



Government  
Actuary's  
Department

# Local Government Pension Scheme England and Wales

Section 13 Report as at 31 March  
2019

Appendices

May 2022



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# Appendix A: Compliance

A.1 In this appendix we set out checks we conducted to determine whether the actuarial valuations of the 88 Local Government Pension Scheme (LGPS) funds have been completed in accordance with the scheme regulations.

## Statement of Compliance

A.2 The Government Actuary's Department (GAD) selected one fund as a representative example from each of the firms of actuarial advisors. The following statements of compliance were contained within the chosen reports by each firm:

**Table A1: Statement of Compliance**

Fund	Statement of compliance
<b>London Borough of Enfield Pension Fund (Aon)</b>	This report was commissioned by and is produced solely for the use of the Administering Authority. It is produced in compliance with: Regulation 62 of the Local Government Pension Scheme Regulations 2013.
<b>London Borough of Sutton Pension Fund (Barnett Waddingham)</b>	The purpose of the valuation is to review the financial position of the Fund and to set appropriate contribution rates for each employer in the Fund for the period from 1 April 2020 to 31 March 2023 as required under Regulation 62 of the Regulations.
<b>Derbyshire Pension Fund (Hymans Robertson)</b>	We have been commissioned by Derbyshire County Council ("the Administering Authority") to carry out an actuarial valuation of the Derbyshire Pension Fund ("the Fund") as at 31 March 2019 as required under Regulation 62 of the Local Government Pension Scheme Regulations 2013 ("the Regulations")
<b>Lancashire County Pension Fund (Mercer)</b>	This report is addressed to the Administering Authority of the Lancashire County Pension Fund ("the Administering Authority") and is provided to meet the requirements of Regulation 62 of the Local Government Pension Scheme Regulations 2013 (as amended) ("the Regulations").

## Compliance with valuation regulations

### Actuarial Valuation Reports Regulation 62 (1 - 2)

A.3 Regulation 62 (1) requires the administering authority to obtain an actuarial valuation report on the assets and liabilities of each of its pension funds, including a rates and adjustments certificate, as at 31st March 2016 and on 31st March in every subsequent valuation year (i.e. 31st March 2019). Regulation 62 (2) requires that the above documents be obtained by the first anniversary of the date at which the valuation is made, namely, 31 March 2020 in the case of the 2019 valuation.

## Publication

A.4 Each chosen fund was published in accordance with regulations. The following table sets out dates of publication of the actuarial report.

**Table A2: Publication date**

<b>Fund</b>	<b>Date of publication</b>
<b>London Borough of Enfield Pension Fund (Aon)</b>	31 March 2020
<b>London Borough of Sutton Pension Fund (Barnett Waddingham)</b>	31 March 2020
<b>Derbyshire Pension Fund (Hymans Robertson)</b>	31 March 2020
<b>Lancashire County Pension Fund (Mercer)</b>	31 March 2020

## Demographic Assumptions

A.5 Regulation 62 (3) states that the actuarial valuation report must contain a statement of the demographic assumptions that have been used in making the valuation, and must show how these assumptions reflect the experience that has actually occurred during the period since the last valuation. Each valuation report contains a section on demographic assumptions including all the assumptions that we would expect in an actuarial valuation report.

**Table A3: Demographic Assumptions**

Demographic	London Borough of Enfield Pension Fund (Aon)	London Borough of Sutton Pension Fund (Barnett Waddingham)	Derbyshire Pension Fund (Hymans Robertson)	Lancashire County Pension Fund (Mercer)
Pre-retirement mortality	✓	✓	✓	✓
Post-retirement mortality	✓	✓	✓	✓
Dependant mortality	✓	✓	✓	✓
Ill health retirement	✓	✓	✓	✓
Normal health retirements	✓	✓	✓	✓
Withdrawals	✓	✓	✓	✓
Promotional salary scale	✓	N/A	✓	N/A
Family details (partners and dependants)	✓	✓	✓	✓
50:50 option take-up	✓	✓	✓	✓
Commutation	✓	✓	✓	✓

Barnett Waddingham and Mercer did not make a separate promotional salary scale assumption and therefore effectively this was combined in their general pay increase assumption.

### Local Experience

A.6 The regulation requires that the reports “must *show how* the assumptions relate to the events which have actually occurred in relation to members of the Scheme since the last valuation.” in respect of the demographic assumptions. For the four chosen funds:

- > All have shown differences between expectations and experiences for the inter-valuation period

We note that additional information on demographic experience and assumption setting may be contained in supporting (non-public) reports/advice.

### Contribution Rates

A.7 Regulation 62 sets out that employer contributions are separated into two components:

- > Primary rates which meet the cost of ongoing accrual for current active members; and
- > Secondary rates, which are mainly established to repay deficit or eliminate surplus over a given period (the deficit/surplus recovery period).

A.8 Regulation 62 (6) states that when setting the contribution rates the actuary must have regard to:

- > the existing and prospective liabilities arising from circumstances common to all those bodies

- > the *desirability* of maintaining as nearly constant a common rate as possible
- > the current version of the administering authority’s funding strategy mentioned in regulation 58 (funding strategy statements), and
- > the *requirement* to secure the solvency of the pension fund and the long-term cost efficiency of the Scheme, so far as relating to the pension fund.

A.9 Regulation 62 (4) states that the rates and adjustments certificate must specify both the primary rate of the employer’s contribution and the secondary rate of the employer’s contribution, for each year of the period of three years beginning with 1st April in the year following that in which the valuation date falls.

A.10 Each valuation report must set out primary and secondary employer contribution rates.

### Primary Rates

A.11 Regulation 62 (5) defines the primary rate of an employer’s contribution as “the amount in respect of the cost of future accruals which, in the actuary’s opinion, should be paid to a fund by all bodies whose employees contribute to it so as to secure its solvency”, and specifies that this must be expressed as a percentage of the pay of their employees who are active members.

A.12 The following table shows the primary rate of employer contribution for the administering authorities whole fund:

**Table A4: Primary contribution rate**

Fund	Primary contribution rate
London Borough of Enfield Pension Fund (Aon)	18.5%
London Borough of Sutton Pension Fund (Barnett Waddingham)	19.2%
Derbyshire Pension Fund (Hymans Robertson)	18.5%
Lancashire County Pension Fund (Mercer)	17.4%

A.13 Each primary rate of employer contribution has been calculated to cover the cost of future benefits accrued by their employees. Each valuation also provides a breakdown of the primary rate for each employer. Each valuation provides a secondary rate for each employer (expressed as a cash amount and/or percentage of pay for each employer).

## Secondary Rates

A.14 Regulation 62 (7) states that the secondary contribution rate may be expressed as either a percentage or a monetary amount. Each valuation provides a secondary rate for each employer (expressed as a cash amount and/or percentage of pay for each employer). The secondary rates of employer contributions for each valuation have been defined to be adjustments to the primary rate as required. In all cases, the secondary rates have been provided for the next three years for each employer.

**Table A5: Whole fund Secondary Contribution Rates**

Fund	2020/21	2021/22	2022/23
<b>London Borough of Enfield Pension Fund (Aon)</b>	£2,099,000 or 1.3% of pensionable pay plus £8,100	£2,175,000 or 1.3% of pensionable pay plus £8,400	£2,253,000 or 1.3% of pensionable pay plus £8,700
<b>London Borough of Sutton Pension Fund (Barnett Waddingham)</b>	4.5% of pensionable pay or £4,879,000	4.5% of pensionable pay or £5,058,000	4.5% of pensionable pay or £5,242,000
<b>Derbyshire Pension Fund (Hymans Robertson)</b>	£17,432,000	£17,752,000	£18,079,000
<b>Lancashire County Pension Fund (Mercer)</b>	£3,200,000 or £9,300,000 less 0.6% of pensionable pay	£3,300,000 or £9,700,000 less 0.6% of pensionable pay	£3,400,000 or £10,000,000 less 0.6% of pensionable pay

## Rates and Adjustments Certificate (Regulation 62 (8))

A.15 Regulation 62 (8) states that the rates and adjustments certificate must contain a statement of the assumptions on which the certificate is given as respects:

(a) the number of members who will become entitled to payment of pensions under the provisions of the Scheme; and

(b) the amount of the liabilities arising in respect of such members

during the period covered by the certificate.

A.16 In the following table we set out where the assumptions for each valuation can be found.

A.17 Of the four chosen funds only two had Rates and Adjustments Certificate containing a clear statement detailing the assumptions on which the certificate has been given and where to find them in our opinion. We recommend that advisers consider further at subsequent valuations. However, we do not consider this to be material non-compliance.

**Table A6: Location of assumptions**

Fund	Statement in rates and adjustments certificate	Location of assumptions in valuation report
London Borough of Enfield Pension Fund (Aon)	Not transparent to GAD initially (but updated once highlighted)	Further information e
London Borough of Sutton Pension Fund (Barnett Waddingham)	✓	Appendix 2
Derbyshire Pension Fund (Hymans Robertson)	✓	Appendix 2
Lancashire County Pension Fund (Mercer)	Not transparent to GAD	Appendix A

**Regulation 62 (9)**

- A.18 Regulation 62 (9) States that the administering authority must provide the actuary preparing a valuation or a rates and adjustments certificate with the consolidated revenue account of the fund and such other information as the actuary requests.
- A.19 For each of the four valuation reports examined we have seen evidence of having received relevant data from the administering authority.



# Appendix B: Consistency

B.1 In this appendix we set out analysis we undertook in relation to whether the actuarial valuations were carried out in a way which is not inconsistent with other valuations completed under the scheme regulations. This appendix contains comments and a number of charts referring to the following aspects:

- > Key information
- > Funding levels
- > Discount rates
- > Demographic assumptions

## Key Information

B.2 Based on the recommendation in the 2016 report all funds provided a standardised dashboard of results. The standardised dashboard is provided below, but in green are suggested additional elements which have been recommended as part of the 2019 section 13 review.

**Table B1: Dashboard**

Item requested	Format
<b>Past service funding position – local funding basis:</b>	
Funding level (assets/liabilities)	%
Funding level (change since last valuation)	%
Asset value used at the valuation	£m
Value of liabilities	£m
Surplus (deficit)	£m
Discount rate – past service	% pa
Discount rate – future service used for contribution rate setting	% pa
Assumed pension increases (CPI)	% pa
Method of derivation of discount rate, plus any changes since the previous valuation	Freeform text
<b>Assumed life expectancies at age 65:</b>	
Average life expectancy for current pensioners – men currently age 65	years

<b>Item requested</b>	<b>Format</b>	
Average life expectancy for current pensioners – women currently age 65	years	
Average life expectancy for future pensioners – men currently age 45	years	
Average life expectancy for future pensioners – women currently age 45	years	
<b>Past service funding position – SAB basis:</b>		
Market value of assets	£m	
Value of liabilities	£m	
Funding level on SAB basis (assets/liabilities)	%	
Funding level on SAB basis (change since last valuation)	%	
<b>Contributions rates payable:</b>		
	<i>2019 Valuation</i>	<i>2022 Valuation</i>
Primary contribution rate (average for the fund)	% pa	% pa
Secondary contribution - 1 <sup>st</sup> year of rates and adjustment certificate	£m	£m
Secondary contribution - 2 <sup>nd</sup> year of rates and adjustment certificate	£m	£m
Secondary contribution - 3 <sup>rd</sup> year of rates and adjustment certificate	£m	£m
Assumed payroll - 1 <sup>st</sup> year of rates and adjustment certificate	£m	£m
Assumed payroll – 2 <sup>nd</sup> year of rates and adjustment certificate	£m	£m
Assumed payroll – 3 <sup>rd</sup> year of rates and adjustment certificate	£m	£m
Total expected contributions - 1 <sup>st</sup> year of rates and adjustment certificate	£m	£m
Total expected contributions – 2 <sup>nd</sup> year of rates and adjustment certificate	£m	£m
Total expected contributions – 3 <sup>rd</sup> year of rates and adjustment certificate	£m	£m
Average total employer contribution rate (over the 3 years covered by the rates and adjustment certificate)	%pa	% pa
Average employee contribution rate (over the 3 years covered by the rates and adjustment certificate)	%pa	% pa
Employee contribution rate based on 1 <sup>st</sup> year of rates and adjustment certificate assumed payroll	£m	£m

Item requested	Format	
<b>Deficit recovery plan</b>	<i>2019 Valuation</i>	<i>2022 Valuation</i>
Deficit/(Surplus) recovery period end date	<i>Year</i>	<i>Year</i>
Where a deficit recovery end date is not provided, please provide: time horizon for valuation funding plan	<i>Year</i>	<i>Year</i>
Likelihood of success of valuation funding plan on the 2019 time horizon	<i>%</i>	<i>%</i>
<b>Additional information:</b>		
Percentage of liabilities relating to employers with deficit recovery periods of longer than 20 years		%
Percentage of total liabilities that are in respect of Tier 3 employers		%

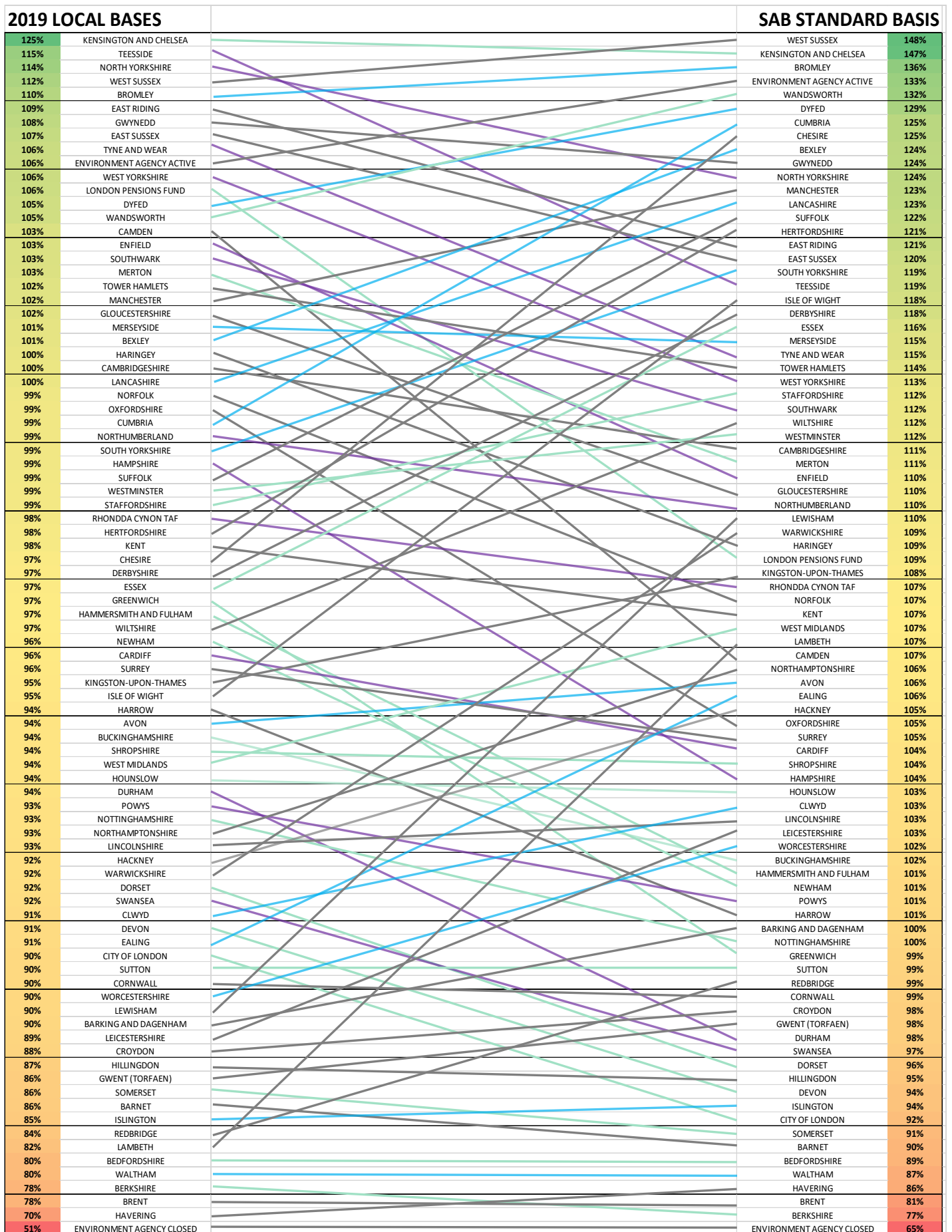
B.3 All information was included for the sample fund reports we considered in more detail listed below:

Fund
London Borough of Enfield Pension Fund (Aon)
London Borough of Sutton Pension Fund (Barnett Waddingham)
Derbyshire Pension Fund (Hymans Robertson)
Lancashire County Pension Fund (Mercer)

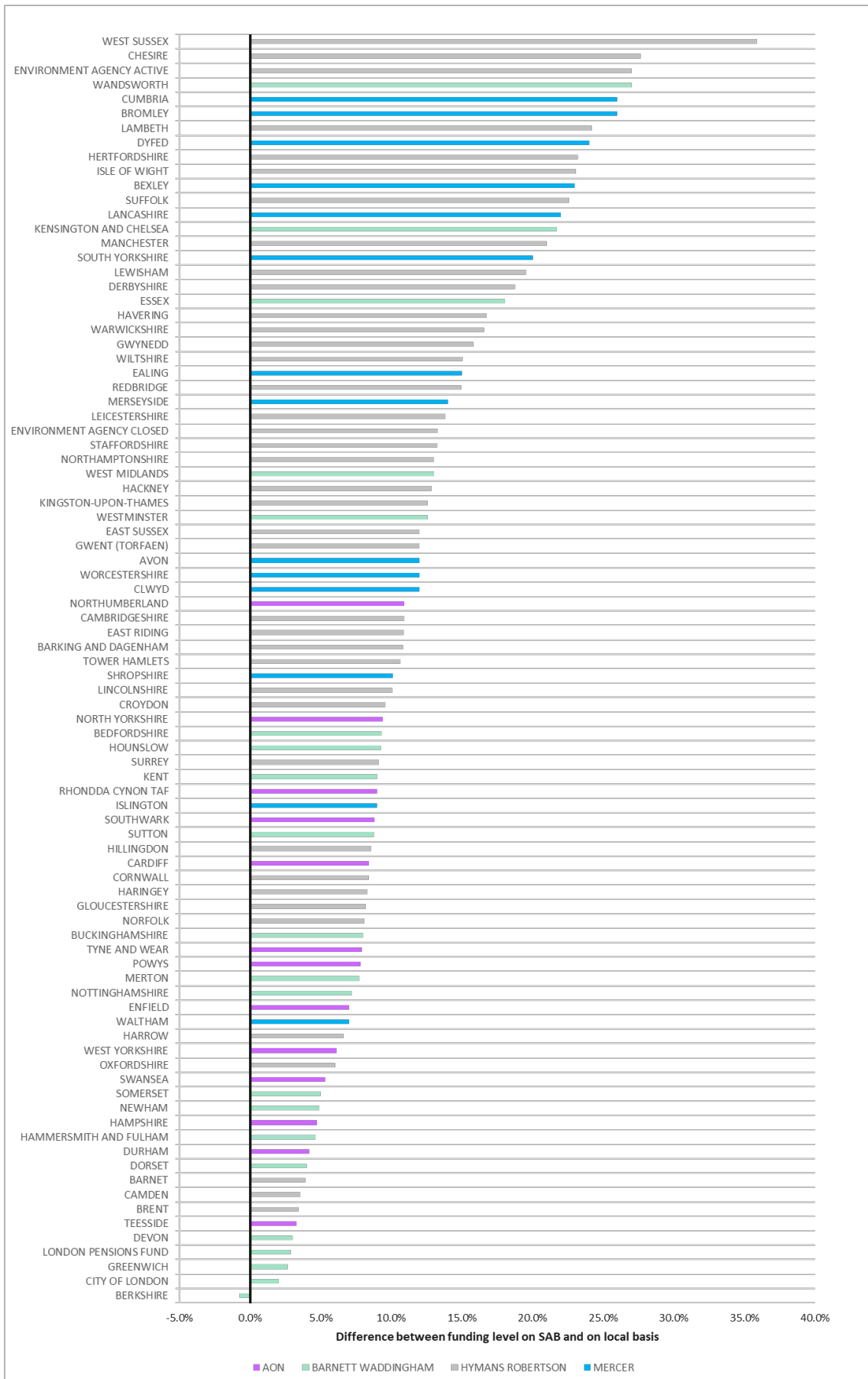
## Funding Levels

B.4 Chart B1 shows how the ranking of local funding levels varies when results are restated onto the SAB standardised basis. We might expect the rankings of funding levels when calculated on the local bases to correspond roughly to the rankings of funding levels when calculated on the SAB standard basis. We would therefore expect the lines in Chart B1 joining each fund in the column on the left with itself in the column on the right to be roughly horizontal. However, we see that there is no clear correlation between how funds rank on local bases and how they rank on the SAB standard basis. To choose a typical example, Cheshire is ranked mid-table on the local basis but is towards the top quartile of the table on the SAB standard basis, indicating that their local fund basis is, relatively, more prudent than the other funds. To note we would expect the local funding basis to be prudent. A prudent basis is one where there is a greater than 50% likelihood that the available assets will cover the benefits in respect of accrued service when they fall due if assets are valued equal to liabilities.

**Chart B1: Standardising Local Valuation Results**



**Chart B2: Difference Between Funding Level on SAB Standardised Basis and Funding Level on Local Bases**



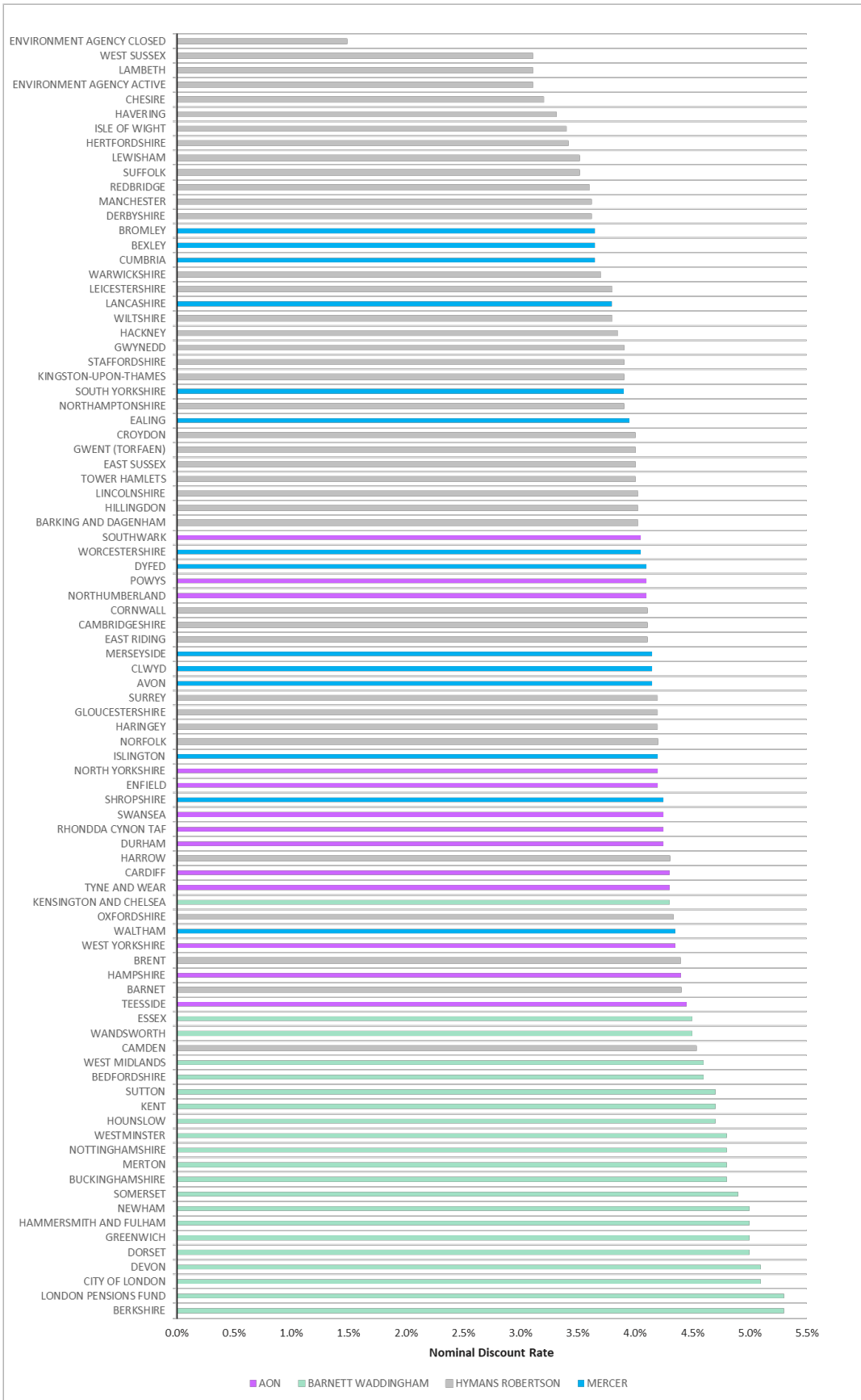
## Discount Rates

- B.5 Each firm of actuarial advisors applies their own method for calculating discount rates as shown in the table below.
- B.6 Chart B3 shows the pre-retirement discount rate used to assess past service liability applied in the actuarial valuations for each fund. Note that some funds (advised by Mercers’) used different discount rates to assess past service liabilities and future service contribution rates, we consider only the former here.
- B.7 The discount rates set by each fund are likely to be linked to the mix of assets held by the fund, and we would therefore expect to see differences in discount rate from fund to fund.

**Table B2: Discount Rate Methodology**

Fund	Discount rate methodology
London Borough of Enfield Pension Fund (Aon)	Stochastic modelling
London Borough of Sutton Pension Fund (Barnett Waddingham)	Weighted average expected return on long term asset classes
Derbyshire Pension Fund (Hymans Robertson)	Stochastic modelling
Lancashire County Pension Fund (Mercer)	Stochastic modelling

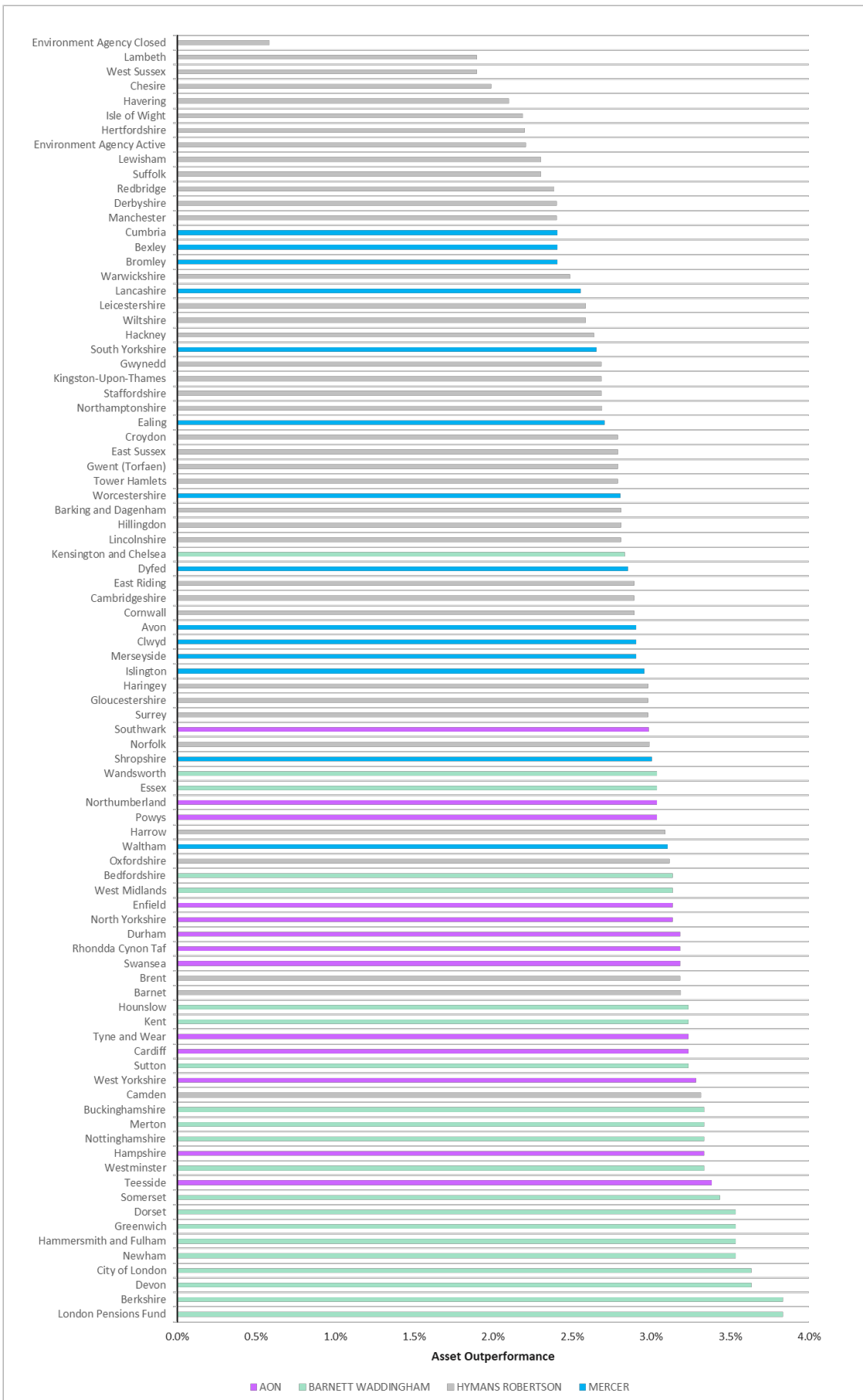
**Chart B3: Pre – retirement Discount Rates**



- B.8 We assess implied asset outperformance as discount rate less risk free rate less RPI, where the risk free rate is taken to be the real 20 year Bank of England spot rate as at 31 March 2019 (-2.14%). Chart B4 shows the assumed asset out performance (“AOA”) over and above the risk free rate, where AOA is calculated as the fund’s nominal discount rate (“DR”) net of:
- > The RFR – the real 20 year Bank of England spot rate as at 31 March 2019
  - > Assumed CPI – as assumed by the fund in their 2019 actuarial valuation
  - > The excess of assumed RPI inflation over assumed CPI inflation (“RPI- CPI”) – as assumed by the fund in their 2019 actuarial valuation i.e.  $AOA = DR - RFR - RPI$ . (Chart B4 shows the implied rate of asset outperformance for each fund.)
- B.9 The implied asset outperformance shows less variation than in 2016. This may suggest some improvement in consistency in the assumption that in previous years. However, there is still a notable trend for funds advised by Aon and Barnett Waddingham to have higher levels of asset outperformance, whilst those advised by Hymans Robertson show lower levels of asset outperformance.



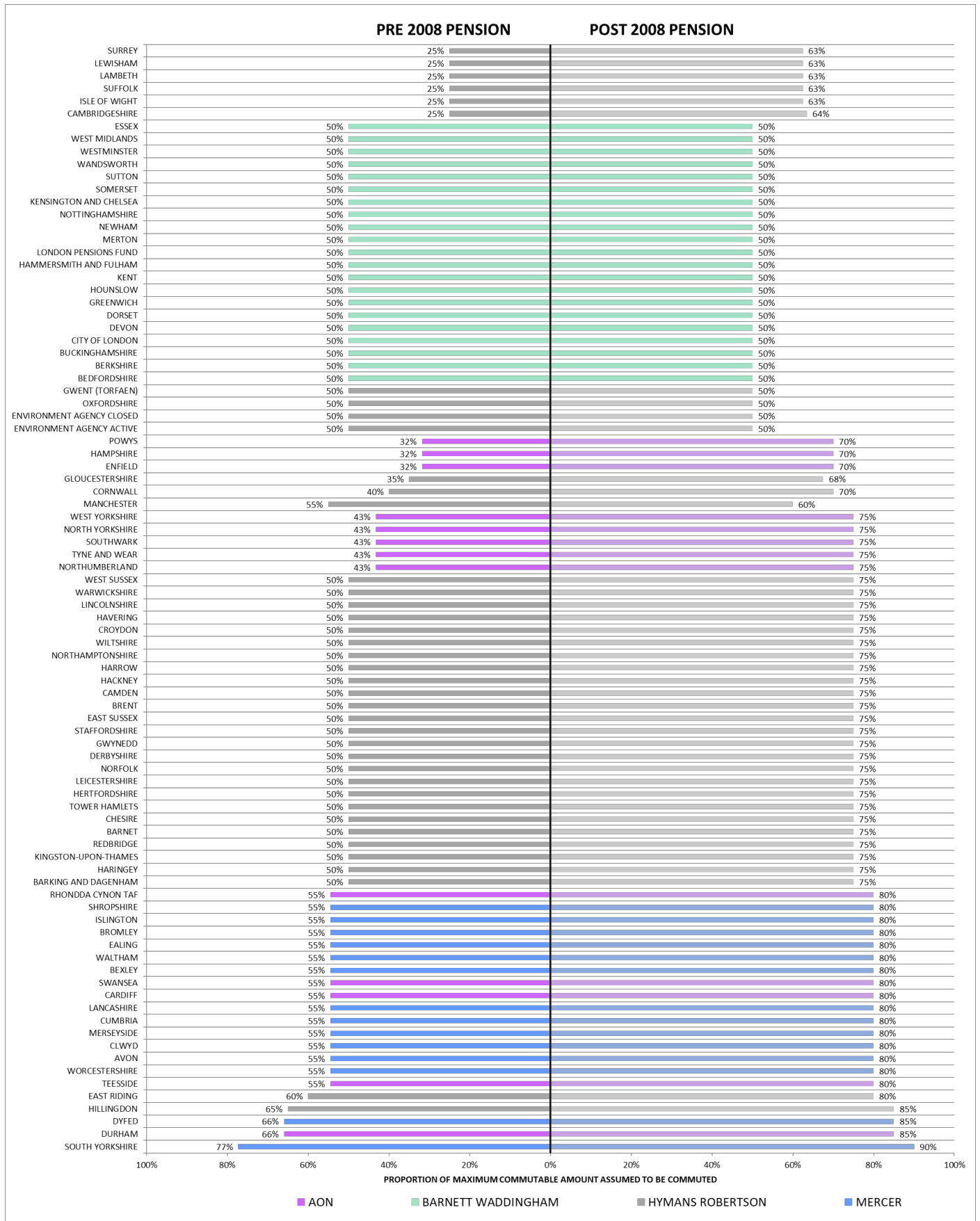
**Chart B4: Assumed Asset Outperformance within Discount Rate**



## Demographic assumptions

- B.10 Commutation assumptions (the extent to which members on average exchange pension in favour of a tax free cash benefit) are set as the percentage of the maximum commutable amount that a member is assumed to take on retirement. Chart B5 shows the assumed percentages for both pre 2008 and post 2008 pensions, which may be set separately.
- B.11 Other things being equal, it is more prudent to assume a lower rate of commutation, because the cost of providing a pension benefit is higher than the commutation factor. In addition, cash was provided as of right in the LGPS prior to 2008 whereas for benefits accrued after that date, cash was available only by commutation of pension.
- B.12 The chart shows that the funds advised by Barnett Waddingham assume that members commute 50% of the maximum allowable cash amount. The majority of funds advised by Mercer assume that members take 80% of the maximum allowable cash amount. There is more variation in the commutation assumptions made by funds advised by Aon and Hymans Robertson. However, there is a noticeable cluster of funds assuming members commute 50% of the maximum allowable for pre 2008 pensions and 75% for post 2008 for Hymans Robertson clients.
- B.13 If it is the case that firms of actuarial advisors find that there is insufficient data to make assumptions on a fund by fund basis, then it would be reasonable for them to make the assumption based on scheme wide data. However, each advisor only has access to the data from the funds that it advises, and therefore can only base their assumptions on the data from those funds. Another firm of actuarial advisors has access to the data for a different collection of funds and therefore might draw a different conclusion as to what the scheme wide average commutation rate is.
- B.14 We encourage further discussions on how assumptions are derived based on local circumstances in valuation reports.

**Chart B5: Commutation Assumptions for Pre and Post 2008 Pensions**



# Appendix C: Solvency

C.1 In this appendix we set out analysis we undertook in relation to whether the rate of employer contributions to the LGPS pension fund is set at an appropriate level to ensure the solvency of the pension fund. This appendix contains a description of:

- > Solvency considerations
- > Core Spending Power
- > Mapping of solvency considerations to measures adopted
- > Methodology used for solvency measures
- > Table of outcomes for each fund

## Potential for default

C.2 In the context of the LGPS:

- > Our understanding based on confirmation from the Department for Levelling Up, Housing and Communities (DLUHC) is that, in contrast to employers in the private sector, there is no insolvency regime for local authorities
- > Therefore, for the purposes of our analysis we assume that local authority sponsors cannot default on their pension liabilities through failure
- > Members' benefits are therefore dependent on the assets of the scheme and future contributions from employers including local authorities

## Solvency considerations

C.3 In assessing whether the conditions for solvency are met, we will have regard to:

### Risks already present:

- > funding level on the SAB standard basis
- > whether or not the fund continues to be open to new members. If the fund is closed to new members or is highly mature and without any guarantee in place, we will focus on the ability to meet additional cash contributions.
- > the ability of tax raising authorities to meet employer contributions

### Emerging risks:

- > the risks posed by changes to the value of scheme assets (to the extent that these are not matched by changes to the scheme liabilities)
- > the proportion of scheme employers without tax raising powers or without statutory backing

C.4 We express the emerging risks in the context of Core Spending Power (for English local authorities, described below) or financing data (for Welsh local authorities). For funds which have no or limited Core Spending Power we have followed the same approach used in 2016 and the dry run.

## Core Spending Power

- C.5 GAD's stress tests are designed to test the ability of the underlying tax raising employers to meet a shock in the fund; one that results in a sustained reduction of the funding position, requiring remedial action from those employers in the form of long term additional contributions.
- C.6 The purpose is to put this in the context of the financial resources available to those tax raising employers. In order to do that, DLUHC has pointed to an objective, well used and publicly available measure referred to as Core Spending Power. This applies for all local authorities across England and is published [here](#).
- C.7 Core Spending Power has the following components:
- > Modified Settlement Funding Assessment
  - > Estimated Council Tax excluding Parish Precepts
  - > Potential additional Council Tax revenue from Adult Social Care flexibility
  - > Potential additional Council Tax revenue from £5 referendum principle for districts with lower quartile B and D
  - > Proposed Improved Better Care Fund
  - > Illustrative New Homes Bonus
  - > Rural Services Delivery Grant
- C.8 GAD have referenced Core Spending Power for 2019-20 (to be consistent with the effective date of the data provided for section 13) as the measure of financial resource of the underlying (tax raising) employers, and amalgamated these up to the fund level, in order to compare like with like. The Core Spending Power 2019-20 data was subsequently revised, however the results were not revised as this was not material to GAD's recommendations.
- C.9 Core Spending Power is not a measure of total local authority income. It does not include commercial income, sales fees and charges, or ring-fenced grants (except improved Better Care Fund). Core Spending Power includes an assumed modelled amount of locally retained business rates and as such does not include growth (or falls) in actual retained business rates. In some authorities, non-uniformed police employees participate in the LGPS, but their funding comes from Home Office. On the basis that the majority of this applies to uniformed police officers, no adjustment is made for it. Similarly, DfE funding for academies is not included.
- C.10 Core Spending Power is publicly available and objective, therefore DLUHC have advised it is the best such measure available currently.
- C.11 Core Spending Power does not apply to Welsh local authorities. For Welsh funds GAD have used "financing of gross revenue expenditure" ("financing data"), which is broadly comparable with Core Spending Power, following discussions with Welsh Government in 2016. This applies for all local authorities in Wales and is published [here](#). The 2019-20 "financing of gross revenue expenditure" data was subsequently revised, however the results were not revised as this was not material to GAD's recommendations.
- C.12 Financing data has the following components which GAD have included for the purpose of section 13 analysis:
- > Adjustments (including amending reports)

- > Council tax reduction scheme (including RSG element)
- > Discretionary non-domestic rate relief
- > General government grants
- > Share of re-distributed non-domestic rates
- > Amount to be collected from council tax

C.13 Financing data also has the following components which we have not included for the purpose of section 13 analysis:

- > Specific grants
- > Appropriations from(+) / to(-) reserves

C.14 We have referenced financing data for 2019-20 (to be consistent with the effective date of the data provided for section 13) as the measure of financial resource of the underlying (tax raising) employers, and amalgamated these up to the fund level, in order to compare like with like.

C.15 Similarly to Core Spending Power, financing data excludes income from sales, fees, and charges and we have excluded police funding from the analysis.

## **Solvency measures**

C.16 The five solvency metrics adopted in the 2016 exercise have been adopted for the 2019 exercise. We developed and considered other measures but have excluded, for example the liability shock as it did not add value under current circumstances beyond what was already measured under asset shock.

**Table C1: 2019 Solvency measures**

Consideration	Measure Used
<b>Risks already present:</b>	
The relative ability of the fund to meet its accrued liabilities	<b>SAB funding level:</b> A fund's funding level using the SAB standard basis, as set out in Appendix G
The extent to which the fund continues to be open to new members. If a fund is closed to new members or is highly mature, we will focus on the ability to meet additional cash contributions	<b>Open fund:</b> Whether the fund is open to new members
The proportion of scheme employers without tax raising powers or without statutory backing	<b>Non-statutory members:</b> The proportion of members within the fund who are/were employed by an employer without tax raising powers or statutory backing
<b>Emerging risks:</b>	
The cost risks posed by changes to the value of scheme assets (to the extent that these are not matched by changes to the scheme liabilities)	<b>Asset shock:</b> The change in average employer contribution rates expressed as a percentage of Core Spending Power (or financing data) after a 15% fall in value of return-seeking assets
The impact that non-statutory employers defaulting on contributions would have on the income of sponsoring employers as a whole	<b>Employer default:</b> The change in average employer contribution rates as a percentage of Core Spending Power (or financing data) if all employers without tax raising powers or statutory backing default on their existing deficits

C.17 Emerging risk measures require assumptions. We used best estimate assumptions for this purpose, details of which can be found in Appendix G. Details of the methods used to calculate scores under each measure and the criteria used to assign a colour code can be found in this chapter.

## Funds with no or low core spending

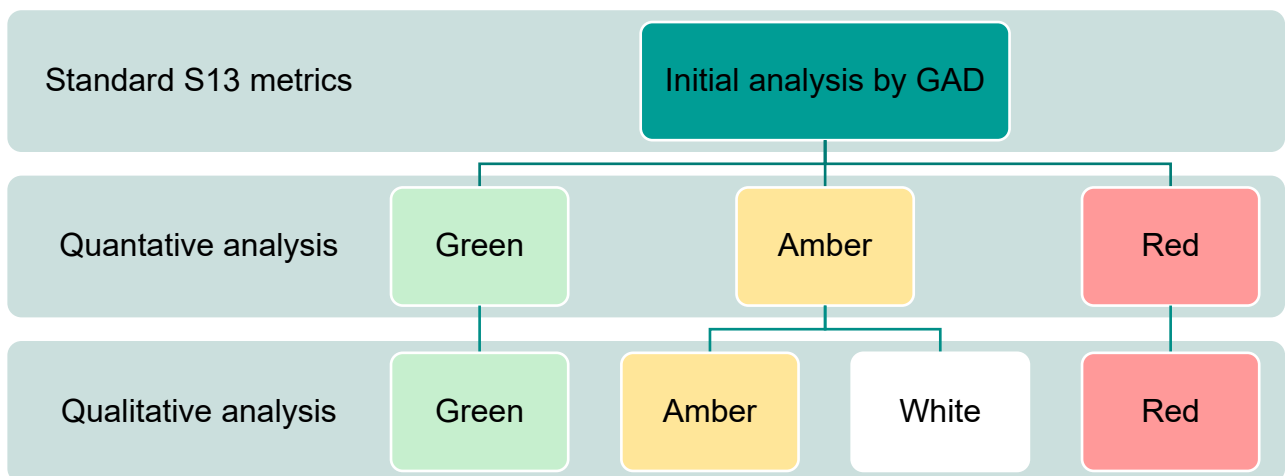
C.18 There were four funds with no or low core spending:

- > City of London Corporation Pension Fund
- > Environmental Agency Active Fund
- > Environmental Agency Closed Fund
- > London Pension Fund Authority Pension Fund

C.19 For each of these funds, we have reverted to the 2016 and dry run methodology for asset shock and employer default, which expressed the resulting additional contributions to meet the emerging deficit as a percentage of pensionable pay.

## Solvency measures – methodology

- C.20 We detail the methodology behind the measures used to assess a fund’s solvency position. Some of the measures listed below were calculated using a market consistent set of assumptions. For more information on this best estimate basis please see Appendix G.
- C.21 The 2016 exercise used red, amber and green (‘RAG’) flags for the solvency measure, where amber and red flags were raised when a fund breached thresholds set by GAD. For the 2019 exercise, GAD initially adopted the same RAG approach and 2016 thresholds, however the flag allocations were subsequently revised for the solvency measures taking into account to the following:
- > The scheme funding position has improved significantly since 2016 (the aggregate funding position on prudent local bases improved from 85% to 98%)
  - > The size of funds has grown considerably over the past three years to 31 March 2019 but the ability of tax backed employers to increase contributions if required (as measured by core spending power and financing data) has not kept pace. This could pose a risk to the LGPS, for example if there is a severe shock to return seeking asset classes.
- C.22 Following discussions with DLUHC, GAD agreed that it is not helpful to raise individual fund flags which have been primarily driven by the relatively larger increase in the size of funds relative to the possible contributions available and introduced the “white” flag. The white flag is an advisory flag that highlights a general risk but does not require action in isolation.
- C.23 The chart below illustrates the steps taken by GAD in determining the flag colours for the metrics





C.24 The text box below defines each flag colour:

**Key**

**RED** indicates a material issue that may result in the aims of section 13 not being met. In such circumstances remedial action to ensure Solvency may be considered.

**AMBER** indicates a potential material issue that we would expect funds' to be aware of. In isolation this would not usually contribute to a recommendation for remedial action in order to ensure Solvency.

**WHITE** is an advisory flag that highlights a general issue but one which does not require an action in isolation. It may have been an amber flag if we had broader concerns.

**GREEN** indicates that there are no material issues that may contribute to a recommendation for remedial action in order to ensure Solvency.

C.25 GAD will assess the position at the time of the 2022 section 13 report and will decide whether to retain the white flag, return to the RAG approach or use other metrics/thresholds that are appropriate for the circumstances of the LGPS at that point in time.

### **SAB funding level: A fund's funding level using the SAB standard basis**

C.26 This measure highlights possible risks to a fund as a result of assets being significantly lower than liabilities, where liabilities are those estimated on the SAB standard basis detailed in Appendix G.

C.27 A fund in deficit will need to pay additional contributions in order to meet the liabilities that have already been accrued.

C.28 This measure assesses the relative funding levels of individual funds. All funds have been ordered by this measure (highest funding level first) and the five funds ranked 83 to 87 out of 88 (i.e. not including Environment Agency Closed Fund) are assigned an amber code. All other funds are assigned a green colour code.

C.29 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised.

### **Open fund: Whether the fund is open to new members**

C.30 A scheme that is closed to new members will be closer to maturity than a scheme which is still open. This creates a possible risk to sponsoring employees as there is less scope to make regular contributions and receive investment returns on those contributions. Additionally, if problems do occur with the scheme funding level, the reduced time to maturity of the scheme means that additional contributions must be spread over a shorter timeframe and could be more volatile as a result.

C.31 This measure is a 'Yes' when a fund is still open to new members and a 'No' otherwise. A 'Yes' results in a green colour code, while a 'No' results in a red colour code. As at 31 March 2019, the Environment Agency Closed Fund is the only closed fund. However, given that this fund has a DEFRA guarantee we consider it appropriate to set the flag to green in this circumstance.

C.32 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised.

### **Non-statutory members: The proportion of members within the fund who are employed by an employer without tax raising powers or statutory backing**

- C.33 We have considered taxpayer-backed employers of stronger covenant value than other employers. It is important, in this context, that administering authorities and other employers understand the potential cost that may fall on taxpayers in the future if employers without statutory backing or tax raising powers are unable to meet their required contributions and those with such powers become responsible for the accrued costs.
- C.34 Data for this measure has been taken from the publicly available 'Local government pension scheme funds local authority data: 2019 to 20120' published by DLUHC [here](#). The data contains the number of employees within each fund by employer group, where:
- > Group 1 refers to local authorities and connected bodies
  - > Group 2 refers to centrally funded public sector bodies
  - > Group 3 refers to other public sector bodies and
  - > Group 4 refers to private sector, voluntary sector and other bodies
- C.35 For the purposes of this measure, and unless information has been provided to the contrary, it has been assumed that employers listed under groups 1 and 2 are those with tax raising powers or statutory backing and that employers listed under groups 3 and 4 are those without tax raising powers or statutory backing.
- C.36 The measure therefore gives the proportion of members within the fund that are/were employed by group 1 and 2 employers as a proportion of all members within the fund.
- C.37 Under this measure a fund has been allocated an amber colour code if its proportion of members who are employed by an employer without tax raising powers or statutory backing is between 25% and 50%, a red colour code would allocated if the proportion is more than 50%.and a green colour code in all other cases.
- C.38 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised.

### **Asset shock: The change in average employer contribution rates as a percentage of Core Spending Power or financing data after a 15% fall in value of return-seeking assets**

- C.39 This measure shows the effect on total employer contribution rates of a one-off decrease in the value of a fund's return seeking assets equal to 15% of the value of those assets expressed as a percentage of Core Spending Power or financing data. Defensive assets are assumed to be unaffected.
- C.40 For the purposes of this measure liabilities have been restated on the standardised best estimate basis and deficit recovery periods have been standardised using a period of 20 years to ensure that results are comparable.
- C.41 For the scenario where a fund is in deficit after the asset shock (the funding level is less than 100% after the shock) and the threshold has been breached, then an amber flag is raised. However, where the fund is in surplus after the shock and the fund had breached the threshold, the fund will not raise a flag but the risk remains that such an event could bring forward the need to increase contributions.
- C.42 Return-seeking asset classes are assumed to be:

- > Equities (UK, Overseas and Unquoted or private equities)
- > Property
- > Infrastructure investments which are equity type
- > “Other” return seeking investment

Defensive asset classes are assumed to be:

- > Cash
- > Bonds (Gilts, Corporate Bonds or index linked)
- > “Other” defensive investments

C.43 We calculated the emerging deficit from the shock following a 15% fall in return seeking assets which would be attributed to the employers covered by core spending or financing data (which we refer to as “% tax raising employers” below):

$$\text{New Deficit} = (\text{Pre stress asset value} - \text{post stress asset value}) \times \% \text{ Tax raising employers}$$

We spread this over 20 years of annual payments and express as a percentage of Core Spending Power (or financing data for Welsh funds)

$$\frac{\text{New Deficit}}{\bar{a}_{20} \times \text{Core Spending Power}}$$

Where:

- > new deficit is calculated on the standardised best estimate basis as at 31 March 2019
- >  $\bar{a}_{20}$  is a continuous annuity over the 20-year deficit recovery period at the rate of interest equal to  $\frac{(1+i)}{(1+e)} - 1$ .
- >  $i$  is the nominal discount rate assumption on the standardised best estimate basis.
- >  $e$  is the general earnings inflation assumption on the standardised best estimate basis

C.44 A fund is allocated an amber colour code if its result is above 3% and a green colour code otherwise.

C.45 For those funds with no/low core spending, the measure considered the change of contribution rate and was expressed as a percentage of pensionable pay, with an amber flag raised if that was greater than 5% and is in deficit after the asset shock. No results are available for the Environment Agency Closed Fund as there are no remaining active members within the fund with which to calculate contribution rates.

C.46 As set out in methodology section above, GAD undertook a subsequent qualitative analysis to consider whether it was felt that the risk identified was potentially material to the fund, and hence whether the amber flag should be maintained.

**Employer default: The change in average employer contribution rates as a percentage of payroll if all employers without tax raising powers or statutory backing default on their existing deficits**

C.47 LGPS regulations require employers to pay contributions set in the valuation. DLUHC has confirmed that:

- > there is a guarantee of LGPS pension liabilities by a public body
- > that public body is incapable of becoming insolvent, and
- > the governing legislation is designed to ensure the solvency and long term economic efficiency of the Scheme.

C.48 It is important, in this context, that administering authorities and other employers understand the potential cost that may fall on taxpayers in the future if employers without statutory backing or tax raising powers are unable to meet their required contributions and those with such powers become responsible for the accrued costs.

C.49 A fund's deficit will not change as a result of the default, but as the deficit is spread over a smaller number of employers, the contribution rate for each remaining employer will increase.

C.50 For the purposes of this measure liabilities have been restated on the standardised best estimate basis and deficit recovery periods have been standardised using a period of 20 years to ensure that results are comparable.

C.51 For funds in surplus under the standardised best estimate basis, the flag colour for a fund is green, as there would be no deficits attributed to non-taxed backed employer, therefore the risk has been mitigated. The measure therefore considers those funds in deficit on the standardised best estimate basis.

C.52 We calculated the amount of deficit attributed to tax raising authorities if other public sector bodies & private sector, voluntary sector and other bodies were to default:

$$\text{Share of Deficit} = \text{Deficit} \times \% \text{ non – tax raising employers}$$

C.53 We spread this over 20 years of annual payments and express as a percentage of Core Spending Power for most funds (Welsh funds use financing data and funds with no/low Core Spending use pensionable pay, as set out in C.55 below).

$$\frac{(\text{Share of Deficit})}{(\bar{a}_{20} \times \text{Core Spending Power})}$$

Where:

- > Share of deficit is calculated on the standardised best estimate basis as at 31 March 2019
- >  $\bar{a}_{20}$  is a continuous annuity over the 20 year deficit recovery period at the rate of interest equal to  $\frac{(1+i)}{(1+e)} - 1$ .
- > i is the nominal discount rate assumption on the standardised best estimate basis.
- > e is the general earnings inflation assumption on the standardised best estimate basis

C.54 A fund is allocated an amber colour code if its result is greater than 3% and a green colour code otherwise.

- C.55 For those funds with no/low core spending, the change of contribution rate was expressed as a percentage of pensionable pay, with an amber flag raised if that was greater than 2% and is in deficit after the asset shock. No results are available for the Environment Agency Closed Fund as there are no remaining active members within the fund with which to calculate contribution rates and Environmental agency closed as there is no SF3 data for the fund.
- C.56 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised.

## Solvency measures – by fund

**Table C2: Solvency measures by fund**

Pension fund	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
Avon Pension Fund	Yes	106.0%	5.1%	2.2%	Surplus
Bedfordshire Pension Fund	Yes	89.3%	6.8%	2.2%	0.2%
Buckinghamshire County Council Pension Fund	Yes	102.0%	4.3%	2.1%	Surplus
Cambridgeshire Pension Fund	Yes	110.9%	9.2%	2.7%	Surplus
Cardiff and Vale of Glamorgan Pension Fund	Yes	104.2%	6.4%	1.5%	Surplus
Cheshire Pension Fund	Yes	124.9%	7.2%	Surplus	Surplus
City and County of Swansea Pension Fund	Yes	96.8%	3.7%	1.9%	0.0%
City of Westminster Pension Fund	Yes	111.2%	10.4%	2.9%	Surplus
Clwyd Pension Fund	Yes	103.0%	4.8%	1.4%	Surplus
Cornwall Pension Fund	Yes	98.7%	6.0%	1.3%	0.0%
Cumbria Local Government Pension Scheme	Yes	125.0%	6.8%	Surplus	Surplus
Derbyshire Pension Fund	Yes	115.8%	4.8%	Surplus	Surplus
Devon County Council Pension Fund	Yes	95.7%	5.2%	2.3%	0.1%
Dorset County Pension Fund	Yes	96.2%	4.7%	2.2%	0.1%
Durham County Council Pension Fund	Yes	98.0%	3.4%	2.4%	0.0%
Dyfed Pension Fund	Yes	129.0%	3.7%	Surplus	Surplus
East Riding Pension Fund	Yes	120.0%	2.6%	Surplus	Surplus
East Sussex Pension Fund	Yes	118.7%	1.7%	Surplus	Surplus
Essex Pension Fund	Yes	115.1%	9.1%	2.3%	Surplus
Gloucestershire County Council Pension Fund	Yes	109.9%	9.5%	2.4%	Surplus

Pension fund	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
Greater Gwent (Torfaen) Pension Fund	Yes	97.7%	7.8%	1.7%	0.0%
Greater Manchester Pension Fund	Yes	123.3%	22.6%	Surplus	Surplus
Gwynedd Pension Fund	Yes	123.9%	3.3%	Surplus	Surplus
Hampshire County Council Pension Fund	Yes	103.6%	3.4%	2.6%	Surplus
Hertfordshire County Council Pension Fund	Yes	121.2%	5.4%	Surplus	Surplus
Isle of Wight Council Pension Fund	Yes	118.0%	2.7%	Surplus	Surplus
Islington Council Pension Fund	Yes	94.0%	6.1%	3.1%	0.1%
Kent County Council Pension Fund	Yes	107.4%	8.6%	2.5%	Surplus
Lancashire County Pension Fund	Yes	122.0%	8.2%	Surplus	Surplus
Leicestershire County Council Pension Fund	Yes	102.8%	1.4%	2.2%	Surplus
Lincolnshire Pension Fund	Yes	102.8%	2.8%	2.3%	Surplus
London Borough of Barking and Dagenham Pension Fund	Yes	100.4%	4.7%	2.7%	0.0%
London Borough of Barnet Pension Fund	Yes	89.8%	30.5%	1.4%	0.7%
London Borough of Bexley Pension Fund	Yes	124.0%	4.3%	Surplus	Surplus
London Borough of Brent Pension Fund	Yes	81.0%	17.1%	1.6%	0.6%
London Borough of Bromley Pension Fund	Yes	136.0%	12.9%	Surplus	Surplus
London Borough of Camden Pension Fund	Yes	106.5%	11.2%	3.5%	Surplus
London Borough of Croydon Pension Fund	Yes	98.0%	5.5%	1.5%	0.0%
London Borough of Ealing Pension Fund	Yes	106.0%	0.7%	1.7%	Surplus
London Borough of Enfield Pension Fund	Yes	110.2%	1.4%	1.5%	Surplus
London Borough of Hackney Pension Fund	Yes	105.2%	2.1%	2.7%	Surplus

Pension fund	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
London Borough of Hammersmith and Fulham Pension Fund	Yes	101.3%	6.0%	2.7%	Surplus
London Borough of Haringey Pension Fund	Yes	108.7%	1.2%	2.7%	Surplus
London Borough of Harrow Pension Fund	Yes	100.8%	0.3%	2.2%	0.0%
London Borough of Havering Pension Fund	Yes	86.4%	1.5%	1.3%	0.0%
London Borough of Hillingdon Pension Fund	Yes	95.4%	1.2%	1.5%	0.0%
London Borough of Hounslow Pension Fund	Yes	103.2%	10.7%	2.4%	Surplus
London Borough of Lambeth Pension Fund	Yes	106.6%	1.0%	2.2%	Surplus
London Borough of Lewisham Pension Fund	Yes	109.5%	6.0%	2.0%	Surplus
London Borough of Merton Pension Fund	Yes	110.6%	2.1%	2.4%	Surplus
London Borough of Newham Pension Fund	Yes	100.8%	6.9%	1.8%	0.0%
London Borough of Redbridge Pension Fund	Yes	99.0%	10.9%	2.1%	0.0%
London Borough of Southwark Pension Fund	Yes	111.8%	3.0%	2.7%	Surplus
London Borough of Tower Hamlets Pension Fund	Yes	112.7%	6.4%	2.5%	Surplus
London Borough of Waltham Forest Pension Fund	Yes	87.0%	3.4%	1.6%	0.1%
Merseyside Pension Fund	Yes	115.0%	11.6%	3.6%	Surplus
Norfolk Pension Fund	Yes	107.4%	8.4%	2.4%	Surplus
North Yorkshire Pension Fund	Yes	123.4%	4.8%	Surplus	Surplus
Northamptonshire Pension Fund	Yes	106.1%	4.8%	2.3%	Surplus
Northumberland County Council Pension Fund	Yes	109.9%	3.9%	2.8%	Surplus
Nottinghamshire County Council Pension Fund	Yes	100.2%	4.8%	3.2%	0.0%
Oxfordshire County Council Pension Fund	Yes	105.2%	4.3%	3.2%	Surplus



Pension fund	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
Powys County Council Pension Fund	Yes	101.0%	5.5%	1.3%	0.0%
Rhondda Cynon Taf County Borough Council Pension Fund	Yes	107.4%	5.8%	2.4%	Surplus
Royal Borough of Greenwich Pension Fund	Yes	99.4%	3.4%	2.6%	0.0%
Royal Borough of Kensington and Chelsea Pension Fund	Yes	146.5%	4.0%	Surplus	Surplus
Royal Borough of Kingston Upon Thames Pension Fund	Yes	107.8%	7.4%	2.1%	Surplus
Royal County of Berkshire Pension Fund	Yes	77.2%	6.0%	1.5%	0.3%
Shropshire County Pension Fund	Yes	104.1%	9.5%	2.1%	Surplus
Somerset County Council Pension Fund	Yes	91.0%	8.9%	2.5%	0.3%
South Yorkshire Pension Fund	Yes	119.0%	9.3%	Surplus	Surplus
Staffordshire Pension Fund	Yes	111.8%	5.9%	3.0%	Surplus
Suffolk Pension Fund	Yes	121.4%	4.9%	Surplus	Surplus
Surrey Pension Fund	Yes	104.7%	4.4%	2.3%	Surplus
Sutton Pension Fund	Yes	99.1%	2.4%	1.3%	0.0%
Teesside Pension Fund	Yes	118.1%	7.2%	Surplus	Surplus
Tyne and Wear Pension Fund	Yes	114.0%	12.1%	4.3%	Surplus
Wandsworth Council Pension Fund	Yes	132.2%	4.4%	Surplus	Surplus
Warwickshire Pension Fund	Yes	108.9%	0.0%	3.0%	Surplus
West Midlands Pension Fund	Yes	106.8%	8.6%	2.8%	Surplus
West Sussex County Council Pension Fund	Yes	147.5%	4.7%	Surplus	Surplus
West Yorkshire Pension Fund	Yes	112.1%	12.7%	4.1%	Surplus
Wiltshire Pension Fund	Yes	111.6%	4.2%	2.2%	Surplus

Pension fund	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
Worcestershire County Council Pension Fund	Yes	102.0%	7.9%	2.5%	Surplus
City of London Corporation Pension Fund*	Yes	92.4%	10.9%	3.6%	0.5%
London Pensions Fund Authority Pension Fund*	Yes	108.6%	18.3%	7.3%	Surplus
Environment Agency Active Fund*	Yes	132.8%	N/A	Surplus	N/A
Environment Agency Closed Fund*	No	64.6%	N/A	N/A	N/A

Notes:

1. Funding levels are on the SAB standard basis.
2. The liability value and salary roll figures in the maturity indicator are as at 31 March 2019. The liability value was calculated on the standardised best estimate basis.
3. For funds marked \* against asset shock we have assessed the shock as a percentage of pensionable pay (as we did in the 2016 and the dry run).

# Appendix D: Long term cost efficiency

D.1 We developed a series of relative and absolute considerations to help assess whether the contributions met the aims of section 13 under long term cost efficiency. This appendix contains a description of:

- > Mapping of long term cost efficiency considerations to measures adopted
- > Methodology used for long term cost efficiency measures
- > Engagement with funds which flagged on LTCE measures
- > Table of outcomes for each fund

## Long term cost efficiency – considerations and methodology

Table D1: Long term cost efficiency considerations and measures

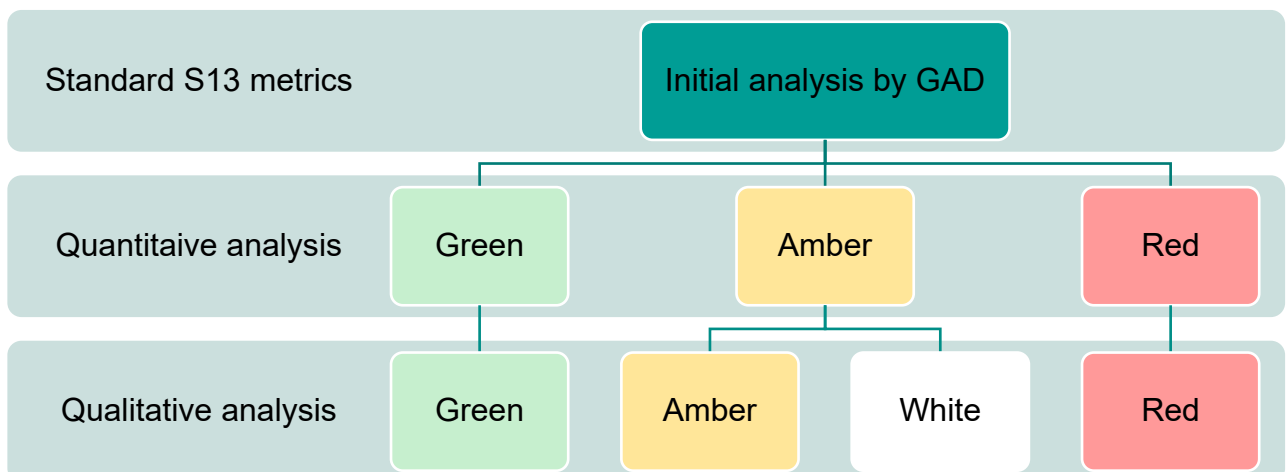
Consideration	Measure Used
<b>Relative considerations:</b>	
The implied deficit recovery period	<b>Deficit Period:</b> Implied deficit recovery period calculated on a standardised best estimate basis (SAB Actuarial (section 13) key indicator 2)
The investment return required to achieve full funding	<b>Required Return:</b> The required investment return rates to achieve full funding in 20 years' time on a standardised best estimate basis (SAB Actuarial (section 13) key indicator 3)
The pace at which the deficit is expected to be paid off	<b>Repayment Shortfall:</b> The difference between: actual contribution in excess of GAD's best estimate of future service cost and the annual deficit recovery contributions required as a percentage of payroll to pay off the deficit in 20 years, where the deficit is calculated on a standardised best estimate basis
<b>Absolute Considerations:</b>	
The extent to which the required investment return above is less than the estimated future return being targeted by a fund's investment strategy	<b>Return Scope:</b> The required investment return rates as calculated in required return (i.e. SAB Actuarial (section 13) key indicator 3), compared with the fund's expected best estimate future returns assuming current asset mix maintained (SAB Actuarial (section 13) key indicator 3)
The extent to which any deficit recovery plan can be reconciled with, and can be demonstrated to be a continuation of, the previous deficit recovery plan, after allowing for actual fund experience	<b>Deficit Reconciliation:</b> Confirmation that the deficit period can be demonstrated to be a continuation of the previous deficit recovery plan, after allowing for actual fund experience

D.2 For the 2019 section 13 report, GAD has adopted the same measures as those in 2016. However, a further qualitative step was introduced to consider whether it was felt that the risk identified was potentially material to the fund.

- D.3 Three of these measures were selected from the Actuarial section 13 KPIs defined by the [SAB](#). The selected SAB measures have been augmented with two additional measures which we believe are appropriate in helping to assess whether the aims of section 13 are met.
- D.4 The analyses and calculations carried out under these long term cost efficiency measures are approximate. They rely on the accuracy of the data provided by the respective local firms of actuarial advisors.
- D.5 Although the calculations are approximate, we consider they are sufficient for the purposes of identifying which funds are a cause for concern. While the measures should not represent targets, these measures help us determine whether a more detailed review is required for example, we would have concern where multiples measures triggered amber for a given fund.

## Long term cost efficiency measures – methodology

- D.6 We detail the methodology behind the measures used to assess a fund’s long term cost efficiency position below. Some of the measures listed below were calculated using a market consistent set of assumptions. For more information on this best estimate basis please see Appendix G.
- D.7 The 2016 exercise used Red, Amber or Green (‘RAG’) flags for the solvency measure, where amber and red flags were raised when a fund breached thresholds set by GAD. For the 2019 exercise, GAD initially adopted the same RAG approach and 2016 thresholds, however the flag allocation was subsequently revised for the long term cost efficiency measures as GAD wished to concentrate on funds which raised multiple amber flags. GAD also introduced a subsequent qualitative measure, which considered the funding level relative to contributions graph, which assisted GAD on determining whether to flag and/or engage with a fund.
- D.8 Following discussions with DLUHC, GAD agreed that it is not helpful to raise individual fund flags but rather concentrate on funds with multiple flags and this resulted in the introduction of a “white” flag. The white flag is an advisory flag that highlights a general risk but does not require action in isolation.
- D.9 The chart below illustrates the steps taken by GAD in determining the flag colours for the metrics



D.10 The text box below defines each flag colour:

**Key**

**RED** indicates a material issue that may result in the aims of section 13 not being met. In such circumstances remedial action to ensure Solvency may be considered.

**AMBER** indicates a potential material issue that we would expect funds' to be aware of. In isolation this would not usually contribute to a recommendation for remedial action in order to ensure Solvency.

**WHITE** is an advisory flag that highlights a general issue but one which does not require an action in isolation. It may have been an amber flag if we had broader concerns.

**GREEN** indicates that there are no material issues that may contribute to a recommendation for remedial action in order to ensure Solvency.

D.11 GAD will assess the position at the 2022 section 13 and will decide whether to retain the white flag, return to the RAG approach or use other metrics/thresholds that are appropriate for the circumstances of the LGPS at that point in time.

**Deficit period: The implied deficit recovery period calculated on a standardised best estimate basis**

D.12 This measure is based on SAB Actuarial (section 13) key indicator 2. However, as the SCAPE discount rate used in the SAB standard basis is not market-related, the calculations are done on a standardised best estimate basis.

D.13 The implied deficit recovery period on the standardised best estimate basis was found by solving the following equation for x:

D.14 
$$\bar{a}_x = \frac{\text{Deficit on standardised BE basis}}{\text{Annual deficit recovery payment on standardised BE basis}}$$

Where:

- > x is the implied deficit recovery period.
- >  $\bar{a}_x$  is a continuous annuity over x years at the rate of interest equal to  $\frac{(1+i)}{(1+e)} - 1$ .
- > i is the nominal discount rate assumption on the standardised best estimate basis.
- > e is the general earnings inflation assumption on the standardised best estimate basis.
- > The deficit on the standardised best estimate basis is as at 31 March 2019.
- > The annual deficit recovery payment on the standardised best estimate basis is calculated as the difference between the average employer contribution rate for the years 2020/21 to 2022/23, allowing for both contributions paid as a percentage of salary and fixed monetary contributions into the fund, where deficit contributions are fixed (i.e. the fixed monetary contributions, if any, have been converted so that they are quoted as a percentage of salary roll), and the employer standard contribution rate on the standardised best estimate basis for the years 2020/21 to 2022/23 (which is assumed to be equal to the future cost of accrual of that particular fund).

- D.15 Funds that were in surplus or where the implied deficit recovery period was less than 10 years were flagged as green. Those with recovery periods greater than or equal to 10 years were flagged as amber. If there were any funds that were paying contributions at a level that would result in an increase in deficit, they would have been flagged as red.
- D.16 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised based on whether multiple flags were raised for a fund.

**Required return: The required investment return rates to achieve full funding in 20 years' time on the standardised best estimate basis**

- D.17 This measure is based on SAB Actuarial (section 13) key indicator 3. However, as the SCAPE discount rate used in the SAB standard basis is not market related, the calculations are done on a standardised best estimate basis.
- D.18 The following assumptions were made for the purposes of this calculations:
- > Time 0 is 31 March 2019.
  - > Time 20 is 31 March 2039.
  - >  $A_0$  is the value of the fund's assets at time 0, and was obtained from the data provided by the local firms of actuarial advisors.
  - >  $A_{20}$  is the projected value of the fund's assets at time 20 (using the equation below)
  - >  $L_0$  is the value of the fund's liabilities at time 0, on a standardised best estimate basis
  - >  $L_{20}$  is the projected value of the fund's liabilities at time 20 (using the equation below)
  - >  $C_0$  is one year's employer contributions paid from time 0
  - >  $C_{0-20}$  is the total employer contributions payable over the period time 0 – 20, assumed to occur mid-way between time 0 and time 20 (i.e. at time 10)
  - >  $B_0$  is the value of one year's benefits paid (excluding transfers) from time 0
  - >  $B_{0-20}$  is the total value of benefits payable (excluding transfers) over the period time 0 – 20, assumed to occur mid-way between time 0 and time 20 (i.e. at time 10).
  - >  $SCR_0$  is the standard contribution rate payable from time 0 to time 1 on a standardised best estimate basis.
  - >  $SCR_{0-20}$  is the standard contribution rate payable from time 0 – 20, assumed to occur mid-way between time 0 and time 20 (i.e. at time 10).
  - >  $Sal_0$  is the salary roll at time 0 and was obtained from the data provided by the local firms of actuarial advisors.
  - >  $i$  is the nominal discount rate assumption on the standardised best estimate basis.
  - >  $e$  is the general earnings assumption on the standardised best estimate basis.
  - >  $x$  is the required investment return that is to be calculated
- D.19 The membership profile is assumed to be constant.

D.20 The assets and liabilities at time 20 were then equated and the resulting quadratic equation solved to find the required rate of investment return to achieve full funding, i.e.:

$$A_{20} - L_{20} = 0$$

Where:

- >  $A_{20} = [A_0 \times (1 + x)^{20}] + [(C_{0-20} - B_{0-20}) \times (1 + x)^{10}]$
- >  $L_{20} = [L_0 \times (1 + i)^{20}] + [(SCR_{0-20} - B_{0-20}) \times (1 + i)^{10}]$
- >  $C_{0-20} = C_0 \times 20 \times (1 + e)^{10}$
- >  $B_{0-20} = B_0 \times 20 \times (1 + e)^{10}$
- >  $SCR_{0-20} = Sal_0 \times SCR_0 \times 20 \times (1 + e)^{10}$

D.21 Where the required investment return was higher than the nominal discount rate on the standardised best estimate basis (i.e.  $i$  where  $i = 4.30\%$ ) funds would be classified as amber, whereas funds were classified as green if the required return was less than  $i$ .

D.22 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised based on whether multiple flags were raised for a fund.

**Repayment shortfall: The difference between the actual contribution rate net of GAD's best estimate future service cost and the annual deficit recovery contributions (on a standardised best estimate basis and assuming deficit is paid off in 20 years), as a percentage of payroll**

D.23 This measure is an extension from the deficit period measure, as it considers the affordability of the deficit on GAD's best estimate basis. For this calculation we determine the difference between:

- > The employer contributions in excess of GAD's best estimate future service cost, and
- > The required annual deficit recovery contribution rate on a standardised best estimate basis to pay off the deficit in 20 years' time (the 20 year deficit recovery period is based on the SAB Actuarial (section 13) key indicator 3)

D.24 The required annual deficit recovery contribution rate to be paid on a standardised best estimate basis is equal to:

$$\frac{\text{Deficit on standardised best estimate basis}}{\bar{a}_{20} \times \text{Salary Roll}}$$

Where:

- > The deficit on the standardised best estimate basis is as at 31 March 2019.
- >  $\bar{a}_{20}$  is a continuous annuity over the 20 year deficit recovery period at the rate of interest equal to  $\frac{(1+i)}{(1+e)} - 1$ .
- >  $i$  is the nominal discount rate assumption on the standardised best estimate basis.
- >  $e$  is the general earnings inflation assumption on the standardised best estimate basis.
- > The salary roll is as at 31 March 2019 and has not been adjusted.

D.25 The difference in deficit recovery contribution rates is then defined as:

$$(\text{Avg ER cont rate paid} - \text{ER SCR on BE basis}) - \frac{\text{Deficit on BE basis}}{\bar{a}_{20} \times \text{Salary Roll}}$$

Where:

- > The average employer contribution rate is for the years 2020/21 – 2022/23, allowing for both contributions paid as a percentage of salary and fixed monetary contributions into the fund where deficit contributions are fixed (i.e. the fixed monetary contributions, if any, have been converted so that they are quoted as a percentage of salary roll).
- > The employer standard contribution rate on the standardised best estimate basis is for the years 2020/21 – 2022/23. It is assumed that the standard contribution rate is equal to the future cost of accrual of that particular fund.

D.26 The data required for each of the funds to carry out the above calculation was provided by their respective firms of actuarial advisors.

D.27 Where appropriate data has been restated on the standardised best estimate basis.

D.28 Funds in surplus on GAD's best estimate basis or where the difference in deficit recovery contribution rates is greater than 0% are flagged as green. Where the difference between contribution rates is between 0% and -3%, the funds would be flagged as amber and if the difference in deficit recovery contribution rates is less than -3%, then the fund would be flagged as red.

D.29 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised based on whether multiple flags were raised for a fund.

**Return scope: The required investment return rates as calculated in required return, compared with the fund's expected best estimate future returns assuming current asset mix maintained**

D.30 This measure is based on SAB Actuarial (section 13) key indicator 3.

D.31 The required investment return (x) calculated in the required return measure was compared against the best estimate investment return expected from the fund's assets held on 31 March 2019.

D.32 The asset data used in this calculation was provided by each fund's respective firm of actuarial advisors.

D.33 Funds where the best estimate future returns were higher than the required investment return by 0.5% or more were flagged as green. Those funds where this difference was between 0% and 0.5% would be flagged as amber whilst those where the best estimate returns were lower than the required investment returns were flagged as red.

D.34 As set out in methodology section above, GAD undertook a subsequent qualitative analysis on whether flag colours should be revised based on whether multiple flags were raised for a fund.

**Deficit reconciliation: Confirmation that the deficit period can be demonstrated to be a continuation of the previous deficit recovery plan, after allowing for actual fund experience**

D.35 This measure is used to monitor the change in the deficit recovery end point set locally by the fund at each valuation and what the underlying reasons are for any adverse changes in this period.

D.36 This measure considers the following:



- > Whether contributions have decreased since the previous valuations (reducing the burden on current tax payers)
- > Whether the deficit recovery end point has moved further into the future, compared with the previous valuation (increasing the burden on future tax payers)

D.37 Funds where both of the above have occurred are flagged amber otherwise funds are flagged green. There was no allowance for white flags as this measure indicates a material issue that funds should be aware of.

## Long term cost efficiency measures – engagement

D.38 The metrics set out above and qualitative analysis of funds funding position relative to the contribution helped determine which funds GAD would engage with to discuss the potential material and material risks and the general issues that arose from the analysis. The approach used for determining whether to engage with funds was based on the approach set out in paragraph D.7, however GAD undertook two types of engagements:

- > “Full” Engagement – discussion with funds for which a combination of flags for were raised, which raised material or potentially material risks
- > “Light” Engagement – discussion with funds where a combination of flags was not raised but which were close to flagging and therefore may want to take action to avoid the likelihood of being flagged in the section 13 report following the 2022 valuation

### Full engagement

D.39 The four funds for which GAD held a “Full” engagement with set out in the main report are City of London Corporation Pension Fund, Royal County of Berkshire Pension Fund, Islington County Pension Fund and Devon County Council Pension Fund. The engagement with all funds was constructive.

D.40 Following the initial engagement Islington County Pension Fund committed to making an additional contribution which was sufficient to remove the flags raised.

D.41 Further Devon County Council Pension Fund confirmed a post valuation investment had been made which was again sufficient prove their position to remove the concerns

### Light Engagement

D.42 GAD also engaged with funds with funds where a combination of flags were not raised but where some flags may been raised and where the funding level and contribution levels were low relative to the other LGPS funds. The funds which GAD engaged with were:

- > Dorset County Pension Fund (Barnett Waddingham)
- > London Borough of Newham Pension Fund (Barnett Waddingham)
- > Royal Borough of Greenwich Pension Fund (Barnett Waddingham)
- > Somerset County Council Pension Fund (Barnett Waddingham)
- > London Borough of Waltham Forest (Mercer)

D.43 The engagement with these funds was positive and GAD explained that whilst these funds were not part of the “full” engagement there were concerns regarding the position of these funds and that the

funds may wish to take action in order to reduce the likelihood of being flagged in the section 13 report following the 2022 valuation.

## Long term cost efficiency measures – by fund

Table D2: Long term cost efficiency measures by fund

Pension fund	Maturity (rank)	Deficit period (rank)	Required return (rank)	Repayment shortfall	Return scope (rank)	Deficit recovery plan
Avon Pension Fund	7.5 (52)	Surplus	3.3% (48)	Surplus	0.8% (61)	Green
Bedfordshire Pension Fund	6.6 (84)	8 (76)	3.4% (51)	5.7%	0.3% (77)	Green
Buckinghamshire County Council Pension Fund	6.6 (85)	Surplus	3.4% (54)	Surplus	0.6% (70)	Green
Cambridgeshire Pension Fund	7 (68)	Surplus	3.1% (39)	Surplus	1.6% (23)	Green
Cardiff and Vale of Glamorgan Pension Fund	7.2 (65)	Surplus	3.6% (67)	Surplus	0.7% (67)	Green
Cheshire Pension Fund	7.7 (41)	Surplus	2.4% (10)	Surplus	1.2% (38)	Green
City and County of Swansea Pension Fund	7.3 (59)	6 (74)	3.7% (72)	3.9%	0.9% (53)	Green
City of Westminster Pension Fund	10.9 (1)	Surplus	0.3% (1)	Surplus	4.3% (1)	Green
Clwyd Pension Fund	7.3 (61)	Surplus	3% (35)	Surplus	0.9% (55)	Green
Cornwall Pension Fund	7.3 (62)	3 (69)	3.4% (55)	5.7%	0.3% (78)	Green
Cumbria Local Government Pension Scheme	8 (26)	Surplus	2.4% (12)	Surplus	1.2% (35)	Green
Derbyshire Pension Fund	6.9 (73)	Surplus	3.2% (40)	Surplus	1% (50)	Green
Devon County Council Pension Fund	7.6 (43)	15 (85)	4.2% (86)	0.8%	0.6% (71)	Green
Dorset County Pension Fund	7.5 (53)	9 (78)	4% (83)	2.2%	0.3% (79)	Green
Durham County Council Pension Fund	8 (29)	5 (71)	3.7% (70)	4.1%	-0.1% (85)	Green
Dyfed Pension Fund	6.8 (76)	Surplus	2.9% (26)	Surplus	1.6% (19)	Green
East Riding Pension Fund	7.3 (58)	Surplus	2.9% (25)	Surplus	1.7% (18)	Green
East Sussex Pension Fund	7.5 (50)	Surplus	3.1% (38)	Surplus	1.2% (34)	Green
Essex Pension Fund	7 (70)	Surplus	2.6% (14)	Surplus	1.9% (13)	Green

Pension fund	Maturity (rank)	Deficit period (rank)	Required return (rank)	Repayment shortfall	Return scope (rank)	Deficit recovery plan
Gloucestershire County Council Pension Fund	7.7 (38)	Surplus	2.3% (9)	Surplus	2.1% (7)	Green
Greater Gwent (Torfaen) Pension Fund	7.4 (56)	6 (73)	3.8% (75)	3.5%	0.8% (63)	Green
Greater Manchester Pension Fund	8.6 (15)	Surplus	2.6% (18)	Surplus	1.7% (16)	Green
Gwynedd Pension Fund	6.8 (81)	Surplus	2.9% (24)	Surplus	1.7% (17)	Green
Hampshire County Council Pension Fund	6.9 (72)	Surplus	3.9% (80)	Surplus	0.3% (80)	Green
Hertfordshire County Council Pension Fund	6.8 (77)	Surplus	2.6% (16)	Surplus	1.1% (44)	Green
Isle of Wight Council Pension Fund	8.7 (13)	Surplus	2.6% (15)	Surplus	1.9% (10)	Green
Islington Council Pension Fund	8.5 (17)	10 (80)	3.9% (79)	3.0%	0.7% (68)	Green
Kent County Council Pension Fund	6.9 (74)	Surplus	3.2% (41)	Surplus	1.3% (32)	Green
Lancashire County Council Pension Fund	7.5 (51)	Surplus	2.9% (23)	Surplus	1.5% (25)	Green
Leicestershire County Council Pension Fund	6.8 (78)	Surplus	2.9% (27)	Surplus	1.1% (41)	Green
Lincolnshire Pension Fund	6.9 (71)	Surplus	3% (33)	Surplus	1.6% (22)	Green
London Borough of Barking and Dagenham Pension Fund	7.5 (45)	2 (65)	3.5% (63)	5.1%	1% (48)	Amber
London Borough of Barnet Pension Fund	8 (28)	10 (79)	3.6% (66)	4.4%	0.2% (81)	Green
London Borough of Bexley Pension Fund	7.4 (55)	Surplus	2.6% (17)	Surplus	1.9% (14)	Green
London Borough of Brent Pension Fund	9.1 (7)	10 (81)	3% (32)	8.6%	1.6% (20)	Green
London Borough of Bromley Pension Fund	7.5 (46)	Surplus	1.9% (3)	Surplus	2.6% (4)	Green
London Borough of Camden Pension Fund	9.6 (5)	Surplus	2% (4)	Surplus	2.9% (3)	Green
London Borough of Croydon Pension Fund	6.9 (75)	4 (70)	3.5% (60)	4.8%	0.9% (56)	Green
London Borough of Ealing Pension Fund	7.7 (40)	Surplus	3.1% (37)	Surplus	1.1% (45)	Green
London Borough of Enfield Pension Fund	6.8 (79)	Surplus	3.4% (53)	Surplus	0.5% (73)	Green
London Borough of Hackney Pension Fund	8.2 (22)	Surplus	2.2% (8)	Surplus	2.1% (9)	Green
London Borough of Hammersmith and Fulham Pension Fund	10.6 (4)	Surplus	3.8% (74)	Surplus	0.4% (75)	Green

Pension fund	Maturity (rank)	Deficit period (rank)	Required return (rank)	Repayment shortfall	Return scope (rank)	Deficit recovery plan
London Borough of Haringey Pension Fund	9.1 (8)	Surplus	3.4% (50)	Surplus	0.8% (59)	Green
London Borough of Harrow Pension Fund	8.4 (20)	1 (64)	3.6% (64)	5.3%	1.1% (43)	Green
London Borough of Havering Pension Fund	8 (27)	12 (84)	3.7% (69)	4.0%	0.1% (83)	Green
London Borough of Hillingdon Pension Fund	8.1 (25)	8 (75)	3.8% (76)	3.4%	-0.1% (86)	Green
London Borough of Hounslow Pension Fund	7.6 (44)	Surplus	3.4% (57)	Surplus	1% (47)	Green
London Borough of Lambeth Pension Fund	10.7 (2)	Surplus	2.7% (20)	Surplus	1.6% (24)	Green
London Borough of Lewisham Pension Fund	9 (9)	Surplus	3.3% (44)	Surplus	0.5% (72)	Green
London Borough of Merton Pension Fund	7.5 (49)	Surplus	3.5% (61)	Surplus	1% (49)	Green
London Borough of Newham Pension Fund	7.5 (48)	2 (67)	4% (82)	2.3%	-0.3% (87)	Green
London Borough of Redbridge Pension Fund	7.7 (37)	5 (72)	3.9% (81)	2.4%	0.5% (74)	Amber
London Borough of Southwark Pension Fund	8.4 (21)	Surplus	2.8% (22)	Surplus	1.5% (28)	Green
London Borough of Tower Hamlets Pension Fund	8.8 (12)	Surplus	2.1% (6)	Surplus	2.2% (5)	Green
London Borough of Waltham Forest	8.1 (24)	11 (82)	3.6% (65)	4.2%	0.8% (65)	Green
Merseyside Pension Fund	9.2 (6)	Surplus	3.3% (47)	Surplus	1.2% (36)	Green
Norfolk Pension Fund	7.7 (39)	Surplus	3% (28)	Surplus	1.4% (31)	Green
North Yorkshire Pension Fund	6.5 (86)	Surplus	3% (31)	Surplus	0.9% (51)	Green
Northamptonshire Pension Fund	7.3 (63)	Surplus	3% (34)	Surplus	1.5% (27)	Green
Northumberland County Council Pension Fund	8.8 (11)	Surplus	3.2% (43)	Surplus	1.1% (42)	Green
Nottinghamshire County Council Pension Fund	6.7 (82)	2 (66)	3.6% (68)	4.5%	0.9% (52)	Green
Oxfordshire County Council Pension Fund	7.2 (64)	Surplus	3.7% (71)	Surplus	0.9% (54)	Green
Powys County Council Pension Fund	8.1 (23)	1 (63)	3.2% (42)	7.3%	0.8% (64)	Green

Pension fund	Maturity (rank)	Deficit period (rank)	Required return (rank)	Repayment shortfall	Return scope (rank)	Deficit recovery plan
Rhondda Cynon Taf County Borough Council Pension Fund	7.9 (32)	Surplus	3.5% (62)	Surplus	0.8% (62)	Green
Royal Borough of Greenwich Pension Fund	7 (69)	9 (77)	4.2% (85)	0.8%	0.2% (82)	Green
Royal Borough of Kensington and Chelsea Pension Fund	8.4 (18)	Surplus	2% (5)	Surplus	3.1% (2)	Green
Royal Borough of Kingston Upon Thames Pension Fund	7.5 (47)	Surplus	3.3% (49)	Surplus	1.1% (39)	Green
Royal county of Berkshire Pension Fund	6.6 (83)	25 (87)	4.6% (87)	-1.5%	0.1% (84)	Green
Shropshire County Pension Fund	7.9 (31)	Surplus	3.5% (59)	Surplus	0.6% (69)	Green
Somerset County Council Pension Fund	7.8 (36)	12 (83)	3.9% (78)	2.9%	1.6% (21)	Green
South Yorkshire Pension Fund	7.8 (34)	Surplus	3% (30)	Surplus	1.4% (30)	Green
Staffordshire Pension Fund	8.7 (14)	Surplus	2.5% (13)	Surplus	1.9% (11)	Green
Suffolk Pension Fund	7.4 (54)	Surplus	2.4% (11)	Surplus	1.9% (12)	Green
Surrey Pension Fund	7.2 (66)	Surplus	3.4% (52)	Surplus	1.1% (40)	Green
Sutton Pension Fund	6.4 (87)	2 (68)	3.3% (46)	5.8%	0.7% (66)	Green
Teesside Pension Fund	8.5 (16)	Surplus	3.8% (73)	Surplus	0.9% (57)	Green
Tyne and Wear Pension Fund	8.9 (10)	Surplus	3.5% (58)	Surplus	1.2% (37)	Green
Wandsworth Council Pension Fund	8.4 (19)	Surplus	2.1% (7)	Surplus	2.1% (8)	Green
Warwickshire Pension Fund	7.3 (60)	Surplus	3.3% (45)	Surplus	1.1% (46)	Green
West Midlands Pension Fund	7.9 (30)	Surplus	2.7% (21)	Surplus	1.5% (26)	Green
West Sussex County Council Pension Fund	6.8 (80)	Surplus	1.7% (2)	Surplus	2.2% (6)	Green
West Yorkshire Pension Fund	7.3 (57)	Surplus	3.8% (77)	Surplus	0.8% (60)	Green
Wiltshire Pension Fund	7.1 (67)	Surplus	2.6% (19)	Surplus	1.5% (29)	Green
Worcestershire County Council Pension Fund	7.7 (42)	Surplus	3% (36)	Surplus	1.8% (15)	Green
City of London Corporation Pension Fund	7.8 (35)	15 (86)	4.1% (84)	1.2%	0.3% (76)	Green

<b>Pension fund</b>	<b>Maturity (rank)</b>	<b>Deficit period (rank)</b>	<b>Required return (rank)</b>	<b>Repayment shortfall</b>	<b>Return scope (rank)</b>	<b>Deficit recovery plan</b>
London Pensions Fund Authority Pension Fund	10.6 (3)	Surplus	3.4% (56)	Surplus	0.9% (58)	Green
Environment Agency Active Fund	7.8 (33)	Surplus	3% (29)	Surplus	1.3% (33)	Green
Environment Agency Closed Fund	0 (N/A)	N/A	N/A	N/A	N/A	N/A

Notes:

1. The liability value and salary roll figures in the maturity indicator are as at 31 March 2019. The liability value was calculated on the standardised best estimate basis.

# Appendix E: ALM

## Why perform an Asset Liability Modelling (ALM) exercise?

- E.1 An ALM exercise allows us to simultaneously project the assets and liabilities of the scheme under a range of simulations (known as stochastic economic scenarios), to investigate possible outcomes for key variables and metrics. Modelling the scheme in this way allows us to understand not only central, expected outcomes but also the wider range of possible outcomes and associated probabilities.
- E.2 A common use of ALM studies is to help scheme managers and sponsors determine investment, contribution and funding policy by illustrating the impact of changing policy on key variables, such as the funding level (i.e. ratio of assets to liabilities), of the scheme under a range of scenarios.
- E.3 For this piece of work, we modelled the whole Scheme rather than individual funds and our focus was on variations of the employer contribution rates over time as a broad measure of long term cost efficiency and sustainability relative to the funding available to local authorities. We are primarily interested in the extent to which contribution rates can vary from current levels as well as the projection of funding levels. Consequently, we have assumed that the current investment policy remains in place and is constant over the projection period.
- E.4 Stochastic modelling techniques allow us to simulate one thousand economic scenarios – with different outturns and paths of key parameters and variables. The simulations are calibrated to reflect views on expected returns and relative behaviours between key variables, but importantly include an element of randomness in order to capture volatility observed in financial markets. By running the scenario generator many times, the spread of different possible outcomes can be illustrated, and the probability of certain outcomes can be estimated.
- E.5 As with all models, the outcomes are a function of the assumptions adopted, and the outcomes are not intended to be predictors of the future but are illustrations of the range of possible outcomes. It is highly unlikely that the assumptions made will be borne out in practice and adjustments might be made to manage any pressures that arise.
- E.6 Our study models change in economic outcomes only – we have not looked at any other possible changes such as demographic changes, including mortality, nor management changes such as changes to the investment approach or the impacts of climate change.

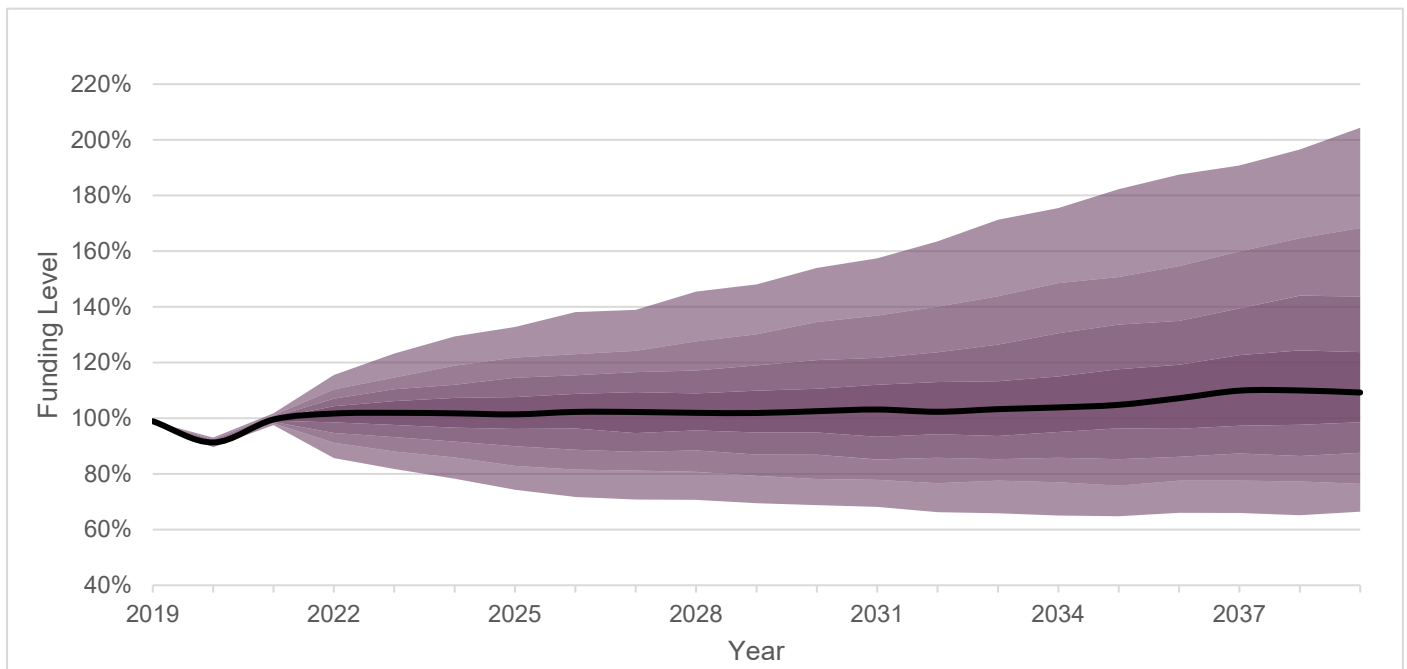
## Outcomes of our modelling

- E.7 The ALM exercise provides underlying projections, under thousands of scenarios, for a number of key variables and metrics of interest, including:
  - > The scheme's assets
  - > The scheme's liabilities
  - > The scheme's funding level
  - > The contribution rates
- E.8 The main report includes illustrations of funding level and contributions (relative to the salary and the level of funding available to local authorities) of the LGPS, as a whole. These illustrations assumed no immediate recovery of assets in 2020/21 as GAD currently hold no information on the extent to

which funds have recovered. The illustrations considered the impact with and without a constraint on contribution rates.

- E.9 Charts E.1 and E.2 below illustrates the possible impact on funding levels and contribution rates if an allowance was made for the expected recovery of assets for 2020/21 in the projections and assuming that the contributions are not restricted. In the absence of any data available to illustrate the effect of a possible immediate recovery in asset values we have reset the funding level to 100% as at 31 March 2021 in the following analysis.
- E.10 In charts E.1 and E.2, the black line shows the median funding level and contribution rate. Each shade of purple represents the range of funding level or contribution for a decile (10%) of scenarios, with the subsequent lighter shade representing the next decile. We have not shown the most extreme deciles (0-10% and 90-100%)

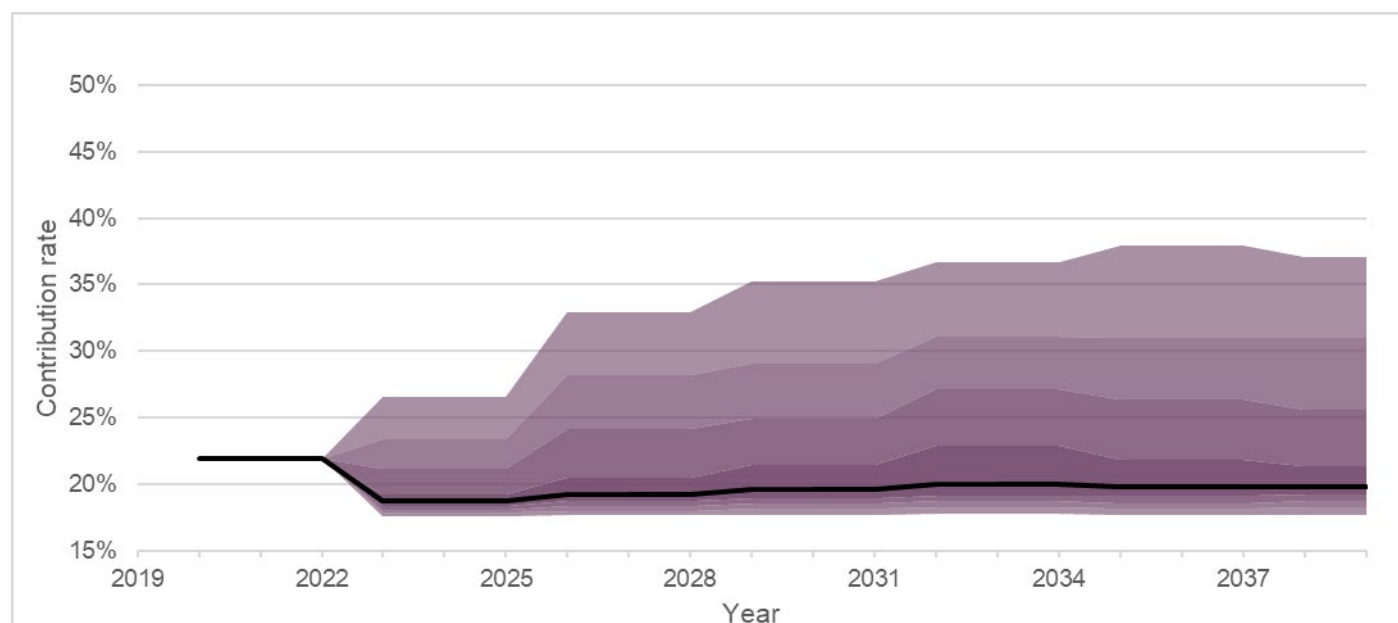
**Chart E1: Illustration of funding levels with unconstrained contributions including allowance for expected 2020/21 recovery in assets**



- E.11 Chart E1 illustrates the initial drop in assets for the 2019/20 scheme year, due to COVID-19. For illustration purposes, we have shown the effect of an immediate recovery in the following year, by setting the scheme to be fully funded as at 31 March 2021 (a better position relative to that at the 2019 valuation).
- E.12 The chart shows significant risk still remains as there is around 20% likelihood of the funding being 80% or lower by 2037. The upside is also illustrated in chart E.1, as the likelihood of improved funding is greater than that of chart 6.1, as there is over 30% chance that funding exceeds 140% funding.



**Chart E2: Illustration of unconstrained employer contributions including allowance for expected 2020/21 recovery in assets**



- E.13 Based on the assumption that there is a rebound in asset values in 2020/21, chart E.2 illustrates that the median level of contributions may reduce at the 2022 valuation, due to the improvement in funding relative to the 2019 valuation.
- E.14 Chart E.2 also illustrates that the risk to future contributions remain. After the assumed recovery there is around a 20% likelihood that contribution rates could exceed 30% by 2031. However, there is a limited likelihood of a significant reduction in contributions due to the assumption that no reduction is applied to primary contribution rates when the LGPS is in surplus.

## Methodology

- E.15 Our model projects the entire Scheme and assumes that the asset strategy and future valuation assumptions are an average of those used for the individual funds as at 31 March 2019. In practice, schemes are likely to have specific asset strategies and valuation assumptions, for example the discount rate will have regard to the expected return for each fund.
- E.16 Projection of the contribution rates are determined based on the liability and asset values at each future triennial valuation and these are assumed to remain consistent for the following three years.
- E.17 To project the development of the scheme we must make assumptions about the following:
- > Expected new entrants into the scheme
  - > The way in which liabilities will evolve – for example, the rate at which current active liabilities “migrate” to being non-active (i.e. deferred/pensioner liabilities) over time or the extent to which liabilities are increased by CPI inflation and wage inflation at each point in time
  - > The way in which liabilities are assessed, and
  - > The way in which contributions are determined – both in respect of ongoing accrual and in respect of any surplus or deficit that arises.

The box below provides further details on the assumptions made in respect of these areas.

### Key assumptions made in the ALM

For the purpose of assessing liabilities and determining contribution rates, assumptions are needed to carry out an actuarial valuation at each future point in time. In our modelling we have assumed that:

- > The discount rate is set based on a constant margin above expected CPI. As such, the extent of the margin above real gilt yields included in the valuation may vary within the projections according to the projected economic conditions.
- > The length of the recovery period is reset at each valuation i.e. deficit is spread over a 20 year period. However, when a surplus arises no reduction is applied to the primary rate (the cost of the benefits being accrued)
- > New entrants' assumption – the scheme's active membership is assumed to remain stable over time
- > The Scheme investment strategy is assumed to remain stable i.e. we assume the assets are rebalanced each year to the same allocation as that in the 2019 valuation.
- > Demographic experience is as assumed in the underlying 2019 valuations

- E.18 It should be noted that any change to manage down employer contribution rates in the short term do not alter the long term cost of the scheme (which depends on the level of scheme benefits and scheme experience, including asset returns) and more generally might have some other less desirable outcomes, for example:
- > increasing the length of recovery periods transfers costs onto future generations
  - > choosing a more return seeking investment strategy would be expected to increase volatility and risk

## Assumptions

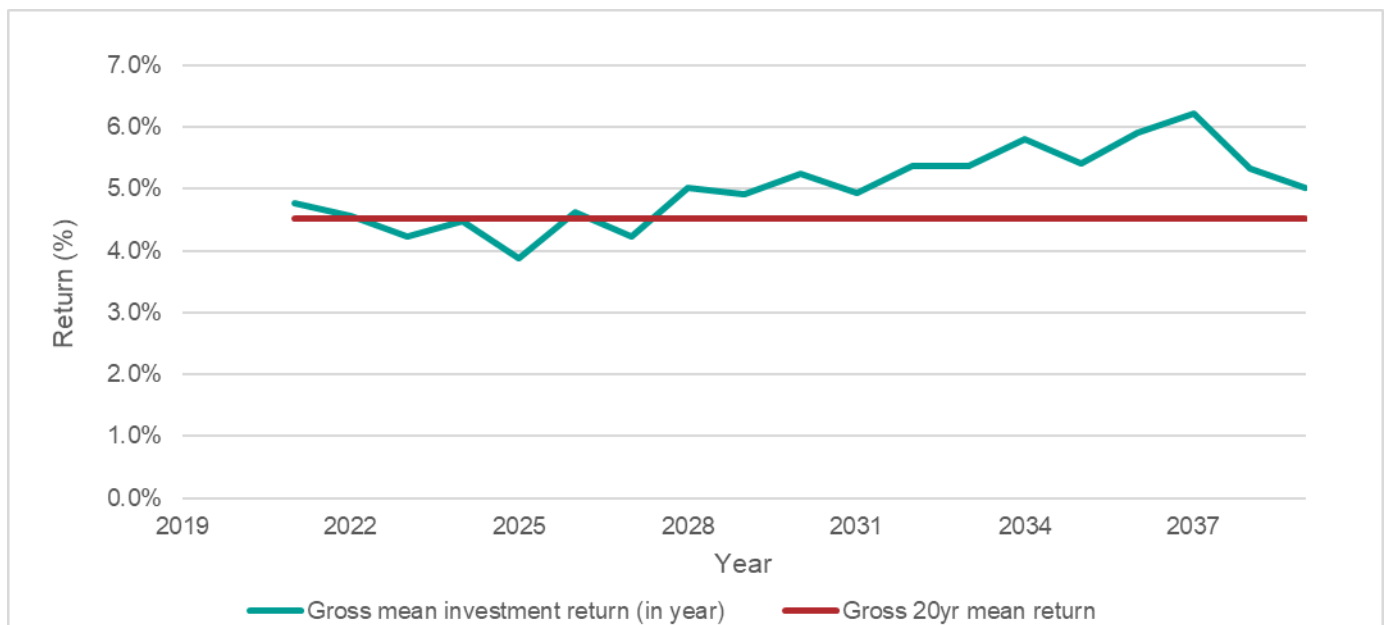
- E.19 An ALM produces a broader amount of information than a traditional deterministic actuarial valuation. Consequently, we need to make more detailed assumptions to simplify the calculations involved in the projections and make it practical to analyse all the key outcomes we are interested in.
- E.20 To project the development of the scheme we must make assumptions about the key economic variable and financial assumptions for example price inflation, salary growth and returns on assets held. These are determined from the economic scenario generator (ESG).
- E.21 The ESG is calibrated to current conditions and expectations for the future and specifies how key economic variables may vary (stochastically, according to probability distributions) in future. The ESG was provided by Moody's, with a calibration date of 31 March 2020, and reflected the market expectations at that time.
- E.22 GAD made subsequent amendments to the ESG:
- > As the calibration was as at 31 March 2020, asset returns for the 2019/20 scheme year were introduced to allow for the known financial outcomes and ensuring that the asset value as at 31 March 2020 are consistent with publicly available SF3 data

- > CPI simulations are derived based on projected RPI simulations less a constant margin. The margin, set at 1.15%, is based on GAD’s house view for the current difference between RPI and CPI and is constant throughout the projection period. In practice the difference between RPI and CPI is expected to reduce from 2030 when RPI reforms, however allowing for this would result in a disjoint in CPI projections because market expectations for RPI (which drive simulations) do not show such a disjoint.
- > Assumed asset returns were enhanced to align with GAD’s long-term views

E.23 Charts E.3 and E.4 illustrate the investment returns used in the ALM projections. The green line in Chart E.3 represents the mean return in each simulation year, and the expectation is that returns improve on average with time.

E.24 The red line in chart E.3. illustrates the annualised mean return over the projection period of the ALM projection, which is 4.5%. The expected return in the ALM is in line with GAD’s expectation based on the economic environment as at 31 March 2020.

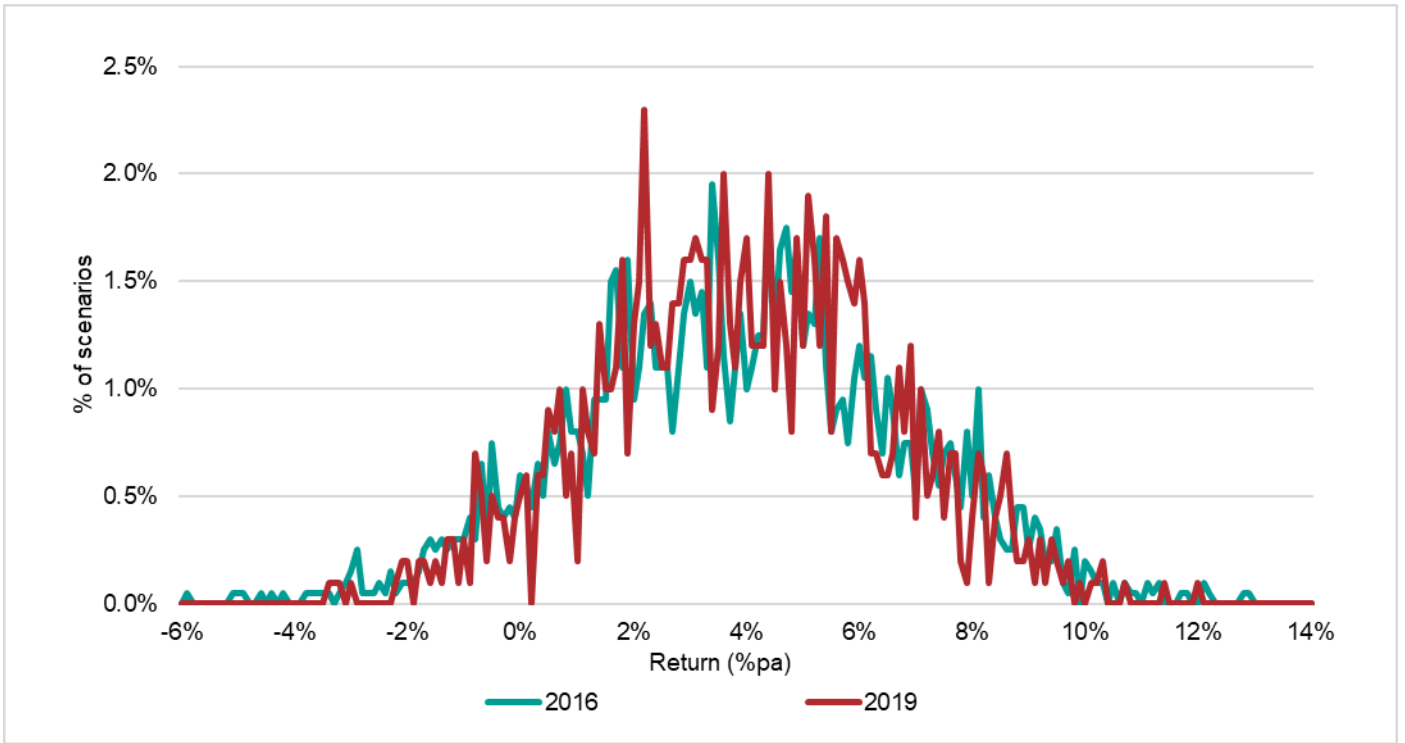
**Chart E3: Mean investment return for future years**



E.25 Chart E.4 is the distribution of the annualised portfolio returns over the twenty-year period and compares the projection to that of the 2016 ALM exercise. The distributions of the returns are similar, which is expected due to the same investment strategy being adopted at the 2016 and 2019 valuation and similar return prospects.

E.26 Chart E.4 demonstrates the volatility in the LGPS, which was also one of the key risks identified in the investment returns section within the main report. The chart below illustrates that whilst returns are mainly clustered between -2% and 10%, with the mean round 4%, significant risks of low returns over the 20-year period remain but so does the upside potential.

Chart E4: Distribution of annualised nominal investment returns



## Appendix F: Data Provided

- F.1 At the request of DLUHC, GAD collected data from each fund's 2019 valuation report via the fund actuaries. These actuarial funding valuations were conducted by four firms of actuarial advisors:
- > Aon
  - > Barnett Waddingham
  - > Hymans Robertson
  - > Mercer
- F.2 Data was received from the relevant firm of actuarial advisors for all 88 pension funds and included additional information provided to the fund actuaries by administrators in respect of their fund's employers.
- F.3 Limited checks, consisting of spot checks to make sure that data entries appear sensible, have been performed by GAD and the data received appears to be of sufficient quality for the purpose of analysing the 2019 valuation results. These checks do not represent a full, independent audit of the data supplied. The analysis contained in this report relies on the general completeness and accuracy of the information supplied by the administering authority or their firms of actuarial advisors.
- F.4 In addition, data has been collated from the 'Local government pension scheme funds local authority data', which is published annually by DLUHC at <https://www.gov.uk/government/statistics/local-government-pension-scheme-funds-for-england-and-wales-2019-to-2020> . This published data may be referred to elsewhere as SF3 statistics.
- F.5 Unless otherwise stated the data detailed above has been used to inform the analysis contained in the LGPS England and Wales section 13 2019 Report.
- F.6 The information provided to GAD is, in many instances, more detailed than that provided in the actuarial valuation reports.
- F.7 There was some inconsistency in the information provided to GAD. For example, membership details were not always split by gender as requested. However, this did not have a material impact on the analysis that GAD was able to complete (we assumed the average male female breakdown for these funds).

## Data specification

### (1) MEMBERSHIP DATA

Data split by gender.

- (a) Active members: number of members, unweighted average age (to 2dp), total rate of annual actual pensionable pay at 31 March 2019 and 31 March 2016 (2014 pay definition)
- (b) Deferred members: number of members, unweighted average age (to 2dp), total annual preserved pension revalued to 31 March 2019 for both 31 March 2016 and 31 March 2016. Note this should exclude undecided members.
- (c) Pensioners (former members): number of members, unweighted average age (to 2dp), total annual pensions in payment at 31 March 2019 and 31 March 2016.
- (d) Pensioners (dependants including partners and children): number of members, average age (weighted as appropriate), total annual pensions in payment at 31 March 2019 and 31 March 2016.

### (2) FINANCIAL ASSUMPTIONS

Assumptions used to value the liabilities of the most secure employers (e.g. local authorities)

- (a) Specify what proportion of the liabilities is calculated using the assumptions below
- (b) Provide assumptions used for past service liabilities, these have been given for both as at 31 March 2019 and 31 March 2016.
  - i. Nominal discount rate (pre & post retirement separately if applicable)
  - ii. RPI inflation
  - iii. CPI inflation rate
  - iv. Earnings inflation
- (c) Provide assumptions used for future contributions, these have been given for both as at 31 March 2019 and 31 March 2016.
  - i. Nominal discount rate (pre & post retirement separately if applicable)
  - ii. RPI inflation
  - iii. CPI inflation rate
  - iv. Earnings inflation
- (d) Short term assumptions used in the valuation (if applicable)
  - i. CPI
  - ii. Salary Increases
  - iii. Discount Rate
- (e) Deficit Recovery Period (years)

### (3) DEMOGRAPHIC ASSUMPTIONS

Rates to be provided at sample ages split by gender

Each could be split further in Group 1, Group 2, Group 3, Group 4, and Group 5

#### (a) Assumed life expectancy for members retiring in normal health

- i. Pensioner members aged 65 (for members retiring on normal health) (to 2dp) (with mortality improvements)
- ii. Pensioner members aged 65 (for members retiring on normal health) (to 2dp) (without mortality improvements)
- iii. Active / deferred members at age 65 if they are currently aged 45 (to 2dp) (with mortality improvements)
- iv. Active / deferred members at age 65 if they are currently aged 45 (to 2dp) (without mortality improvements)

#### (b) Commutation

- i. Pre 2008 pension Commutation Assumptions (as % of maximum lump sum allowed under HMRC rules). For example, maximum proportion of pension that may be commuted under the 2008 scheme is 35.71%. This will give a lump sum equal to the permitted maximum and thus if the member is assumed to commute this amount of pension, the entry in the table above is 100%. For pre2008 service, members already receive a lump sum =  $\frac{3}{80}$ ths x pre 2008 pensionable service x final pensionable salary. Please specify the pre 2008 assumption as the proportion of the permitted maximum that is expected to be commuted over and above the  $\frac{3}{80}$ ths lump sum.
- ii. Post 2008 pension Commutation Assumptions (as % of maximum lump sum allowed under HMRC rules).

### (4) ASSETS These are split to provide information for 31 March 2019 and 31 March 2016

(a) Market value of assets

(b) Value of assets used in the valuation

(c) Do you use a smoothed asset value in the valuation? If yes please attach an explanation

(d) Actual Asset Distribution split into the following:

- i. Proportion of assets held in Bonds
  - a) Proportion of bonds which are fixed interest government bonds
  - b) Proportion of bonds which are fixed interest non-government bonds
  - c) Proportion of bonds which are inflation linked bonds
- ii. Proportion of assets held in Equities
  - a) Proportion of equities which are UK equities
  - b) Proportion of equities which are overseas equities

- c) Proportion of equities which are unquoted or private equities
  - iii. Proportion of assets held in Property
  - iv. Proportion of assets held in Insurance Policies
  - v. Proportion of assets held in Fully insured annuities
  - vi. Proportion of assets held in Deferred or immediate fully insured annuities
  - vii. Proportion of assets held in Hedge funds
  - viii. Proportion of assets held in Cash and net current assets
  - ix. Proportion of assets held in Commodities,
  - x. Proportion of assets held in ABC arrangements
  - xi. Proportion of assets held in Infrastructure – debt type
  - xii. Proportion of assets held in Infrastructure\* – equity type
  - xiii. Proportion of assets held in “Other” investments – defensive\*
  - xiv. Proportion of assets held in “Other” investments – return seeking

(e) Weighted best estimate return

## (5) LIABILITIES AND FUTURE CONTRIBUTION RATE

These are split to provide information for 31 March 2019 and 31 March 2016

### Local assumptions

- (a) Past service liability – split between Actives, Deferred, Pensioners and Total
- (b) Funding level
- (c) Surplus / deficit
- (d) Deficit recovery period
- (e) Assumed member contribution yield k) Expenses, split by administration and investment (if not included implicitly in discount rate) l) Pensionable Pay definition (2008 or 2014 scheme definition) m) Is a smoothed liability value used? If Yes, an explanation is included ii) SAB standardised basis (only relevant for England and Wales) a) Past service liability – split between Actives, Deferred, Pensioners and Total b) Funding level c) Surplus / deficit d) Deficit recovery period Future contribution rates h) Standard contribution rate i) Contribution rate in respect of surplus or deficit j) Assumed member contribution yield

### SAB standardised basis

- (a) Past service liability – split between Actives, Deferred, Pensioners and Total
- (b) Funding level
- (c) Surplus / deficit



(d) SAB future service costs (excluding expenses) %

(6) Deficit recovery plan reconciliation

(a) Deficit contribution expected to be paid over each 3 yearly period from 2016 to 2043 as at March 2019 and March 2016

(b) Present value of deficit contribution expected to be paid over each 3 yearly period from 2016 to 2043 as at March 2019 and March 2016

(7) Post 2014 scheme

(a) Assumption for members in 50/50 scheme (if a proportion of members include details in 7b below)

(b) Proportion of members assumed to be in 50/50 scheme

(8) Documentation required

(a) Valuation Report @ 31 March 2019

(b) Relevant related reports

(c) Compliance Extract

(d) Statement of Investment Strategy

(e) Funding Strategy Statement

(f) Other

(9) McCloud approach

Please note the planned approach to risks arising from the McCloud judgement as discussed in the FSS

ALTERNATIVE FINANCIAL ASSUMPTIONS

Specify where a significant proportion of employer liabilities have been valued using alternative assumptions – provided as above in section 2

# Appendix G: Assumptions

G.1 Each section of analysis contained in the main report is based on one of three sets of assumptions:

- > The local fund assumptions, as used in the fund's 2019 actuarial valuation
- > The SAB standardised set of assumptions, or SAB standard basis
- > A best estimate set of assumptions

G.2 Details of local fund assumptions can be found in each fund's actuarial valuation report as at 31 March 2019. Details of the SAB standard basis and the standardised best estimate basis can be found in the table below.

**Table G1: SAB standard basis and best estimate basis**

<b>Assumption</b>	<b>SAB standard basis</b>	<b>Best Estimate basis</b>
<b>Methodology</b>	Projected Unit Methodology with 1 year control period	Projected Unit Methodology with 1 year control period
<b>Rate of pension increases</b>	2% per annum	2% per annum
<b>Public sector earnings growth</b>	3.5% per annum	3.5% per annum
<b>Discount rate</b>	4.45% per annum	4.3% per annum
<b>Changes to State Pension Age (SPA)</b>	As legislated	As legislated
<b>Pensioner Baseline mortality</b>	Set locally based on Fund experience	As set out in GAD's 2016 valuation
<b>Mortality improvements</b>	Core CMI_2018 with long term reduction in mortality rates of 1.5% per annum	Improvements in line with those underlying the ONS 2018-based principal population projections for the UK
<b>Age retirement</b>	Set locally based on Fund experience	As set out in GAD's 2016 valuation
<b>Ill health retirement rates</b>	Set locally based on Fund experience	As set out in GAD's 2016 valuation
<b>Withdrawal rates</b>	Set locally based on Fund experience	As set out in GAD's 2016 valuation
<b>Death before retirement rates</b>	Set locally based on Fund experience	As set out in GAD's 2016 valuation
<b>Promotional salary scales</b>	None	As set out in GAD's 2016 valuation
<b>Commutation</b>	We have used the SAB future service cost assumption of 65% of the maximum allowable amount	As set out in GAD's 2016 valuation
<b>Family statistics</b>	Set locally based on Fund experience	Set locally based on Fund experience

- G.3 The financial assumptions for the best estimate basis are based on GAD's neutral assumptions for long term inflation measures and asset returns, and the split of LGPS assets held as at 31 March 2019. These neutral assumptions are not deliberately optimistic nor pessimistic and do not incorporate adjustments to reflect any desired outcome. We believe there is around a 50% chance of outcomes being better and a 50% chance of outcomes being worse than these assumptions imply.
- G.4 Future asset returns are uncertain and there is a wide range of reasonable views on what future asset returns will be and therefore the best estimate discount rate should be. We have presented GAD's house view above, but there are other reasonable best estimate bases which may give materially different results.

# Appendix H: Section 13 of the Public Service Pensions Act 2013

## 13 Employer contributions in funded schemes

- (1) This section, which can be found at [Public Service Pensions Act 2013 \(legislation.gov.uk\)](https://www.legislation.gov.uk), applies in relation to a scheme under section 1 which is a defined benefits scheme with a pension fund.
- (2) Scheme regulations must provide for the rate of employer contributions to be set at an appropriate level to ensure
  - (a) the solvency of the pension fund, and
  - (b) the long term cost efficiency of the scheme, so far as relating to the pension fund.
- (3) For that purpose, scheme regulations must require actuarial valuations of the pension fund.
- (4) Where an actuarial valuation under subsection (3) has taken place, a person appointed by the responsible authority is to report on whether the following aims are achieved
  - (a) the valuation is in accordance with the scheme regulations
  - (b) the valuation has been carried out in a way which is not inconsistent with other valuations under subsection (3)
  - (c) the rate of employer contributions is set as specified in subsection (2).
- (5) A report under subsection (4) must be published and a copy must be sent to the scheme manager and (if different) the responsible authority.
- (6) If a report under subsection (4) states that, in the view of the person making the report, any of the aims in that subsection has not been achieved
  - (a) the report may recommend remedial steps
  - (b) the scheme manager must
    - i. take such remedial steps as the scheme manager considers appropriate, and
    - ii. publish details of those steps and the reasons for taking them
  - (c) the responsible authority may
    - i. require the scheme manager to report on progress in taking remedial steps
    - ii. direct the scheme manager to take such remedial steps as the responsible authority considers appropriate.
- (7) The person appointed under subsection (4) must, in the view of the responsible authority, be appropriately qualified.

# Appendix I: Extracts from other relevant regulations

## Regulations 58 and 62 of 'The Local Government Pension Scheme Regulations 201320'

### Funding strategy statement (Regulation 58)

- (1) An administering authority must, after consultation with such persons as it considers appropriate, prepare, maintain and publish a written statement setting out its funding strategy.
- (2) The statement must be published no later than 31st March 2015.
- (3) The authority must keep the statement under review and, after consultation with such persons as it considers appropriate, make such revisions as are appropriate following a material change in its policy set out in the statement, and if revisions are made, publish the statement as revised.
- (4) In preparing, maintaining and reviewing the statement, the administering authority must have regard to
  - (a) the guidance set out in the document published in October 2012 by CIPFA, the Chartered Institute of Public Finance and Accountancy and called "Preparing and Maintaining a Funding Strategy Statement in the Local Government Pension Scheme 2012" and
  - (b) the current version of the investment strategy under regulation 7 (investment strategy statement) of the Local Government Pension Scheme (Management and Investment of Funds) Regulations 2016.

### Actuarial valuations of pension funds (Regulation 62)

- (1) An administering authority must obtain
  - (a) an actuarial valuation of the assets and liabilities of each of its pension funds as at 31st March 2016 and on 31st March in every third year afterwards
  - (b) a report by an actuary in respect of the valuation, and
  - (c) a rates and adjustments certificate prepared by an actuary.
- (2) Each of those documents must be obtained before the first anniversary of the date ("the valuation date") as at which the valuation is made or such later date as the Secretary of State may agree.
- (3) A report under paragraph (1)(b) must contain a statement of the demographic assumptions used in making the valuation and the statement must show how the assumptions relate to the events which have actually occurred in relation to members of the Scheme since the last valuation.
- (4) A rates and adjustments certificate is a certificate specifying
  - (a) the primary rate of the employer's contribution and
  - (b) the secondary rate of the employer's contribution,

for each year of the period of three years beginning with 1st April in the year following that in which the valuation date falls.

- (5) The primary rate of an employer's contribution is the amount in respect of the cost of future accruals which, in the actuary's opinion, should be paid to a fund by all bodies whose employees contribute to it so as to secure its solvency, expressed as a percentage of the pay of their employees who are active members.
- (6) The actuary must have regard to-
- (a) the existing and prospective liabilities arising from circumstances common to all those bodies
  - (b) the desirability of maintaining as nearly constant a common rate as possible
  - (c) the current version of the administering authority's funding strategy mentioned in regulation 58 (funding strategy statements) and
  - (d) the requirement to secure the solvency of the pension fund and the long term cost efficiency of the Scheme, so far as relating to the pension fund.
- (7) The secondary rate of an employer's contributions is any percentage or amount by which, in the actuary's opinion, contributions at the primary rate should, in the case of a Scheme employer, be increased or reduced by reason of any circumstances peculiar to that employer.
- (8) A rates and adjustments certificate must contain a statement of the assumptions on which the certificate is given as respects
- (a) the number of members who will become entitled to payment of pensions under the provisions of the Scheme and
  - (b) the amount of the liabilities arising in respect of such members
- during the period covered by the certificate.
- (9) The administering authority must provide the actuary preparing a valuation or a rates and adjustments certificate with the consolidated revenue account of the fund and such other information as the actuary requests.