements for the cost cap valuation report

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
25 (a)	Cost cap liabilities at the effective date	34	Appendix A
25 (b)	Prior value of the core cost cap fund	35	Appendix A
25 (c)	Core cost cap fund contribution rate	36	Appendix A
25 (d)	Core cost cap income	37	Appendix A
25 (e)	Cost cap benefits paid	38	Appendix A

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
25 (f)	Core cost cap notional investment returns	39	Appendix A
25 (g)	Past service technical immunity adjustment	40	Appendix A
25 (h)	Value of the core cost cap fund at the effective date	41	Appendix A
25 (i)	Change in the value of the core cost cap fund	42	Appendix A
25 (j)	Core cost cap past service cost	43	Appendix A
25 (k)	Cost cap future service cost	44	Appendix A
25 (l)	Cost cap contribution yield	45	Appendix A
25 (m)	Future service technical immunity adjustment	46	Appendix A
25 (n)	Cumulative future service technical immunity adjustment	47	Appendix A
25 (o)	Core cost cap cost of the scheme	48	9 and Appendix A

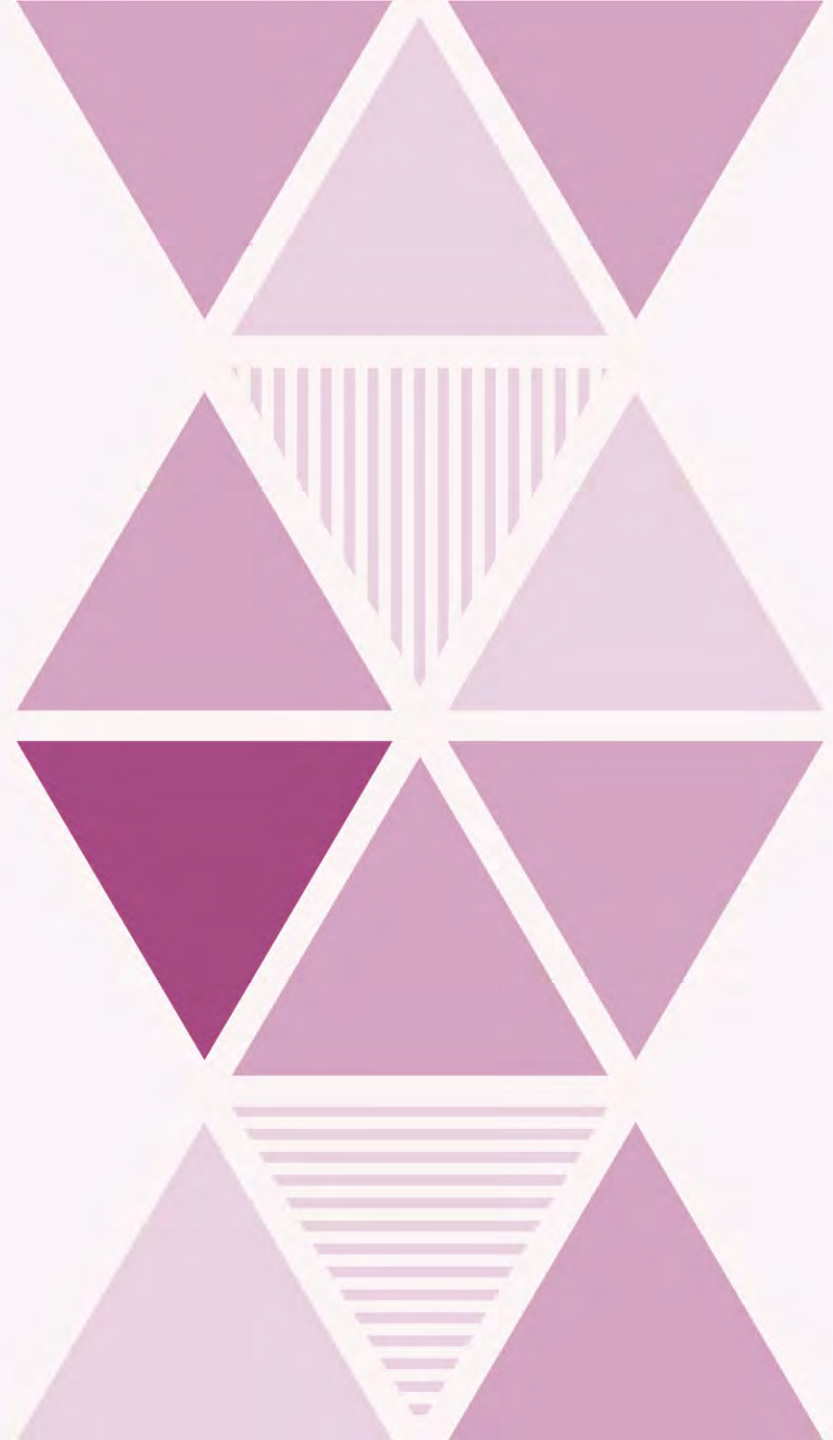
Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
25 (p)	Prior value of the economic cost cap fund	60	Appendix A
25 (q)	Economic cost cap fund contribution rate	61	Appendix A
25 (r)	Economic cost cap income	62	Appendix A
25 (s)	Economic cost cap notional investment returns	63	Appendix A
25 (t)	Value of the economic cost cap fund at the effective date	64	Appendix A
25 (u)	Change in value of the economic cost cap fund	65	Appendix A
25 (v)	Economic cost cap past service cost	66	Appendix A
25 (w)	Economic cost cap cost of the scheme	67	Appendix A
25 (x)	Total cumulative technical immunity adjustment	68	Appendix A
25 (y)	Statement that the core cost cap valuation results and economic cost cap valuation results have been calculated in accordance with the requirement of the Directions		4 and Appendix F

Reporting Direction	Description	Relevant Directions	Location (Page, Appendix or Report)
25 (z)	Summary of the regulations, Directions and professional standard applicable to the preparation of the cost cap valuation report		Appendix E
25 (aa)	Comparison of the core cost cap of the scheme with the employer cost cap	70	9 and Appendix A
25 (bb)	Comparison of the economic cost cap of the scheme with the employer cost cap		9 and Appendix A
25 (cc)	Notification to the responsible authority of a <u>cost control mechanism</u> breach		n/a
25 (dd)	Analysis of difference between the employer cost cap cost of the scheme and the core cost cap cost of the scheme		10

Appendix H:

Glossary 1 – General

**Glossary 2 – Cost Control
Mechanism**



Glossary 1 - General

CARE	<p>CARE stands for Career Average Revalued Earnings and refers to a methodology whereby earnings over a member's working lifetime in the scheme are used in the calculation of their benefits in the reformed scheme.</p>
Directions	<p>A document published by HM Treasury and referred to in The Public Service Pensions Act 2013, which sets out the process and requirements for carrying out valuations, including the results which need to be disclosed.</p> <p>Directions were first published in 2014 and have been amended several times since then.</p> <p>The latest Directions, on which the results of this valuation are based, are the Public Service Pensions (Valuation and Employer Cost Cap) Directions 2023, as they apply at the date of signing.</p>
Effective date	31 March 2020
Employer Contribution Rate	<p>The percentage of scheme members' pensionable salaries which employers are required to pay in order to:</p> <ul style="list-style-type: none">• meet the costs of future benefits accrued by active members• make good any deficit in the notional amounts set aside to cover benefits already built up. <p>The result is heavily dependent on assumptions about future financial conditions and membership changes.</p>
Implementation date	1 April 2024
Implementation period	<p>The period over which future accrual in the scheme is measured for the purposes of the Employer Contribution Rate. For the 31 March 2020 valuation, the implementation period is 1 April 2024 to 31 March 2027.</p>

Glossary 1 - General

Inter-valuation period	For the valuation with an effective date of 31 March 2020, the inter-valuation period is the four years from 1 April 2016 to 31 March 2020.
Matthews	The Matthews second option exercise (or “M2”) is a programme to enable certain members to elect to buy historic service in the 2006 (Special) Scheme. M2 is expected to commence in early 2024. It arises because of a November 2018 ruling in a legal case involving part-time judges (“O’Brien v MoJ”) that effectively broadened the scope of an earlier ruling in the equivalent case for retained firefighters (“Matthews”) and which had previously led to the first Matthews options exercise.
McCloud	McCloud refers to a legal judgment made in December 2018. The England and Wales Court of Appeal upheld claims of age discrimination brought by some firefighters and members of the judiciary against ‘transitional protection’ rules. These rules determined the date on which some members would move between the <u>legacy schemes and the reformed scheme</u> . More information can be found on page 62.
Normal pension age	The age at which a member in normal health is entitled to unreduced benefits. This age varies between the schemes and is set out in Appendix C.
Notional assets	Notional amount of money, initially set as the value of all members’ past service liabilities at a specific date (as set out in Schedule 1 of the Directions). It is updated at each valuation to take account of all actual scheme income and benefits paid, plus an allowance for notional investment returns.
Past service liabilities	The monetary amount assessed in today’s terms, as being required to meet benefit promises (pensions, lump sums, dependants’ pensions etc) that have been made to scheme members over their period of service prior to the <u>effective date</u> . For active members, these liabilities include allowance for future salary inflation and in-service benefit revaluation until the assumed date of cessation of pensionable service.
Pension increase	Public service pensions are increased under the provisions of the Pensions (Increase) Act 1971 and Section 59 of the Social Security Pensions Act 1975.

Glossary 1 - General

Pension revaluation	The rate at which the CARE pension is revalued each year a member is active.
Professional actuarial requirements	<p>The professional requirements that we have complied with when completing this actuarial valuation include:</p> <ol style="list-style-type: none">1. Technical Actuarial Standards: TAS 100 and TAS 300, issued by the Financial Reporting Council (FRC)2. The Actuaries' Code, issued by the Institute and Faculty of Actuaries (IFoA)3. The Civil Service Code. <p>GAD is also accredited under the IFoA's Quality Assurance Scheme. More details can be found on our website.</p>
Reformed and legacy schemes	The reformed scheme is the scheme that was set up in line with The Public Service Pensions Act 2013, and which came into force on 1 April 2015 (referred to as the 2015 Scheme in this report). All non-reformed schemes are known as legacy schemes. This terminology is used in the McCloud judgment.
SCAPE discount rate	<p>SCAPE is short for the Superannuation Contributions Adjusted for Past Experience.</p> <p>It is the discount rate set by HM Treasury which is used when assessing the discounted value of pension payments from the unfunded public service pension schemes.</p> <p>It is currently based on OBR's forecast for long-term GDP growth.</p>

Glossary 2 – Cost Control Mechanism

Cost cap benefits paid	Benefits paid during the inter-valuation period 1 April 2016 to 31 March 2020 from the 2015 Scheme (excluding any CARE benefits paid in respect of members who are in scope for McCloud remedy).
Cost cap ceiling	3% above the employer cost cap
Cost cap contribution yield	The expected average contribution rate payable by members who are not eligible for McCloud remedy over the cost cap implementation period.
Cost cap corridor	The range of rates lying between the employer cost cap $\pm 3\%$. If the cost cap costs of the scheme both lie outside of this corridor in the same direction, then a breach is deemed to have occurred.
Cost cap cost of the scheme	<p>The rate which is compared to the employer cost cap at each valuation to determine whether the Secretary of State is required to consult on changes to the scheme.</p> <p>The cost cap cost of the scheme comes in two forms:</p> <ol style="list-style-type: none"> 1) Core cost cap cost of the scheme – <u>excludes</u> the impact of changing long-term economic assumptions. 2) Economic cost cap cost of the scheme – <u>includes</u> the impact of changing long-term economic assumptions.
Cost cap floor	3% below the employer cost cap.

Glossary 2 – Cost Control Mechanism

Cost cap fund	<p>The cost cap fund comes in two forms, core and economic.</p> <p>It is a notional amount of money, building up from 1 April 2015 when the <u>reformed scheme</u> was introduced.</p> <p>The cost cap fund values at 31 March 2016 have been reconstructed in accordance with the latest Directions and have been estimated at 31 March 2020 using data at this date.</p>
Cost cap fund contribution rate	<p>The cost cap fund contribution rate comes in two forms, core and economic.</p> <p>It is the rate required to cover the cost of benefits accruing from 1 April 2016 to 31 March 2020. Consists of:</p> <ol style="list-style-type: none"> 1) Expected cost of benefits accrued 2016 to 2020 plus 2) Cost cap past service cost at 2016 minus 3) Member contributions paid 2016 to 2020
Cost cap future service cost	<p>The contribution rate required to cover the expected cost of benefits accrued by members during the cost cap implementation period.</p>
Cost cap implementation date	<p>1 April 2023.</p>
Cost cap implementation period	<p>The period over which future accrual in the scheme is measured for the purposes of the cost control mechanism. For the 31 March 2020 valuation the implementation period is 1 April 2023 to 31 March 2027.</p>
Cost cap income	<p>The cost cap income comes in two forms, core and economic.</p> <p>Income received by the scheme, for example employee contributions. Employer contributions are also included, but these are set to the amount that would have been received if employer contributions were paid at the core, or economic, cost cap fund contribution rate.</p>

Glossary 2 – Cost Control Mechanism

Cost cap liabilities	The value of the liabilities relating to benefits that have accrued in the reformed scheme as at 31 March 2020.
Cost cap notional investment returns	The cost cap notional investment returns comes in two forms, core and economic . Notional amount of money added to the core , or economic , cost cap fund representing the growth of the core cost cap fund over time.
Cost cap past service cost	The cost cap past service cost comes in two forms, core and economic . It is the difference between the cost cap liabilities and the core , or economic , cost cap fund as at 31 March 2020, expressed as a percentage of pensionable pay.
Cost control mechanism	A risk-sharing arrangement that seeks to ensure a fair balance of risk between members of public service pension schemes and taxpayers regarding these scheme costs. It also aims to maintain value to members and provide stability and certainty of member benefit and contribution levels, with changes only being triggered by 'extraordinary, unpredictable' events. The mechanism compares certain costs of the schemes (core and economic cost cap costs) to the original employer cost cap. If both these assessed costs have moved outside the cost cap corridor in the same direction, a breach of the mechanism is said to have occurred and Scottish Ministers are required to consult on changes to the scheme to bring the costs back to the employer cost cap. See pages 5 and 29 for further information.
Cumulative future service technical immunity adjustment	An adjustment made to the core cost cap cost of the scheme to exclude the impact of changes to long-term economic assumptions (e.g. SCAPE rate) from the future service cost.

Glossary 2 – Cost Control Mechanism

Economic check	Assessment of whether the economic cost cap cost of the scheme (which includes the impact of changing long-term economic assumptions) breaches the cost cap corridor.
Employer cost cap	<p>The contribution rate, determined at the 2012 valuation, to cover the cost of benefits accruing over the implementation period 2015 to 2019, less expected member contribution payable during this same period.</p> <p>The employer cost cap can be thought of as the baseline cost or target cost of the scheme and is used as the comparator for the core cost cap cost and economic cost cap cost at the 2020 valuation.</p>
Future service technical immunity adjustment	The part of the Cumulative Future service technical immunity adjustment that is in respect of the impact of changes to long-term economic assumptions arising only since the previous valuation.
Past service technical immunity adjustment	An adjustment made to the core cost cap fund to exclude the impact of changes to long-term economic assumptions (e.g SCAPE rate).
Total cumulative technical immunity adjustment	The difference between the core cost cap of the scheme and the economic cost cap of the scheme .