Government Actuary's Department

Firefighters' Pension Schemes (England)

Actuarial valuation as at 31 March 2012

Report by the Scheme Actuary

Date: 6 March 2015

Authors: Martin Clarke FIA

Ian Boonin FIA

Contents

1 Executive summary

This report is addressed to the Secretary of State for Communities and Local Government and provides the results of the actuarial valuation of the Firefighters' Pension Schemes (England) carried out as at 31 March 2012.

1.1 At the request of the Department for Communities and Local Government, GAD has carried out an actuarial valuation of the Firefighters' Pension Schemes (England) as at 31 March 2012 (the ***effective date***). The valuation has been undertaken in accordance with *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014*, as amended, which specify certain assumptions and require other assumptions to be the Secretary of State for Communities and Local Government's best estimates. HM Treasury has confirmed its consent to the assumptions proposed by the Secretary of State.

1.2 This report is addressed to the Secretary of State for Communities and Local Government and sets out the results of the valuation. The ***valuation results*** specify the rate of employer contribution payable for the four year period from 1 April 2015 (the ***implementation period***) and the ***proposed employer cost cap***[1].

1.3 The key results of the valuation are as follows:

> ***Employer contribution rate*** payable for the ***implementation period***: 17.6% of pensionable pay

> ***Proposed employer cost cap***: 16.8% of pensionable pay

> Total liabilities of the Schemes for service to the ***effective date*** of £16.07 bn and ***notional assets*** of £16.50 bn, giving a notional past service surplus of £0.43 bn.

1.4 The ***employer contribution rate*** is the total amount required to be paid by employers into the Firefighters' Pension Schemes (England), calculated in accordance with the Directions, and represents an average rate across the 1992 Scheme, the 2006 Scheme and the 2015 Scheme. The Secretary of State may wish to split this ***employer contribution rate*** between:

> a regular contribution rate and ill-health capital charges to be payable by employers when an ill-health retirement occurs

> the 1992 Scheme, the 2006 Scheme and the 2015 Scheme

This report provides advice on appropriate employer contribution rates, split as above.

[1] In accordance with Section 12 of the Public Service Pensions Act 2013 ('the Act').

2 Background

The valuation has been carried out in accordance with the HMT Directions.

2.1 The Firefighters' Pension Schemes (England) ('the Schemes') provide pensions and other benefits to or in respect of fire and rescue workers who are firefighters in England. The Schemes are unfunded statutory public service pension schemes. The Schemes are financed by payments from the employer and from those current employees who are members of the Schemes, who pay contributions at different rates which depend on their salaries and the section of the Schemes of which they are a member. The previous valuation of the Schemes was carried out as at 31 March 2007[2].

2.2 The Government Actuary's Department (GAD) has been appointed as ***Scheme Actuary***[3] by the Secretary of State for Communities and Local Government to carry out an actuarial valuation of the Schemes as at 31 March 2012 (the ***effective date***). This report on the valuation is addressed to the Secretary of State and is also being made available to HM Treasury (HMT).

2.3 The valuation has been undertaken in accordance with *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014* as amended[4] ('the Directions'). Terms defined in the Directions are shown in ***bold italics*** when used in this report.

2.4 The Directions require the existing Firefighters' Pension Schemes (England) and the new scheme being introduced for firefighters on 1 April 2015 under Section 1 of the 2013 Act[5] ('the 2015 Scheme') to be taken into account in aggregate for the purposes of the current valuation. The results shown in this report relate to 'the aggregate scheme' that is the combination of the existing Firefighters' Pension Schemes (England) and 2015 Scheme.

2.5 The main requirements of the valuation are set out in the Directions. These are to determine the rate of employer contribution payable from 1 April 2015 (***the implementation date***[6]) for the four year period from 1 April 2015 (the ***implementation period***) and the ***proposed employer cost cap.*** Direction 22 requires a number of results relating to the liabilities, ***notional assets***, and contribution rates to be prepared and reported. These results are set out in Section 4

[2] A valuation as at 31 March 2011 was started but not completed.
[3] In accordance with direction 4 of *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014.*
[4] Amendments include all those made up to and including *The Public Service Pensions (Valuations and Employer Cost Cap) (Amendment) (No. 2) Directions 2015.*
[5] *The Public Service Pensions Act 2013.*
[6] The Directions specify the ***implementation date*** for the purpose of the valuation calculations. However, the decision on the actual contribution rate to be implemented and from when is to be taken by the Secretary of State.

of this report. Appendix H sets out where other information as required by the Directions is provided in this, or related, valuation reports.

2.6 The ***employer contribution rate*** is expected to be reassessed at the actuarial valuation to be carried out as at 31 March 2016 (and each subsequent four yearly valuation). The next revision to the ***employer contribution rate*** is expected to take effect from 1 April 2019. The financial position relative to the ***employer cost cap*** will also be reconsidered at each four yearly valuation.

2.7 We have provided advice and information separately on certain aspects of the valuation. The following documents should be read in conjunction with this report.

> *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on membership data,* dated 15 August 2013

> *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on data used for experience analysis,* dated 6 March 2015

> *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Advice on assumptions*, dated 6 March 2015

> *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on methodology*, dated 6 March 2015

2.8 The Department for Communities and Local Government (DCLG) has consulted the Firefighters' Pension Committee (FPC) on the assumptions determined by the Secretary of State. The 'Advice on assumptions' and 'Report on methodology' were circulated in draft to the FPC in October 2013 and October 2014 respectively. The final versions signed alongside this report include a record of changes made since the drafts were originally circulated to the FPC.

2.9 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.

2.10 Appendix I sets out the limitations of this report.

3 Key inputs

This section summarises what calculations were carried out, including the data, methodology and assumptions used, and the analysis performed on the results.

Data

3.1 At the ***effective date***, there were 35,000 contributors to the Schemes with a total payroll of £1.1 billion[7] and 39,000 pensions in payment with total annual pensions amounting to £540 million. There were a further 5,000 ex-contributors who had not yet started to receive their pension. Appendix A provides a summary of the membership data. Further details on the data, including the checks carried out on that data, the limitations of those checks and adjustments made, are provided in the report *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on membership data,* dated 15 August 2013.

Benefits

3.2 The benefits provided to members of the Firefighters' Pension Schemes (England) are set out in the regulations[8]. A new scheme ('the 2015 Scheme') is being introduced from 1 April 2015 under separate regulations[9]. Most members of the existing schemes will transfer to the 2015 Scheme on 1 April 2015. Under transitional arrangements aimed at providing protection for those nearest retirement age, defined older members will continue in the existing schemes until they leave due to retirement or otherwise (full protection members), while others will transfer to the 2015 Scheme at a later date (tapered protection members).

3.3 The Schemes currently consist of two final salary schemes, the 1992 Scheme and the 2006 Scheme. The 1992 Scheme has an accrual rate of 1/60 for the first twenty years of service, and then doubled accrual up to a maximum of another 10 years of service (with lump sum provided through commutation). Firefighters in the 1992 Scheme often retire after serving for 30 years[10]. The 2006 Scheme has an accrual rate of 1/60 (and no double accrual) with lump sum provided through commutation. Firefighters in the 2006 Scheme can retire at age 60. Employee contribution rates for both schemes are currently tiered in relation to members' salaries.

3.4 The 2015 Scheme is a career average scheme with a normal pension age of 60, an accrual rate of 1/59.7, and revaluation in line with earnings as made by Treasury order (expected to be AWE) while in service and the Pensions Increase Act 1971 (currently CPI) out of service. Employee contribution rates are tiered in relation to members' salaries.

[7] Full time equivalent payroll.

[8] The Firefighters' Pension Scheme Order 1992 (SI 1992 No. 129) (as amended), and The Firefighters' Pension Scheme (England) Order 2006 (SI 2006 No. 3432) (as amended).

[9] The Firefighters' Pension Scheme (England) Regulations 2014 (SI 2014 No. 2848).

[10] Most firefighters are able to retire after serving for 25 years (provided they are aged 50 or over) or at age 55, whichever comes first.

3.5 Appendix B gives a summary of the benefits provided under the Firefighters' Pension Schemes (England) and of those to be provided under the 2015 Scheme. It also sets out the criteria by which scheme membership will be determined from 1 April 2015 when the 2015 Scheme is introduced.

Notional assets

3.6 The Schemes are financed by contributions from employers and current members of the Schemes. The contributions paid to the Schemes are received by Fire and Rescue Authorities and are then used to pay pensions in payment. There is no actual fund of assets but, for the purposes of the actuarial valuation, an account is maintained of a notional fund made up of contributions paid by employers and members, supplemented by a return on the notional fund at a pre-determined rate and reduced by benefits as and when they are paid to retired and former members of the Schemes. The notional fund stood at £16.5 billion as at the ***effective date***. Appendix C provides further information on the development of the notional fund since the previous valuation as at 31 March 2007. Appendix D sets out the rates of contribution paid since the previous valuation and summarises other events affecting the Schemes since that valuation.

Assumptions

3.7 The Directions specify certain assumptions to be used for the valuation whilst requiring certain other assumptions to be set as the Secretary of State's best estimates, after taking the advice of the ***Scheme Actuary***. Actuarial advice on the scheme specific assumptions (including variations appropriate for the purposes of determining the ***proposed employer cost cap***), and other relevant information (including an analysis of the Schemes' demographic experience), is set out in the reports:

> *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Advice on assumptions*, dated 6 March 2015

> *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on data used for experience analysis,* dated 6 March 2015

3.8 The Secretary of State has consulted relevant stakeholders and instructed us to adopt the best estimate assumptions recommended in our advice, having obtained HMT consent to those assumptions. Appendix E summarises the key assumptions made.

Methodology and calculations

3.9 The Directions specify that the Projected Unit Methodology should be used. Application of this methodology to determine the ***valuation results*** as specified requires some assumptions to be made about the size and make-up of the workforce up to the end of the ***implementation period***[11].

3.10 To calculate the ***employer contribution rate***, we have placed a net present value on the annual benefit accrual over the four-year ***implementation period*** and then

[11] 31 March 2019.

adjusted this to allow for the reduction of the surplus over 15 years and for member contributions. The ***employer cost cap*** is a measure of the cost of the 2015 Scheme only. The calculation of the ***proposed employer cost cap*** is similar to that of the ***employer contribution rate*** but is based on all members being in the 2015 Scheme in April 2015, with assumptions reflecting members' likely behaviour had they never been members of the existing schemes, and no surplus or deficit contributions apply.

3.11 Appendix F summarises the actuarial methodology adopted for the valuation in more detail. Further details on methodology, including the approach taken to projecting the workforce and the rationale for that approach, are provided in the report *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on methodology,* dated 6 March 2015. Appendix F also summarises the calculations undertaken to determine the ***valuation results***.

Analysis of result

3.12 Section 4 of this report sets out the ***valuation results***.

3.13 Section 5 of this report provides a reconciliation of the financial position at the previous valuation date, 31 March 2007, and at the ***effective date*** of the current valuation.

3.14 Section 6 provides further information which is intended to assist in the interpretation of the results shown. In particular, this section shows the main sensitivities of the ***valuation results*** to the assumptions set by the Secretary of State. The most significant of these are post-retirement mortality and promotional pay increases.

3.15 Section 7 comments on the main risks which could result in some variations in the ***valuation results*** at subsequent valuations.

4 Valuation results

This section provides the valuation results required by the Directions.

4.1 Direction 22 requires certain numerical ***valuation results*** to be reported. This section provides the information required by the Directions.

Valuation balance sheet at 31 March 2012

4.2 The assets and past service liabilities of the aggregate scheme[12] as at the ***effective date*** calculated in accordance with the Directions, and otherwise as specified in this report, are set out in Table 4.1. The liabilities valued include all benefits currently or prospectively payable under the aggregate scheme to pensioners and deferred pensioners as at 31 March 2012 and to active members as at 31 March 2012 in respect of service completed to the ***effective date***. In the case of active members, liabilities arising from future pay inflation to the assumed future date of cessation of pensionable service are included in the liability shown. Corresponding figures at the previous valuation date are shown for comparison purposes. However, that valuation used a different valuation method, the Entry Age Method, so not all results are directly comparable.

Table 4.1: Valuation balance sheet

	£ billion 31 March 2012	***Direction***	**£ billion** 31 March 2007
Aggregate scheme assets	16.50	*25.*	13.1
Aggregate scheme liabilities[13] in respect of:			
Active members	6.37		6.4
Deferred pensioners	0.24		0.1
Pensioners	9.46		6.5
Total aggregate scheme liabilities	16.07	*24.*	13.1[14]
Surplus (Shortfall) as at valuation date	0.43		0.0

[12] The results shown in this report relate to 'the aggregate scheme' that is the combination of the existing Firefighters' Pension Schemes and 2015 Scheme. All liabilities in respect of service to the ***effective date*** relate to the existing Firefighters' Pension Schemes.

[13] Includes liabilities relating to past added years and additional pension and other liabilities created by options paid for by additional member contributions.

[14] Appendix C provides further details of the liabilities as at 31 March 2007

Contribution rates

4.3 Whilst the ***effective date*** of the actuarial valuation is 31 March 2012, the ***employer contribution rate*** determined is that payable in respect of the period 1 April 2015 to 31 March 2019 (the ***implementation period***). The ***employer contribution rate*** required over the ***implementation period*** is determined from the following components:

> A reduction to the contribution rate, applying from 1 April 2015 for a period of 15 years, to allow for the surplus as at 31 March 2012, as shown in Table 4.1

> Plus the contribution rate, payable from 1 April 2015 for a period of 15 years, required to meet any shortfall in the expected cost of benefits accruing between the ***effective date*** and 31 March 2015 and the actual contributions paid by employers and members over the same period

> Plus the contribution rate, payable from 1 April 2015, required to cover the expected cost of benefits accruing by members over the ***implementation period***

> Less normal[15] member contributions expected to be payable during the ***implementation period***.

[15] Excluding additional voluntary contributions and contributions for any other options exercised

4.4 The relevant ***valuation results***, expressed as a percentage of pensionable payroll, are summarised in Table 4.2.

Table 4.2: Contribution rates

	%	%		*Direction*
Contribution rate required to be paid for 15 years from 1 April 2015 to adjust for surplus at 31 March 2012		(4.3)	A	*27(1)(a).*
Contribution rate required to cover cost of benefits accruing between 1 April 2012 and 31 March 2015	40.9			*27(1)(b).*
Less normal[16] member contribution rate expected between 1 April 2012 and 31 March 2015	12.2			*28(a).*
Less employer contribution rate expected between 1 April 2012 and 31 March 2015	19.5			*28(b).*
Net contribution shortfall between 1 April 2012 and 31 March 2015	9.2			
Contribution rate required to be paid for 15 years from 1 April 2015 to correct underpayment of contributions between 1 April 2012 and 31 March 2015		2.4	B	*27(1)(c).*
Contribution rate required to cover cost of benefits accruing over implementation period	32.7		C	*27(1)(d).*
Less normal member contribution rate expected over implementation period[17]	13.2		D	*28(c).*
Employer contribution rate required for cost of accrual of benefits over implementation period		19.5		
Employer contribution rate required over implementation period (A + B + C) – D		17.6		*29.*

Employer contribution rates for the 1992, 2006 and 2015 schemes

4.5 The ***employer contribution rate*** is the total amount required to be paid by employers into the Schemes, calculated in accordance with the Directions. It is a single average rate across the 1992, 2006 and 2015 schemes.

4.6 Under the Regulations, the Secretary of State must determine, after consultation with the Scheme Actuary, the ***employer contribution rate*** payable by employers[18].

4.7 Where a member has retired with an entitlement to the immediate payment of an ill-health pension, that member's employer must pay an ill-health additional contribution. DCLG has confirmed they intend that the ill-health additional contribution will be as follows:

> Higher tier ill-health additional contribution: 4 times pensionable pay (over the last 12 months)

[16] Excludes additional voluntary contributions and contributions for any other options exercised.
[17] Target overall rate as set out in Proposed Final Agreement dated May 2012 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/14943/120524_-_Final_Agreement_-_Fire_-_FINALv2.pdf
[18] The Firefighters' Pension Scheme (England) Regulations 2014, Regulation 117(1).

> Lower tier ill-health additional contribution: 2 times pensionable pay (over the last 12 months)

4.8 At the request of DCLG, we have calculated separate employer contribution rates for the 1992 Scheme, the 2006 Scheme and the 2015 Scheme, after allowance for the expected ill-health additional contributions as set out above. DCLG have instructed us to calculate these separate rates such that:

> their weighted average, including expected ill-health additional contributions, is expected to be equal to the employer contribution rate of 17.6% of pay stated at paragraph 4.4 above, and

> the required past service adjustment over the period 1 April 2015 to 31 March 2019 is allocated to the 1992 and 2006 schemes only.

4.9 The following table sets out the separate contribution rates, which are expressed as a percentage of pay in each scheme.

Table 4.3: Employer contribution rates for 1992, 2006 and 2015 schemes

	1992 Scheme % pay	**2006 Scheme % pay**	**2015 Scheme % pay**	**Note**
Cost of benefits accruing over implementation period	43.6	30.7	27.3	1
Less normal member contribution rates	14.8	10.7	12.5	2
Employer rate for benefits accruing over implementation period	**28.8**	**20.0**	**14.8**	
Less adjustment for past service effects	5.5	5.5	0.0	3
Less allowance for ill-health additional contributions	1.6	2.6	0.5	4
Employer contribution rate payable from 1 April 2015	**21.7**	**11.9**	**14.3**	
Weighting by projected salary over the implementation period	33%	2%	65%	5

Table 4.4: Explanation of employer contribution rates

Note	Explanation
1.	Reflects the benefits and projected membership of each scheme over the ***implementation period***. The weighted average is equal to line C in Table 4.2 (ie 32.7% of pensionable pay).
2.	Reflects the contribution rates and projected membership of each scheme over the ***implementation period***. The weighted average is equal to line D in Table 4.2 (ie 13.2% of pensionable pay).
3.	Reflects the surplus as at 31 March 2012 and the underpayment of contributions 2012-15. Equal to the sum of line A (-4.3% of pensionable pay) and line B (+2.4% of pensionable pay) in Table 4.2. The same adjustment has been applied to the 1992 and 2006 schemes and no adjustment applied to the 2015 Scheme, as described in paragraph 4.8.
4.	Reflects the additional contributions set out in paragraph 4.7, the projected membership of the Schemes, and the ill-health retirement assumption, calculated as an average over the implementation period.
5.	Weightings are the present value of projected salary over the ***implementation period***.

4.10 To summarise, the separate employer contribution rates for the 1992 Scheme, 2006 Scheme and the 2015 Scheme over the implementation period are then as follows:

> 1992 Scheme: 21.7% of pensionable pay, plus ill health additional contributions

> 2006 Scheme: 11.9% of pensionable pay, plus ill health additional contributions

> 2015 Scheme: 14.3% of pensionable pay, plus ill health additional contributions

4.11 If employers pay contributions in line with the rates set out in the previous paragraph (and ill-health additional contributions are as expected), then the weighted average of the contributions during the implementation period, expressed to the nearest 0.1% of pensionable pay, is expected to be equal to the ***employer contribution rate*** stated at paragraph 4.4 above.

Cost cap

4.12 The ***proposed employer cost cap*** is determined from the following components:

> The contribution rate, payable from 1 April 2015, required to cover the expected cost of benefits accruing by members over the ***implementation period*** (determined using data, methodology and assumptions adjusted in accordance with Direction 53 (3) to (6))

> Less normal member contributions expected to be payable over the ***implementation period***.

4.13 The relevant valuation results, expressed as a percentage of pensionable payroll, are summarised in Table 4.5.

Table 4.5: Proposed employer cost cap

	%		*Direction*
Contribution rate required to cover expected cost of benefits accruing over implementation period, assuming all members are accruing benefits in the 2015 Scheme	30.0	A	
Less normal member contribution rate expected over implementation period[19]	13.2	B	
Proposed employer cost cap (A - B)	16.8		*53.*

4.14 The ***valuation results*** have been determined in accordance with the requirements as to data, assumptions and methodology as specified in the Directions.

[19] Target overall rate as set out in Proposed Final Agreement dated May 2012

5 Reconciliation of result with previous valuation results

This section looks at how the valuation results have changed since the previous valuation as at 31 March 2007.

5.1 The previous valuation of the Firefighters' Pension Schemes (England) was carried out as at 31 March 2007. The framework for that valuation was different to that under which the current valuation has been carried out. This has resulted in some considerable movements in the calculation of the liabilities. Table 5.1 shows how the valuation balance sheet has changed since the previous valuation. Some figures have been calculated in an approximate manner but are sufficient to show the general size of the impact on the balance sheet. Table 5.2 provides further information on the items identified. Impacts are considered in the order listed. Using a different order could change the intermediate figures significantly, though there is no impact on the final surplus.

Table 5.1: Valuation balance sheet - Comparison with previous valuation

	£ billion	Note
Surplus at 31 March 2007	**-**	
Change in actuarial method	0.11	1.
Adjusted surplus at 31 March 2007	**0.11**	
Interest on surplus	0.04	
(Shortfall) in return on notional assets	(0.08)	2.
(Shortfall) of contributions paid against cost of benefits accruing 2007 to 2012	(0.02)	
Experience effects		
Pay increases lower than expected	1.23	3.
Demographic experience	(0.02)	4.
Negative inflation in 2009 (pensions held level in 2010)	(0.14)	
Change in long term financial assumptions	(2.09)	5.
Impact of short term variation of assumptions	1.07	6.
Impact of change in demographic assumptions	0.30	7.
Unattributed	0.03	
Surplus at 31 March 2012	**0.43**	

Table 5.2: Explanation of analysis

Note	Explanation
1.	The Directions require the use of the Projected Unit Methodology for the current valuation. The Entry Age Method was used for the previous valuation. The net effect of the change in method for the Schemes is that the liability attributed to past service is lower.
2.	At the previous valuation the return on the ***notional assets*** was anticipated to be 3.5% a year above pension increases. This rate applied until 31 March 2011 but was reduced to 3% above pension increases after that date, see Direction 25 (4). The impact of this change means the ***notional assets*** are lower than anticipated at the previous valuation.
3.	Pay increases over the period between the previous and current valuations have been lower than anticipated. This is largely as a result of the pay restraint policy applied to public service workers during the period.
4.	The impact shown for deviations in scheme experience from the assumptions adopted for the previous valuation is the net result of a number of items, including more pensioner deaths than expected; fewer dependants' pensions payable than expected; and fewer ill-health retirements than expected.
5.	The financial assumptions are set by HMT. Appendix E summarises the financial assumptions set for the current and previous valuations. The most financially significant change in the long term financial assumptions is the reduction in the rate of discount net of pension increases from 3.5% a year to 3.0% a year. This includes the impact of changing from RPI to CPI revaluation of pensions in payment and deferment, which in isolation would reduce liabilities by about 10%[20].
6.	The Directions for the current valuation specify some variation in financial assumptions for the period between the ***effective date*** and the end of the ***implementation period***. The short term assumptions specified result in lower assessed liabilities. No short term variations were assumed for the previous valuation.
7.	The impact of the change in demographic assumptions is the net result of a number of changes; the largest of these related to changes to assumptions for proportions married/partnered, life expectancy and promotional pay awards.

[20] Assuming a long-term difference between RPI and CPI of 0.75% a year, as used to account for the change to CPI revaluation at the time the change was made in the accounts of individual Fire authorities.

5.2 The 2007 valuation did not make a formal employer rate recommendation; it did however calculate contribution rates for the 1992 and 2006 schemes allowing for the ill-health additional contributions. Table 5.3 shows the contribution rates calculated at the 2007 valuation and the employer contribution rates actually payable since 1 April 2007. All rates shown are net of ill health additional contributions.

Table 5.3: Employer contribution rates

	1992 Scheme % pay	2006 Scheme % pay
Calculated at 2007 valuation	24.4%	11.8%
Actually payable by employers since 1 April 2007	21.3%	11.0%

5.3 Table 5.4 illustrates how the employer contribution rate for the 1992 and 2006 schemes has changed since the previous valuation. Again, some figures have been calculated in an approximate manner but are sufficient to show the general size of the impact on the contribution rate. Impacts are considered in the order listed. Using a different order could change the intermediate figures significantly[21], though there is no impact on the final contribution rate.

Table 5.4: Employer contribution rate - Comparison with previous valuation

	1992 Scheme % pay	2006 Scheme % pay
Employer contribution rate calculated at 2007 valuation (after reduction for ill health charges)	**24.4**	**11.8**
Change in actuarial method	0.8	1.5
Change in financial assumptions	7.1	9.4
Change in demographic assumptions	0.6	(0.1)
Allowance for past service effects[22]	(5.5)	(5.5)
Increase in member contributions	(3.8)	(2.2)
Change in Membership profile	1.1	(0.4)
Introduction of the 2015 Scheme[23]	(3.3)	(2.8)
Recognising cost of Public Sector Transfer Club	0.3	0.3
Employer contribution rate payable from 1 April 2015	**21.7**	**11.9**

[21] In particular, the change in the membership profile is very significant, because only older full protection and tapered protection members will remain in the 1992 Scheme or 2006 Scheme from 1 April 2015, and other items in this analysis vary depending on whether they are considered across all members or just the full protection and tapered protection members.
[22] Reflects the surplus as at 31 March 2012 and the underpayment of contributions 2012-15.
[23] The introduction of the 2015 Scheme has an impact on the employer rate in the 1992 and 2006 schemes due to the change in the membership profile of those schemes resulting from unprotected and tapered protection members leaving those schemes.

5.4 The average employer contribution rate based on 2007 data was 23.3% of pay. This is the average of the current employer contribution rates after reduction for ill health additional contributions (1992 Scheme: 24.4% of pay, 2006 Scheme: 11.8% of pay), weighted by actual pay as at 31 March 2007 (1992 Scheme: 91%, 2006 Scheme: 9%).

5.5 The average employer contribution rate in 2015-19 is expected to be 16.7% of pay. This is the average of the employer contribution rates after reduction for ill health additional contributions set out in Table 4.3 (1992 Scheme: 21.7% of pay, 2006 Scheme: 11.9% of pay, 2015 Scheme: 14.3% of pay), weighted by projected salary over 2015-19 (1992 Scheme: 33%, 2006 Scheme: 2%, 2015 Scheme 65%).

5.6 Table 5.4 illustrates how the average employer contribution rate after reduction for ill health additional contributions has changed from 2007 to 2015-19. Again, some figures have been calculated in an approximate manner but are sufficient to show the general size of the impact on the contribution rate. Impacts are considered in the order listed. Using a different order could change the intermediate figures significantly, though there is no impact on the final contribution rate.

Table 5.5: Average employer contribution rate - Comparison with 2007

	% pay
Average employer contribution rate (based on 2007 membership)	**23.3**
Change in actuarial method[24]	0.9
Change in financial assumptions	7.3
Change in demographic assumptions[25]	0.5
Adjustment for past service effects[26]	(1.9)
Increase in member contributions	(2.9)
Changes in membership profile	(1.3)
Introduction of the 2015 Scheme	(9.5)
Recognising cost of Public Sector Transfer Club	0.3
Average employer contribution rate (2015-19)	**16.7**

[24] Change in actuarial method is the impact of valuation methodology changes, including the move from the Entry Age Method to the Projected Unit Method.
[25] Includes change in expected ill health additional contributions.
[26] Reflects the surplus as at 31 March 2012 and the underpayment of contributions 2012-15

6 Sensitivity of valuation results to assumptions

This section illustrates how the valuation results would change if different assumptions were used.

6.1 This section illustrates the sensitivities of the ***valuation results*** to the assumptions determined by the Secretary of State[27]. Sensitivities are not shown for assumptions specified in the Directions since these are fixed for the purpose of this valuation.

6.2 Table 6.1 shows the sensitivities relative to the past service liabilities, the cost of future accrual, the ***employer contribution rate*** and the ***proposed employer cost cap***. The sensitivities shown are intended to illustrate a range of reasonable outcomes which might have been determined at this valuation. They are not intended to show the possible range of variation in assumptions which might be considered at future valuations and in light of future experience. Section 7 and Appendix G comment on the main risks which could result in some variations in the ***valuation results*** at subsequent valuations.

Table 6.1: Sensitivity of valuation results to Secretary of State set assumptions

	Addition to past service liabilities	**Addition to contribution rate for future accrual (% of pensionable pay)**	**Combined addition to employer contribution rate[28] (% of pensionable pay)**	**Addition to proposed employer cost cap (% of pensionable pay)**
(i) **New entrant profile***: new joiners assumed 2 years older on average	No impact	0.1%	0.1%	0.1%
(ii) **Mortality rates***:				
(a) pensioners subject to mortality rates 5% heavier than assumed[29]	(£140m)	(0.2%)	(1.6%)	(0.2%)
(b) 5% more deaths before retirement than currently assumed	Not material	Not material	Not material	Not material
(iii) **Age retirement rates** All new entrants to the 2015 Scheme retire at age 55	No impact	(0.1%)	(0.1%)	(2.6%)

[27] As specified in direction 19(e).
[28] Combined effect of additions for past service, underpayment of contributions over 2012-15 (not shown separately) and future accrual.
[29] Broadly speaking this is equivalent to assuming members spend half a year less in retirement.

	Addition to past service liabilities	Addition to contribution rate for future accrual (% of pensionable pay)	Combined addition to employer contribution rate[28] (% of pensionable pay)	Addition to proposed employer cost cap (% of pensionable pay)
(iv) **Commutation*** (other than as directed): all unprotected members of the 1992 Scheme commute 15% of 2015 Scheme pension	No impact	(0.5%)	(0.5%)	No impact
(v) **Ill health retirements***				
(a) Rate of ill health retirements: 20% higher numbers of members assumed to retire on ill health grounds than currently assumed	Not material	0.1%	0.1%	0.1%
(b) Severity of ill health retirements: 5% more members assumed to receive upper tier benefits than currently assumed	No impact	Not material	Not material	Not material
(vi) **Members' dependants***				
(a) proportions partnered: 5% more members assumed to have qualifying partners at death	£80m	0.2%	1.1%	0.2%
(b) age difference between member and partner: dependants assumed to be 1 year older than that based on current assumption	(£60m)	(0.1%)	(0.8%)	(0.1%)
(vii) **Withdrawal***: withdrawal rates 5% higher than assumed	Not material	Not material	(0.1%)	Not material
(viii) **Promotional pay increases***: promotional pay increases 0.5% per annum higher on average than assumed	£270m	0.2%	3.6%	No impact

* Opposite changes in the assumptions will produce approximately equal and opposite changes in the valuation results.
Changes are considered to be 'Not material' if their impact on past service liabilities is less than £5 million, or their impact on contribution rates is less than 0.05% of pensionable pay.

6.3 In each variant of Table 6.1 the sensitivity shown is in relation only to the change in assumption described. The impact of a combination of assumption changes will not necessarily equate to the sum of the relevant rows above.

7 Uncertainties around possible outcomes of the next valuation

This section considers some of the risks relating to the outcomes of the next valuation.

7.1 The results of this valuation are set out in Section 4. Section 6 outlines the sensitivity of the results to those assumptions set by the Secretary of State. The sensitivities shown in that section are intended to illustrate a range of reasonable outcomes which might have been determined at this valuation had different assumptions been used. The range of reasonable outcomes at this valuation is different to, and not necessarily related to, the possible range of outcomes at future valuations.

7.2 The results of the next valuation (both the ***employer contribution rate*** and the ***cost cap cost of the scheme***[30]) will differ from the results shown in this report for many reasons. Table 7.1 shows some of these reasons. These differences can be split into three categories:

> those that are expected, even if future outturns are exactly in line with assumptions

> those that are likely to occur due to short term variations between experience and assumptions

> those that are possible but less likely and result from more significant experience variations leading to changes in assumptions or from data errors

7.3 The results of future valuations might affect the level of contributions payable by both employers and members and/or the amount of benefits payable to members for future service. Further information on the cost cap mechanism and how this may affect member benefits and/or contributions after future valuations is provided in Appendix G.

7.4 More explanation relating to the items in the table is given in the remainder of this section.

[30] This will be compared to the ***employer cost cap*** at the next valuation. See Appendix G for further details.

Table 7.1: Items that may affect the next valuation[31, 32]

Item		Employer contribution rate[33]	Cost cap cost of the scheme[33]
Expected:	Reduction in proportion of membership accruing benefits in existing schemes	✓✓	o
	Partial use of surplus due to reduction in employer contribution rates	✓	N/A
	Short term mortality improvements & increases in members' average SPA	o	o
	Run-off of short term financials up to the next valuation date	✓	N/A
Likely:	Short term experience effects:		
	- demographic	✓	✓
	- financial	✓✓	✓
	Assumption changes:		
	- short term financials after the next valuation date	✓✓	✓✓
	- mortality improvements	✓✓	✓✓
Possible:	Errors found in data sets from previous valuations	✓✓	✓
	Unexpected membership changes	✓✓	✓
	Assumption changes:		
	- demographics set by the Secretary of State	✓✓	✓

Key[34, 35]:N/A = not applicable,

o = impact is likely to be less than 0.5% of pay,

✓ = impact may well be more than 0.5% of pay but, although possible, is quite unlikely to be more than 2.0% of pay,

✓✓ = impact of more than 2.0% of pay would be quite possible

[31] All cost pressures are assumed to feed through to the ***employer contribution rate*** and the ***cost cap cost of the scheme*** in line with the Directions; more detail on how the Directions treat cost pressures is set out in paragraphs 2.31 to 2.35 of *Public service pensions: actuarial valuations and the employer cost cap mechanism* published by HMT in March 2014.

[32] We have ignored items such as changes to the Directions (apart from those described as "likely" in paragraph 2.39 of *Public service pensions: actuarial valuations and the employer cost cap mechanism*), benefit changes or changes to relevant law (including European law), because it is impossible for us to form any judgement on the likelihood or quantum of such changes.

[33] Each item is considered separately; a combination of these items could have a larger impact than is considered likely for any of those items individually.

[34] Showing relative importance of items in the table, in our judgement at the time of signing.

[35] Shown in increasing order.

7.5 As explained above, some of the factors affecting the results of the next valuation are relatively predictable. For example:

> **Scheme membership:** There will be fewer members of the existing 1992 and 2006 schemes as full protection members retire and tapered protection members move across to the 2015 Scheme. This will impact on the average cost of future accrual, although the impact on the scheme specific employer contribution rates for the 1992, 2006 and 2015 schemes will be much less pronounced.

> **Surplus:** The ***employer contribution rate*** has been reduced due to the surplus as at 31 March 2012. This reduction will use up part of the surplus by the next ***implementation date***.

> **Mortality improvements:** Life expectancies are expected to continue to increase[36].

> **Short term financials:** The short term financial assumptions up to the effective date of the next valuation will determine some of the experience effects at the next valuation but otherwise will not be relevant to the determination of the valuation results of the next valuation.

7.6 It would be possible to calculate the expected contribution rate at the next valuation allowing for these more predictable effects. However, any estimate would still be subject to considerable uncertainty, not least because of the long period over which the membership would need to be projected.

7.7 Other impacts on the results of the next valuation are less predictable. These include:

> **Data:** If the data used for this valuation is later shown to be materially incorrect, a gain or loss will emerge when it is corrected. For example, if the next valuation reveals that the accrued pensions (for all members) at this valuation are found to be 5% underreported, all other things being equal, the ***employer contribution rate*** could increase by around 8% of pay.

> **Scheme membership:** The distribution of future scheme membership may differ from that projected at this valuation. For example, if the scheme membership unexpectedly grows[37] by 10% by 2016 then this might reduce the ***employer contribution rate*** by about ¼% of pay and the ***cost cap cost of the scheme*** by about ¼% of pay.

> **Short term experience effects:** If experience is not in line with the assumptions made, a gain or loss will emerge over an inter-valuation period. Although the scale of the experience effects seen over the current inter-valuation period is not necessarily indicative of the scale of the effects for future periods, it is reasonable to infer that the impact of demographic experience effects is likely to be considerably lower than the potential impact of financial experience effects. For example, at this valuation none of the items of demographic experience resulted in an impact on the ***employer contribution rate*** of significantly more than ½% of pay whereas the pay experience was equivalent to a contribution impact of about 12% of pay.

[36] This impact may be offset by future reviews of the 2015 Scheme's normal pension age. See Appendix G.
[37] Growth due to a surge of new entrants with characteristics in line with the current valuation assumptions.

- **Longer term experience effects:** Assumption changes at future valuations in light of scheme experience may have more substantial effects on the results than actual experience effects. The greater sensitivity to assumption changes is because the assumptions typically apply to longer periods than the experience effects are measured over.

- **Other assumption changes:** Assumptions may change for reasons other than scheme experience, and paragraph 2.39 of *Public service pensions: actuarial valuations and the employer cost cap mechanism* (published by HMT in March 2014) flags that some of the assumptions set in the Directions (including short term financial assumptions) are likely to change. The ***employer contribution rate*** is particularly sensitive to the short term financial assumptions (the use of short term rather than long term assumptions up to March 2019 for this valuation reduced the ***employer contribution rate*** by about 12% of pay). ***Valuation results*** are also sensitive to other assumptions set in the Directions, such as the discount rate, mortality improvements and commutation take up. It is expected that any changes to assumptions in the Directions will impact on the ***employer contribution rate***. The impact of changes in assumptions on the cost cap mechanism is described in paragraphs 2.31 to 2.35 of *Public service pensions: actuarial valuations and the employer cost cap mechanism*.

8 Conclusion

This section summarises the valuation results.

8.1 Based on the detailed analysis as set out in this report, the key results of the valuation are as follows:

> ***Employer contribution rate*** payable for the ***implementation period***: 17.6% of pensionable pay

> ***Proposed employer cost cap***: 16.8% of pensionable pay

> Total liabilities of the Schemes for service to the ***effective date*** of £16.07 bn and ***notional assets*** of £16.50 bn, giving a notional past service surplus of £0.43 bn.

8.2 The ***employer contribution rate*** is the total amount required to be paid by employers into the Firefighters' Pension Schemes (England), calculated in accordance with the Directions and represents an average rate across the 1992 Scheme, the 2006 Scheme and the 2015 Scheme. The Secretary of State may wish to split this ***employer contribution rate*** between:

> a regular contribution rate and ill-health capital charges to be payable by employers when an ill-health retirement occurs

> the 1992 Scheme, the 2006 Scheme and the 2015 Scheme.

This report provides advice on appropriate employer contribution rates, split as above.

8.3 The next valuation of the Schemes is due to be undertaken as at 31 March 2016. This will set the ***employer contribution rate*** payable from 1 April 2019, determine the opening value of the ***cost cap fund*** and provide the cost cap analysis as required by the Directions for future valuations.

Martin Clarke
Government Actuary
6 March 2015

Ian Boonin
Fellow of the Institute and Faculty of Actuaries
6 March 2015

Appendix A: Summary of membership data and comparison with data at previous valuation

Table A1: Actives

		2007				2012			
Scheme	**Gender**	**Number of members (head count)**	**Total pensionable pay (i) (£m)**	**Average age (ii)**	**Average service (years)**	**Number of members (head count)**	**Total pensionable pay (£m) (i)**	**Average age (ii)**	**Average service (years) (iii)**
1992 Scheme	Male	28,369	872.8	41.2	16.3	21,649	729.0	43.4	18.4
	Female	705	19.2	33.6	7.5	647	20.7	38.6	12.4
2006 Scheme	Male	1,230	27.7	30.7	1.2	4,799	137.8	33.4	4.4
	Female	109	2.4	30.4	0.8	500	14.1	32.3	4.1
Retained	Male	2,994	77.7	39.6	0.4	7,213	198.5	39.2	1.2
	Female	126	3.1	35.3	0.2	341	8.7	35.7	1.1
Total		**33,533**	1,002.9	**40.6**	**14.1**	**35,149**	**1,108.7**	**41.1**	**12.5**

(i) Full-time equivalent annual rate of pensionable pay at valuation date
(ii) Weighted by full time equivalent pay
(iii) Active Service in the Fire Pension Schemes plus transferred-in service

Table A2: Deferreds

		2007 (i)			2012		
Scheme	Gender	Number of members	Total deferred pension (£m pa)	Average age (ii)	Number of members	Total deferred pension (iii) (£m pa)	Average age (ii)
1992 Scheme	Male	1,800	10.0	45.0	2,067	15.5	46.6
	Female	245	1.2	46.9	525	3.4	49.2
2006 Scheme	Male	3	Not Disclosed	Not Disclosed	2,425	1.1	39.5
	Female	-	-	-	225	0.2	39.2
Total		**2,048**	**11.2**	**45.2**	**5,242**	**20.2**	**46.6**

(i) The figures shown as at 2007 are based on the data that was provided to GAD for the 31 March 2007 valuation. They may also be affected by the issue described in Table A3: Pensioners, note (i).

(ii) Weighted by deferred pension.

(iii) Including pension increases awarded in April 2012.

Table A3: Pensioners

		2007 (i)			2012		
Type of Pensioner	**Gender**	**Number of members**	**Total Pension (£m pa)**	**Average age (ii)**	**Number of members**	**Total pension (iii) (£m pa)**	**Average age (ii)**
Age retirement (iv)	Male	12,585	188.0	62.4	16,442	298.4	62.1
	Female	69	0.3	69.3	25	0.2	69.0
Ill health retirement	Male	16,319	186.7	60.6	15,418	192.1	64.4
	Female	51	0.3	46.6	52	0.3	49.7
Unknown	Male	-	-	-	812	11.4	67.1
	Female	-	-	-	11	0.0	61.4
Dependants (v)	Male	223	0.6	36.1	218	0.7	34.1
	Female	5,385	24.7	70.7	5,620	35.4	72.3
All Pensioners (excl Dependants)	Male	28,904	374.7	61.5	32,672	501.9	63.1
	Female	120	0.6	58.2	88	0.5	57.4
All Pensioners (incl Dependants)	Male	29,127	375.3	61.5	32,890	502.6	63.0
	Female	5,505	25.3	70.4	5,708	35.9	72.1
Total		**34,632**	**400.6**	**62.0**	**38,598**	**538.5**	**63.6**

(i) The figures shown as at 2007 are based on the data that was provided to GAD for the 31 March 2007 valuation. It has since been established that the pension in payment data was overstated and this has an impact on the 2007 valuation results (see Appendix C, paragraphs C.4 to C.5). Therefore, some of the figures in the 2007 section of this table may not be reliable, in particular the Total Pension amounts.
(ii) Weighted by pension.
(iii) Including pension increases awarded in April 2012.
(iv) Includes pensioners retiring for reasons other than ill health (such as early retirement).
(v) Including pension credit members.

Appendix B: Summary of benefits

B.1 The Directions require the Firefighters' Pension Schemes (England) and the new scheme being introduced for the firefighters on 1 April 2015 under section 1 of the 2013 Act[38] ('the 2015 Scheme') to be taken into account in aggregate for the purposes of the current valuation. The summary of benefits provided is shown separately for the Firefighters' Pension Scheme 1992 ('the 1992 Scheme'), the New Firefighters' Pension Scheme (England) 2006 ('the 2006 Scheme') and the 2015 Scheme. The criteria by which scheme membership will be determined from 1 April 2015 is also detailed below.

Firefighters' Pension Schemes (England)

B.2 The main benefit provisions of the schemes for each category of member are shown in Table B1.

[38] The Public Service Pensions Act 2013

Table B1: Main benefit provisions of Firefighters' Pension Schemes (England)

	1992 Scheme	2006 Scheme	2015 Scheme
Basis of provision	Final salary	Final salary	Career Average Revalued Earnings
Relationship with S2P	Contracted out	Contracted out	Contracted out
Employees Covered	Members who joined before 6th April 2006 (excluding retained members). Unprotected members move to the 2015 Scheme from 1 April 2015. Tapered protection members move to the 2015 Scheme at the end of their protected period	Members joining between 6th April 2006 and 31st March 2015 (including retained members) Unprotected members move to the 2015 Scheme from 1 April 2015. Tapered protection members move to the 2015 Scheme at the end of their protected period	Members joining on or after 1st April 2015 (including retained members), Unprotected members from the 1992 and 2006 schemes, and Tapered protection members from the 1992 and 2006 schemes at the end of their protected period
Normal Pension Age (NPA)	55 (or from age 50 after completion of 25 years' service)	60 (55 for Special members[39])	60
Pensionable Pay (PP)	Basic Salary plus other permanent emoluments	Basic Salary plus other permanent emoluments	Basic Salary plus other permanent emoluments including CPD payments
		For Retained members Pensionable Pay is the Reference Pay (whole-time equivalent pensionable pay of a regular Firefighter employed in a similar role and with equivalent qualifying service.)	For Retained members, Pensionable Pay is the Reference Pay (whole-time equivalent pensionable pay of a regular Firefighter employed in a similar role and with equivalent qualifying service.)
Final Pensionable Pay (FPP)	PP received in the last 12 months. This would be calculated as at the 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	PP received in the last 12 months. This would be calculated as at the 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 average.	Not required.

[39] Special members are retained members who were in retained employment before 6 April 2006 and who have elected to become a Special member

<table>
<tr><th></th><th>1992 Scheme</th><th>2006 Scheme</th><th>2015 Scheme</th></tr>
<tr><td>Member's Contributions</td><td>Tiered contributions
See Appendix D, Table D1</td><td>Tiered contributions
See Appendix D, Table D1</td><td>Tiered contributions
For scheme year 1 April 2015 – 31 March 2016:<table><tr><th>Pensionable Pay</th><th>Contribution Rate</th></tr><tr><td>Up to £27,000</td><td>10.0%</td></tr><tr><td>£27,001 - £50,000</td><td>12.2%</td></tr><tr><td>£50,001 - £142,500</td><td>13.5%</td></tr><tr><td>£142,501 or more</td><td>14.5%</td></tr></table></td></tr>
<tr><td>Normal Retirement</td><td></td><td></td><td></td></tr>
<tr><td>Pension to Member</td><td>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.</td><td>$1/60^{th}$ per year of actual service ($1/45^{th}$ per year of special membership service for special members) subject to a maximum of 45 years.</td><td>$1/59.7^{th}$ of earnings in each year, revalued in line with earnings as made by Treasury order (expected to be AWE). No cap on service.
Revaluation will be at 1 April each year</td></tr>
<tr><td>Lump Sum</td><td>By commutation: Rates vary with age.</td><td>By commutation at £12:£1 (rates vary with age for Special members).</td><td>By commutation at £12:£1.</td></tr>
<tr><td></td><td>Limit of 25% of full pension; lower limits apply to some members</td><td>Limit of 25% of full pension.</td><td>Limit of 25% of full pension.</td></tr>
<tr><td></td><td>No commutation is allowed in respect of the higher tier element of an ill health pension.</td><td>No commutation is allowed in respect of the higher tier element of an ill health pension.</td><td>No commutation is allowed in respect of the higher tier element of an ill health pension.</td></tr>
<tr><td>Spouse's Pension</td><td>50% of member's pension before commutation</td><td>50% of member's pension after commutation</td><td>50% of member's pension after commutation</td></tr>
<tr><td>Pension Increases</td><td>In line with Pensions Increase Act 1971 (currently CPI, but deferred to age 55 for age retirements prior to age 55 and some ill health retirements from preserved status)</td><td>In line with Pensions Increase Act 1971 (currently CPI)</td><td>In line with Pensions Increase Act 1971 (currently CPI)</td></tr>
</table>

	1992 Scheme	2006 Scheme	2015 Scheme
Early Retirement	Unreduced pension from age 50 after completion of 25 years' service.	Reduced pension payable from age 55, with the reduction calculated so that the early retirement pension is actuarially equivalent in value to a deferred pension payable from age 65.	Reduced pension payable from age 55, with the reduction calculated so that the early retirement pension is actuarially equivalent in value to a deferred pension. From active service this reduction is based on the period to age 60, otherwise it is based on the period to State Pension Age.
Ill Health (IH) Retirement	Two Tier – payable after two years' service Lower tier – capable of undertaking alternative employment • 2- 5 years' service - 1/60th per year of service (subject to a minimum of 1 years pensionable service) • 5 or more years' service –unreduced accrued benefits	Two tier – payable after 3 months qualifying service Lower tier – capable of undertaking alternative employment • unreduced accrued benefits	Two tier – payable after 3 months qualifying service Lower tier – capable of undertaking alternative employment • unreduced accrued benefits For members who were previously in 1992 Scheme or 2006 Scheme, benefits will be the sum of benefits from the two arrangements.
	Higher tier – incapable of undertaking other employment. • 2 to 5 years' service – same as lower tier • 5 to 10 years' service – service doubled • 10 to 20 years' service – service enhanced by an additional 7 years, subject to a minimum total enhanced service of 20 years • Over 20 years' service - service enhanced by an additional 7 years plus the period in years by which service exceeds 20 years	Higher tier – subject to 5 years qualifying service and incapable of undertaking other employment, service calculated as: • actual service plus • an enhancement of 2% for each year of past service multiplied by prospective service to 60	Higher tier – subject to 5 years qualifying service and incapable of undertaking other employment, calculated as: • the 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 Normal Pension Age For members who were previously in 1992 Scheme or 2006 Scheme, benefits

	1992 Scheme	2006 Scheme	2015 Scheme
			will be the sum of the lower tier benefits from those schemes plus the higher tier benefit above.
Dependant's Pension on Death in Service	Payable after two years' service 50% of Higher tier ill health pension	Payable after 3 months qualifying service: 50% of Higher Tier ill health pension	Payable after 3 months qualifying service: 50% of Higher Tier ill health pension
Dependant's Short Term Pension	Generally payable without any minimum service requirement	Payable if member has more than 3 months qualifying service	Payable if member has more than 3 months qualifying service
Death in Service	The difference between the member's weekly rate of pensionable pay when the member died and the children's or spouse's weekly pension, is payable for 13 weeks following the death	The difference between the member's weekly rate of pensionable pay when the member died and the spouse's weekly pension, is payable for 13 weeks following the death	The difference between the member's weekly rate of pensionable pay when the member died and the spouse's weekly pension, is payable for 13 weeks following the death
Death after Retirement	The difference between the member's weekly rate of pension when the member died and the spouse's weekly pension, is payable for 13 weeks following the death	The difference between the member's weekly rate of pension when the member died and the spouse's weekly pension, is payable for 13 weeks following the death	The difference between the member's weekly rate of pension when the member died and the spouse's weekly pension, is payable for 13 weeks following the death
Lump Sum Death Benefits			
Death in Service	2 x Pensionable Pay	3 x Pensionable Pay (2 x Pensionable Pay for special members)	3 x Pensionable Pay
Death after Retirement	If all payments made to the member and his/her dependants plus the actuarial value of the dependant's pension are less than the member's total contributions, then the balance of contributions is refunded.	5 times pre commutation pension less amount already paid	5 times post commutation pension less amount already paid
Children's Pensions	18.75% of member's pension (enhanced if the member dies in service to the higher tier ill health	25% of member's pensions (enhanced if the member dies in service as for upper tier ill health) up to a	25% of member's pensions (enhanced if the member dies in service as for upper tier ill health) up to a

	1992 Scheme	2006 Scheme	2015 Scheme
	pension) up to a maximum of 37.5% shared between the eligible children Orphans – receive 25% of member's pension (enhanced on death in service to the higher tier ill health pension) up to maximum of 50% shared between the eligible children	maximum of 50% shared between the eligible children Orphans – 50% of the member's pension (enhanced on death in service to the higher tier ill health pension) shared between the eligible children	maximum of 50% shared between the eligible children Orphans – 50% of the member's pension (enhanced on death in service to the higher tier ill health pension) shared between the eligible children
'Dependant' provision	Spouses or Civil partners	Spouse, Civil partners, or nominated partners	Spouse, Civil partners, or co-habiting partner
Cessation on remarriage or cohabitation	Yes	No	No
Withdrawal Benefits on Leaving	Refund of contributions if less than three months' service, otherwise; Deferred pension payable from age 60.	Refund of contributions if less than three months' service, otherwise; Deferred pension payable from age 65 (age 60 for special members)	Refund of contributions if less than three months' service, otherwise; Deferred pension payable from State Pension Age, or age 65 if later.
Preserved Benefits	Deferred pension is the lesser of: **1)** 40 / 60 x Pensionable Pay; or **2)** A x B / C where: A is member's notional pension at normal pension age based on average pensionable pay at the date of leaving B is member's actual pensionable service C is member's notional service to age 55 subject to a maximum of 30 years' service	1/60th per year of actual service (1/45th per year of special membership service for Special members) subject to a maximum of 45 years.	1/59.7th of earnings in each year, revalued in line with the increase in average weekly earnings in service, and in line with Pensions Increase Act 1971 (CPI) thereafter.
Spouses Pension at date of death	50% of member's deferred pension	50% of member's deferred pension	50% of member's deferred pension

Criteria for scheme membership from 1 April 2015

Full protection members

B.3 Scheme members who, on 1 April 2012, are in the 1992 Scheme and aged 45 or over will remain in the 1992 Scheme from 1 April 2015 until they retire.

B.4 Scheme members who, on 1 April 2012, are in the 2006 Scheme and aged 50 or over will remain in the 2006 Scheme from 1 April 2015 until they retire.

Tapered protection members

B.5 Active members who, as of 1 April 2012, are within 4 years of qualifying for protected status will have limited protection so that on average for every month closer to qualifying for transitional protection they gain about 53 days of protection in their current scheme. At the end of their protected period, they will transfer into the 2015 Scheme.

Unprotected members

B.6 All other active members will transfer to the new 2015 Scheme on 1 April 2015.

B.7 Further details on transitional protection after 1 April 2015 can be found in the 2015 Scheme regulations[40].

[40] The Firefighters' Pension Scheme (England) Regulations 2014 (SI 2014 No. 2848).

Appendix C: Notional assets and cashflows

C.1 The Directions specify the calculation of the ***notional assets*** as at 31 March 2012. The calculation is set out in Table C1. Income and benefit payments have been derived from the DCLG's Fire & Rescue Services Statistical Release 'Firefighters' Pension Fund Income and Expenditure'[41] and supplementary information supplied by DCLG. The relevant information is summarised in Table C2. The notional return credited each year in line with the return specified in the Directions is also shown. Income and expenditure is assumed to occur mid-year for the purposes of crediting the notional return.

Table C1: Notional assets

	£ billion		Direction
Scheme Notional Assets at 31 March 2007	13.10	A	Schedule 2
Change in Scheme Notional Assets in respect of:			
Income received	1.61	B	*25*
Benefits paid	2.97	C	*25*
Notional investment returns	4.75	D	*25*
Scheme Notional Assets at 31 March 2012 (A + (B – C)) + D	**16.50**		*25*

Table C2: Cashflows

	2007/08 £ bn	2008/09[42] £ bn	2009/10 £ bn	2010/11 £ bn	2011/12 £ bn	Total 2007-12 £ bn
Income	0.33	0.33	0.34	0.31	0.30	1.61
Benefit payments	0.49	0.59	0.64	0.60	0.64	2.97
Notional investment returns[43]	0.98	1.20	0.30	0.99	1.29	4.75
(%)	7.5 %	8.7 %	2.1 %	6.7 %	8.4 %	

[41] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225855/Firefighters__pensions_2012-13.pdf

[42] Income and expenditure figures for this year both include any payments made in respect of the March 2009 High Court judgement on backdating commutation factors within the 1992 Scheme. These items of income and expenditure are equal, so this judgement does not have any impact on the surplus at 31 March 2012, employer contribution rates, or the proposed employer cost cap.

[43] Calculated in accordance with direction 25(4). In basic terms, the rate of return is the measure of price inflation (which can be negative) compounded with the net discount rate applying at the time.

C.2 Future cashflows to the Schemes will comprise income and benefit payments. The liabilities set out in this report are based on the overall cashflows expected to arise in all future years based on the assumptions used. Over shorter time periods it is likely that actual cashflows will differ from those taken into account when considering the longer term. Given the sensitivity of cashflow projections to particular time periods they are required for, none are provided in this report. It is recognised cashflow projections based on the valuation data may be required for other purposes.

C.3 The notional asset figure of £13.1 billion at 31 March 2007 is specified in Schedule 2 of the Directions. This is intended to equal the liabilities of the Schemes at that date, such that there is no notional surplus or deficit.

C.4 The previous valuation report of the Schemes as at 31 March 2007 showed liabilities of £13.8 billion. This figure was revised to £13.1 billion following some investigations carried out by GAD, the most significant of which was into data provided to DCLG by Fire and Rescue Authorities for the 2007 valuation. This investigation revealed that pensions in payment data provided to GAD for the 2007 valuation was overstated and, consequently, that the assessed liabilities of the Schemes were also overstated.

C.5 GAD has concluded that setting the initial value of the notional assets to be £13.1 billion as at 31 March 2007 more accurately achieves the objective of setting assets equal to liabilities than the figure shown in the 31 March 2007 valuation report, and HMT have therefore used the revised figure of £13.1 billion in the Directions

Appendix D: Events since the 2007 actuarial valuation

Changes to Scheme benefits

D.1 The benefits provided from all sections are summarised in Appendix B.

D.2 An amendment to the 2006 Scheme regulations introduced a modified section of the 2006 Scheme for retained firefighters who were employed in England during the period 1 July 2000 to 5 April 2006 inclusive to provide them with access to a pension scheme for that period (known as 'special' members). The special members can join this modified section of the 2006 Scheme from the date their service began or from 1 July 2000 if later. Their normal retirement age, normal benefit age and accrual rate differ from the ordinary members of the 2006 Scheme.

D.3 An option exercise is currently in progress that provides eligible retained members with the choice of paying backdated employee contributions to obtain past service in the modified section of the 2006 Scheme. This will result in an increase to the liabilities in the 2006 Scheme greater than the employee contributions that will be paid.

D.4 An allowance for this potential increase in liabilities has not been made in the valuation results in this report, as we do not know the result of the option exercise (which is ongoing).

D.5 Any increase in liabilities, above the employee contributions paid, resulting from the option exercise will result in a smaller surplus (or larger deficit) at the next valuation. The treatment of this options exercise will need to be considered as part of the 2016 valuation. It is anticipated that there would be no impact on the cost cap mechanism on the basis that the additional liability will have already arisen by the time the cost cap fund commences in April 2015.

D.6 At the time of writing this report there is a complaint before the Pensions Ombudsman about the level of commutation factors applied to the benefits of Firefighters retiring in the early to mid-2000s. The Ombudsman has not yet reached a determination and it is not therefore known what financial implications any determination might have on the finances of the Schemes. Depending on the outcome there could be a material impact on the results at the next valuation.

Member contributions

D.7 Between 1 April 2007 and 31 March 2012, member contributions were payable at the rate of 11.0% of pensionable pay in 1992 Scheme and 8.5% of pensionable pay in 2006 Scheme.

D.8 Changes to member contributions were introduced after the ***effective date*** as set out in Table D1.

Table D1: Member contribution rates 1 April 2012 to 31 March 2015

1992 Scheme:

Earnings	Member contribution rate 2012/13 (%)	2013/14 (%)	2014/15 (%)
Up to £15,000	11.0	11.0	11.0
£15,001 - £21,000	11.6	11.9	12.2
£21,001 - £30,000	11.6	12.9	14.2
£30,001 - £40,000	11.7	13.2	14.7
£40,001 - £50,000	11.8	13.5	15.2
£50,001 - £60,000	11.9	13.7	15.5
£60,001 - £100,000	12.2	14.1	16.0
£100,001 - £120,000	12.5	14.5	16.5
Over £120,000	13.0	15.0	17.0

2006 Scheme:

Earnings	Member contribution rate 2012/13 (%)	2013/14 (%)	2014/15 (%)
Up to £15,000	8.5	8.5	8.5
£15,001 - £21,000	8.8	9.1	9.4
£21,001 - £30,000	8.8	9.6	10.4
£30,001 - £40,000	8.9	9.9	10.9
£40,001 - £50,000	9.0	10.1	11.2
£50,001 - £60,000	9.1	10.2	11.3
£60,001 - £100,000	9.3	10.5	11.7
£100,001 - £120,000	9.5	10.8	12.1
Over £120,000	9.7	11.1	12.5

Employer contributions

D.9 Since 1 April 2007 employer contributions were payable at a rate of 21.3% of pensionable pay for the 1992 Scheme and 11.0% of pensionable pay for the 2006 Scheme, plus ill-health additional contributions.

Pension increases

D.10 The Government announced that Consumer Price Index (CPI) rather than the Retail Price Index (RPI) would be used to set pension increases under the PI Act with effect from the April 2011 increase. The financial assumptions were amended accordingly as set out in Appendix E. The actual rate of increase awarded since the 2007 valuation are set out in Table D2. The known rates of increase awarded since the ***effective date*** are also shown. These have been taken into account in the valuation.

Table D2: pension increases since the previous valuation

Date	Pension Increase
April 2007	3.6 %
April 2008	3.9 %
April 2009	5.0 %
April 2010	0.0 %
April 2011	3.1 %
April 2012	5.2 %
April 2013	2.2 %
April 2014	2.7 %

D.11 The rate of increase of official pensions in April 2015 and subsequent years has not yet been set by order, and the assumed rates of increase are set out in Appendix E.

Appendix E: Summary of assumptions

Table E1: Financial assumptions at current and previous valuation

	Current valuation 31 March 2012	Previous valuation 31 March 2007
Long term discount rate	5.06% pa nominal 3.0% pa real	6.0% pa nominal 3.5% pa real
Long term pension increases	2.0% pa	2.4% pa
Long term CARE earnings revaluation	4.75% pa (2.75% pa in excess of assumed pension increase)	N/A
Long term salary growth	4.75% pa (2.75% pa in excess of assumed pension increase)	3.9% pa
Short term variations in assumptions	See below	None

Short term variations in assumptions (current valuation):

Year	Gross discount rate	Pension increases	CARE earnings revaluation	Salary growth
2012/13	5.27%	2.2%	n/a	1.8%
2013/14	5.78%	2.7%	n/a	0.5%
2014/15	5.27%	2.2%	n/a	1.5%
2015/16	5.16%	2.1%	3.4%	2.0%
2016/17	n/a	n/a	3.6%	2.5%
2017/18	n/a	n/a	3.7%	3.0%
2018/19	n/a	n/a	3.7%	3.0%

Demographic assumptions

E.1 Full details of the demographic assumptions are provided in the report *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Advice on assumptions*, dated 6 March 2015. Sample rates and values are provided below.

Pensioner mortality

E.2 The following mortality assumptions were used. Nearly all members are male and nearly all dependants are female and the assumptions set out below were used for both males and females in each membership group.

Table E2: Baseline mortality assumptions

Baseline mortality	Standard table[44]	Adjustment
Current pensioners (normal and ill-health)	S1NMA	113%
Future pensioners (normal health)	S1NMA	110%
Future pensioners (ill-health)	S1IMA	100%
Dependants	S1DFA	100%

E.3 As specified by the Directions, future improvements in mortality will be assumed to be in line with those underlying the ONS 2012-based population projections.

E.4 Resultant expectations of life are shown in Table E3 together with comparative figures for the previous valuation.

[44] From the 'S1' series of standard tables published by the Continuous Mortality Investigation and based on the experience of self-administered pension schemes over the period 2000 to 2006. Separate tables are available based on experience of members retiring in normal and ill-health and for dependants.

Table E3: Comparison of future life expectancies (years)

	2007 valuation	2012 valuation	UK Population[45]
Current pensioners (normal and ill health)			
Member aged 50	36.3	37.2	35.7
Member aged 55	31.6	31.9	30.6
Member aged 60	27.0	27.0	25.8
Member aged 65	22.6	22.1	21.2
Future pensioners (normal health) – current age 45			
Member life expectancy from age 50	39.6	38.1	36.5
Member life expectancy from age 55	34.8	33.4	32.0
Member life expectancy from age 60	30.2	28.9	27.7
Member life expectancy from age 65	25.7	24.5	23.6
Future pensioners (ill health) – current age 45			
Member life expectancy from age 50	36.7	34.0	
Member life expectancy from age 55	32.0	30.2	
Member life expectancy from age 60	27.4	26.4	
Member life expectancy from age 65	23.0	22.6	

[45] Cohort life expectancies from the 2012-based principal projections for males in the United Kingdom, produced by the Office for National Statistics.

Age retirement from service

Table E4: Age retirement rates for 1992 Scheme full protection members, tapered protection members and unprotected members with more than 16 years' service at 31 March 2012.

Age at joining	***18***	***19***	***20***	***21***	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30 and over***
Age													
50	0.795	0.795	0.795	0.050	0.050	0.050	0.050	0.050	0.000	0.000	0.000	0.000	0.000
51	0.490	0.490	0.490	0.795	0.020	0.020	0.020	0.020	0.050	0.000	0.000	0.000	0.000
52	0.490	0.490	0.490	0.490	0.915	0.020	0.020	0.020	0.020	0.050	0.000	0.000	0.000
53	0.490	0.490	0.490	0.490	0.490	0.975	0.020	0.020	0.020	0.020	0.050	0.000	0.000
54	0.490	0.490	0.490	0.490	0.490	0.490	0.975	0.020	0.020	0.020	0.020	0.050	0.000
55	0.660	0.660	0.660	0.680	0.705	0.725	0.750	0.975	0.790	0.790	0.790	0.790	0.790
56	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410	0.410	0.410	0.410
57	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410	0.410	0.410
58	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410	0.410
59	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410
60 and over	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Age retirement from service

Table E5: Age retirement rates for 1992 Scheme unprotected members with less than 16 years' service at 31 March 2012

Age at joining	***18***	***19***	***20***	***21***	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30 and over***
Age													
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	0.995	0.995	0. 995	0. 992	0.994	0.996	0.994	0.978	0.812	0.808	0.804	0.801	0.790
56	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410	0.410	0.410	0.410
57	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410	0.410	0.410
58	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410	0.410
59	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.975	0.410
60 and over	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table E6: Age retirement rates for 2006 Scheme members and new entrants to the 2015 Scheme

Retirement Age	2006 Scheme only	Unprotected 2006 Scheme members in the 2015 Scheme	2015 Scheme only
55	-	-	0.250
56	-	-	-
57	-	-	-
58	-	-	-
59	-	-	-
60	1.000	1.000	1.000

Ill-health retirement from service

Table E7: Ill-health retirement rates for all members

Age	Ill-health retirement rate
20	0.00008
25	0.00016
30	0.00031
35	0.00063
40	0.00128
45	0.00260
50	0.00526
55	0.01023
59	0.01139

Voluntary withdrawal from service

Table E8: Withdrawal rates (net of re-entry within 5 years)

Age	Withdrawal rate		
	1992 Scheme	2006 Scheme and New entrants from 2015 (Regular Firefighters)	2006 Scheme and New entrants from 2015 (Retained Firefighters)
20	0.0106	0.0106	0.0954
25	0.0106	0.0106	0.0954
30	0.0106	0.0106	0.0954
35	0.0098	0.0098	0.0882
40	0.0061	0.0061	0.0549
45	0.0034	0.0034	0.0306
50	0.0019[46]	0.0019	0.0171
55	0.0000	0.0000	0.0000
59	0.0000	0.0000	0.0000

[46] Rates are zero at age 50 if the member is eligible to retire on an unreduced pension.

Death before retirement

Table E9: Death before retirement rates for all members

Age	Death before retirement
20	0.00014
25	0.00015
30	0.00021
35	0.00028
40	0.00038
45	0.00054
50	0.00079
55	0.00128
60	0.00196
65	0.00308

Promotional salary scales

Table E10: Promotional salary scales for Regular firefighter members

The salary scale shows assumed pay progression in excess of general wage inflation in comparison to an index base of 100 at entry.

Service (years)	Promotional Pay for Wholetime Members
0	100.0
5	140.4
10	145.4
15	152.2
20	161.6
25	171.1
30	183.6
35	190.1
40	190.1

Table E11: Promotional salary scales for Retained firefighter members

The salary scale (with an index base of 100 at age 18) is summarised in the table below.

Age	Promotional Pay for Retained Firefighters
20	102.2
25	107.7
30	113.2
35	118.7
40	124.2
45	129.7
50	135.2
55	137.7
60	140.2
65	142.7

Commutation of pension for cash at retirement

Table E12: - Recommended commutation assumptions

Member with service in the following schemes	1992 Scheme only	2006 Scheme only	Mixed 1992 and 2015 Scheme		Mixed 2006 and 2015 Scheme		2015 Scheme only
Scheme pension commuted from	**1992**	**2006**	**1992**	**2015**	**2006**	**2015**	**2015**
All members	0%	15%*	0%	0%	15%*	15%*	15%*

* as specified in direction 18(e)

Family statistics

Table E13: Recommended proportion married or partnered at retirement for future pensioners

Proportion married	Proportion married or Partnered
75%	80%

Table E14: Recommended proportion married or partnered for current pensioners (at the valuation date)

Age	Proportion married	Proportion married or partnered
50	75%	80%
60	75%	80%
70	75%	78%
80	63%	64%
90	36%	36%

Males are assumed to be three years older than their partners.

Appendix F: Summary of methodology and calculations

Methodology

F.1 The Directions specify the use of the Projected Unit Methodology and that benefits should be attributed to periods of service in accordance with the requirements of International Accounting Standard 19: Employee Benefits.

F.2 Since the expected cost of benefits provided to members remaining in the existing schemes differs from the expected cost of providing those members with benefits in the 2015 Scheme, and the expected cost of providing benefits varies for members with differing benefit provisions within the existing schemes (notably for members with differing normal pension ages), projecting the membership gives a materially different estimate of the valuation result.

F.3 We have projected the current membership to run off in accordance with the valuation assumptions from the ***effective date*** to the end of the implementation period. We have assumed that the number of new entrants to the Schemes is in line with forecasts provided by Fire and Rescue Authorities to the Office for Budget Responsibility for use in their work for the Autumn Statement 2013. The profile of new entrants is assumed to be the same as that of recent entrants into the Schemes. Full details of the membership projection is provided in the report *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on methodology*, dated 6 March 2015.

Calculations

F.4 The following provides a brief explanation of the actuarial calculations used to derive the ***valuation results***.

Scheme benefits

F.5 First, an estimate is made of the amount of benefit to be received by each scheme member (and their dependants, where applicable) over each future year of the Schemes, from the ***effective date*** onwards. In order to do that, it is necessary to make some assumptions about the future service and salaries of the Schemes' members, and the length of time over which they will receive benefits. (More information about the assumptions is set out in Appendix E.)

F.6 Having estimated the benefits as a stream of projected cash flows from the ***effective date*** onwards, the second step is to calculate the capital sum which would need to be held at the ***effective date*** in order to pay all of the benefits. This requires an assumption to be made as to the rate of return which would be earned by the capital sum if it were invested. In the case of the Schemes, there is no actual sum of money, but the valuation approach is predicated on the premise that there is a notional fund with a notional investment return.

F.7 This capital sum is often referred to as the 'present value' of the benefits and is calculated by 'discounting' the future cash flows back to the ***effective date*** using the valuation discount rate (see Appendix E). The present value can alternatively be considered as the amount of money which would need to be invested at an assumed interest rate (equal to the discount rate) in order to pay all the benefits. The result of the calculation is, by its nature, a planning or budgeting estimate, not a 'valuation' as such.

Calculations

F.8 For the valuation, it is necessary to separate the capital sum into two parts: (i) the sum needed to pay out benefits which relate to service *prior to* the ***effective date*** ('past service'), and (ii) the sum needed to pay out those benefits which relate to service *after* the ***effective date*** ('future service').

Past Service Position

F.9 In relation to the past service element, we compare the capital sum (or present value) relating to past service with the balance in the notional fund at the ***effective date***. If all the assumptions made during previous reviews had been borne out exactly, and assuming no errors in previous data sets are revealed, the notional fund would exactly equal the capital sum now needed to pay for those past service benefits. But, if actual events have differed from the assumptions made, then the notional fund will exceed, or fall short of, the capital sum now estimated to be needed.

F.10 To the extent that the notional fund is *less* than the capital sum needed to pay out all the benefits relating to past service, the fund is said to be in *deficit*. This deficit needs to be met by additional contributions. If the notional fund *exceeds* the capital sum required for past service benefits, it is said to be in *surplus* and there would be a reduction in the contributions that would otherwise be paid for future service.

Future contributions

F.11 To arrive at the level of contributions required to meet benefits estimated to arise out of future service, we calculate the percentage of total pensionable pay which, if paid during the ***implementation period***, would be sufficient to make up the capital sum needed to pay out the benefits. (Or, using the terminology from above, we calculate the contribution rate which has the same 'present value' as the benefit stream which the contributions will pay for.) In making this calculation, we adopt the same assumptions that we mentioned above regarding the future service and salaries of the Schemes' members and the rate of return which would be earned by the capital sum if it were invested.

Appendix G: The cost cap mechanism

G.1 This report calculates an ***employer contribution rate*** and a ***proposed employer cost cap*** (the ***valuation results***) based on a number of assumptions about the future. Section 7 outlines the main reasons why future ***valuation results*** may differ from the results shown in this report. This section gives further information on the cost cap mechanism and the factors which may influence the level of contributions payable by, or amount of benefits payable to, members at future valuations.

Allocation of cost savings/increases at future valuations

G.2 The cost cap mechanism specifies that:

a. If the ***cost cap cost of the scheme*** determined at a future valuation differs from the ***employer cost cap*** by more than 2% of pay, then member contributions or benefits will be adjusted.

b. If the ***cost cap cost of the scheme*** is within 2% of the ***employer cost cap***, then member contributions and benefits will not be adjusted.

Liabilities considered for future valuation results

G.3 The ***employer contribution rate*** takes into account the whole of the aggregate scheme's liabilities, ie those attributable to all service in both the existing and 2015 schemes.

G.4 By contrast, only part of the aggregate scheme's liabilities are considered for the calculation of the ***cost cap cost of the scheme***. In particular the ***cost cap fund*** is intended to exclude costs relating to deferred and pensioner members of the existing schemes. More detail is set out in paragraphs 2.24 to 2.27 of *Public service pensions: actuarial valuations and the employer cost cap mechanism* published by HMT in March 2014.

G.5 The prior value of the ***cost cap fund*** will be first determined at the actuarial valuation due to be carried out as at 31 March 2015. This will be based on the Schemes' liabilities only for members who are active (that is, still in employment) as at 31 March 2015. As members with earlier scheme benefits progressively leave active service, their liability will move outside the ***cost cap fund***. Of the liabilities expected to establish the cost cap fund as at 31 March 2015 a significant proportion of the liabilities will relate to members who are in protection (including tapered protection) and who are expected to retire in the relatively short term. Over this period, the cost cap mechanism may therefore be exposed to significant variations in pay experience and retirement patterns.

G.6 Over the longer term, the cost cap mechanism will become relatively more sensitive to other demographic assumptions. The ***cost cap cost of the scheme*** is also sensitive to changes in longevity expectations. Initially, this only relates to active members but once members with 2015 Scheme service have retired, then any changes in expectations of their longevity will also have an impact on the ***cost cap***

cost of the scheme. The normal pension age of the 2015 Scheme (initially 60) is subject to regular review. These reviews will consider increases to State Pension Age, which are intended to vary in line with longevity expectations, but will also consider other factors. Therefore, costs from increasing longevity may well not be exactly met by changes to the normal pension age.

G.7 Further, although the retirement age of active members is intended to vary in line with longevity expectations, the timing of any legislative changes to retirement age is unlikely to be synchronised with the timing of future valuation cycles.

G.8 More information about the employer cost cap mechanism can be found in *Public service pensions: actuarial valuations and the employer cost cap mechanism* published by HMT in March 2014.

Appendix H: Location of material required by Directions

Direction	Description	Location
21(a)(i), (ii)	Summary of membership data and checks carried out	Appendix A; and *Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on membership data,* dated 15 August 2013
21(a)(iii)	Adjustments made to data	*Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on membership data,* dated 15 August 2013
	Projections made	*Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Report on methodology,* dated 6 March 2015
21(b)	Average age of active members	Appendix A, Table A1
21(c)	Statement of compliance with directions	Paragraph 2.3
21(d)	Summary of regulations, directions and professional standards	Paragraphs 2.3-2.5, GAD website
21(e)	Summary of main provisions of the schemes	Appendix B
21(f)	Analysis of demographic experience	*Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Advice on assumptions,* dated 6 March 2015
21(g)(i), (ii)	Statement of assumptions, including rationale	*Firefighters' Pension Schemes (England): Actuarial valuation as at 31 March 2012: Advice on assumptions,* dated 6 March 2015 See also Appendix E of this report
21(g)(iii)	Illustration of sensitivity to assumptions set by the Secretary of State	Section 6
21 (h)	Other liabilities valued	None
22(a), (b)	Valuation balance sheet	Section 4, Table 4.1
22(c)	Notional asset cashflows	Appendix C, Table C2
22(d), (e), (f)	Contribution rates	Section 4, Table 4.2
53	***Proposed employer cost cap***	Section 4, Table 4.5

Appendix I: Limitations

I.1 This report is intended solely for the use of the Secretary of State for Communities and Local Government and DCLG for the purposes of determining the ***employer contribution rate*** payable for the period 1 April 2015 to 31 March 2019 and the initial ***employer cost cap***. 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. GAD does not accept any liability to third parties, whether or not GAD has agreed to the disclosure of its advice to the third party.

I.2 We are content for the Secretary of State for Communities and Local Government to release this report to third parties, provided that:

> it is released in full

> the advice is not quoted selectively or partially

> GAD is identified as the source of the report

> GAD is notified of such release.

I.3 Third parties whose interests may differ from those of the Secretary of State for Communities and Local Government 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.

I.4 GAD is not responsible for any decision taken by DCLG, except to the extent that the decision has been made in accordance with specific advice provided by GAD. Advice provided by GAD must be taken in context and is intended to be read and used as a whole, not in parts. GAD does not accept responsibility for advice that is altered or used selectively. No significant action should be taken based on oral advice alone. Clarification should be sought if there is any doubt about the intention or scope of advice provided by GAD.

I.5 GAD relies on the accuracy of data and information provided by DCLG and the Fire Authorities. GAD does not accept responsibility for advice based on wrong or incomplete data or information provided by DCLG or the Fire Authorities.