

Report Title:	GAD Section 13 Report
Contains Confidential or Exempt Information?	YES - Part I
Member reporting:	Councillor Lenton, Chairman Berkshire Pension Fund and Pension Fund Advisory Panels
Meeting and Date:	Berkshire Pension Fund and Pension Fund Advisory Panels – 12 November 2018
Responsible Officer(s):	Rob Stubbs, s151 Officer, Kevin Taylor, Deputy Pension Fund Manager
Wards affected:	None

REPORT SUMMARY

1. This report provides Members with an overview of The Government Actuary's Section 13 report issued in accordance with Section 13 of the Public Service Pensions Act 2013.
2. The full report, an Executive Summary and the Section 13 Report Appendices are attached to this report.

1 DETAILS OF RECOMMENDATION(S)

RECOMMENDATION: That Panel notes this report and:

- i) **Considers the Section 13 reports attached to this paper.**

2 REASON(S) FOR RECOMMENDATION(S) AND OPTIONS CONSIDERED

2.1 The Government Actuary has been appointed by the Ministry of Housing, Communities and Local Government (MCHLG) to report under section 13 of the Public Service Pensions Act 2013.

2.2 Section 13 requires the Government Actuary to report on whether the following scheme aims are achieved:

- Compliance
- Consistency
- Solvency
- Long term cost efficiency

2.3 The Section 13 report issued on 27 September 2018 is the first formal report of its kind and is based on the results of the 2016 triennial valuation of the LGPS Funds in England and Wales. A 'dry run' was produced and published in 2016 based on the results of the 2013 triennial valuation of the LGPS Funds in England and Wales.

2.4 Members will recall that the results of the 'dry run' flagged up the Berkshire Pension Fund in two particular areas:

- Funding Level; and
- Deficit Recovery Period.

2.5 A meeting between Members, the Government Actuary and the Fund's own Actuary to discuss these areas of concern was held on 24 May 2018 in the offices of the Pension Fund. The Government Actuary appeared positive in that the Fund had taken the appropriate actions to increase employer contribution rates and that the funding level had improved since 2016. In paragraph 1.6 of the Executive Summary attached at Appendix 1 to this paper, comment is made that Berkshire has "taken steps to increase their employer contributions which has helped reduce our concerns regarding long term cost efficiency".

2.6 Despite this, Berkshire is still mentioned throughout the full report, which can be found at Appendix 2 to this report, and the Appendices to the full report. Chart B1 on page 11 of the Appendices, which can be found at Appendix 3 to this paper, shows Berkshire's funding level to be bottom but one on the SAB Standard Basis and bottom but seven on the 2016 Local Bases.

2.7 The table on page 42 of the Appendices also shows Berkshire to have the longest deficit recovery period whilst the majority of Funds listed appear to be in surplus.

2.8 The four firms that provide actuarial services to the LGPS Funds in England and Wales have written to the Chair of the Local Government Pension Scheme Advisory Board expressing their material concerns as to the detail contained within the report and giving their reasons as to why, in their opinion, it is not in the interests of the LGPS for some of the Government Actuary's recommendations to be taken forward. This letter can be found at Appendix 4 to this report.

3 KEY IMPLICATIONS

3.1 The Scheme Manager (Administering Authority) is required by law to maintain the Royal County of Berkshire Pension Fund in accordance with the LGPS Regulations and all other associated legislation.

3.2 The Scheme Manager (Administering Authority) has a duty to set the investment strategy for the Fund whilst monitoring investment performance and the strategic allocation of assets.

4 FINANCIAL DETAILS / VALUE FOR MONEY

4.1 N/A

5 LEGAL IMPLICATIONS

5.1 The Local Government Pension Scheme Regulations 2013 (as amended) set out the statutory requirements of the Administering Authority in maintaining a Pension Fund.

6 RISK MANAGEMENT

- 6.1 Failure to maintain the Pension Fund in line with statutory legislation could result in the Scheme Manager (Administering Authority) being reported to the Pensions Regulator.

7 POTENTIAL IMPACTS

- 7.1 Failure to maintain the Pension Fund in accordance with statutory legislation could result in fines being imposed by the Pensions Regulator and a loss of confidence in the Scheme Manager (Administering Authority).

8 CONSULTATION

Not applicable.

9 TIMETABLE FOR IMPLEMENTATION

- 9.1 N/A

10 APPENDICES

Appendix 1 – Executive Summary of the Government Actuary's section 13 report

Appendix 2 – Full section 13 report

Appendix 3 – Appendices to full report

Appendix 4 – Actuarial firms' letter to Chair of SAB

11 BACKGROUND DOCUMENTS

11.1 Public Service Pensions Act 2013

11.2 Local Government Pension Scheme Regulations 2013 (as amended)

12 CONSULTATION (MANDATORY)

Name of consultee	Post held	Date issued for comment	Date returned with comments
Cllr John Lenton	Chairman – Berkshire Pension Fund Panel		
Rob Stubbs	Section 151 Officer		



Government
Actuary's
Department

Local Government Pension Scheme England and Wales

Review of the Actuarial Valuations of
Funds as at 31 March 2016 Pursuant
to Section 13 of the Public Service
Pensions Act 2013

Executive Summary

Date: 27 September 2018

Author: Martin Clarke, John Bayliss



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Executive summary

- 1.1 The Government Actuary has been appointed by the Ministry of Housing, Communities and Local Government (MHCLG) to report under section 13 of the Public Service Pensions Act 2013 in connection with the actuarial valuations of the 91 funds in the Local Government Pension Scheme in England and Wales ('LGPS' or 'the Scheme').
- 1.2 Section 13 requires the Government Actuary (GAD) to report on whether the following aims are achieved:
 - compliance
 - consistency
 - solvency
 - long term cost efficiency
- 1.3 This is the first formal section 13 report. This report is published as three documents: the executive summary, the report and appendices. A 'Dry Run' was produced in respect of the 2013 valuations and published in 2016.¹
- 1.4 This report is based on the actuarial valuations of the 91 funds, other data provided by the funds and their actuaries, and a significant engagement exercise with affected funds. We are grateful to these stakeholders for their assistance in preparing this report. We are committed to preparing a section 13 report that makes practical recommendations to advance the aims listed above. We will continue to work with stakeholders to advance these aims and expect that our approach to section 13 will continue to evolve to reflect ever-changing circumstances and feedback received.

Overall comments

- 1.5 In aggregate, the LGPS is in a strong financial position and funds have made significant progress since the 2013 valuation based on the criteria that:
 - total assets have grown in market value from £180bn to £217bn. The aggregate funding level on prudent local bases has improved from 79% to 85% at 2016
 - the improved funding level (assets divided by liabilities) is due in part to the significant financial contributions from LGPS employers (total contributions in the three years covered by the 2013 valuation report were £6.9bn per year, on average of which approximately £2bn per year were deficit recovery payments), as well as better than expected returns on assets
 - on our best estimate basis, the LGPS was in surplus in aggregate at 2016 (funding level approximately 106%), and around 60 of the 91 individual funds were in surplus. This means that we expect there is, on average, a greater than 50% chance that existing assets would be sufficient to cover benefits in respect of accrued service when they fall due
- 1.6 Significant progress has been made by a number of funds that were highlighted in the dry run, which we welcome:
 - South Yorkshire Passenger Transport Fund's assets and liabilities have been transferred to Greater Manchester Pension Fund, to remove the specific risk arising from the fund being backed by a single private sector employer

¹ <http://www.lgpsboard.org/images/Reports/Section13DryRun20160711.pdf>

- Berkshire and Somerset Pension Funds have taken steps to increase their employer contributions which has helped reduce our concerns regarding long term cost efficiency
- a consistent definition of Primary and Secondary Contribution Rates has been agreed between the four firms of actuarial advisors that undertake local valuations, which has gone a long way towards improving consistency of valuation reporting

- 1.7 We also consider it our role to highlight specific areas where risks may be present. We have looked at a range of metrics to identify potential issues in respect of solvency and long term cost efficiency. Each fund's score under each measure is colour coded (red, amber or green). In total, 70 out of 89 funds tested had green flags on all solvency and long term cost efficiency metrics. This is a significant improvement compared with the previous dry run report (52 out of 90). There are a total of 20 amber and 2 red flags, which is again a significant improvement compared with the dry run (58 amber, 5 red).
- 1.8 Based on the criteria above, the Scheme is in a strong financial position, and has made significant progress since the dry run. To further improve transparency and comparability, we consider it would be helpful for administering authorities and other stakeholders if they were able to make meaningful comparisons between the 91 actuarial valuations. Consequently this report makes three recommendations on consistency which affect all the funds. It also makes one specific recommendation on solvency (affecting one fund) and one recommendation on long term cost efficiency (affecting all funds).
- 1.9 We set out below our findings on each of the four aims and our recommendations.

Compliance

- 1.10 Our review indicated that fund valuations were compliant with relevant regulations on the basis described in Chapter 2 of this report.

Consistency

- 1.11 We interpreted 'not inconsistent' to mean that methodologies and assumptions used, in conjunction with adequate disclosure in the report, should facilitate comparison by a reader of the reports.
- 1.12 Readers of the actuarial valuations face two difficulties in making meaningful comparisons between the reports:
- presentational: information is presented in different ways in different reports (eg funding levels), and sometimes information is contained in some reports but not others (eg life expectancies), so readers may have some difficulties in locating the information they wish to compare. We call this presentational inconsistency
 - evidential: even when the reader has located the relevant information (eg funding levels), differences in the underlying methodology and assumptions mean that it is not possible to make a like-for-like comparison. We call this evidential inconsistency. We believe that local circumstances may merit different assumptions (eg financial assumptions are affected by the current and future planned investment strategy, different financial circumstances leading to different levels of prudence adopted). However, in some areas, it appears that the choice of assumptions is more dependent on the house view of the particular firm of actuaries advising the fund, than on the local circumstances of the fund
- 1.13 There has been an improvement in consistency of presentation of contribution rates emerging from the 2016 valuations.

1.14 However, despite this welcome improvement, inconsistencies remain, both presentational and evidential. Our recommendations are designed to:

- encourage the presentation of results in a consistent way which is easy to understand and compare across the whole LGPS
- move towards an assumption set that differs from one fund to another only where local conditions justify it, rather than being dependent on the house view of a particular actuarial advisor

Recommendation 1: We recommend that the Scheme Advisory Board should consider how best to implement a standard way of presenting relevant disclosures in all valuation reports to better facilitate comparison, with a view to making a recommendation to the MHCLG minister in advance of the next valuation. We have included a draft dashboard in this report to facilitate the Scheme Advisory Board's consultation with stakeholders.

Recommendation 2: We recommend that the Scheme Advisory Board should consider what steps should be taken to achieve greater clarity and consistency in actuarial assumptions, except where differences are justified by material local variations, with a view to making a recommendation to the MHCLG minister in advance of the next valuation.

1.15 In relation to academies, we support the work of the SAB in seeking to simplify and streamline administration processes, noting that these improvements are not just relevant to academies, but to all employer

groups. We expect this to lead to more consistent data quality, which in turn assists consistency objectives.

Recommendation 3: We recommend that the Scheme Advisory Board seeks a common basis for future conversions to academy status that treat future academies more consistently, with a view to making a recommendation to the MHCLG minister in advance of the next valuation.

Solvency

1.16 As set out in CIPFA's Funding Strategy Statement Guidance,² the rate of employer contributions shall be deemed to have been set at an appropriate level to ensure solvency of the pension fund if:

- the rate of employer contributions is set to target a funding level for the whole fund (assets divided by liabilities) of 100% over an appropriate time period and using appropriate actuarial assumptions (where appropriateness is considered in both absolute and relative terms in comparison with other funds)

and either:

- employers collectively have the financial capacity to increase employer contributions, should future circumstances require, in order to continue to target a funding level of 100%

or

- there is an appropriate plan in place should there be, or if there is expected in future to be, no or a limited number of fund employers, or a material reduction in the capacity of fund employers to increase contributions as might be needed

² <http://www.cipfa.org/policy-and-guidance/publications/p/preparing-and-maintaining-a-funding-strategy-statement-in-the-lgps-2016-edition>

1.17 For open funds, solvency is dependent on employers being able to pay contributions as required, knowing that these contributions may increase or decrease significantly in future. Considering the LGPS as a whole, our long term expectation is that contributions will fall below their current levels as remaining deficits are paid off. However there is a significant chance that contributions remain at their current levels or even increase further in the long term, and in the short term there is always the risk that contributions need to increase or decrease following actuarial valuations.

1.18 At a fund level, we have expressed our stress tests in terms of the relative effects of an adverse stress to asset values on core spending power for English local authorities, and financing data for Welsh local authorities. We find that if asset values were to fall by 15%, then there is a range of impacts on different funds and, on the basis of our assumptions,³ funds could face increases in contribution over 3% of their core spending. Funds should be aware of this risk, and consider if any action should be taken to manage it. For the avoidance of doubt, we do not consider that this risk implies that the aims of section 13 are not achieved.

1.19 West Midlands Integrated Transport Authority Pension Fund (WMITA) retains the specific risk arising from the majority of the fund liabilities being backed by a single private sector employer and being closed to new entrants. The administering authority and the employers have made substantial efforts by paying significant contributions to mitigate this risk. However, without a plan in place to ensure that the WMITA fund continues to meet benefits due in an environment of no future employer contributions being available, we do not think that any (realistic) employer contribution rate would be sufficient to achieve the solvency

aim of section 13. We recommend that the administering authority put such a plan in place.

Recommendation 4: We recommend that the administering authority put a plan in place to ensure that the benefits of members in the West Midlands Integrated Transport Authority Pension Fund can continue to be paid in the event that employers' contributions, including any exit payments made, are insufficient to meet those liabilities.

Long term cost efficiency

1.20 As set out in CIPFA's Funding Strategy Statement Guidance, we consider that the rate of employer contributions has been set at an appropriate level to ensure long term cost efficiency if it is sufficient to make provision for the cost of current benefit accrual, with an appropriate adjustment to that rate for any surplus or deficit in the fund.

1.21 A number of funds highlighted in the Dry Run have made progress, with their employers increasing contributions following the 2016 valuation.

1.22 CIPFA's Funding Strategy Statement Guidance states "Administering authorities should avoid continually extending deficit recovery periods at each and subsequent actuarial valuations. Over time and given stable market conditions, administering authorities should aim to reduce deficit recovery periods." In the dry run, we established the deficit reconciliation measure so that funds could confirm that the deficit recovery plan can be demonstrated to be a continuation of the previous plan, after allowing for actual fund experience.

³ Core spending power is a measure of financial resource of the underlying (tax raising) employers. Details are provided in Appendix C.

- 1.23 We consider that reconciliation of the deficit recovery plan is an important component of section 13 for all funds.
- 1.24 Through this exercise, we have identified and engaged with a number of funds that have extended their deficit recovery end points. We have not concluded that this implies the aims of section 13 are not achieved, however we do recommend that all funds review their funding strategy and consider whether this is in accordance with the CIPFA guidance referred to above.

Recommendation 5: We recommend that all funds review their funding strategy to ensure that the handling of surplus or deficit is consistent with CIPFA guidance and that the deficit recovery plan can be demonstrated to be a continuation of the previous plan, after allowing for actual fund experience.

- 1.25 We would not normally expect to see employer contribution rates decreasing (reducing the burden on current taxpayers) at the same time as the deficit recovery end point being extended further into the future (increasing the burden on future taxpayers).



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Local Government Pension Scheme England and Wales

Review of the Actuarial Valuations of
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1

Introduction

- 1.1 This report is addressed to the Ministry of Housing, Communities and Local Government (MHCLG) as the responsible authority for the purposes of subsection (4) of section 13 of the Public Service Pensions Act 2013 ('the Act'). GAD has prepared this report to set out the results of our review of the 2016 funding valuations of the Local Government Pension Scheme (LGPS). This report will be of relevance to: administering authorities and other employers, actuaries performing valuations for the funds within the LGPS, the LGPS Scheme Advisory Board (SAB), HM Treasury (HMT) and the Chartered Institute of Public Finance and Accountancy (CIPFA), as well as other LGPS stakeholders.
- 1.2 In this introduction we provide:
- background information on the LGPS and fund valuations
 - background information on this review and section 13 of the Act
 - details of the structure of this report, including the executive summary and the appendices
 - discussion of the metrics and flags that we have used in this report, noting the significant improvement in outcomes compared with the previous review
 - commentary on the role of the actuary and other stakeholders, noting that nothing in this report should be taken as criticism of administering authorities, their actuary, or other stakeholders
- discussion of the data and assumptions underpinning this review
 - a note of our engagement with stakeholders
 - a statement of compliance and limitations
- ### The Local Government Pension Scheme and fund valuations
- 1.3 The LGPS is a funded scheme and periodic assessments are needed to ensure the fund has sufficient assets to meet its liabilities. Employer contribution rates may change depending on the results of valuations. Scheme regulations set out when valuations are to be carried out.
- 1.4 Each LGPS pension fund is required to appoint its own fund actuary, who carries out the fund's valuation. The fund actuary uses a number of assumptions to value the liabilities of the fund. Liabilities are split between those that relate to the past (the past service cost), and those that relate to the future (the future service cost). The results of the valuation may lead to changes in employer contribution rates for both future and past service costs.
- ### GAD's review and section 13
- 1.5 Section 13 applies for the first time to the valuations as at 31 March 2016.
- 1.6 Subsection (4) of section 13 requires the Government Actuary as the person appointed by MHCLG to report on whether the four main aims are achieved, namely:

- compliance: whether the fund's valuation is in accordance with the scheme regulations
- consistency: whether the fund's valuation has been carried out in a way which is not inconsistent with the other fund valuations within LGPS
- solvency: whether the rate of employer contributions is set at an appropriate level to ensure the solvency of the pension fund
- long term cost efficiency: whether the rate of employer contributions is set at an appropriate level to ensure the long term cost efficiency of the scheme, so far as relating to the pension fund

1.7 Section 13 subsection (6) states that if any of the aims of subsection (4) are not achieved:

- a) the report may recommend remedial steps
- b) the scheme manager must:
 - i) take such remedial steps as the scheme manager considers appropriate
 - ii) publish details of those steps and the reasons for taking them
- c) the responsible authority may
 - iii) require the scheme manager to report on progress in taking remedial steps
 - iv) direct the scheme manager to take such remedial steps as the responsible authority considers appropriate

1.8 A dry run of this exercise was published¹ following the valuations as at 31 March 2013.

Structure of this report

1.9 An executive summary to this report is provided in a separate document.

1.10 In the remaining chapters in this report, we consider each of the four aims of section 13:

- Chapter 2: Compliance
- Chapter 3: Consistency
- Chapter 4: Solvency
- Chapter 5: Long term cost efficiency

1.11 Appendices are contained in a separate document, and cover:

- Appendix A: Compliance
- Appendix B: Consistency
- Appendix C: Solvency
- Appendix D: Long term cost efficiency
- Appendix E: Asset liability study
- Appendix F: Data provided
- Appendix G: Assumptions
- Appendix H: Section 13 of the Public Service Pensions Act 2013
- Appendix I: Extracts from other relevant regulations

Metrics and flags

1.12 In its notes to the establishment of key performance indicators² (KPIs), the Scheme Advisory Board states: "The SAB considers that maintaining and improving the overall performance of the LGPS is best done by focusing on improving key financial and governance metrics of 'under-performing' funds, and concurrently seeking to raise the level of performance of 'average' funds to that of the 'highest performing' funds."

¹ <http://www.lgpsboard.org/images/Reports/Section13DryRun20160711.pdf>

² <http://committees.westminster.gov.uk/documents/s15058/11%20-%20Appendix%201%20-%20KPI%20Guidance.pdf>

1.13 We have looked at a range of metrics to identify potential issues in respect of solvency and long term cost efficiency. Each fund's score under each measure is colour coded or flagged, where:

- indicates that there are no material issues that may contribute to a recommendation for remedial action in order to ensure solvency or long term cost efficiency
- indicates a potential issue should be recognised, but in isolation would not usually contribute to a recommendation for remedial action in order to ensure solvency or long term cost efficiency
- indicates a potentially material issue that may contribute to a recommendation for remedial action in order to ensure solvency or long term cost efficiency

1.14 The trigger points for these flags are based on a combination of absolute measures and measures relative to the bulk of the funds in scope. We have had regard to the particular circumstances of some potential exceptions, following engagement with the administering authority and the fund actuary.

Results

1.15 In total, 70 out of 89 funds tested had green flags on all solvency and long term cost efficiency metrics. This is a significant improvement compared with the previous dry run report (52 out of 90). There are a total of 20 amber and 2 red flags, which is again a significant improvement compared with the dry run (58 amber, 5 red).

Interpretation of flags

1.16 While they should not represent targets, these measures and flags help us determine whether a more detailed review is required, for example, we might have concern where

multiple measures are triggered amber for a given fund.

1.17 In broad terms, amber flags are advisory signals that may indicate action and a need for further investigation through engagement with the relevant administering authority and their actuary. It should be noted that these flags are intended to highlight areas where risk may be present, or further investigation is required. Where an amber flag remains following that engagement, we believe this relates to an area where an issue remains that administering authorities and pension boards should be aware of. There is no implication that the administering authority was previously unaware of the issue.

1.18 A green flag (ie the absence of a red or amber flag) does not necessarily indicate that no risk is present and similarly the fact that we are not specifically suggesting remedial action does not mean that scheme managers should not consider actions.

Limitations

1.19 We recognise that the use of data and models has limitations. For instance, the data that we have from valuation submissions and publicly available financial information is likely to be significantly less detailed than that available to funds. Our risk assessment framework is designed to broadly assess scheme risks and decide on our engagement with schemes on an indicative basis.

1.20 Because of the nature of this exercise, the only post-valuation events considered are those that may have already been taken into account in the valuation disclosures.

1.21 Further detail is provided in the solvency and long term cost efficiency chapters and appendices.

Exclusions

1.22 The Environment Agency Closed Pension Fund is different from other LGPS funds, in that the benefits payable and costs of the fund are met by Grant-in-Aid funding by the Department for Environment, Food and Rural Affairs³, guaranteeing the security of these benefits. South Yorkshire Passenger Transport Pension Fund's assets and liabilities have been transferred to the Greater Manchester Pension Fund, hence we have not considered the fund further. In general, these funds have been excluded from the analyses that follow.

The role of the actuary and other stakeholders

1.23 The following key has been used to identify the actuarial advisers for each fund:

-  Aon
-  Barnett Waddingham
-  Hymans Robertson
-  Mercer

1.24 Local valuation outputs depend on the local circumstances of each fund, the administering authorities' Funding Strategy Statements, and the actuary's work on the valuation.

1.25 We have reported where the review raised concerns in relation to the aims of section 13. In some cases these concerns are related to the particular circumstances of individual funds – for example mature funds that could have large liabilities relative to the financial resources of their employers have some inherent risks and may be more likely to be flagged under our 'asset shock' measure.

1.26 It is not our role to express an opinion as to whether any concerns raised are driven by the local circumstances of a fund, or the actions of authorities, their actuary, or other stakeholders. Nothing in this report should be taken as criticism of authorities, their actuary, or other stakeholders.

Data and assumptions

1.27 The metrics are based on publicly available data and data provided to GAD by or on behalf of administering authorities. Further details are in Appendix F.

1.28 To make meaningful comparison of valuation results, we have referred to results restated on two bases:

- the standard basis established by the SAB, as calculated by fund actuaries
- a market consistent basis derived by us

1.29 Further details of both these bases are set out in Appendix G.

1.30 The market consistent basis is GAD's best estimate as at 2016, based on our views of likely future returns on each asset class across the Scheme. 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 rates should be. We have presented GAD's view above, but there are other reasonable best estimate bases which may give materially different results.

1.31 This use of these standard bases does not imply the bases are suitable to be used for funding purposes:

- the SAB standard basis is not market consistent

³ <http://www.lgpsboard.org/images/Valuations2016/EAPFClosed2016.pdf>

- the market consistent basis is a best estimate (while regulations and CIPFA guidance call for prudence to be adopted). This best estimate is based on the average investment strategy for the overall scheme, and so will not be pertinent to any given fund's particular investment strategy. Further, this does not take into account any anticipated changes in investment strategy that may be planned or in train

1.32 The local valuations and our calculations underlying this report are based on specific sets of assumptions about the future. Some of our solvency measures are stress tests but these are not intended to indicate a worst case scenario.

Engagement with stakeholders

1.33 In preparing this report, we are grateful for helpful discussions with and cooperation from:

- MHCLG
- fund administrators
- actuarial advisors
- LGPS Scheme Advisory Board
- HMT

1.34 We note that this report is GAD's alone and the stakeholders above are not responsible for the content.

1.35 We are committed to preparing a section 13 report that makes practical recommendations to advance the aims in the legislation. We will continue to work with stakeholders to advance these aims and expect that our approach to section 13 will continue to evolve to reflect ever changing circumstances and feedback received.

Compliance and limitations

1.36 This work has been carried out in accordance with the applicable Technical Actuarial Standard: TAS 100 issued by the Financial Reporting Council (FRC). The FRC sets technical standards for actuarial work in the UK.

1.37 GAD has no liability to any person or third party for any act or omission taken, either in whole or in part, on the basis of this report. No decisions should be taken on the basis of this report alone without having received proper advice. GAD is not responsible for any such decisions taken.

1.38 We understand and assume that there is no regulatory authority assumed by or conferred on the Government Actuary in preparing this or any future section 13 report. In addition, the appointment to report under section 13 does not give the Government Actuary any statutory power to enforce actions on scheme managers (or others).



2

Compliance



Key compliance findings

- All reports checked contained a statement of compliance.
- All reports checked contained confirmation of each of the requirements in Regulation 62.
- We concluded that the aims of section 13 were achieved under the heading of compliance.

- 2.1 Section 13 requires that GAD must report on whether the actuarial valuations of the funds have been completed in accordance with the scheme regulations.
- 2.2 We found no concerns over compliance.
- 2.3 There is a great deal of consistency between the actuarial methodologies and the presentation of the actuarial valuation reports for funds that are advised by the same firm of actuarial advisors (see chapter on Consistency). Accordingly, GAD has selected one fund as a representative example from each of the firms of actuarial advisors, and has assessed whether these reports have been completed in accordance with Regulation 62.⁴
- 2.4 We found that the actuarial valuation reports for each of the above funds have been completed in accordance with Regulation 62, and have therefore concluded that the compliance criteria of section 13 have been achieved. We note that this is not a legal opinion.
- 2.5 Our review of compliance is focused on the actuarial valuation reports produced under Regulation 62. We have not, for example, systematically reviewed Funding Strategy Statements prepared under Regulation 58.
- 2.6 The comments we make in subsequent chapters on consistency, solvency and long term cost efficiency do not imply that we believe that the valuations are not compliant with the regulations. These comments relate only to whether the valuations appear to achieve the aims of section 13.

⁴ The statutory instrument governing the publication of actuarial valuations for the LGPS in England and Wales is Regulation 62 of the Local Government Pension Scheme Regulations 2013.



3

Consistency



Key consistency findings

- There has been an improvement in relation to disclosure of contribution rates.
- We recommend the SAB consider how best to implement a standard way of presenting relevant disclosures.
- The following assumptions show a marked difference for funds advised by the different firms of actuarial advisors that are not apparently due to local differences:
 - discount rate
 - mortality improvements
 - salary increases
 - commutation
- We recommend the SAB consider what steps should be taken to achieve greater clarity and consistency in actuarial assumptions, except where differences are justified by material local variations.
- We recommend the SAB seeks a common basis for future conversions to academy status.

3.1 Section 13 requires that GAD must report on whether the actuarial valuation has been carried out in a way which is not inconsistent with other valuations.

3.2 In this chapter we:

- provide some background on the legislation, and previous valuations
- discuss two types of consistency: presentational and evidential
- consider presentational consistency in more detail, looking in particular at the presentation of employer contribution rates and the analysis of the change in these rates since the previous valuation

- consider evidential consistency in more detail, looking first at liability values and then at various assumptions: discount rate, mortality improvements, salary increases and commutation assumptions
- conclude and make recommendations
- take a more detailed look the treatment of academies

Background: legislation and previous valuations

3.3 Section 13(4)(b) requires us to report on whether actuarial valuations have been carried out in a way which is not inconsistent with other valuations completed under the scheme regulations.

- 3.4 We consider how consistency relates to the ability to compare two actuarial valuation reports and draw appropriate conclusions. This relates to how key information is presented as well as whether the outcomes are able to be compared. We consider it is wholly appropriate for assumptions to be set relative to local conditions, but that this should be clearly explained and permit such comparisons to be made.
- 3.5 Note that Regulation 62 of the 2013 regulations does not include a requirement that the actuarial valuations are carried out in a way which is not inconsistent with other valuations completed under the scheme regulations. However, section 13 of the 2013 Act requires us to comment whether they have been carried out in this way.
- 3.6 We found improvements in consistency of contribution rate disclosure since the dry run. This was a major concern at the time. We welcome this significant progress. However, we found some other aspects of consistency had not improved since the dry run. Some aspects of this are discussed below.

Presentational and evidential consistency

- 3.7 Readers of the actuarial valuations face two difficulties in making meaningful comparisons between the reports:
- Presentational: information may be presented in different ways in different reports (eg funding levels), and sometimes information is contained in some reports but not others (eg life expectancies), so readers may have some difficulties in locating the information they wish to compare. We call this presentational inconsistency.
 - Evidential: even when the reader has located the relevant information (eg funding levels), differences in the underlying methodology and assumptions mean that it is not possible to make a like for like comparison. We call this evidential inconsistency. We believe that local circumstances may merit different assumptions (eg financial assumptions are affected by the current and future planned investment strategy, different financial circumstances leading to different levels of prudence adopted). However, in some areas, it appears that the choice of assumptions is highly dependent on the house view of the particular firm of actuaries advising the fund, with only limited evidence of allowance for local circumstances.
- 3.8 Under both aspects there is a great deal of consistency when comparing any two reports produced by the same firm of actuarial advisors, but comparisons between reports of different firms of actuaries are more difficult.

Presentational consistency

- 3.9 We have taken a report produced by each firm of actuarial advisors to assess whether the information disclosed is consistent across all four advisors. The chosen funds are:
- Merseyside Pension Fund: Mercer
 - London Borough of Haringey Pension Fund: Hymans Robertson
 - Hampshire County Council Pension Fund: Aon
 - Royal County of Berkshire Pension Fund: Barnett Waddingham
- 3.10 All four funds provide most of the key information that we expected from an actuarial valuation report. Each report also contains a section that summarises the changes to the funding position since the 2013 reports, and these are presented in very similar ways making for easy comparison.

3.11 However, the whole fund secondary contribution rates were not presented consistently, which might cause user difficulties if they wished to make comparisons between funds. This is discussed in more detail below.

Contribution rates

3.12 Contribution rates include the following components:

- primary contribution rate
- secondary contribution rate
- member contribution rate

3.13 The primary contribution rates are easily found in the valuation reports for each fund, and, as they are all expressed as a percentage of pay, are easily comparable. The same is true of member contribution rates.

3.14 Secondary contribution rates are more complex and the whole fund rates are not

presented consistently in the valuation reports. All firms of actuarial advisors provide a detailed breakdown of the secondary contribution rates by employer for each of the next three years in their Rates and Adjustments Certificates. However, the summary statistics provided for the funds as a whole varied significantly between firms of actuarial advisors.

3.15 Table 3.1 summarises the information with regard to secondary contribution rates that are given in the valuation reports for the different firms of actuarial advisors. The inconsistent presentation of the secondary contribution rates relates to the presentation of the whole of fund / aggregate secondary contribution rates rather than individual employer secondary contribution rates. To aid comparison of these rates it would be helpful to present them more consistently. Given funds are of different sizes, translating whole fund secondary rates into a percentage of pensionable pay would assist.

Table 3.1: Secondary contribution rates

Fund (Firm of actuarial advisors)	2017	2018	2019	Average for recovery period
Hampshire (Aon)	£75,680,400 less 2.9% of pensionable pay	£81,548,300 less 1.9% of pensionable pay	£87,248,800 less 0.9% of pensionable pay	7.5% of pensionable pay
Berkshire (Barnett Waddingham)	£21,017,000 or 5.3% of pensionable pay	£27,468,000 or 6.7% of pensionable pay	£34,075,000 or 8.2% of pensionable pay	7.7% of pensionable pay
Haringey (Hymans Robertson)	£9,252,000	£8,612,000	£9,554,000	-
Merseyside (Mercer)	£136,300,000 less 0.9% of pensionable pay	£52,500,000 less 0.4% of pensionable pay	£53,600,000 plus 0.1% of pensionable pay	-

- 3.16 Barnett Waddingham expressed the secondary contribution rate as a percentage of pay and also gave the equivalent monetary amount. Aon and Mercer expressed the secondary contribution rate as a combination of a monetary amount and a (negative) percentage of pay. Hymans Robertson gave a monetary amount only.
- 3.17 Aon and Barnett Waddingham gave a single headline figure that summarises the average secondary contribution rate over the entire deficit recovery period for that fund.
- 3.18 In our view, the 2016 reports represent an improvement in the consistency of disclosures compared to those in the 2013 reports. Nevertheless, presentational inconsistency makes it difficult to compare the funds from all four firms of actuarial advisors based on the information provided in the valuation reports, without performing further analysis.

Change in contribution rates since the previous valuation

- 3.19 We note that regulations have changed with common contributions being replaced by primary and secondary contribution rates for employers. This makes comparison with the previous valuation difficult. Ideally, in future, we would expect to see a comparison of recommended primary and secondary contribution rates with those from the previous valuation. Table 3.2 shows the comparisons provided in each of the four reports.
- 3.20 A comparison with aggregate employer rates is provided in some cases. Others provide a comparison of primary rates only. We believe such a comparison is useful to enable the reader to understand the total level of contributions being paid into the fund.

Table 3.2: Comparison with prior valuation contribution rates

Fund	Comparison provided
Hampshire (Aon)	Comparison of the aggregate employer total contribution rate
Berkshire (Barnett Waddingham)	Analysis of the change in primary contribution rates, but no comparison of total employer rates
Haringey (Hymans Robertson)	The 2013 common contribution rate ⁵ alongside a comment that the change in regulatory regime and guidance on contribution rates means that a direct comparison to the whole fund rate at 2016 is not appropriate
Merseyside (Mercer)	Breakdown of the primary employer contribution rate compared with the previous valuation

⁵ The common contribution rate (CCR) has been replaced by primary and secondary contribution rates in legislation. In some cases the CCR bore no relationship to actual contributions paid by employers.

Evidential consistency

3.21 We have considered whether the local fund valuations have been carried out in a way which is not inconsistent with each other. We have not found any significant inconsistencies in the results of the valuations (the recommended employer contribution rates), but there are significant inconsistencies in the assumptions adopted.

3.22 Inconsistencies in the methodology and assumptions are less critical than inconsistencies in the results would be. However these inconsistencies make it difficult for users to compare reports, and in our view do not serve any clear purpose. We therefore make a recommendation below that the SAB consider this issue.

3.23 In the paragraphs that follow we:

- look at the range of difference in the value assigned to the liabilities between the local basis and the standard SAB basis, which illustrates the impact of inconsistencies in the local bases

- consider some specific assumptions in detail (including the discount rate), to illustrate the apparent inconsistencies

Value assigned to the liabilities

3.24 The value assigned to liabilities in each actuarial valuation report has been calculated on assumptions set locally. Differing levels of prudence are to be expected and may be reflective of local variations in risk appetite, but care needs to be taken when comparing results.

3.25 Table 3.4 shows a comparison of local basis liability values vs SAB basis liability values, and charts B1 and B2 in Appendix B shows a comparison of local funding levels vs SAB basis funding levels, which illustrate the variation in levels of prudence adopted in each valuation, and therefore the difficulty in drawing conclusions based on liability values.

3.26 The liability value on the local basis for Berkshire is lower than on the SAB standard basis, yet the reverse is true for the other three funds. Across the whole Scheme, the range is between 36% and -1%. This illustrates the difficulty for the reader in drawing comparisons between reports.

Table 3.3: Liability values

Fund	Local basis £m	SAB standard basis £m	Difference between local basis and SAB standard basis
Hampshire (Aon)	6,453	5,718	13%
Berkshire (Barnett Waddingham)	2,242	2,267	-1%
Haringey (Hymans Robertson)	1,323	1,118	18%
Merseyside (Mercer)	8,081	7,019	15%

Assumptions adopted

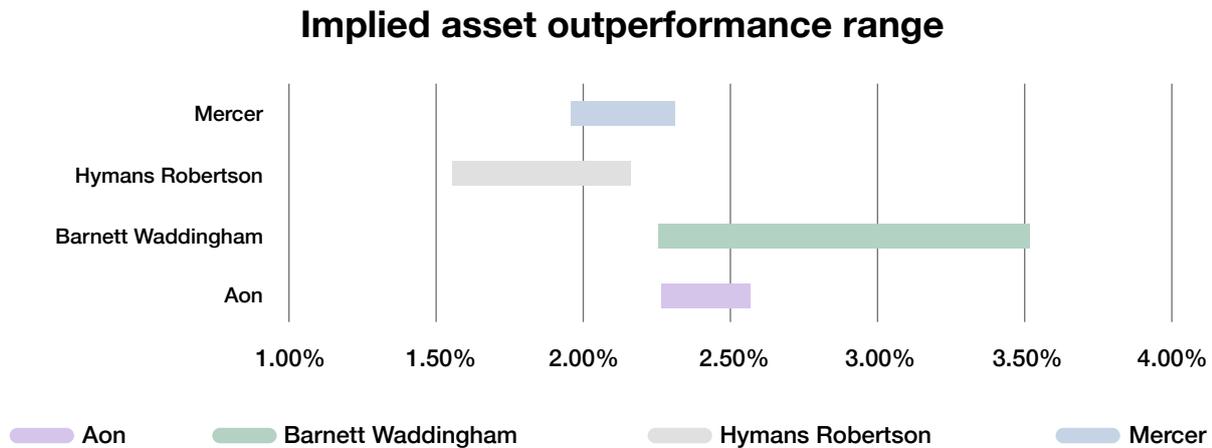
3.27 We compared the following key assumptions that need to be made for the actuarial valuations for all funds to consider whether variations in those assumptions are justified in terms of local conditions:

- discount rate
- mortality improvements
- salary increases
- commutation rates

Discount rates

3.28 A way of measuring the level of prudence built into the pre-retirement discount rate used to assess past service liability is by considering the implied asset outperformance within the discount rate (the implied real return above the risk free return within the discount rate) (see Appendix B.8 for more details). Note this applies to all assets, not just 'return seeking' assets. The following chart illustrates implied asset outperformance ranges within the discount rate used to assess past service liability⁶, by firm of actuarial advisors.

Chart 3.1: Implied asset outperformance



⁶ Note that some funds use different discount rates to assess past service liabilities and future service contribution rates, we consider only the former here.

3.29 We would expect some fund-by-fund variation due to asset strategy and different levels of risk appetite. Therefore we do not consider the fact that funds adopt different discount rates to be a particular cause for concern. Future asset returns are highly uncertain, and so there is a wide range of reasonable assumptions that may be adopted.

3.30 We are not stating that any particular set of assumptions adopted is not reasonable. However it does appear that they are not consistent with each other.

3.31 Chart 3.1 illustrates one aspect of this difference in assumptions applied by the four firms of actuarial advisors. The funds advised by Hymans Robertson tended to show the lowest level of asset outperformance within the discount rate. Those advised by Mercer sit in the middle of the range, and the funds advised by Aon and Barnett Waddingham have the highest level of outperformance within the discount rate used for assessing past service liability values.⁷

3.32 We might expect less bunching by firm of actuarial advisors if discount rates were set according to local conditions. The discount rate chosen appears to depend on the choice of firm of actuarial advisors. In this regard, we consider the aim of section 13 under consistency may not be achieved.

3.33 We acknowledge, given there are multiple funds advised by four different actuarial advisors, that there is difficulty ensuring consistency of methodologies and assumptions used. This, in conjunction with adequate disclosure in the reports, should allow comparison by a reader of the reports. Consistency is, however, one of the four aims of section 13 and we consider that to improve consistency, stakeholders should work together to overcome some of these difficulties.

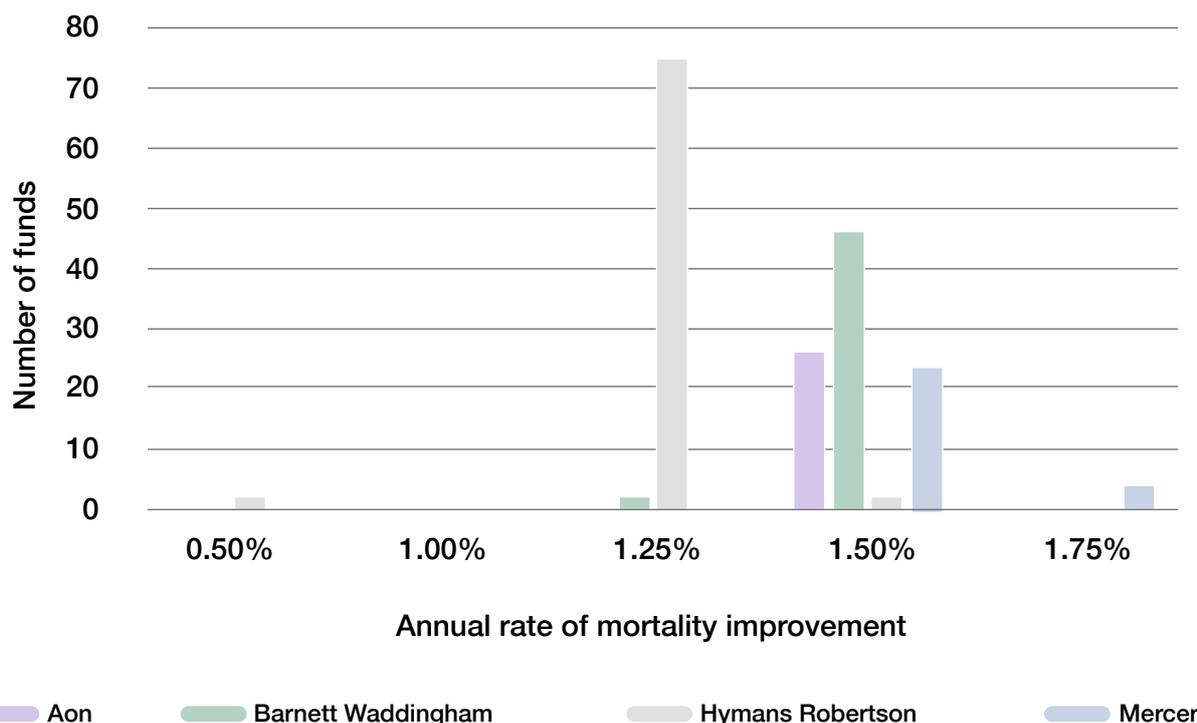
Mortality improvements

3.34 The mortality assumption is a function of current (or base) mortality and expectations for future improvements. It is reasonable to set the base mortality assumption on local data. However, mortality improvements must be based on a projection, such as the Institute and Faculty of Actuaries' CMI projections⁸ with an assumed rate of future increases counted separately. The assumed long term rates of future mortality improvements for males and females are summarised in Chart 3.2 below:

⁷ The asset outperformance in Chart 3.1 relates to the discount rate for past service liabilities only. For setting future service contribution rates, Hymans Robertson use a stochastic approach . Mercer follow a deterministic method, but add eg 0.5% to the discount rate for setting contribution rates.

⁸ <https://www.actuaries.org.uk/learn-and-develop/continuous-mortality-investigation/cmi-investigations/mortality-projections>

Chart 3.2: Mortality improvements assumptions for males and females



3.35 Hymans Robertson tends to assume a rate of mortality improvement 0.25% lower than that of the three other firms of actuarial advisors. Hymans Robertson also use an earlier mortality improvements model. The other three firms of actuarial advisors used higher improvement rates and based their mortality improvements on more recent projections. This is understandable because it is difficult to assess future mortality trends, and during the period up to 2016 there was considerable uncertainty in the direction of these trends. The assumption adopted by each fund appears to be heavily influenced by the advisor rather than any local considerations. Each assumption falls within an acceptable range, but we consider it would be helpful if the four firms adopted a consistent assumption for this item.

Salary increases and commutation assumptions

- 3.36 The rate of promotional pay increases and commutation (the extent to which members on average exchange pension in favour of a tax free cash benefit) assumptions appear in the case of some of the firms of actuarial advisors to be set as a house view rather than an approach clearly based on local conditions. Charts B5 and B6 in Appendix B illustrate this.
- 3.37 Most firms of actuarial advisors confirmed they perform some analysis under both these areas. In some cases this appears to result not in local variation, but rather an average assumption across the funds under a given advisor. The firms of actuarial advisors cite lack of materiality in some cases, which we consider reasonable. However, in these cases, we believe it would be helpful to use a common assumption across all funds to aid comparability.

Conclusion and recommendations

3.38 Section 13 requires valuations to be carried out in a way that is not inconsistent with other LGPS fund valuations. We interpret this in a presentational and evidential way. We consider the criterion has not been achieved if a user is not able to draw comparisons between the results from two valuation reports.

3.39 Stakeholders may wish to set out objectives for a possible project to improve consistency to help readers to understand the prudence being used in the report with regard to both past service liabilities and aggregate contribution rates. These objectives may include:

- a framework for relevant assumptions to be set by local government collectively
- recognition that, where appropriate, assumptions should be set according to local conditions, following review of local experience and discussion with relevant stakeholders
- assumptions should be set consistently, in that different assumptions should be clearly justified by specific local circumstances (eg different asset strategies, different risk appetites, different local mortality experience)

3.40 Examples of where the criterion may not have been achieved include:

- some remaining inconsistency in reporting of whole of fund secondary contribution rates

- assumptions with a marked difference for funds advised by the different firms of actuarial advisors that cannot be justified by local differences:

- mortality improvements
- discount rate
- salary increases
- commutation

3.41 These differences contribute, alongside genuine local variations, to differences between funding levels and recommended contribution rates on local bases which a reader may find it difficult to interpret without undertaking further analysis.

Recommendation 1: We recommend that the Scheme Advisory Board should consider how best to implement a standard way of presenting relevant disclosures in all valuation reports to better facilitate comparison, with a view to making a recommendation to the MHCLG minister in advance of the next valuation. We have included a draft dashboard in this report to facilitate the Scheme Advisory Board's consultation with stakeholders.

3.42 We set out a possible dashboard to facilitate the Scheme Advisory Board's consultation with stakeholders. Such a dashboard could facilitate comparison both between funds and between successive valuations of the same fund.

Table 3.4: Possible dashboard for inclusion in valuation reports

Item	Proposed format
Funding level (assets/liabilities)	%
Funding level (change since previous valuation)	%
Market value of assets	£m
Value of liabilities	£m
Surplus (deficit)	£m
Deficit recovery end point	year
Change in deficit recovery end point	+/- number of years
Primary contribution rate (average for the fund)	£ pa, % of pay
Secondary contribution rate (average for the fund)	£ pa, % of pay
Total employer rate (average for the fund)	£ pa, % of pay
Total employer rate (change since previous valuation)	£ pa, % of pay
Employee contribution rate	£ pa, % of pay
Discount rate(s)	% pa
Assumed pension increases (CPI)	% pa
Method of derivation of discount rate, plus any changes since previous valuation	Freeform text
Life expectancy for current pensioners – men age 65	years
Life expectancy for current pensioners – women age 65	years
Life expectancy for future pensioners – men age 45	years
Life expectancy for future pensioners – women age 45	years
Funding level on SAB basis (for comparison purposes only)	Simple overall percentage

3.43 We note that such a dashboard would facilitate comparison between funds, but should not be translated into funding advice.

Recommendation 2: We recommend that the Scheme Advisory Board should consider what steps should be taken to achieve greater clarity and consistency in actuarial assumptions, except where differences are justified by material local variations, with a view to making a recommendation to the MHCLG minister in advance of the next valuation.

Academies

- 3.44 MHCLG has asked GAD to review academy contribution rates under the heading of consistency, following recent work led by the SAB.
- 3.45 We conducted our investigation based on data provided by the firms of actuarial advisors in order to understand how academies are being treated in the LGPS. The outcomes of this investigation are summarised below.
- 3.46 The SAB has identified two work-streams – administration and funding – and plans to complete its work and make recommendations to ministers later this year.

GAD's investigations

- 3.47 GAD's report is published [here](#).⁹
- 3.48 The analysis concluded that:
- on average academies currently pay 2% of payroll less in contributions than local authorities (LAs) (21% on average for academies, 23% on average for local authorities)
 - there is a high degree of variability in individual contribution rates
 - academies are treated consistently with LAs, suggesting that the DfE guarantee is currently being recognised by funds
 - given the existing approach for setting academy contribution rates, we would expect (material) nationwide variation between individual academy contribution rates and LA contribution rates to persist in future. Further, the extent of the variation observed at the 2016 valuation could potentially increase, particularly if there is a large increase in the number of new academies

Conclusions and recommendations

- 3.49 We concluded that, on average, academies were treated fairly in relation to LA employers, but there was considerable inconsistency in methods adopted for allocating initial assets to the academies, and in some cases the period for repaying initial deficits, and this has contributed to a wide range of contribution rates paid by academies.
- 3.50 Two streams are being pursued by the SAB:
- administration stream: we support the work of the SAB in seeking to simplify and streamline administration processes, noting that these improvements are not just relevant to academies, but to all employer groups
 - funding stream
- 3.51 One area that can improve consistency of treatment between academies is the allocation of assets upon conversion to academy status. Consistency in the basis adopted at conversion, in particular for allocation of assets between the academy and the fund, and for the deficit recovery period, will help provide clarity to multi academy trusts about the costs associated with conversion.

Recommendation 3: We recommend that the Scheme Advisory Board seeks a common basis for future conversions to academy status that treat future academies more consistently, with a view to making a recommendation to the MHCLG minister in advance of the next valuation.

⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740947/Academies_analysis_report_final.pdf



4

Solvency



Key solvency findings

- Most funds in the LGPS meet the conditions required to be able to demonstrate solvency and in general funding levels have improved significantly across the scheme since the dry run.
- In total, 74 out of 89 funds tested had green flags on all solvency measures, an improvement since the dry run (56 out of 90).
- We have highlighted a number of funds where substantial contribution increases may need to be absorbed. Although we did not conclude that the aims of section 13 were not achieved, we believe fund managers should be aware of this risk.
- We recommend that West Midlands Integrated Transport Authority Pension Fund puts a plan into place to ensure the fund is able to continue to meet benefits in the event that no future contributions are available.

4.1 Under section 13(4)(c) of the Act, the Government Actuary must report on whether the rate of employer contributions to the fund is set at an appropriate level to ensure the solvency¹⁰ of the pension fund.

4.2 In this chapter we:

- provide a definition of solvency
- provide some background on solvency issues, and the measures and flags we have used in considering them
- consider the potential volatility of contributions through an asset liability study
- set out flagged solvency risks for open funds

- discuss the solvency risks for West Midlands Integrated Transport Authority, which is a closed fund

Definition of solvency

4.3 We do not regard that solvency means that a pension fund should be 100% funded at all times. Rather, in line with the definition in CIPFA's Funding Strategy Statement guidance¹¹ which we adopt for the purposes of section 13, we consider that the rate of employer contributions has been set at an appropriate level to ensure solvency of the pension fund if:

- the rate of employer contributions is set to target a funding level for the whole fund (assets divided by liabilities) of 100% over

¹⁰ The explanatory notes to the Act state that solvency means that the rate of employer contributions should be set at "such a level as to ensure that the scheme's liabilities can be met as they arise".

¹¹ <http://www.cipfa.org/policy-and-guidance/publications/p/preparing-and-maintaining-a-funding-strategy-statement-in-the-lgps-2016-edition>

an appropriate time period and using appropriate actuarial assumptions

and either:

- employers collectively have the financial capacity to increase employer contributions, and/or the fund is able to realise contingent assets should future circumstances require, in order to continue to target a funding level of 100%

or

- there is an appropriate plan in place should there be, or there is expected in future to be, no or a limited number of fund employers and/or a material reduction in the capacity of fund employers to increase contributions as might be needed

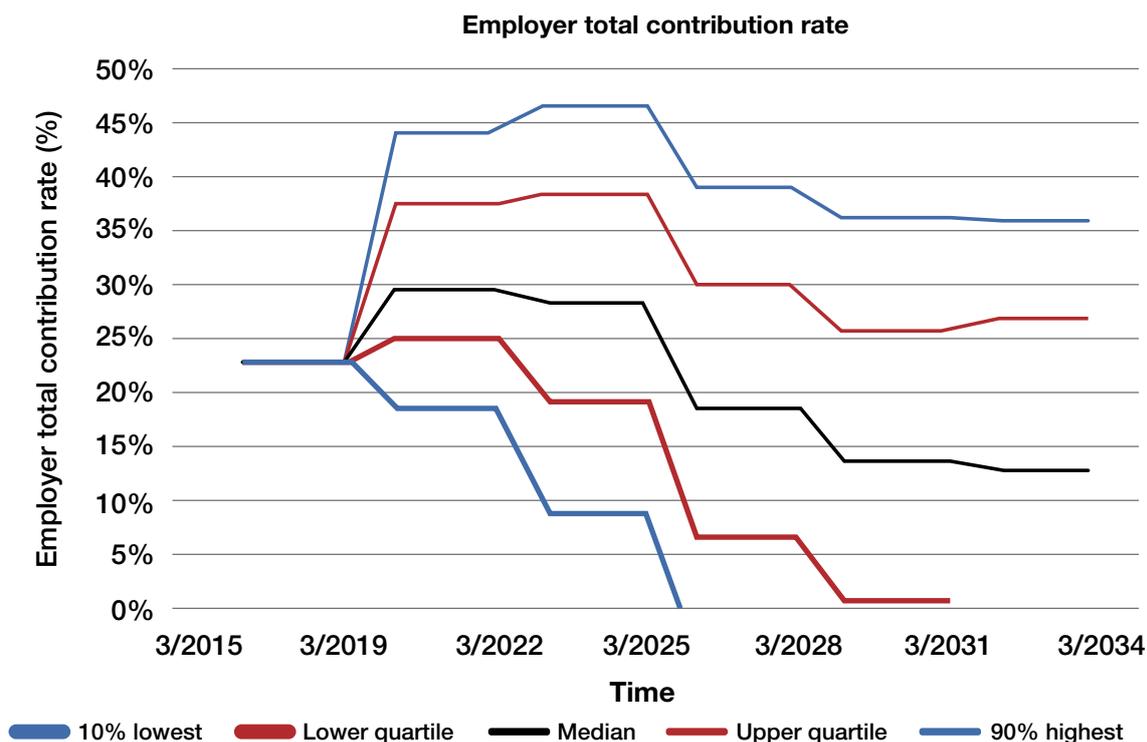
Background on solvency

- 4.4 Most funds have improved their funding level since the 2013 valuations. For example, on GAD's best estimate basis, the aggregate funding level across all LGPS funds at 2016 had improved from around 93% to approximately 106%, and around 60 funds were in surplus on this basis. This means that we expect, on average, there is a greater than 50% chance that existing assets would be sufficient to cover benefits in respect of accrued service when they fall due.
- 4.5 In the case of tax-raising employers, accommodating contribution variability is a political, as well as financial, consideration. We consider it is important that administering authorities and other employers understand the potential range of future cost, so that they can understand the affordability of potential future contribution requirements.
- 4.6 We have performed some asset liability modelling work to help illustrate the potential for variation in contribution rates that may be required if foreseeable variations to market conditions were to occur.
- 4.7 We have assessed risk against a range of measures and have highlighted funds where we believe specific risk is present. These are risks of potential contribution volatility that managers should be aware of. Managers should consider actions required to manage these risks, but accepting the risk may be a valid option. The flag does not imply that anything has gone wrong and maintaining the flag does not imply that we take issue with any decision to accept the risk. The amber flag is an indication that the risk is accepted or has not been mitigated – it is not implying that the administering authority is unaware of the risk.
- 4.8 All funds should be aware of their solvency position, to ensure that the relevant plans are in place to be able to pay benefits when they fall due and employers are able to accommodate potential future increases in contributions.
- 4.9 This is particularly important in the case of mature funds, where volatility of contributions may be greater. In particular, they should ensure that sufficient plans are in place to be able to pay benefits when they fall due in the potential environment of no future employer contributions.
- 4.10 We note that, in total, 74 out of 89 funds had green flags on all solvency measures, a significant improvement since the dry run (56 out of 90).
- 4.11 Flagged measures in this report include:
- SAB funding level, where we have highlighted as a risk to be aware of the ten open funds with the lowest figures. This is a purely relative, existing risk
 - asset shock, where we have highlighted four funds that could be required to absorb a large increase in contribution rates (relative to core spending power for all but one fund) should a significant, sustained shock occur

Volatility of contributions: asset liability study

- 4.12 Volatility of asset returns and changes in economic conditions may place significant pressures on the future rate of employer contributions.
- 4.13 We performed an asset liability study to investigate and help quantify these pressures. The asset liability study provides a simultaneous projection of the assets and liabilities of the scheme under a large number of stochastic economic scenarios to demonstrate potential funding and hence contribution outcomes of the scheme under different potential circumstances.
- 4.14 For the purpose of assessing liabilities and determining contributions, assumptions are needed on what set of assumptions will be used to carry out an actuarial valuation at each future point in time being considered. In our modelling we have assumed that:
- changes to the financial assumptions will reflect market conditions at the valuation date (specifically, long term gilt yields)
 - the length of the recovery period is fixed at 20 years at each valuation to approximate what funds are doing in practice
- 4.15 The output of the model is the upwards or downward pressure on contribution rates assuming that the impact of changes in economic conditions feeds through directly to contribution setting.
- 4.16 In practice we might not expect these pressures to feed directly into changes in employer contribution rates, because for example, if there was a downward (or upward) cost pressure the following adjustments might be considered:
- asset strategy might be made more defensive which would be expected to reduce future volatility but would reduce the scope for reducing contributions (conversely,
- if there was an upward cost pressure, the asset strategy might be made more return seeking)
- the length of the recovery period might be reduced (conversely, if there was an upward cost pressure, the length of the recovery period might be increased)
 - the level of prudence might be increased, which could reduce the chance that future experience was worse than assumptions, but could also limit the scope for reducing contributions (conversely, if there was an upward cost pressure, the level of prudence might be reduced)
- 4.17 The output of the model should not therefore be regarded as predictions of changes in future employer contribution rates, but rather the potential pressures on the employer contribution rate that might need to be managed in some way. Any changes 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 asset strategy would be expected to increase volatility and risk

Chart 4.1 Range of employer total contribution rate



4.18 Chart 4.1 illustrates the potential upward or downward pressures on employer contribution rates. The black line represents the median¹² expected outcome, the red lines the 25th and 75th percentile¹³ outcomes and the blue lines the 10th and 90th percentile outcomes.

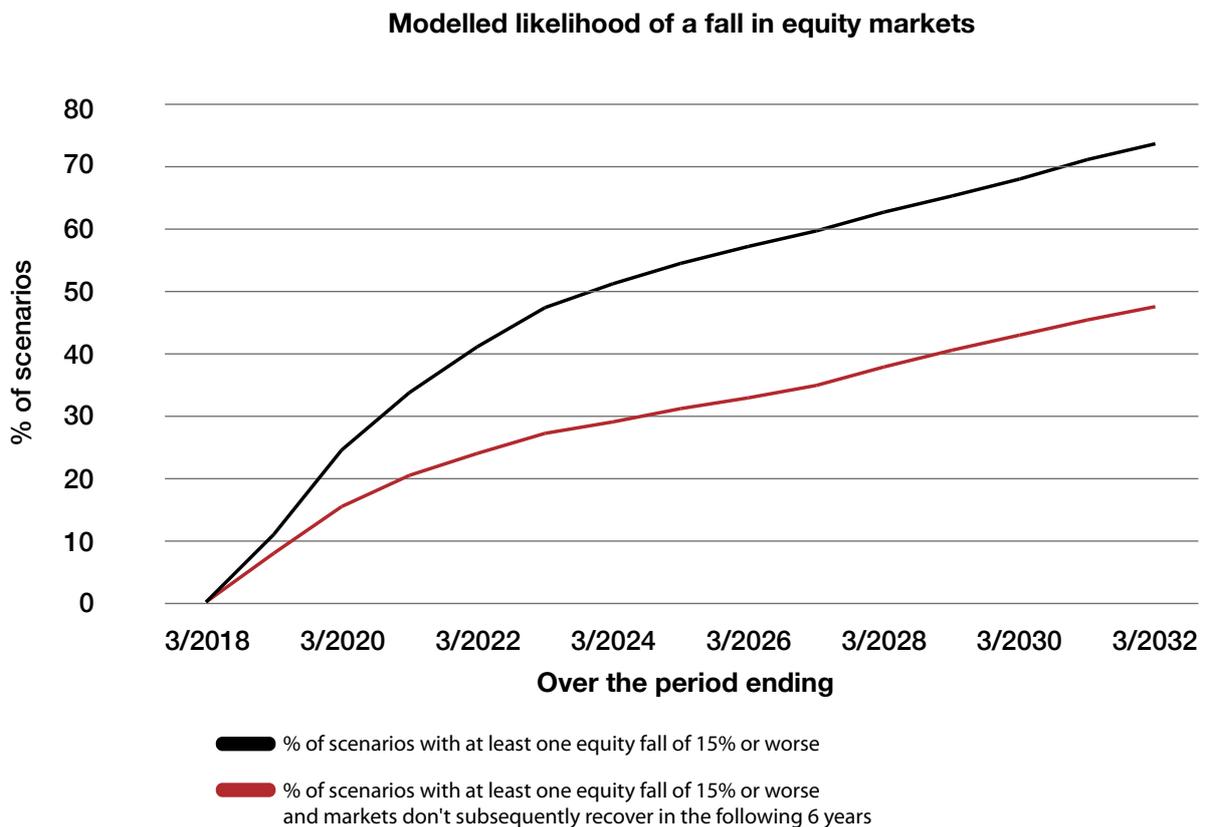
4.19 Chart 4.2 illustrates the cumulative risk¹⁴ that equity markets fall over 12 months by more than 15% at some point over the next 20 years, and the chances of those markets not recovering within two valuation cycles. This indicates the scenario envisaged in our asset shock measure is plausible.

¹² The median is the central outcome of the range, which means, according to the model, the actual outcome is equally likely to be higher or lower than the median. Note that the median is the middle outcome at each point in time. The median line does not represent a prediction of outcomes.

¹³ The 25th and 75th percentile outcomes represent the outcomes where there is a one in four chance the outcome will be more extreme in the relevant direction. For the 10th and 90th percentile outcomes, there is a 10% chance of a more extreme outcome.

¹⁴ This is an output from our model, which itself is dependent on assumptions/economic scenario generator underlying that model, for example in relation to equity market mean reversion. Different models will produce different outcomes. Our model assumes discount rates are driven from underlying gilt yields with a variable equity outperformance assumption.

Chart 4.2 Modelled likelihood of a fall in equity markets



Key message

4.20 It is highly likely that there are significant developments between each valuation that could result in relatively large pressures on employer contribution rates. In particular, after removing potential trends in the projected future contribution rate, we estimate that, based on economic circumstances alone, there is around a 30% chance of an upward pressure of 8% of pay or more and a 30% chance of a downward pressure of 8% of pay or more. This should not be regarded as a prediction of the changes in future employer contribution rates, because adjustments might be made to manage such pressures as discussed above.

4.21 In addition to the key message above, the asset liability study provides further illustration of possible changes in contribution rates.

- **In the short term, there may be upwards pressure on employer contributions at the next valuation cycle.**

This primarily reflects the modelled reduction in valuation discount rates, relative to the last valuation – as a result of falling gilt yields although this is mitigated by strong asset returns since 2016. In practice, the upward pressure on contributions may be further managed (perhaps to the point that upward pressures are relieved) if valuation discount rates (relative to gilt yields) increase or by other changes.

- **In the medium to longer term, employer contributions are expected to fall, such that they are expected to be lower than current contribution levels.**

This reflects reducing deficit repair contributions and expected asset outperformance from growth assets. Depending on the assumptions made about future gilt yields and return expectations, there may also be increases in valuation discount rates which further ease contribution pressures.

- **There remains a risk that contributions are materially higher than current levels.**

There is still a significant chance that economic assumptions and factors do not turn out as expected and contribute to a deterioration in the scheme's funding position or cost of accrual that lead to significant upward pressure on employer contributions.

- 4.22 These messages are illustrated in charts in Appendix E which shows the median and outer percentile results of this exercise. Employer total contributions include the cost of ongoing benefit accrual and deficit recovery contributions where appropriate, less member contributions, aggregated across all funds.

Solvency risks for open funds

- 4.23 In the following tables we illustrate the results of the solvency measures we have used for each of the individual funds in the LGPS where at least one measure of solvency was amber or red. In Appendix C (Table C1) we set out the considerations with regards to risks already present and emerging risks, and map these to the measures we have adopted for this exercise.

SAB funding level

- 4.24 The SAB basis is a useful measure to compare the relative funding position of each fund, but it is not a market related basis, and is therefore not directly appropriate for funding purposes. Our definition of solvency does not require a fund to be 100% funded on any given basis at all times. Rather, this measure gives an indication of the extent of remedial action that may be required to ensure solvency. Long term cost efficiency measures are designed to check whether funds are taking suitable steps to improve the level of funding. Table 4.1 outlines those funds in the lowest decile for funding level (the measure is the distance from the average funding level).
- 4.25 We have engaged with the funds with the lowest SAB funding levels. Most have indicated they have plans to improve funding levels over time, by paying increased deficit contributions. Brent, in particular, indicated that their long term budgeting process allows for these expected contributions over the full term of the expected deficit recovery period, which we acknowledge. If other funds set similar long term budgets this would help to demonstrate solvency. In our engagement with Worcestershire Pension Fund, the administering authority highlighted that their funding position has increased significantly and that their strategy for investments now includes equity protection. This was adopted during early 2018 and runs past the next actuarial revaluation. The fund is assessing its investment strategy and risk appetite also before the next valuation.

Table 4.1 – Funds with an amber flag on SAB funding level

Pension fund	SAB funding level distance from mean
Bedfordshire Pension Fund	-13%
City of London Corporation Pension Fund	-11%
London Borough of Barnet Pension Fund	-13%
London Borough of Brent Pension Fund	-29%
London Borough of Croydon Pension Fund	-15%
London Borough of Havering Pension Fund	-17%
London Borough of Waltham Forest Pension Fund	-19%
Royal County of Berkshire Pension Fund	-23%
Somerset County Council Pension Fund	-15%
Worcestershire County Council Pension Fund	-11%

Asset shock

4.26 We have performed a series of tests in relation to emerging risks. These are stress tests in relation to what may happen if certain events occur. Asset shock considers the scenario of a sustained reduction in the value of return seeking assets. For example, this could be a market correction in which asset values do not immediately recover, and therefore cannot be absorbed by a change in assumptions. In this scenario we model the additional contributions that would be required to meet the emerging deficit (as opposed to the total contributions required following the shock). We are looking at where there is a risk of large changes to the contribution rate, rather than a risk of the total contribution rate exceeding some threshold.

4.27 We consider these additional contributions in the context of the financial resources of the underlying statutory employers, for which we have used core spending power¹⁵, as a proxy as advised by MHCLG. A shock which generates high additional contributions as a

proportion of core spending power generates a flag, as this may indicate that the local authority may be less likely to be able to absorb substantial contribution increases without affecting core services. Funds with a high level of return seeking assets (whether due to a high funding level or their strategic asset allocation between return seeking and defensive) are more exposed to asset shocks and more likely to trigger this flag. More detail is given in Appendix C. We note core spending power does not represent all sources of income for all local authorities.

4.28 The funds in table 4.2 have generated an amber flag for the asset shock. We consider that an asset shock flag, on its own, does not imply that the aims of section 13 are not achieved, and so do not recommend immediate remedial action. Rather, we believe this may indicate some risk in relation to solvency that fund managers should be aware of and monitor over time.

¹⁵ See definition in Appendix C

4.29 We also developed two other stress tests:

- liability shock (in which we consider the impact of an increased liability value as a result of sustained lower interest rates)
- employer default shock (in which non-statutory employers are assumed to default on their pension liabilities, so their deficit transfers to remaining employers)

In practice we considered that the liability shock was not independent of the asset shock and few funds triggered the employer default shock, so we have opted not to highlight the results in this report.

Asset shock - specific engagement outcomes

4.30 We note that, with the exception of London Pensions Fund Authority, the other three amber flags relate to metropolitan funds. The main driver for this is the fact that the pension liabilities for the metropolitan funds are relatively high compared with their core spending power, rather than differences in asset strategies. Further analysis would be required to determine whether there is a different relationship between core spending power and other financial resources in the metropolitan funds, compared with non-metropolitan funds.

Table 4.2 – Funds with an amber flag on asset shock

Pension fund	Asset shock increase in contributions as a % of CSP
South Yorkshire Pension Fund	3.0%
Tyne and Wear Pension Fund	3.5%
West Yorkshire Pension Fund	3.7%
London Pensions Fund Authority Pension Fund	Amber

South Yorkshire Pension Fund

- 4.31 In our engagement with South Yorkshire Pension Fund, the administering authority highlighted that their investment now includes equity protection, which is intended to protect against falls in equity markets of between 5 and 30% over two years, while giving up gains above 14.25%. As such, if the strategy works as intended this will insulate the fund against the sort of major shocks we have modelled. This strategy was implemented during 2018.
- 4.32 This form of equity protection may be a suitable approach to protecting against shocks in the market. We make some brief comments about the operation of this strategy in Appendix C, however we do not comment on the effectiveness of this strategy.
- 4.33 We welcome the fact that South Yorkshire Pension Fund in consultation with the fund's employers has recognised that a risk does exist, and has reviewed the options available, and taken positive action. We maintained the asset shock flag for this report, because it the strategy was implemented after the 2016 valuation date. But if it remains in place, we will do further analysis in the next section 13 report.

London Pensions Fund Authority Pension Fund

- 4.34 LPFA is a special case as it has no core spending power and is a fund with primarily legacy liabilities. In the case of LPFA, the asset shock flag indicates a risk of a significant increase in contribution rate expressed as a percentage of pensionable pay. We engaged with LPFA. They considered pensionable pay as an incomplete representation of their ability to meet contribution variation. We intend to continue to engage with LPFA at the next section 13 exercise to further understand their particular circumstances.

Tyne and Wear Pension Fund, West Yorkshire Pension Fund

- 4.35 We engaged with both funds. They each considered core spending power as an incomplete representation of their ability to meet contribution variation.

Closed Funds: West Midlands Integrated Transport Authority

- 4.36 Funds that are closed to new members typically have decreasing payrolls, and funds which may be large relative to that payroll. This may lead to reduced scope to be able to meet variations in contributions. This in turn means that they may require outside funding in the future, which in turn may be uncertain, for example if there is no specific commitment from a guarantor.
- 4.37 The Environment Agency Closed Pension Fund has been excluded from the analyses in this report as the benefits payable and costs of the fund are met by Grant-in-Aid funding by the Department for Environment, Food and Rural Affairs as set out in the Compliance chapter.
- 4.38 South Yorkshire Passenger Transport Pension Fund's assets and liabilities have been transferred to the Greater Manchester Pension Fund, hence we have not considered the fund further.
- 4.39 West Midlands Integrated Transport Authority Pension Fund (WMITA) is the only remaining fund that is closed to new members and fully private sector backed. Tables 4.4 and 4.5 set out the red flags generated by WMITA.

Table 4.3 – Closed funds with an amber or red flag on open fund measure

Pension fund	Open fund
West Midlands Integrated Transport Authority Pension Fund	No

Table 4.4 – Closed funds with an amber or red flag on non-statutory employees

Pension fund	Non-statutory employees
West Midlands Integrated Transport Authority Pension Fund	100%

Specific engagement outcomes

- 4.40 Heightened employer covenant risk from the two non-statutory employers in this fund has been mitigated in part through guarantee arrangements, which provide some (albeit limited) additional financial capacity.
- 4.41 It is a relatively small fund, with total assets of around £500m.
- 4.42 If the employers were operating in a private sector pension scheme, PPF protection to members' benefits would apply. However, PPF protection does not apply to LGPS funds.
- 4.43 We consider two scenarios in which the solvency of the fund may be at risk:
- if the existing employers both exited the funds (by meeting the exit requirements under Regulation 64), there would be no fall-back in the event that the funds were ultimately insufficient to meet benefits when due
 - if the last remaining employer defaulted and the employer (allowing for any remaining guarantee arrangements) was unable to meet its exit requirements
- 4.44 One employer (with a smaller share, approximately 5% of liabilities) has no active members and is almost sufficiently funded (as at 31 March 2016) to be able to exit the fund. The other employer has remaining but reducing active members and has in

collaboration with the Administering Authority taken significant steps in recent years towards reducing reliance on employer covenant and ensuring solvency.

Ongoing contributions are around 25% of pensionable pay. These are supplemented by around £7m per year to help pay off the deficit. This leads to total contributions of around 80% of payroll. This represents a significant commitment on the part of the employer towards the solvency of the fund.

Independent covenant review, obtained from specialist advisers appointed by the Administering Authority, assessed employer strength as "tending to strong", as at March 2016.

The fund's assets include a Prudential 'buy in' product. This was implemented to cover all pensioners as at 2011, albeit excluding increases in payment. We understand further asset changes are underway to protect the funding position.

- 4.45 We have engaged extensively with the administering authority for WMITA. We also engaged with the respective employers following the dry run. We understand the administering authority recognises the risk and is working to mitigate it.

Recommendations

- 4.46 A plan should be put in place for WMITA to ensure that members' benefits are able to be met from the fund when due in an environment of no future employer contributions being available, to ensure the aims of section 13 are achieved.
- 4.47 We recommend that the administering authority put such a plan in place and that MHCLG review that plan.
- 4.48 Following our dry run report, the only other passenger transport fund in existence at that time has merged with the Greater Manchester Pension Fund. Such a merger could reduce the dependency on a single employer.

Recommendation 4: We recommend that the administering authority put a plan in place to ensure that the benefits of members in the West Midlands Integrated Transport Authority Pension Fund can continue to be paid in the event that employers' contributions, including any exit payments made, are insufficient to meet those liabilities.



5

Long term cost efficiency



Key long term cost efficiency findings

- Funding levels have improved on a best estimate basis, partly as a result of asset performance and partly due to increased contribution levels since the dry run.
- In total, 83 out of 89 funds had green flags on all long term cost efficiency measures. There are a total of 6 amber and no red flags, an improvement since the dry run (14 amber and 3 red).
- We recommend all funds review their funding strategy statement to ensure handling of surplus or deficit is fair to both current and future taxpayers.
- A small number of funds have extended their deficit recovery plan in conjunction with a reduction in employer contributions.

5.1 Under section 13(4)(c) of the Act, the Government Actuary must report on whether the rate of employer contributions to the pension fund is set at an appropriate level to ensure the long term cost efficiency¹⁶ of the scheme, so far as relating to the pension fund.

5.2 In this chapter we:

- provide a definition of long term cost efficiency
- provide some background on long term cost efficiency issues, and the measures and flags we have used in considering them
- set out flagged long term cost efficiency issues: deficit reconciliation and deficit recovery period

Definition of long term cost efficiency

5.3 In line with the definition in CIPFA's Funding Strategy Statement guidance¹⁷, which we adopt for the purposes of section 13, we consider that the rate of employer contributions has been set at an appropriate level to ensure long term cost efficiency if the rate of employer contributions is sufficient to make provision for the cost of current benefit accrual, with an appropriate adjustment to that rate for any surplus or deficit in the fund.

Background on long term cost efficiency

5.4 Long term cost efficiency relates to not deferring payments too far into the future so that they affect future generations of taxpayers disproportionately.

¹⁶ Explanatory notes to the Act state that: "long term cost efficiency implies that the rate must not be set at a level that gives rise to additional costs. For example, deferring costs to the future would be likely to result in those costs being greater overall than if they were provided for at the time."

¹⁷ <http://www.cipfa.org/policy-and-guidance/publications/p/preparing-and-maintaining-a-funding-strategy-statement-in-the-lgps-2016-edition>

- 5.5 Following the 2013 valuations, 13 funds (14%) were in surplus on our best estimate basis. Following the 2016 valuations, that number has improved significantly to around 60 funds (67%). This follows a particularly strong period of asset outperformance, but also greater levels of contributions being paid into some funds.
- 5.6 Since much of our focus under long term cost efficiency is around deficit recovery on the best estimate basis, there are few flags being raised, and some of the flags raised in the dry run have been eliminated. In total, 83 out of 89 funds had green flags on all long term cost efficiency measures. There are a total of 6 amber and no red flags, an improvement since the dry run (14 amber and 3 red).
- 5.7 Other than Deficit Reconciliation and Deficit Recovery Period no flags were raised under the other long term cost efficiency measures. This can be interpreted as the funds' employers are on average paying sufficient contributions into their funds at present.
- 5.8 The two funds that gave rise to concerns in the 2013 dry run report were:
- Royal County of Berkshire Pension Fund
 - Somerset County Council Pension Fund
- 5.9 Both Berkshire and Somerset Pension Funds flagged under all 2013 LTCE measures other than deficit extension.
- 5.10 Both funds' employers have addressed many of the concerns raised, and in particular have increased their contributions compared to the 2013 contributions in addition to both funds benefitting from improved funding levels.

- 5.11 For the 2016 report, Berkshire raises a flag under the deficit period measure. On further engagement, Berkshire indicated a commitment to repaying the deficit. Berkshire also flagged on funding level under solvency.
- 5.12 Somerset does not raise any flags under LTCE measures in the 2016 report.

Deficit reconciliation

- 5.13 CIPFA's Funding Strategy Statement guidance¹⁸ states "Administering authorities should avoid continually extending deficit recovery periods at each and subsequent actuarial valuations. Over time and given stable market conditions, administering authorities should aim to reduce deficit recovery periods."
- 5.14 There are different interpretations of CIPFA's guidance – in particular 'deficit recovery periods' might be interpreted to mean either:
- the period over which deficit recovery contributions are paid (a recovery plan following the 2013 valuations might have been payable over the 2014 to 2034), in which case the CIPFA guidance suggests the period should not be continually extended beyond 2034
 - the length of period – ie 20 years in the example above – in which case the CIPFA guidance suggests 20 years should not be continually increased and in stable market conditions, administering authorities should aim to reduce the length of the deficit recovery period
- 5.15 This first interpretation is in line with guidance from the Pensions Regulator (tPR) for private sector schemes. We believe that, despite differences in environment and covenant value of employers, principles set out by tPR are a useful guide.

¹⁸ <http://www.cipfa.org/policy-and-guidance/publications/p/preparing-and-maintaining-a-funding-strategy-statement-in-the-lgps-2016-edition>

5.16 An extract of tPR's funding statements is reproduced below.

Type	Scheme characteristics	What we expect of trustees
a. With strong or tending to strong employers	Where the scheme's funding position is on track to meet their funding objectives and where technical provisions are not weak and recovery plans are not unduly long	As a minimum to continue with their current pace of funding by not extending their recovery plan end dates unless there is good reason to do so
b. With strong or tending to strong employers	With a combination of weak technical provisions and long recovery plans.	To seek higher contributions now to mitigate against the risk of the employer covenant weakening and other scheme risks materializing in the future

5.17 We believe it is appropriate for funds to consider their plans for the duration of the deficit recovery period, so that future contributions are recognised and these form part of employers' budgeting process.

5.18 We understand that new deficit may emerge between valuations, as a result of the fund's experience, in which case it may be appropriate to extend the recovery period. For example, if a fund within the last three years of its deficit recovery period experienced a material reduction in its funding level, it may not be appropriate in the context of fairness between current and future generations of taxpayers to repay that new deficit within three years.

5.19 We consider that reconciliation of the deficit recovery plan is an important component of section 13 for all funds.

5.20 Through this exercise, we have identified and engaged with a number of funds that have extended their deficit recovery end points. We have not concluded that this implies the aims of section 13 are not achieved, however we do recommend that all funds review their funding strategy and consider whether this is in accordance with the CIPFA guidance referred to above.

5.21 We would not normally expect to see employer contribution rates decreasing (reducing the burden on current taxpayers) at the same time as the deficit recovery end point being extended further into the future (increasing the burden on future taxpayers).

Recommendation 5: We recommend that all funds review their funding strategy to ensure that the handling of surplus or deficit is consistent with CIPFA guidance and that the deficit recovery plan can be demonstrated to be a continuation of the previous plan, after allowing for actual fund experience.

5.22 A significant minority of funds (37 of 91) have maintained their plans to eliminate their deficit (on their own funding basis). Of the remaining 54 funds, according to the data provided, 37 had increased contributions and 5 left them unchanged (expressed as a percentage of pensionable pay). We have engaged with the remaining 12. Through the engagement process, 8 were able to demonstrate that they had in fact increased contributions, or that their chances of deficit recovery are not reduced at the previous end point. We consider this is consistent with the aims of section 13.

Table 5.1 – Funds with an amber flag on deficit reconciliation measure

Pension fund	Deficit recovery plan
London Borough of Lambeth Pension Fund	+ 3 years
London Borough of Merton Pension Fund	+ 3 years
London Borough of Newham Pension Fund	+ 3 years
Royal Borough of Kingston Upon Thames Pension Fund	+ 2 years

5.23 We acknowledge that extending deficit recovery periods is appropriate in some circumstances, for example when new deficit emerges.

5.24 We engaged with those funds who appear to have extended their deficit recovery end point in conjunction with a reduction in overall contributions. However, where funds have been able to demonstrate that the probability of being fully funded at the previous recovery plan end point is not reduced, we have not flagged them.

Commentary from engagement in relation to deficit reconciliation

5.25 We have engaged with the funds listed above and listened to their decision making process in relation to this aspect.

London Borough of Lambeth Pension Fund

5.26 Following the 2013 valuation, Lambeth council opted to pay more than their actuary's central recommendations which would have implied a shorter recovery period than that set out in their funding plan at those times and requested that the Rates and Adjustments Certificates reflect their desire to pay more than required. However, as a result of budgetary pressures, the council have needed to reduce contributions. Therefore, some of the reduction in the 2016 SCR has been driven by the removal of these additional

contributions which will have given the appearance of the fund extending its deficit recovery plan (but in actuality this put them back onto the underlying plan).

5.27 In addition, the fund reviewed both its funding and investment strategies with the ultimate goal of giving the Fund a two-thirds probability of full funding over a 20 year period.

London Borough of Merton Pension Fund

5.28 Similarly to Lambeth, Merton council opted to pay significant additional contributions into the fund following the 2013 valuation. They paid these contributions in lump sum form, rather than spreading them, and subsequently have had to reduce their contributions to a level below the 2013 level, excluding the lump sum contributions.

5.29 We acknowledge that Merton have made considerable contributions, and have a relatively short deficit recovery period. However, we have retained the flag, because following the 2016 valuation employer contribution rates were decreased (reducing the burden on current taxpayers) while at the same time as extending the deficit recovery end point (increasing the burden on future taxpayers).

London Borough of Newham Pension Fund

5.30 Newham council stated they paid contributions above minimum into the fund following the 2013 valuation and subsequently have had to reduce their contributions to a level below the 2013 level.

Royal Borough of Kingston upon Thames Pension Fund

5.31 Kingston extended their deficit recovery end point by 2 years. Kingston have also reduced their contributions by around 2%. They indicate that the level of contributions is above the minimum level implied by their actuary's model.

5.32 In general, most funds referred to the improvement in funding level and affordability of contributions in the light of other demands on budgets. These are all valid concerns, however we consider under section 13 that this involves a risk under long term cost efficiency.

Deficit recovery period

5.33 We included, as a relative measure, deficit recovery period. This refers to the period expected to repay the deficit, restated on our best estimate basis (see Appendix G), on

the assumption that fund contributions are maintained at the current level.

5.34 Two funds also flagged on our deficit recovery period measure, having particularly long deficit recovery periods (after adjusting to our standardised best estimate basis). We consider this to be a risk, but not on its own, contrary to the aims of section 13 under long term cost efficiency, noting that these two funds appear in Table 4.1: Funds with an amber flag on SAB funding level.

Commentary from engagement in relation to deficit recovery period

5.35 In this case, we consider that these funds are carrying a risk that fund managers should be aware of, but we do not consider this sufficient to warrant a recommendation.

5.36 In our engagement with the Brent Pension Fund it is clear that Brent have taken significant steps towards addressing the deficit. Contribution rates are relatively high at an average of 33.6% of pensionable pay over the period 2017/18 to 2019/20 and the deficit recovery plan has been adhered to (the recovery period has reduced from 22 years at 2013 to 19 years at 2016, maintaining the same deficit recovery period end point). This demonstrates that Brent understands the issue and have made a strong commitment to reducing the deficit.

Table 5.2: Open funds with amber flag on deficit recovery period

Pension fund	Deficit recovery period (years)
London Borough of Brent Pension Fund	10
Royal County of Berkshire Pension Fund	13



Government
Actuary's
Department

Local Government Pension Scheme England and Wales

Review of the Actuarial Valuations of
Funds as at 31 March 2016 pursuant
to Section 13 of the Public Service
Pensions Act 2013

Appendices

Date: 27 September 2018

Author: Martin Clarke, John Bayliss

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pursuant to Section 13 of the Public Service Pensions Act 2013

Appendix A: Compliance

A.1 In this appendix we set out checks we conducted to determine whether the actuarial valuations of the 91 Local Government Pension Scheme (LGPS) funds have been completed in accordance with the scheme regulations.

Statement of Compliance

A.2 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:

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. 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 2017 in the case of the 2016 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 A1: Statement of Compliance

Fund	Statement of Compliance
Merseyside (Mercer)	This report is addressed to the Administering Authority of the Merseyside Pension Fund (“the Administering Authority”) and is provided to meet the requirements of Regulation 62 of the Local Government Scheme Regulations 2013 (as amended) (“the Regulations”).
Haringey (Hymans Robertson)	We have carried out an actuarial valuation of the London Borough of Haringey Pension Fund (“the Fund”) as at 31 March 2016 under Regulation 62 of The Local Government Pension Scheme Regulations 2013 (“the Regulations”).
Hampshire (Aon)	This report was ... produced in compliance with Regulation 62 of the Local Government Pension Scheme Regulations 2013
Berkshire (Barnett Waddingham)	In accordance with Regulation 62 of the Local Government Pension Scheme (LGPS) Regulations 2013 (as amended), we have been asked by Royal Borough of Windsor and Maidenhead to prepare an actuarial valuation of the Royal County of Berkshire Pension Fund (the Fund) as at 31 March 2016 as part of their role as the Administering Authority to the Fund.

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Table A2: Publication Date

Fund	Publication Date
Merseyside (Mercer)	31 March 2017
Haringey (Hymans Robertson)	29 March 2017
Hampshire (Aon)	31 March 2017
Berkshire (Barnett Waddingham)	31 March 2017

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	Merseyside (Mercer)	Haringey (Hymans Robertson)	Hampshire (Aon)	Berkshire (Barnett Waddingham)
Pre-retirement mortality	✓	✓	✓	✓
Post-retirement mortality	✓	✓	✓	✓
Dependant mortality	✓	✓	✓	✓
Ill health retirement	✓	✓	✓	✓
Normal health retirements	✓	✓	✓	✓
Withdrawal	✓	✓	✓	✓
Promotional salary scale ¹		✓	✓	✓
Family details (partners and dependants)	✓	✓	✓	✓
50:50 option take-up	✓	✓	✓	✓
Commutation	✓	✓	✓	✓

¹ Mercer combine promotional salary scale into 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.” Most reports have *stated that* the assumptions have been updated to reflect experience. All funds have shown differences between expectations and experiences for the inter-valuation period, and the impact of these differences on the funding position. We note that this information 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 Rates

Fund	Primary rate of Employer Contribution
Merseyside (Mercer)	15.4%
Haringey (Hymans Robertson)	17.6%
Hampshire (Aon)	17.1%
Berkshire (Barnett Waddingham)	14.3%

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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

Whole fund secondary contribution rates			
Fund	2017	2018	2019
Merseyside (Mercer)	£136,300,000 less 0.9% of pensionable pay	£52,500,000 less 0.4% of pensionable pay	£53,600,000 plus 0.1% of pensionable pay
Haringey (Hymans Robertson)	£9,252,000	£8,612,000	£9,554,000
Hampshire (Aon)	£75,680,400 less 2.9% of pensionable pay	£81,548,300 less 1.9% of pensionable pay	£87,248,800 less 0.9% of pensionable pay
Berkshire (Barnett Waddingham)	£21,017,000 or 5.3% of pensionable pay	£27,468,000 or 6.7% of pensionable pay	£34,075,000 or 8.2% 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 Each Rates and Adjustments Certificate contains a statement detailing the assumptions on which the certificate has been given and where to find them.

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 Each valuation shows evidence of having received relevant data from the administering authority, including cash flows for the years 2014, 2015 and 2016.

Table A6: Location of assumptions

Fund	Statement in Rates and Adjustments Certificate	Location of assumptions in Valuation Report
Merseyside (Mercer)	✓	Appendix A
Haringey (Hymans Robertson)	✓	Appendix E
Hampshire (Aon)	✓	Appendix 5
Berkshire (Barnett Waddingham)	✓	Appendix 2 and Funding Strategy Statement

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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 one report from each actuarial firm, table B1 sets out the outcomes for key information that we would expect to see in each valuation.

Table B1: Key Information

Demographic	Hampshire (Aon)	Berkshire (Barnett Waddingham)	Haringey (Hymans Robertson)	Merseyside (Mercer)
Funding level (assets/liabilities)	81%	73%	79%	85%
Market value of assets	£5.2b	£1.6b	£1.0b	£6.9b
Value of liabilities	£6.5b	£2.2b	£1.3b	£8.1b
Surplus (Deficit)	(£1.2b)	(£0.6b)	(£0.3b)	(£1.2b)
Deficit recovery end point*	2036	2040	2036	2035
Primary contribution rate (average for the fund)	17.1%	14.3%	17.6%	15.4%
Secondary contribution rate (average for the fund)	See below			
Employee contribution rate	6.5%	6.5%	6.5%	6.6%
Discount rate(s)	4.5%	5.7%**	4.0%	4.2%
Life expectancies	Given	Not given	Given	Given
Funding level on SAB basis***	Not given	Not given	94%	Not given

* derived from deficit recovery period; Berkshire stated as “illustrative”, Haringey in Funding Strategy Statement

** Discount rate – Unitaries = 5.7%, discount rate Non-Unitaries = 5.5%

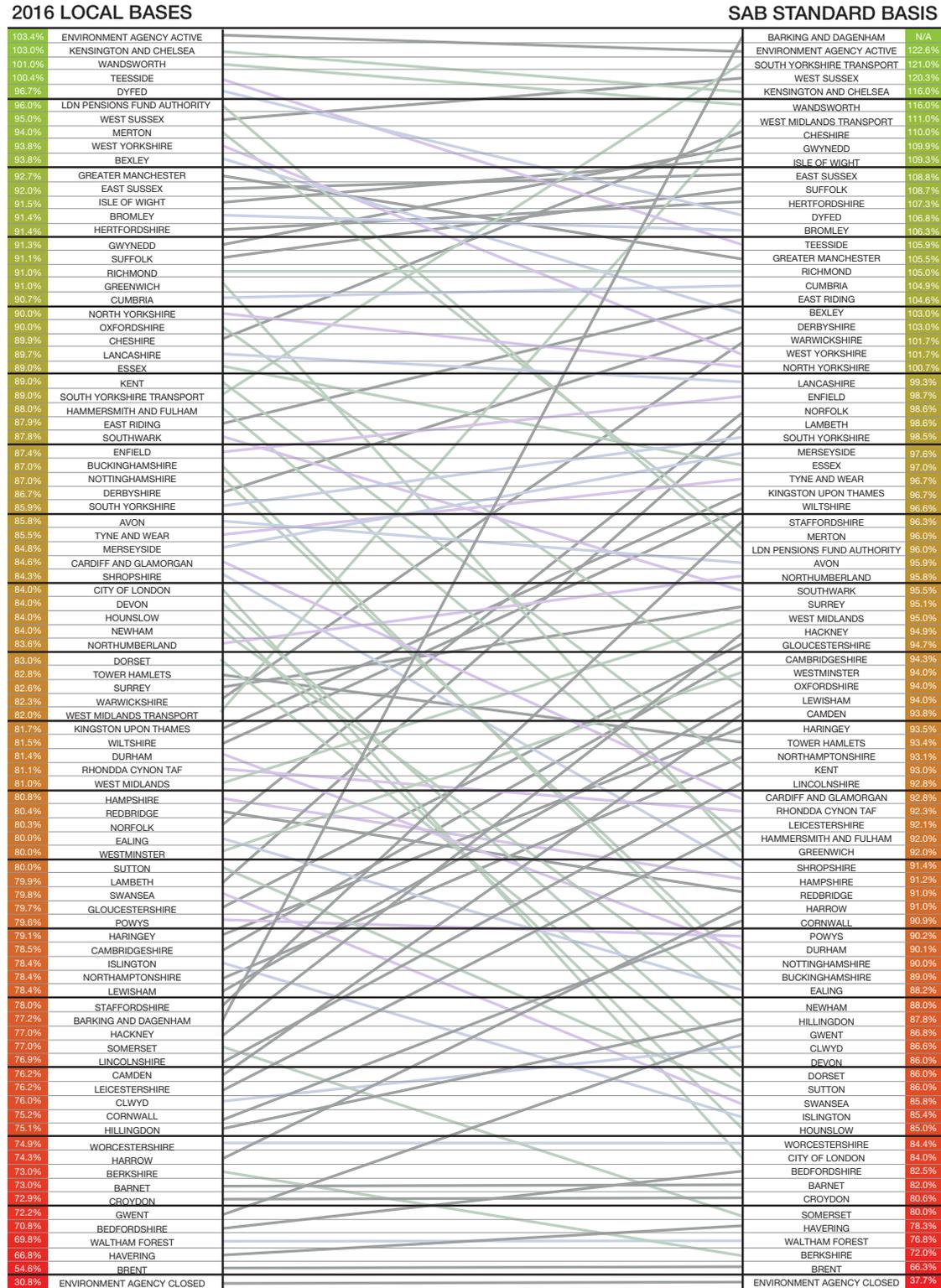
*** we note that it was agreed with SAB this need not be presented. We recommend this be reconsidered.

B.3 Most information was included for most funds, with some exceptions. All firms of actuarial advisors provide a detailed breakdown of the secondary contribution rates by employer for each of the next three years in their Rates and Adjustments Certificates. However, the summary statistics provided for the funds as a whole varied significantly between actuarial advisors. A standardised dashboard could help the reader make comparisons. We note that this information may be contained in supporting (non-public) reports/advice.

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, Warwickshire 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 other funds.

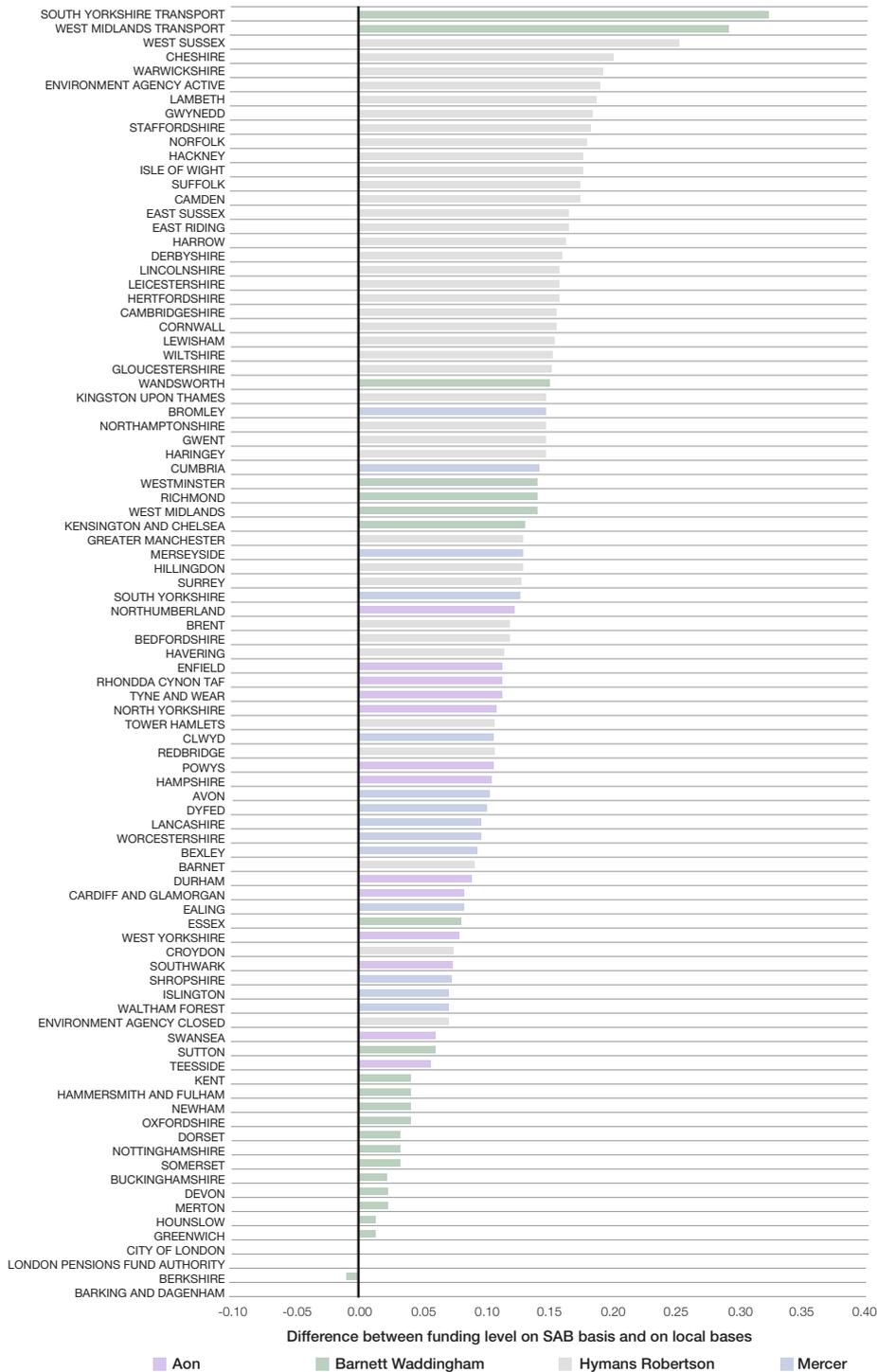
Chart B1: Standardising Local Valuation Results



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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 a different method for calculating discount rates as shown in the table below²:

Table B2: Discount Rate Methodology

Firm of actuarial advisors	Discount rate methodology
Aon	Stochastic Method
Barnett Waddingham	Weighted average expected return on assets classes
Hymans Robertson	Gilts +
Mercer	CPI + real discount rate derived using stochastic modelling

B.6 Chart B3 shows the pre-retirement discount rate used to assess past service liability³ applied in the actuarial valuations for each fund. 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. Hymans Robertson and Mercer use different methods and/or discount rates for future contribution requirements.

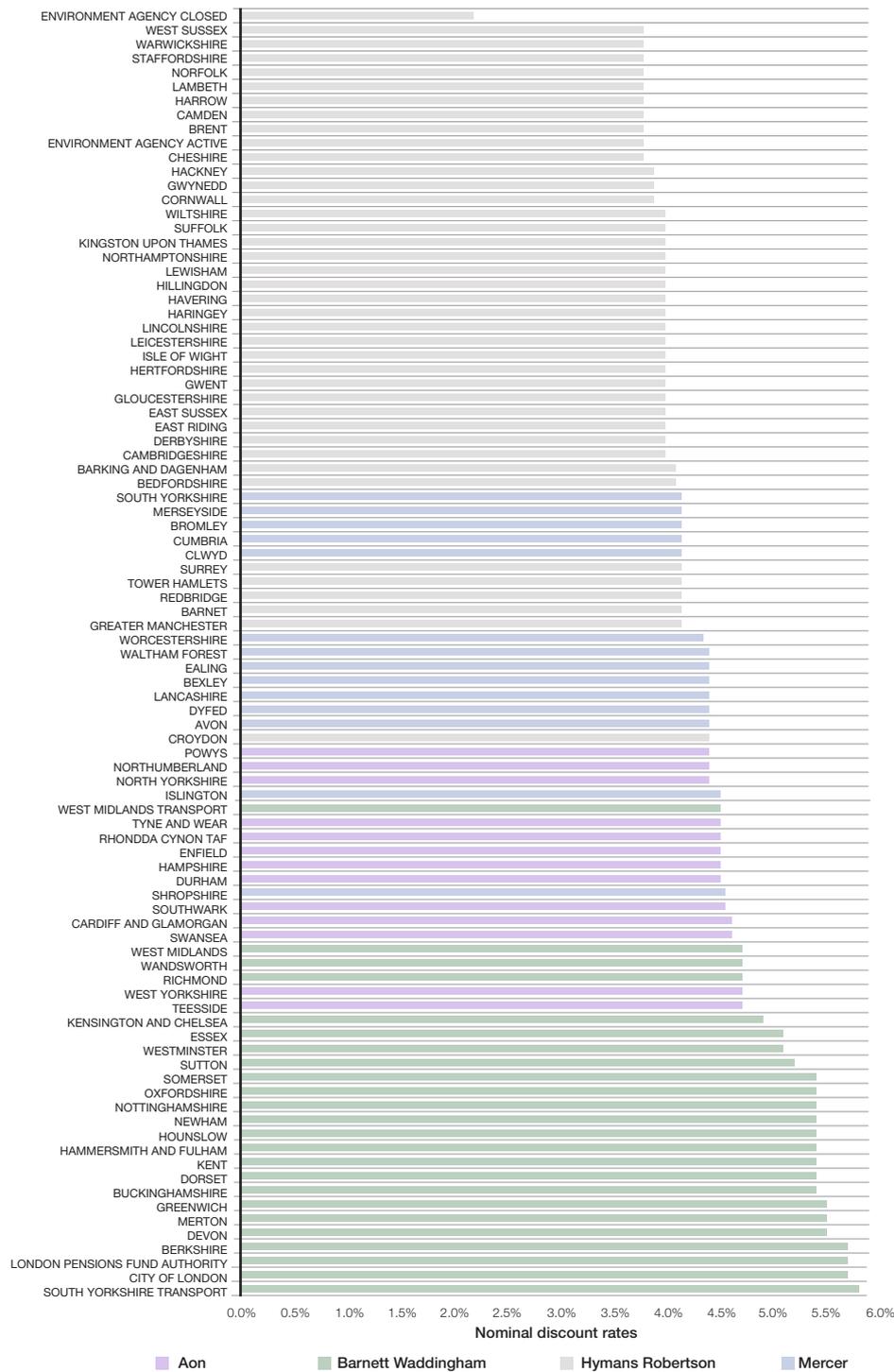
² Note: the method of deriving discount rate is not shown in all reports, but was provided by each firm as part of GAD's data request.

³ Note that some funds used different discount rates to assess past service liabilities and future service contribution rates, we consider only the former here.

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Chart B3: Pre-retirement Discount Rates



B.7 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 2016 (-0.96%). 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:

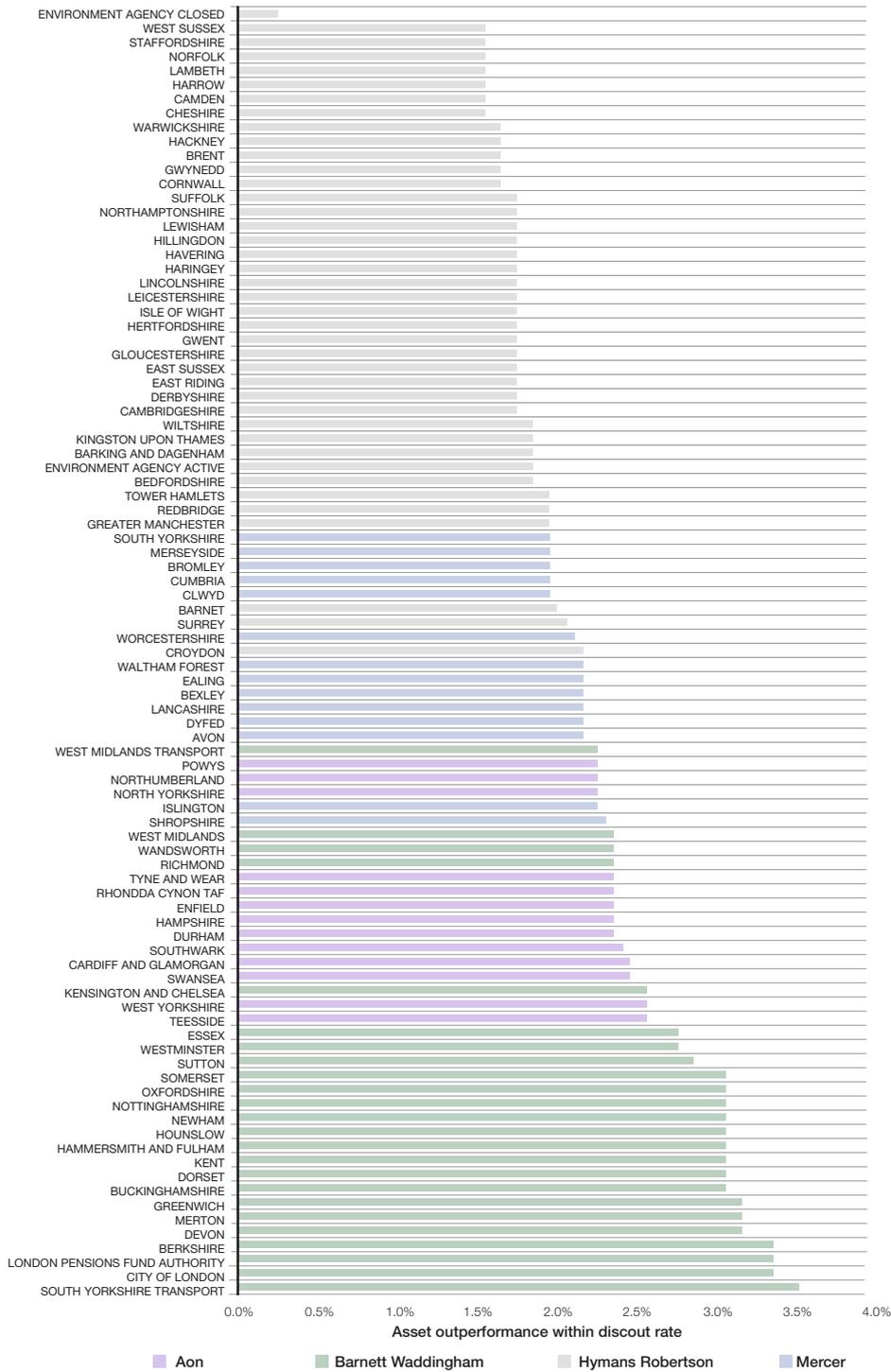
- The *RFR* – the real 20 year Bank of England spot rate as at 31 March 2016
- Assumed *CPI* – as assumed by the fund in their 2016 actuarial valuation
- The excess of assumed RPI inflation over assumed CPI inflation (“*RPI-CPI*”) – as assumed by the fund in their 2016 actuarial valuation

i.e. $AOA = DR - RFR - RPI$. (Chart B4 shows the implied rate of asset outperformance for each fund.)

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Chart B4: Assumed Asset Outperformance within Discount Rate



Demographic assumptions

- B.8 Chart B5 shows the projected salary in present day terms at age 65 for a 45 year old currently earning £20,000 per year.
- B.9 The chart indicates that assumed salary increases appear to follow a house view rather than explicitly reflecting local variations. We note that NJC pay bargaining affects all local councils.

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Chart B5: Projected Real Salary at age 65 for a 45 year old currently earning £20k pa

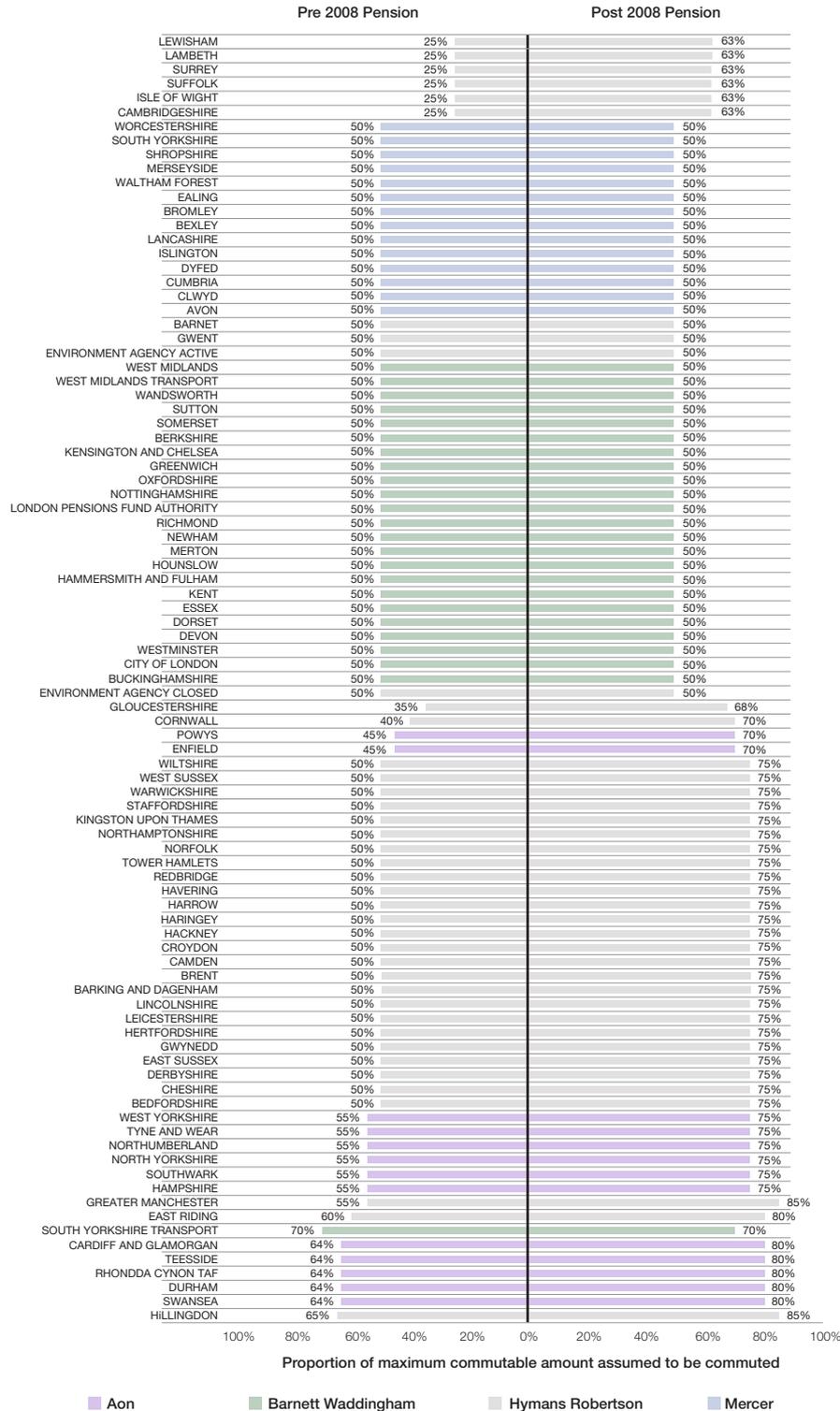


- B.10 Commutation assumptions (the extent to which members on average exchange pension in favour of a tax free cash benefit) are set as the percentage of the maximum commutable amount that a member is assumed to take on retirement. Chart B6 shows the assumed percentages for both pre 2008 and post 2008 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 all the funds advised by Mercer and most funds advised by Barnett Waddingham assume that members commute 50% of the maximum allowable amount. Funds advised by Aon assume that their members commute at least 70% of the maximum allowable amount for post 2008. There is more variation in the commutation assumptions made by funds advised by Hymans Robertson, but with a large cluster of funds assuming 50% for pre 2008 pensions and 75% for post 2008.
- 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 The result is that each firm of actuarial advisors takes a “house view” on commutation assumptions rather than an approach clearly based on local conditions, which calls into question whether the consistency criterion of Section 13 has been met.

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Chart B6: Commutation Assumptions for Pre and Post 2008 Pensions



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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 MHCLG 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, 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 Power⁴ (for English local authorities, described below) or financing data (for Welsh local authorities).

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.

⁴ For some funds, employers do not include local authorities with Core Spending Power or financing data, in which case we have followed the same approach used in the dry run.

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- 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, MHCLG 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**⁵.
- 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 Band D Council Tax levels
 - Proposed Improved Better Care Fund
 - New Homes Bonus
 - Rural Services Delivery Grant
- C.8 GAD have referenced Core Spending Power for 2016-17 (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.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 Because Core Spending Power is publicly available and objective, MHCLG 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. This applies for all local authorities in Wales and is published **here**⁶.
- 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

⁵ <https://www.gov.uk/government/publications/core-spending-power-final-local-government-finance-settlement-2018-to-2019>

⁶ <https://www.gov.uk/government/publications/core-spending-power-final-local-government-finance-settlement-2018-to-2019>

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 2016-17 (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.

C.16 Similarly to Core Spending Power, We have excluded police funding from the analysis.

Solvency measures

C.17 For the 2016 exercise, we have tested the following five metrics under solvency. We developed other measures but have not used them. For example, we considered that liability shock did not add value under current circumstances beyond what was already measured under asset shock.

Table C1: 2016 Solvency measures

Consideration	Measure Used
<p>Risks already present:</p> <p>The relative ability of the fund to meet its accrued liabilities</p> <p>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</p> <p>The proportion of scheme employers without tax raising powers or without statutory-backing</p>	<p>SAB funding level: A fund’s funding level using the SAB standard basis, as set out in Appendix D</p> <p>Open fund: Whether the fund is open to new members</p> <p>Non-statutory members: The proportion of members within the fund who are/were employed by an employer without tax raising powers or statutory backing</p>
<p>Emerging risks:</p> <p>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)</p> <p>The impact that non-statutory employers defaulting on contributions would have on the income of sponsoring employers as a whole</p>	<p>Asset shock: 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</p> <p>Employer default: 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</p>

C.18 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.19 There were six funds with no or low core spending

- Environmental Agency Active Fund
- Environmental Agency Closed Fund
- West Midlands Integrated Transport Authority Pension Fund
- South Yorkshire Passenger Transport Authority Pension Fund
- London Pension Fund Authority Pension Fund
- City of London Corporation Pension Fund

C.20 For each of these funds, we have reverted to the dry run methodology for asset and liability shock, which expressed the resulting additional contributions to meet the emerging deficit as a percentage of pensionable pay.

Solvency measures – methodology

C.21 This Appendix details 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.

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

C.22 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.23 A fund in deficit will need to pay additional contributions in order to meet the liabilities that have already been accrued.

C.24 This measure assesses the relative funding levels of individual funds. All funds have been ordered by this measure (highest funding level first) and the ten funds ranked 81 to 90 out of 91 (i.e. not including Environment Agency Closed Fund) are assigned an amber colour code. All other funds are assigned a green colour code.

Open fund: Whether the fund is open to new members

C.25 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.26 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.

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

- C.27 We have considered tax payer-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.28 Data for this measure has been taken from the publicly available '*Local government pension scheme funds local authority data: 2016 to 2017*' published by DCLG⁷. 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.29 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.30 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.31 Under this measure a fund has been allocated a red colour code if its proportion of members who are employed by an employer without tax raising powers or statutory backing is greater than 50%.
- C.32 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%, and a green colour code in all other cases.
- 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.33 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.34 For the purposes of this measure liabilities have 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. Where a fund is in surplus under the standardised best estimate basis, the surplus is assumed to be paid back to the employer over a period of 20 years. However, where the fund is in surplus after the shock, we have not applied a flag.
- C.35 Return-seeking asset classes are assumed to be:
- Overseas Equities
 - UK Equities
 - Other Investments
 - Property
 - Other return seeking assets

⁷ <https://www.gov.uk/government/collections/local-government-pension-scheme>

Defensive asset classes are assumed to be:

- Cash
- Gilts
- Corporate Bonds
- Other defensive assets

C.36 We calculated the emerging deficit from the shock following a 15% fall in return seeking assets applying to tax raising employers (local authorities and connected bodies & other public sector bodies):

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

C.37 We spread this over 20 years of annual payments and express as a percentage of Core Spending Power (or financing data for Welsh funds)

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

C.38 Where:

- new deficit is calculated on the standardised best estimate basis as at 31 March 2016
- \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.39 A fund is allocated an amber colour code if its result is above 3% and a green colour code otherwise.

C.40 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 5%. 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.

Funds in surplus after shock

C.41 The asset shock resulted in a reduction to the funding level of the scheme on GAD's best estimate basis. However if the fund was in surplus post shock (the funding level was in excess of 100% after the shock) the fund would not receive a flag.

C.42 However, the risk remains that such an event could bring forward the need to increase contributions for the following funds:

- East Riding Pension Fund
- Greater Manchester Pension Fund
- Royal Borough of Kensington and Chelsea Pension Fund
- Teesside Pension Fund
- Wandsworth Council Pension Fund

Equity Protection Strategy

C.43 South Yorkshire Pension Fund has recently added a protection strategy to attempt to limit downside risk from its equity portfolio. The intention of this strategy is to protect £2.6bn of the equity portion of the fund against falls in total return of between 5% and 30%, by giving up total returns above 14.25% over a two year period.

C.44 The strategy has been implemented through buying and selling options and giving up sufficient upside to reduce the net cost to zero. On implementation there was actually a net gain to the scheme of £73k. The structure has been implemented in four parts based on four indices: S&P 500 (c£1bn), FTSE 100 (c£0.9bn), Euro Stoxx 50 (c£0.6bn), Nikkei 225 (c£0.2bn).

C.45 We have not adjusted our asset shock outcomes to reflect this strategy. Although we consider such a strategy may benefit funds wishing to protect their downside risk, and which may mean the premise for our asset shock could change, we would need to understand this in more detail, and that may be appropriate if the strategy is maintained or extended through to the next valuation.

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.46 LGPS regulations require employers to pay contributions set in the valuation. DCLG 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.47 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.48 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. Where a fund is in surplus under the standardised best estimate basis, the surplus is assumed to be paid back to the employer over a period of 20 years. However, where the fund is in surplus after the shock, we have not applied a flag.

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 If an employer defaults when the fund is in surplus, the risk is mitigated, so we have not considered funds in surplus on the standardised best estimate basis for this measure.

C.51 We calculated the amount of deficit from the default of other public sector bodies & private sector, voluntary sector and other bodies:

$$\text{Share of Defecit} = \text{Defecit} \times \% \text{ non-tax raising employers}$$

C.52 We spread this over 20 years of annual payments and express as a percentage of Core Spending Power (or financing data for Welsh funds)

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

C.53 Where:

- Share of deficit is calculated on the standardised best estimate basis as at 31 March 2016
- \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.

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- 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.

Covenant review comments

C.55 We are aware that a significant amount of work goes on by fund managers in relation to covenant of employers.

C.56 Specific covenant reviews are conducted each year in respect of the employers in the WMITA fund.

C.57 We have discussed this covenant work with a range of fund managers, as well as the Pensions Regulator. It helps protect each fund against the risk of the employer defaulting on its obligations to the fund.

C.58 We include a measure for high proportion of non-tax backed employees as a proxy for the risk that their employers do default. We also do a stress test on this item to see if it has a material impact on the finances of the local authorities that may retain any residual deficit in relation to those employers. By doing these tests, it is not our intention to comment on the covenant work that goes on, rather to highlight that there remains some risk.

C.59 This risk exists because those employers have a different potential impact on the funds, and the tax raising employers retain the risk should an employer default.

Solvency measures – by fund

Table C2: Solvency measures by fund

Pension fund	2016 solvency measures				
	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
Avon Pension Fund	Yes	95.9%	5.5%	2.0%	Surplus
Bedfordshire Pension Fund	Yes	82.5%	4.2%	1.8%	0.1%
Buckinghamshire County Council Pension Fund	Yes	89.0%	4.8%	1.9%	0.0%
Cambridgeshire Pension Fund	Yes	94.3%	3.8%	2.2%	Surplus
Cardiff and Vale of Glamorgan Pension Fund	Yes	92.8%	6.7%	1.5%	Surplus
Cheshire Pension Fund	Yes	110.0%	7.6%	Surplus	Surplus
City and County of Swansea Pension Fund	Yes	85.8%	10.2%	1.4%	0.1%
City of London Corporation Pension Fund *	Yes	84.0%	10.6%	3.6%*	1.1%
City of Westminster Pension Fund	Yes	94.0%	0.0%	2.9%	Surplus
Clwyd Pension Fund	Yes	86.6%	2.4%	0.9%	0.0%
Cornwall Pension Fund	Yes	90.9%	6.3%	1.1%	Surplus
Cumbria Local Government Pension Scheme	Yes	104.9%	7.2%	Surplus	Surplus
Derbyshire Pension Fund	Yes	103.0%	4.5%	Surplus	Surplus
Devon County Council Pension Fund	Yes	86.0%	24.9%	2.5%	0.3%
Dorset County Pension Fund	Yes	86.0%	4.9%	1.9%	0.1%
Durham County Council Pension Fund	Yes	90.1%	3.8%	2.1%	0.0%
Dyfed Pension Fund	Yes	106.8%	3.8%	Surplus	Surplus
East Riding Pension Fund	Yes	104.6%	3.0%	Surplus	Surplus
East Sussex Pension Fund	Yes	108.8%	1.7%	Surplus	Surplus
Essex Pension Fund	Yes	97.0%	9.6%	2.1%	Surplus
Gloucestershire County Council Pension Fund	Yes	94.7%	9.6%	2.0%	Surplus
Greater Gwent (Torfaen) Pension Fund	Yes	86.8%	7.3%	1.5%	0.0%
Greater Manchester Pension Fund	Yes	105.5%	22.8%	Surplus	Surplus
Gwynedd Pension Fund	Yes	109.9%	3.4%	Surplus	Surplus
Hampshire County Council Pension Fund	Yes	91.2%	3.5%	1.9%	Surplus
Hertfordshire County Council Pension Fund	Yes	107.3%	5.8%	Surplus	Surplus
Isle of Wight Council Pension Fund	Yes	109.3%	2.7%	Surplus	Surplus
Islington Council Pension Fund	Yes	85.4%	5.9%	2.6%	0.1%
Kent County Council Pension Fund	Yes	93.0%	8.7%	2.1%	Surplus
Lancashire County Pension Fund	Yes	99.3%	7.9%	2.7%	Surplus
Leicestershire County Council Pension Fund	Yes	92.1%	5.0%	2.1%	Surplus

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Pension fund	2016 solvency measures				
	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
Lincolnshire Pension Fund	Yes	92.8%	2.6%	2.1%	Surplus
London Borough of Barking and Dagenham Pension Fund	Yes	90.6%	2.9%	2.3%	0.0%
London Borough of Barnet Pension Fund	Yes	82.0%	11.8%	1.7%	0.2%
London Borough of Bexley Pension Fund	Yes	103.0%	5.7%	1.9%	Surplus
London Borough of Brent Pension Fund	Yes	66.3%	13.4%	1.2%	0.6%
London Borough of Bromley Pension Fund	Yes	106.3%	2.4%	Surplus	Surplus
London Borough of Camden Pension Fund	Yes	93.8%	8.7%	2.6%	Surplus
London Borough of Croydon Pension Fund	Yes	80.6%	3.6%	1.3%	0.1%
London Borough of Ealing Pension Fund	Yes	88.2%	11.0%	1.8%	0.1%
London Borough of Enfield Pension Fund	Yes	98.7%	1.5%	1.4%	Surplus
London Borough of Hackney Pension Fund	Yes	94.9%	0.0%	2.2%	Surplus
London Borough of Hammersmith and Fulham Pension Fund	Yes	92.0%	13.2%	2.4%	Surplus
London Borough of Haringey Pension Fund	Yes	93.5%	0.0%	2.5%	Surplus
London Borough of Harrow Pension Fund	Yes	91.0%	1.7%	1.9%	0.0%
London Borough of Havering Pension Fund	Yes	78.3%	1.1%	1.3%	0.0%
London Borough of Hillingdon Pension Fund	Yes	87.8%	1.2%	1.6%	0.0%
London Borough of Hounslow Pension Fund	Yes	85.0%	12.6%	1.8%	0.2%
London Borough of Lambeth Pension Fund	Yes	98.6%	0.0%	1.9%	Surplus
London Borough of Lewisham Pension Fund	Yes	94.0%	5.8%	2.1%	Surplus
London Borough of Merton Pension Fund	Yes	96.0%	2.4%	1.7%	Surplus
London Borough of Newham Pension Fund	Yes	88.0%	1.3%	2.4%	0.0%
London Borough of Redbridge Pension Fund	Yes	91.0%	10.5%	1.2%	0.0%
London Borough of Richmond Upon Thames Pension Fund	Yes	105.0%	3.8%	Surplus	Surplus
London Borough of Southwark Pension Fund	Yes	95.5%	3.2%	2.3%	Surplus
London Borough of Tower Hamlets Pension Fund	Yes	93.4%	0.0%	2.3%	Surplus
London Borough of Waltham Forest Pension Fund	Yes	76.8%	3.1%	1.3%	0.1%
Merseyside Pension Fund	Yes	97.6%	12.7%	3.0% ⁸	Surplus
Norfolk Pension Fund	Yes	98.6%	8.7%	2.1%	Surplus
North Yorkshire Pension Fund	Yes	100.7%	2.0%	2.6%	Surplus
Northamptonshire Pension Fund	Yes	93.1%	1.6%	2.0%	Surplus
Northumberland County Council Pension Fund	Yes	95.8%	4.5%	2.4%	Surplus
Nottinghamshire County Council Pension Fund	Yes	90.0%	6.2%	2.8%	0.0%
Oxfordshire County Council Pension Fund	Yes	94.0%	4.4%	2.5%	Surplus

⁸ Unrounded figure is less than 3%

Pension fund	2016 solvency measures				
	Open fund	SAB funding level	Non-Statutory employees	Asset shock	Employer default
Powys County Council Pension Fund	Yes	90.2%	5.1%	1.2%	0.0%
Rhondda Cynon Taf County Borough Council Pension Fund	Yes	92.3%	5.9%	2.0%	Surplus
Royal Borough of Greenwich Pension Fund	Yes	92.0%	6.8%	1.7%	Surplus
Royal Borough of Kensington and Chelsea Pension Fund	Yes	116.0%	7.1%	Surplus	Surplus
Royal Borough of Kingston Upon Thames Pension Fund	Yes	96.7%	13%	2.5%	Surplus
Royal County of Berkshire Pension Fund	Yes	72.0%	5.5%	1.5%	0.2%
Shropshire County Pension Fund	Yes	91.4%	9.8%	1.8%	Surplus
Somerset County Council Pension Fund	Yes	80.0%	21.9%	2.7%	0.7%
South Yorkshire Pension Fund	Yes	98.5%	9.6%	3.0%	Surplus
Staffordshire Pension Fund	Yes	96.3%	6.6%	2.9%	Surplus
Suffolk Pension Fund	Yes	108.7%	24.5%	Surplus	Surplus
Surrey Pension Fund	Yes	95.1%	5.1%	2.0%	Surplus
Sutton Pension Fund	Yes	86.0%	4.4%	1.3%	0.0%
Teesside Pension Fund	Yes	105.9%	9.7%	Surplus	Surplus
Tyne and Wear Pension Fund	Yes	96.7%	11.8%	3.5%	Surplus
Wandsworth Council Pension Fund	Yes	116.0%	8.9%	Surplus	Surplus
Warwickshire Pension Fund	Yes	101.7%	5.9%	2.2%	Surplus
West Midlands Pension Fund	Yes	95.0%	4.1%	2.7%	Surplus
West Sussex County Council Pension Fund	Yes	120.3%	5.7%	Surplus	Surplus
West Yorkshire Pension Fund	Yes	101.7%	13.4%	3.7%	Surplus
Wiltshire Pension Fund	Yes	96.6%	21.8%	2.6%	Surplus
Worcestershire County Council Pension Fund	Yes	84.4%	9.0%	2.2%	0.1%
Environment Agency Active Fund*	Yes	122.6%	N/A	Surplus*	N/A
Environment Agency Closed Fund	No	37.7%	N/A	N/A	N/A
South Yorkshire Passenger Transport Pension Fund*	No	121.0%	100.0%	Surplus*	N/A
West Midlands Integrated Transport Authority Pension Fund*	No	111.0%	100.0%	Surplus*	N/A
London Pensions Fund Authority Pension Fund*	Yes	96.0%	19.7%	7.4%*	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 2016. 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 dry run)

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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
 - Table of outcomes for each fund

Table D1: Long Term Cost Efficiency Considerations and Measures

Consideration	Measure Used
Relative considerations:	
The implied deficit recovery period	Deficit Period: Implied deficit recovery period calculated on a standardised best estimate basis (SAB key indicator 3)
The investment return required to achieve full funding	Required Return: The required investment return rates to achieve full funding in 20 years' time on a standardised best estimate basis (SAB key indicator 4(i))
The pace at which the deficit is expected to be paid off	Repayment Shortfall: The difference between the actual deficit recovery contribution rate 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
Absolute Considerations:	
The extent to which the required investment return above is less than the estimated future return being targeted by a fund's investment strategy	Return Scope: The required investment return rates as calculated in required return (i.e. SAB key indicator 4(i)), compared with the fund's expected best estimate future returns assuming current asset mix maintained (SAB key indicator 4(ii))
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	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.2 For the 2016 report, we have removed some measures which represented the same information in a slightly different way to make the report more succinct.
- D.3 Three of these measures were selected from the KPIs defined by the SAB⁹. 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 multiple measures are 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 were calculated using a best estimate set of assumptions. For more information on this best estimate basis please see Appendix G.

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

- D.7 This measure is based on SAB 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.8 The implied deficit recovery period on the standardised best estimate basis was found by solving the following equation for x:

$$\bar{a}_x = \frac{\text{Defecit on standardised BE basis}}{\text{Annual defecit recovery payment on standardised BE basis}}$$

- D.9 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 2016.
 - 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 2017/18 – 2019/20, 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 2017/18 – 2019/20 (which is assumed to be equal to the future cost of accrual of that particular fund).

⁹ <http://committees.westminster.gov.uk/documents/s15058/11%20-%20Appendix%201%20-%20KPI%20Guidance.pdf>

D.10 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.

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

D.11 This measure is based on SAB key indicator 4(i). 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. No amber or red flags were raised under this measure.

D.12 The following assumptions were made for the purposes of this calculations:

- Time 0 is 31 March 2016.
- Time 20 is 31 March 2036.
- 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 value of the fund's assets at time 20.
- L_0 is the value of the fund's liabilities at time 0, and was obtained from the data provided by the local firms of actuarial advisors.
- L_{20} is the value of the fund's liabilities at time 20.
- 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 and was calculated by restating the standard contribution rates on the local fund bases using the 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.13 The membership profile is assumed to be constant.

D.14 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:

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

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D.15 Where the required investment return was higher than the nominal discount rate on the standardised best estimate basis (i.e. i where $i = 5.59\%$) funds would be classified as amber, whereas funds were classified as green if the required return was less than i .

Repayment shortfall: *The difference between the actual deficit recovery contribution rate and the annual deficit recovery contributions required as a percentage of payroll to pay off deficit in 20 years, where the deficit is calculated on a standardised best estimate basis*

D.16 This measure extends the deficit period measure. We calculate the required annual deficit recovery contribution rate on a standardised best estimate basis to pay off the deficit in 20 years' time, and then work out the difference between the actual deficit recovery contribution rate and this rate.

D.17 The 20 year deficit recovery period is based on the SAB key indicator 4(i).

D.18 The required annual deficit recovery contribution rate to be paid on a standardised best estimate basis is equal to:

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

Where:

- The deficit on the standardised best estimate basis is as at 31 March 2016.
- \bar{a}_{20} is a continuous annuity over the 20 year deficit recovery period at the rate of interest equal to $\frac{i+e}{1+e} - 1$.
- 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 2016 and has not been adjusted.

D.19 The difference in deficit recovery contribution rates is then defined as:

(Avg ER cont rate paid – ER SCR on BE basis)

$$- \frac{\text{Defecit on BE basis}}{\bar{a}_{20} \times \text{Salary Roll}}$$

Where:

- The average employer contribution rate is for the years 2017/18 – 2019/20, 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 2017/18 – 2019/20. It is assumed that the standard contribution rate is equal to the future cost of accrual of that particular fund.

D.20 The data required for each of the funds to carry out the above calculation was provided by their respective firms of actuarial advisors.

D.21 Where appropriate data has been restated on the standardised best estimate basis.

D.22 Funds 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. If the difference in deficit recovery contribution rates is less than -3%, then the fund would be flagged as red. No amber or red flags were raised under this measure.

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.23 This measure is based on SAB key indicator 4(ii).

D.24 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 2016.

D.25 The asset data used in this calculation was provided by each fund's respective firm of actuarial advisors.

D.26 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.

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.27 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.28 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)

Funds where both of the above have occurred are flagged amber; otherwise funds are flagged green.

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Long term cost efficiency measures – by fund

Table D2: Long term cost efficiency measures by fund

Pension fund	2016 long term cost efficiency measures					
	Maturity (rank)	Relative considerations			Absolute considerations	
		Deficit period	Required return	Repayment shortfall	Return scope	Deficit Reconciliation
Avon Pension Fund	6 (54)	Surplus	3%	11%	2.2%	Green
Bedfordshire Pension Fund	5.5 (82)	4	3%	11%	2.3%	Green
Buckinghamshire County Council Pension Fund	5.3 (88)	0	3%	9%	2.1%	Green
Cambridgeshire Pension Fund	5.8 (71)	Surplus	3%	11%	2.8%	Green
Cardiff and Vale of Glamorgan Pension Fund	6.1 (48)	Surplus	3%	13%	3.1%	Green
Cheshire Pension Fund	6.6 (32)	Surplus	1%	14%	3.5%	Green
City and County of Swansea Pension Fund	5.6 (75)	3	3%	10%	2.4%	Green
City of London Corporation Pension Fund	7.1 (20)	6	4%	7%	1.8%	Green
City of Westminster Pension Fund	8.8 (5)	Surplus	1%	26%	4.9%	Green
Clwyd Pension Fund	6.5 (35)	2	2%	15%	2.6%	Green
Cornwall Pension Fund	5.9 (60)	Surplus	3%	14%	2.0%	Green
Cumbria Local Government Pension Scheme	7 (21)	Surplus	3%	10%	2.2%	Green
Derbyshire Pension Fund	5.6 (76)	Surplus	3%	8%	2.4%	Green
Devon County Council Pension Fund	6.3 (42)	4	4%	7%	1.7%	Green
Dorset County Pension Fund	5.7 (72)	4	4%	7%	1.4%	Green
Durham County Council Pension Fund	6.8 (23)	0	3%	13%	1.5%	Green
Dyfed Pension Fund	5.9 (56)	Surplus	3%	5%	2.3%	Green
East Riding Pension Fund	5.7 (73)	Surplus	2%	13%	3.7%	Green
East Sussex Pension Fund	6 (52)	Surplus	2%	10%	3.6%	Green
Environment Agency Active Fund	5.9 (62)	Surplus	3%	7%	3.0%	Green
Environment Agency Closed Fund	0 (N/A)	N/A	N/A	N/A	N/A	Green
Essex Pension Fund	5.6 (80)	Surplus	3%	10%	3.1%	Green
Gloucestershire County Council Pension Fund	5.9 (58)	Surplus	1%	19%	4.3%	Green
Greater Gwent (Torfaen) Pension Fund	6 (53)	3	4%	8%	1.9%	Green
Greater Manchester Pension Fund	6.9 (22)	Surplus	3%	9%	3.0%	Green
Gwynedd Pension Fund	5.4 (86)	Surplus	2%	10%	3.4%	Green
Hampshire County Council Pension Fund	5.5 (84)	Surplus	3%	12%	2.2%	Green
Hertfordshire County Council Pension Fund	5.8 (69)	Surplus	2%	12%	3.3%	Green
Isle of Wight Council Pension Fund	7.2 (17)	Surplus	2%	12%	3.7%	Green
Islington Council Pension Fund	7.3 (16)	5	4%	7%	1.1%	Green

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2016 long term cost efficiency measures

Pension fund	Relative considerations			Absolute considerations		
	Maturity (rank)	Deficit period	Required return	Repayment shortfall	Return scope	Deficit Reconciliation
Kent County Council Pension Fund	5.8 (70)	Surplus	3%	10%	2.6%	Green
Lancashire County Pension Fund	6.4 (37)	Surplus	3%	9%	2.8%	Green
Leicestershire County Council Pension Fund	5.4 (85)	Surplus	2%	13%	3.0%	Green
Lincolnshire Pension Fund	5.8 (66)	Surplus	3%	12%	3.0%	Green
London Borough of Barking and Dagenham Pension Fund	5.6 (79)	0	2%	14%	3.3%	Green
London Borough of Barnet Pension Fund	5.9 (61)	4	3%	11%	2.4%	Green
London Borough of Bexley Pension Fund	7.2 (18)	Surplus	3%	8%	3.1%	Green
London Borough of Brent Pension Fund	7.3 (15)	10	4%	10%	1.8%	Green
London Borough of Bromley Pension Fund	6.6 (33)	Surplus	2%	11%	3.4%	Green
London Borough of Camden Pension Fund	8.1 (7)	Surplus	2%	21%	3.9%	Green
London Borough of Croydon Pension Fund	6.1 (51)	6	4%	8%	2.1%	Green
London Borough of Ealing Pension Fund	6.8 (24)	2	3%	12%	2.3%	Green
London Borough of Enfield Pension Fund	5.8 (67)	Surplus	2%	12%	3.0%	Green
London Borough of Hackney Pension Fund	6.1 (50)	Surplus	0%	23%	5.0%	Green
London Borough of Hammersmith and Fulham Pension Fund	9.1 (4)	Surplus	4%	13%	2.0%	Green
London Borough of Haringey Pension Fund	7.4 (12)	Surplus	3%	11%	2.0%	Green
London Borough of Harrow Pension Fund	6.5 (34)	0	3%	11%	2.4%	Green
London Borough of Havering Pension Fund	6.3 (43)	6	3%	9%	2.1%	Green
London Borough of Hillingdon Pension Fund	5.8 (65)	2	3%	10%	2.1%	Green
London Borough of Hounslow Pension Fund	6.2 (44)	4	4%	8%	1.5%	Green
London Borough of Lambeth Pension Fund	8.5 (6)	Surplus	2%	18%	3.5%	Amber
London Borough of Lewisham Pension Fund	7.5 (9)	Surplus	3%	13%	2.6%	Green
London Borough of Merton Pension Fund	6.1 (49)	Surplus	4%	7%	1.6%	Amber
London Borough of Newham Pension Fund	6.4 (39)	2	4%	8%	1.6%	Amber
London Borough of Redbridge Pension Fund	6.3 (41)	0	3%	12%	1.3%	Green
London Borough of Richmond Upon Thames Pension Fund	6.7 (25)	Surplus	3%	11%	2.2%	Green
London Borough of Southwark Pension Fund	6.7 (28)	Surplus	3%	11%	2.4%	Green
London Borough of Tower Hamlets Pension Fund	7.2 (19)	Surplus	2%	20%	3.8%	Green
London Borough of Waltham Forest	7.5 (11)	9	4%	8%	1.8%	Green
London Pensions Fund Authority Pension Fund	9.2 (3)	Surplus	3%	10%	2.4%	Green
Merseyside Pension Fund	7.7 (8)	Surplus	3%	13%	2.8%	Green

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Pension fund	2016 long term cost efficiency measures					
	Relative considerations			Absolute considerations		
	Maturity (rank)	Deficit period	Required return	Repayment shortfall	Return scope	Deficit Reconciliation
Norfolk Pension Fund	6.7 (29)	Surplus	2%	14%	3.1%	Green
North Yorkshire Pension Fund	5.4 (87)	Surplus	3%	10%	2.5%	Green
Northamptonshire Pension Fund	6.2 (46)	Surplus	3%	13%	2.7%	Green
Northumberland County Council Pension Fund	7.5 (10)	Surplus	2%	15%	3.2%	Green
Nottinghamshire County Council Pension Fund	5.6 (74)	1	4%	7%	1.6%	Green
Oxfordshire County Council Pension Fund	5.5 (83)	Surplus	4%	8%	2.3%	Green
Powys County Council Pension Fund	6.1 (47)	0	3%	12%	2.5%	Green
Rhondda Cynon Taf County Borough Council Pension Fund	5.8 (63)	Surplus	3%	13%	2.9%	Green
Royal Borough of Greenwich Pension Fund	5.6 (78)	Surplus	4%	7%	0.8%	Green
Royal Borough of Kensington and Chelsea Pension Fund	7.4 (13)	Surplus	3%	6%	3.5%	Green
Royal Borough of Kingston Upon Thames Pension Fund	5.2 (90)	Surplus	2%	13%	3.5%	Amber
Royal County of Berkshire Pension Fund	5.3 (89)	13	5%	3%	1.2%	Green
Shropshire County Pension Fund	6.6 (31)	Surplus	3%	10%	1.9%	Green
Somerset County Council Pension Fund	5.6 (77)	6	4%	8%	2.0%	Green
South Yorkshire Passenger Transport Pension Fund	32.7 (1)	Surplus	N/A	77%	N/A	Green
South Yorkshire Pension Fund	6.6 (30)	Surplus	3%	11%	2.6%	Green
Staffordshire Pension Fund	6.4 (40)	Surplus	3%	13%	3.1%	Green
Suffolk Pension Fund	5.9 (59)	Surplus	1%	14%	4.2%	Green
Surrey Pension Fund	5.5 (81)	Surplus	3%	12%	3.0%	Green
Sutton Pension Fund	6.4 (36)	2	3%	12%	2.0%	Green
Teesside Pension Fund	6.7 (27)	Surplus	4%	4%	2.4%	Green
Tyne and Wear Pension Fund	6.4 (38)	Surplus	2%	14%	3.4%	Green
Wandsworth Council Pension Fund	7.4 (14)	Surplus	2%	6%	3.9%	Green
Warwickshire Pension Fund	5.8 (64)	Surplus	3%	10%	2.8%	Green
West Midlands Integrated Transport Authority Pension Fund	30.5 (2)	Surplus	N/A	64%	N/A	Green
West Midlands Pension Fund	6.7 (26)	Surplus	2%	16%	3.5%	Green
West Sussex County Council Pension Fund	5.9 (57)	Surplus	2%	12%	4.2%	Green
West Yorkshire Pension Fund	6 (55)	Surplus	4%	6%	2.1%	Green
Wiltshire Pension Fund	5.8 (68)	Surplus	2%	13%	3.3%	Green
Worcestershire County Council Pension Fund	6.2 (45)	3	3%	12%	3.0%	Green

Notes:

1. The liability value and salary roll figures in the maturity indicator are as at 31 March 2016. The liability value was calculated on the standardised best estimate basis.
2. The 'Required Return' and 'Return Scope' measures were not calculated for South Yorkshire PTA and West Midlands ITA as these are closed funds. They were also not calculated for the Environment Agency Active Fund as the DCLG SF3 statistics did not contain data for the fund.
3. The 'Deficit Reconciliation' measure was not calculated for South Yorkshire PTA and West Midlands ITA as information on deficit recovery periods was not applicable.

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Appendix E: Asset Liability Modelling Exercise

Why perform an Asset Liability Modelling (ALM) exercise?

- E.1 An ALM allows us to simultaneously project the assets and liabilities of the scheme under a range of scenarios, using stochastic techniques 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 as a broad measure of long term cost efficiency and sustainability. We are primarily interested in the extent to which contributions can vary from current levels. Consequently we have assumed that the investment policy remains constant over the projection period.
- E.4 Stochastic modelling techniques allow us to simulate thousands of 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 can illustrate the range of possible outcomes. Our study models changes in economic outcomes only – we have not looked at demographic changes, including mortality, nor management changes such as changes to the investment approach.

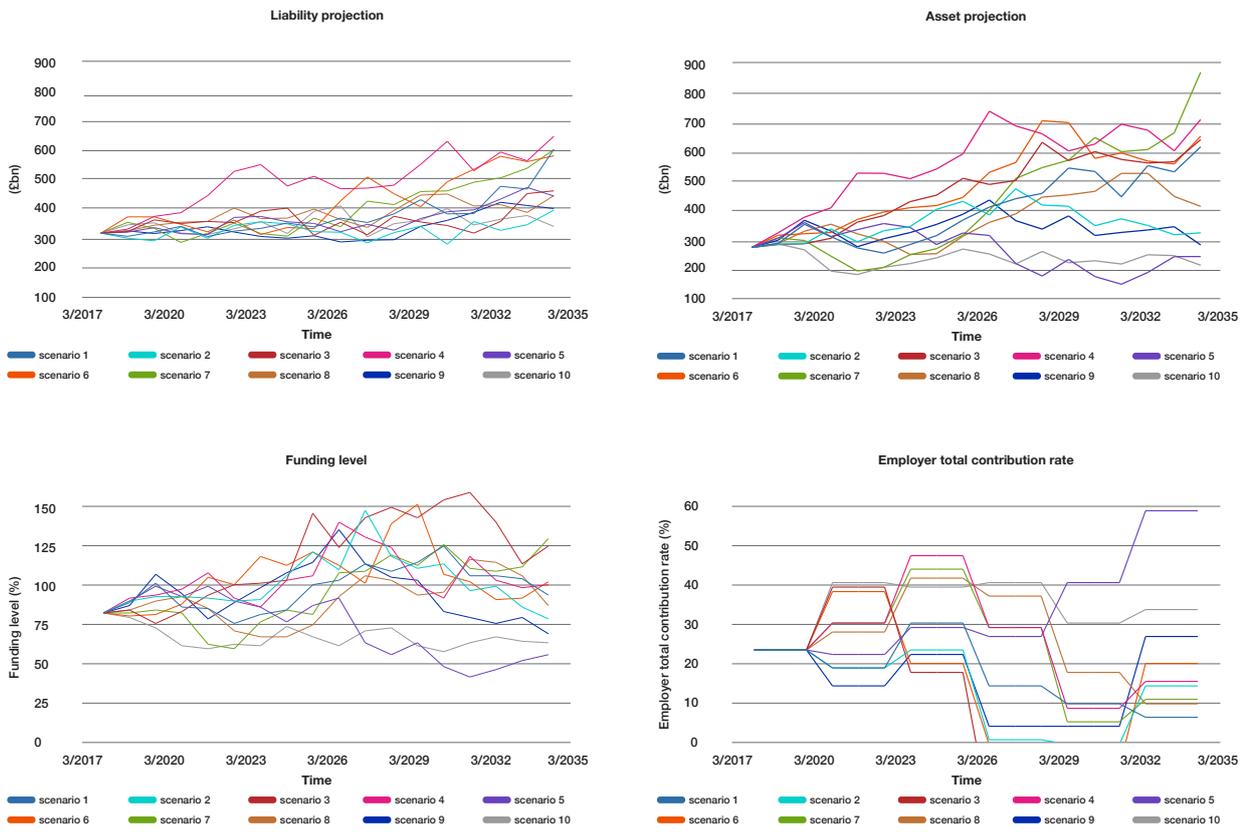
Outcomes of our modelling

- E.6 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 and
 - The contribution rate
- E.7 For example, the charts below provide an illustration of these projected variables for the first 10 scenarios.

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Chart E1: Simulated scenarios within the ALM

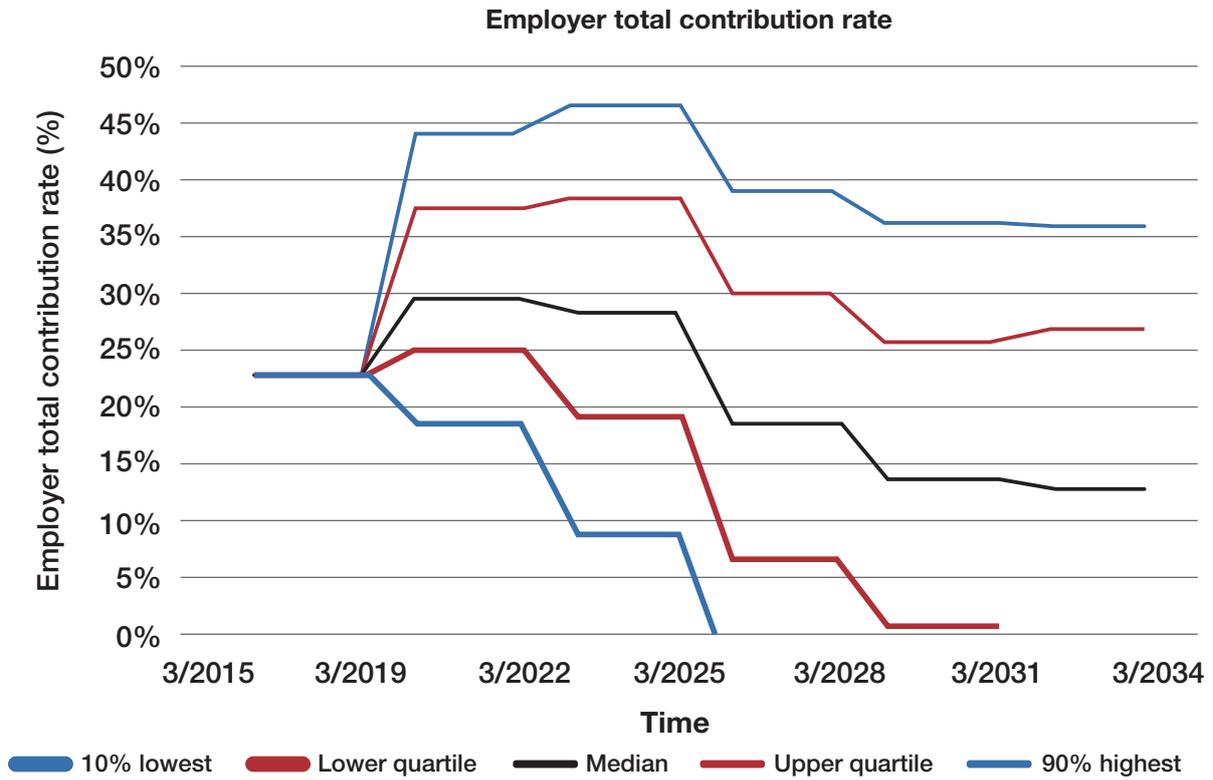


E.8 As demonstrated in these charts, there is a wide range of potential outcomes and there is a significant degree of volatility – demonstrating the risks taken by the Scheme.

E.9 In order to identify the projected trends of the scheme and assess the probability of extreme events, we instead consider different percentiles of the projected employer total contribution rates emerging at each future valuation.

E.10 Chart E2 shows the median value (black), upper and lower quartiles (red, 75th and 25th percentile respectively) and 90th highest, 10th lowest (blue, 90th and 10th percentile respectively) for the employer contribution rate, which allow for both the cost of benefit accrual and deficit contributions and are net of member contributions.

Chart E2: Employer total contribution rate



E.11 Note that none of the lines shown on this chart represent any simulated scenario – instead they are intended to represent the distribution of possible outcomes and how the range of simulated scenarios changes over the projection period.

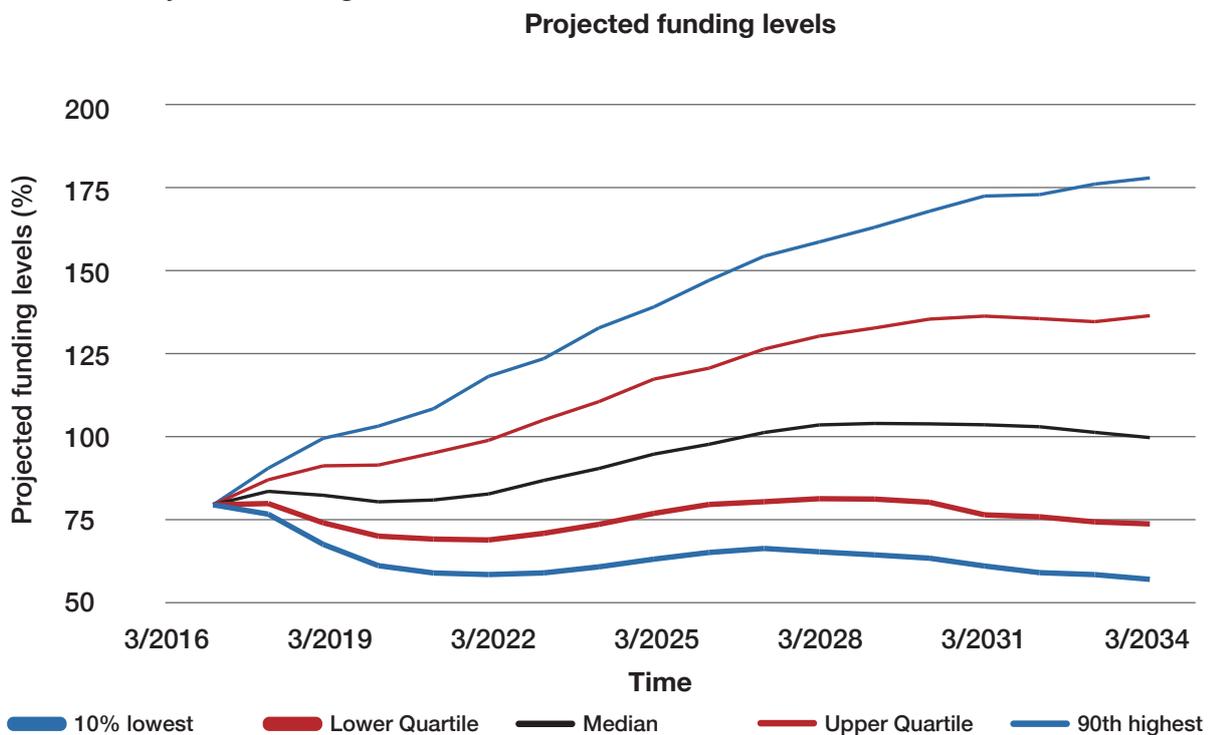
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E.12 The flipside to the projected contribution rate is the projected funding level of the scheme which is shown below.

E.13 Chart E3 shows that, under the parameters of the model, the funding level could range between 60% and 180% (10th and 90th percentile outcomes) but the median outcome tends towards a funding level of just above 100% over the projection period.

Chart E3: Projected funding levels



E.14 The key messages from the charts above show:

- In the short term, the model predicts upwards pressure on employer contributions at the next valuation cycle.
- In the medium to longer term, employer contributions are expected to fall, such that they are expected to be lower than current contribution levels.
- However there remains a significant risk that contributions are materially higher than current levels, throughout the projection period.
- Whilst the path of expected contribution rates is relatively smooth, the significant

variation within each scenario demonstrates the sensitivity of the contribution rate and the extent to which it could swing from valuation to valuation.

- This should not be regarded as a prediction of the changes in future employer contribution rates, because it's highly unlikely that the assumptions made will be borne out in practice and adjustments might be made to manage such pressures as discussed below.

Short term cost pressure

- E.15 Volatility of asset returns and economic conditions may place significant pressures on future rate of employer contributions. We performed an asset liability study to help quantify these risks.
- E.16 For the purpose of assessing liabilities and determining contributions, assumptions are needed on how the set of assumptions used to carry out an actuarial valuation at each future point in time is updated. In our modelling we have assumed that:
- Changes to the financial assumptions will reflect market conditions at the valuation date (specifically, long term gilt yields)
 - The length of the recovery period is fixed at 20 years
 - Demographic experience is as assumed in the underlying valuations
- E.17 The output of the model is the upward or downward pressure on contribution rates assuming that the impact of changes in economic conditions feed through directly to contribution setting.
- E.18 In practice we might not expect these pressures to feed directly into changes in employer contribution rates, because for example if there was a downward (or upward) cost pressure the following adjustments might be considered:
- Asset strategy might be made more defensive which would be expected to reduce future volatility but would reduce the scope for reducing contributions (conversely, if there was an upward cost pressure, assets strategy might be made more return seeking)
 - The length of the recovery period might be reduced (conversely, if there was an upward cost pressure, the length of recovery periods might be increased)
- The level of prudence might be increased, which could reduce the chance that future experience was worse than assumptions, but could also limit the scope for reducing contributions (conversely, if there was an upward cost pressure, the level of prudence might be increased)
- E.19 The output of the model should not therefore be regarded as a prediction of changes in future employer contribution rates, but rather potential pressures on the employer contribution rates that might need to be managed in some way. 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 asset strategy would be expected to increase volatility and risk
- E.20 The model is based on certain parameters and assumptions which drive projected assets, liabilities and contributions. The key assumptions and methodology are discussed in detail below, but the key drivers of the projected increase in contributions rates are:
- A fall in gilt yields, since the last valuation date (31 March 2016), which is assumed to feed through to lower discount rates in the valuation basis
 - The fall in gilt yields affects both the cost of providing ongoing benefits and increases the deficit in the Scheme, leading to higher deficit recovery contributions being required
 - This is partially offset by strong investment returns, in particular in equity markets in 2016 and 2017

Longer term reduction in costs

E.21 In the longer term, the median outcome is that employer contributions come back to below current levels. The key drivers of this are:

- An assumed increase in gilt yields from currently low levels. This is assumed to feed through to higher valuation discount rates, which affects both the cost of providing ongoing benefits and lower deficit recovery contributions
- Deficit repair contributions paid by the employers leading to an improvement in the funding position of the Scheme and a reduction in the overall level of contributions payable
- The assumed investment return – reflecting the investment strategy that is heavily weighted towards equities and other growth assets

Risks of materially higher contribution rates

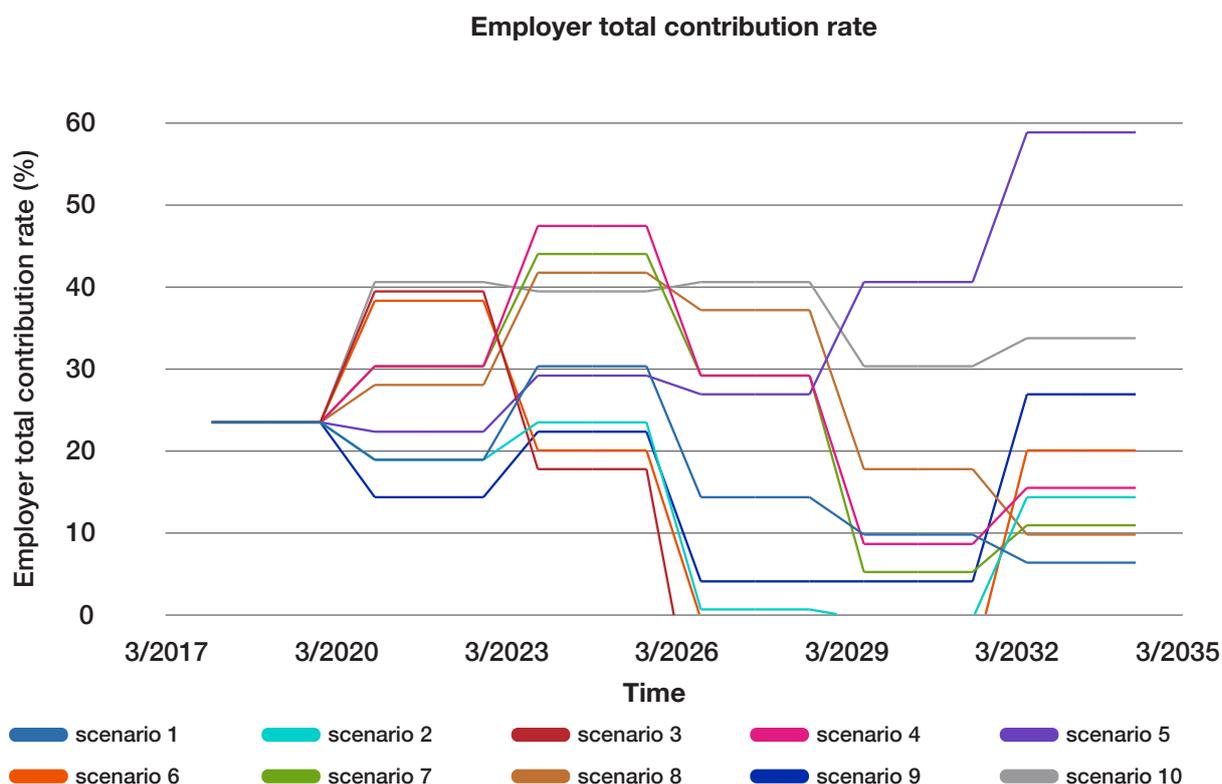
E.22 Despite the projected fall in contribution rates at the average level, the charts above demonstrate the potential for pressure on employer contributions relative to current rates. In particular, they demonstrate that there is roughly a 25% chance that contribution rates remain above 25% throughout the projection, and a 10% chance that they remain above 35%, before allowing for the management of those pressures discussed above.

E.23 The drivers of these scenarios is discussed in more detail below and reflects the key risk factors that the Scheme is running.

Contribution risk/volatility

E.24 Chart E2 represents the relevant percentile outcome at each point in time. As this is the percentile of all simulated scenarios, the lines shown do not represent particular scenarios or simulated outcomes. In the following chart we illustrate a series of contribution rate “paths” that the Scheme could experience according to our model. These show somewhat more apparent variation.

Chart E4: Individual employer contribution rate paths



E.25 This chart indicates that contribution rates can vary significantly from valuation to valuation under the model parameters.

E.26 Looking across all simulated scenarios and after removing the average trend in the projected future contribution rate, we estimate that there is around a 30% chance of potential pressure on the contribution rate of more than 8%, not allowing for management actions.

E.27 Again, the key drivers of this volatility are gilt yields and investment returns:

- Projected changes in gilt yields result in changes to the valuation basis which affect both the ongoing cost of accrual and the level of surplus or deficit in the Scheme.
- The significant investment exposure to risky assets (e.g. equities) which results in a volatile returns and funding levels.

Scheme risks

E.28 Whilst the charts and analysis outlined above give an indication of the range of plausible outcomes and the risk of material potential pressure on employer contributions, they do not explain the factors that might cause such increases.

E.29 As part of section 13, under solvency, we model (deterministically) some stress tests to evaluate whether fund employers are able to meet the additional contributions generated in relation to stress events. These stresses help quantify and illustrate each fund sensitivity to different risk factors.

E.30 In this section we further illustrate two of the key risk factors that can contribute to material increases in employer contribution rates – namely equity returns and future expected returns. We illustrate the risk factors by comparing experience of key variables in the scenarios with large contribution rates and how this compares to other scenarios.

Equity risks

E.31 With an investment strategy weighted towards growth assets, the return on equities is clearly a key risk factor in determining future contribution rates. As a result, one of the stress tests included in our solvency chapter captures an “asset shock”, in which return seeking assets are stressed by 15% relative to the liabilities.

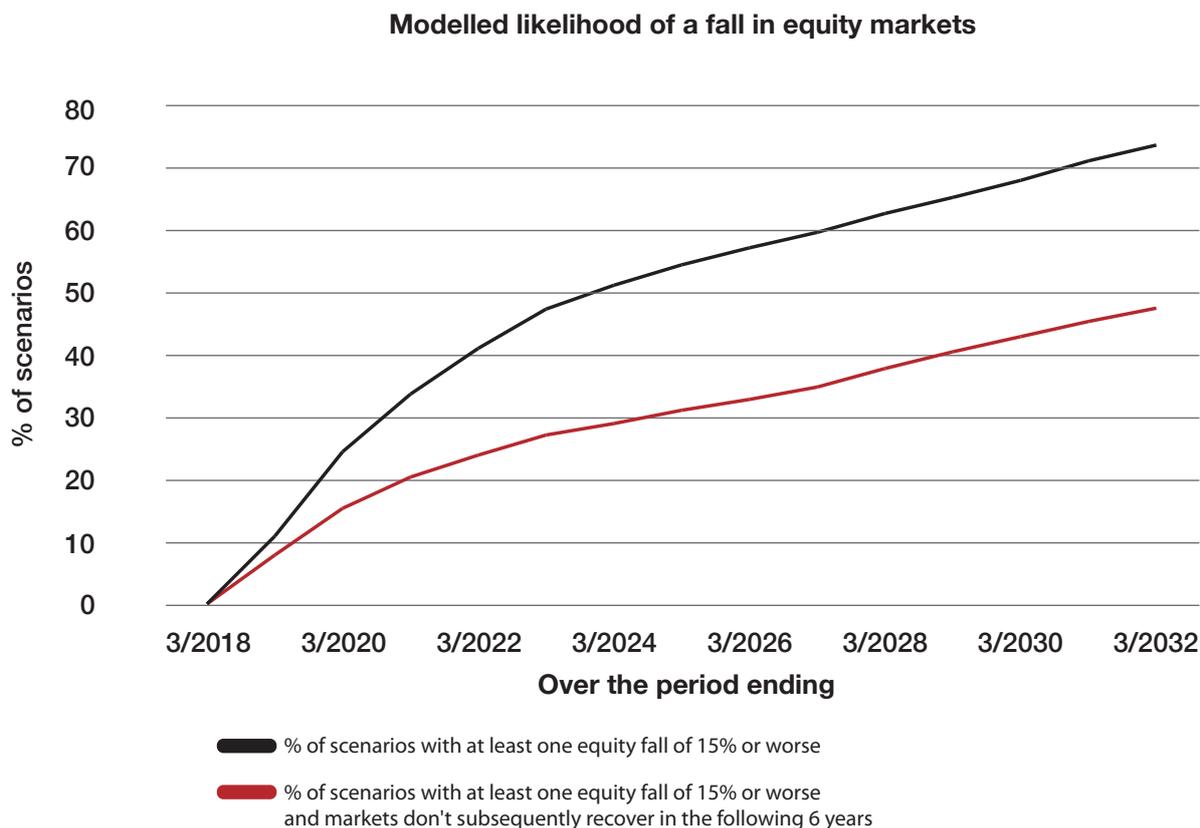
E.32 Investing in equities and other growth assets inevitably comes with volatile returns and the potential for significant downturns in asset values and returns. As a long term investor, the Scheme should be able to ride out short term volatility in returns. However, there remains significant risk of deeper and longer lasting shocks to equity markets.

E.33 The following chart helps to illustrate the possibility of this by showing:

- The proportion of simulated scenarios that experience at least one equity market fall by more than 15% over 12 months (black line) and
- The proportion of these scenarios that do not make a subsequent recovery¹⁰ in the following 6 year period (red line)

¹⁰ Defined as the equity total return index still being less than the pre-crash level 6 years after the fall.

Chart E5: Modelled likelihood of a fall in equity markets



E.34 The chart shows that by 2023, roughly 50% of scenarios are simulated to experience a significant equity downturn, of which 30% of those scenarios do not make a subsequent recovery.

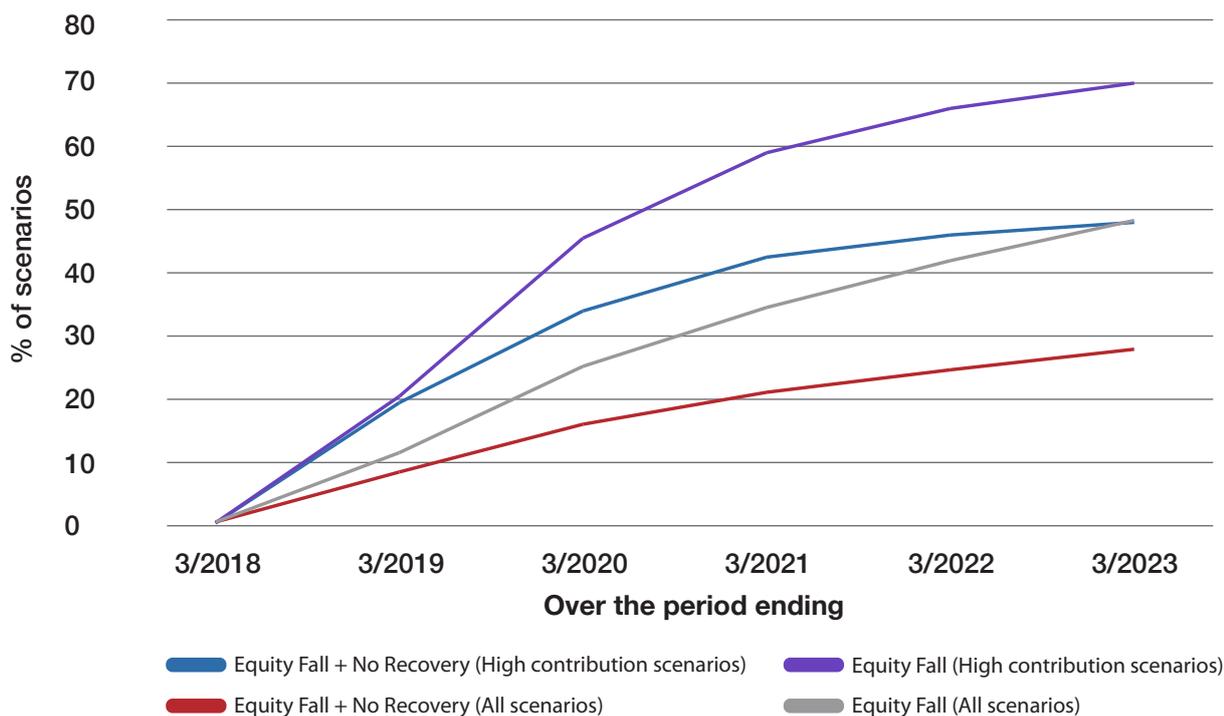
E.36 This is shown in the chart below, which filters on the scenarios with large simulated contribution rates in 2023¹¹ and shows the proportion of scenarios which are simulated to experience a downturn significantly increases.

E.35 The chart above is populated for all scenarios. Generally speaking, scenarios which have material potential pressure on employer contributions are more likely to have experienced a significant equity downturn – reflecting the high level of equity risk being run in the scheme.

¹¹ Defined as the scenarios which have a contribution rate at the 90th percentile or higher.

Chart E6: Modelled likelihood of a fall in equity markets: high contribution scenarios

Modelled likelihood of a fall in equity markets: high contribution scenarios



E.37 In the scenarios with high contribution levels roughly 70% of scenarios are simulated to experience a significant equity downturn (vs 50% for all scenarios), of which 50% of those scenarios do not make a subsequent recovery (vs 30% for all scenarios).

E.38 This demonstrates that equity returns are a key driver of contribution rates.

Expected future returns

E.39 Equity returns are a key risk factor as they influence the returns achieved by the Scheme’s assets and hence influence funding and valuation outcomes. Another key driver of contribution rates is the discount rate assumed in the valuation – which will be primarily driven by assumed future returns on investments.

E.40 In our ALM study, we have assumed that firms of actuarial advisors will update their views on expected future returns in line with projected changes in long term gilt yields (see below). Whilst we appreciate this is unlikely to be the approach adopted by the firms of actuarial advisors in practice, market expectation theory suggests that changes in gilt yields do provide an indication of the change in market expectations for future economic conditions.

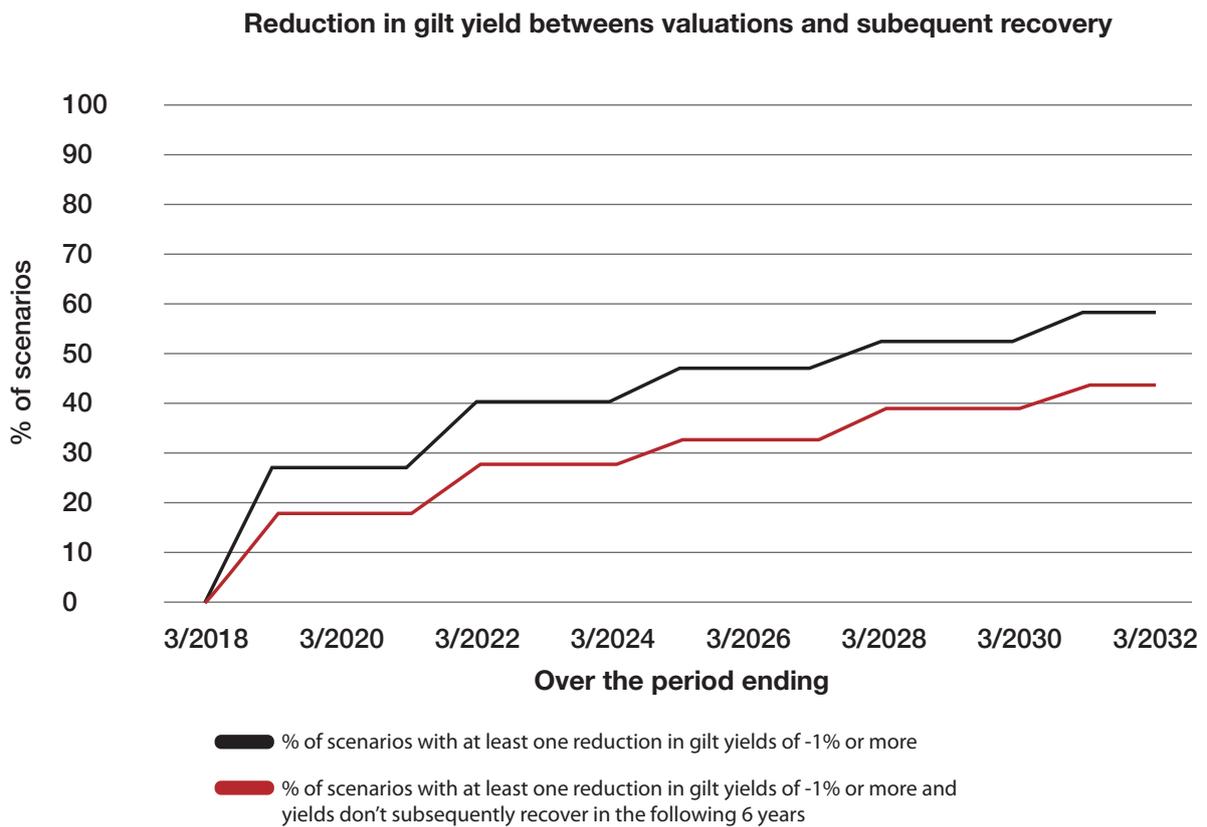
E.41 As a result, large reduction in gilt yields are likely to coincide with reduction in expected future returns which in turn would be expected to lead to higher contributions.

E.42 The following chart helps to illustrate the possibility of this by showing:

- The proportion of simulated scenarios that experience at least one significant reduction in expected future returns between valuations¹² (black line); and
- The proportion of these scenarios where expected returns do not revert¹³ in the next two valuations (red line).

E.43 The chart shows that by 2023 around 50% of scenarios are simulated to experience a significant reduction in expected future returns, of which just over 30% of those scenarios do not experience a reversion in expectations in the next two valuations.

Chart E7: Modelled likelihood of a fall in gilt yields



¹² Defined as a reduction in gilt yields of 1% or more between valuation cycles.

¹³ Defined as the gilt yield still not returning to previous levels after two valuations.

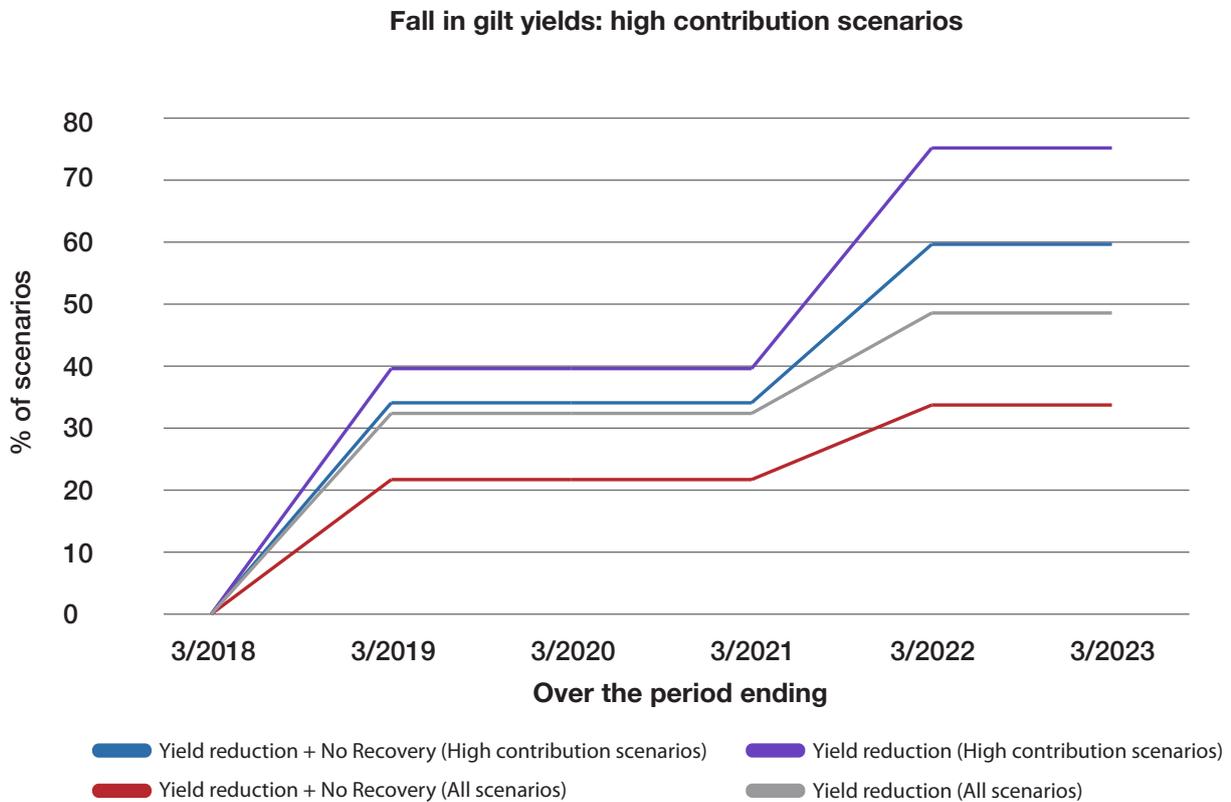
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E.44 The chart above is populated for all scenarios. Generally speaking, scenarios which have material potential pressure on employer contributions are more likely to have experienced a significant reduction in expected returns.

E.45 This is shown in the chart below, which filters on the scenarios with large simulated contribution rates in 2023¹⁴ and shows the proportion of scenarios which are simulated to experience a reduction in expected returns significantly increases.

Chart E8: Modelled likelihood of a fall in gilt yields: high contribution scenarios



E.46 In the scenarios with high contribution levels roughly 75% of scenarios are simulated to experience a significant reduction in expected future returns (vs 50% for all scenarios), of which 60% of those scenarios do not experience a reversion in expectations in the next two valuations (vs 30% for all scenarios).

E.47 This demonstrates that future expected returns are a significant driver in determining contribution rates.

¹⁴ Defined as the scenarios which have a contribution rate at the 90th percentile or higher.

Assumptions and methodology

Model

E.48 For this purpose we used our third party Asset Liability Model ('ALM') developed by Ortec Finance called GLASS (Global Liability and Asset Scenario Simulator). GLASS is based on a total balance sheet approach, meaning that assets, liabilities and contributions are consistently projected into the future.

E.49 GLASS takes scheme cash flow projections (that is benefit payments in respect of current active and non-active members of the Scheme) together with current asset values as its base input. To fully determine future cash flows over the future projection period, the scheme cash flows above are overlaid with:

- Additional cash flows in respect of new accrual in respect of both current and new active members.
- Projected revaluation and pension increases made to accrued pensions.

E.50 The initial assets within the scheme are projected forwards allowing for:

- Contributions paid by both members and employers.
- Pensions payable to retired members.
- Investment returns.

E.51 One of the key model inputs is the economic scenario generator (ESG) which is calibrated to current conditions and expectations for the future, and specifies how key economic variables such as inflation, wage growth and asset returns may vary (stochastically, according to probability distributions) in future.

E.52 Using these inputs and overlaying methodology, GLASS can be used to estimate future contribution rates, assets and liability values and hence funding levels in a dynamic projection process.

E.53 For this purpose we have used Ortec's "Lower for Longer" calibration that has been adjusted slightly in line with our house views. Ortec does provide alternative calibrations, but the Lower for Longer calibration, along with our adjustments aligns most closely with our own views.

Assumptions required

E.54 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.55 To project the development of the scheme we must make assumptions about:

- Key economic variable and financial assumptions – for example price inflation, salary growth and returns on assets held. These are determined from the ESG
- The way in which the Scheme invests its assets and whether and how this might change in the future
- 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 active liabilities are driven 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

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- E.56 For the purpose of assessing liabilities and determining contributions we needed to assume what set of assumptions will be used by the firms of actuarial advisors to carry out an actuarial valuation at each future point in time being considered.
- E.57 In practice, the firms of actuarial advisors are likely to set the discount rate with regards to the expected return on each fund's investments and are required to use prudence in setting these assumptions.
- E.58 In our modelling we have assumed that changes to the valuation basis will be made in accordance with changes in long term gilt yields. The extent of the margin above gilt yields included in the valuation may, in practice, vary according to prevailing conditions, but we have not attempted to model this. That is we assume that the margin above gilt yields is constant relative to prevailing conditions at each valuation date.
- E.59 Our model projects the entire Scheme in one go. The assumed asset strategy and future valuation assumptions are an average of those for the individual funds.
- E.60 Full details of the calibration and projection and future valuation assumptions adopted for this exercise are available on request.

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Appendix F: Data provided

F.1 At the request of the Ministry for Housing, Communities and Local Government ('MHCLG') the Government Actuary's Department ('GAD') has collected data from each fund's 2016 valuation report. 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 91 pension funds. Information for both the Environment Agency Closed Fund and South Yorkshire Passenger Transport Authority Pension Fund have been taken directly from firms of actuarial advisors. Additional data was provided at an employer level in relation to Academies.

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 2016 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 DCLG. 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 2016 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).

F.8 Table F1 shows instances where material information was not provided by the fund on time. These gaps in information forced us to implement a work around that could cast doubt on the outcomes of our work for those funds.

Table F1: Missing or late Information

Fund	Missing or late Information
London Borough of Barnet Pension Fund	No valuation data was provided to GAD as at 2016
Environmental Agency Closed/ Active Funds	Valuation data was provided to GAD as at 2016, but after the deadline specified
London Borough of Barking and Dagenham Pension Fund	No value of liabilities and funding level on the SAB standardised basis were provided.

F.9 We had no alternative but to assume an average profile for these funds, which limits the reliance that can be placed on the analysis.

F.10 Our engagement has highlighted that some funds have provided incorrect data for statutory data returns to MHCLG¹⁵, particularly in relation to the proportion of non-statutory members. It would be helpful if funds ensured that correct information was provided in these returns.

¹⁵ These returns are known as SF3 returns, <https://www.gov.uk/government/statistics/local-government-pension-scheme-funds-for-england-and-wales-2016-to-2017>

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Contribution rate data

F.11 Primary and secondary rates have now replaced common contribution rate (CCRs) in legislation. We now have data that gives an overview of total employer contributions to the fund, which we have used. In contrast, CCRs from 2013 valuations did not always reflect employer contribution rates actually paid, so primary and secondary rates are more useful. However, we have also compared contribution rates between 2013 and 2016 valuations. There is a transitional issue, as 2013 valuations CCRs don't always reflect average employer contribution rates and alternative data were not available. In some cases therefore we have used dry run data for 2014/15 contributions (see table below). However, we expect that this will not be a material issue for future section 13 reports, as it should be possible to compare

primary and secondary rates between the 2016 and 2019 valuations.

- For example, in the Wiltshire Pension Fund 2016 Valuation Report, Hymans Robertson stated "The table below shows the Fund "common contribution rate" as at 31 March 2013 for information purposes. The change in regulatory regime and guidance on contribution rates means that a direct comparison to the Whole Fund rate at 2016 is not appropriate.¹⁶"

F.12 In the following table we set out the 2013 common contribution rate, the 2014-15 actual contribution rate and the 2016 recommended contribution rates to illustrate the variation between actual rates and disclosed (common contribution rates) which could lead to incorrect interpretations being drawn.

Table F2: Contribution comparison

Pension fund	Firm of actuarial advisors	2013 common contribution rate*	Average employer contribution rate actually paid**	Difference	2016 standard contribution rate*
Avon Pension Fund	Mercer	23%	21%	-2%	23%
Bedfordshire Pension Fund	Hymans Robertson	28%	23%	-5%	26%
Buckinghamshire County Council Pension Fund	Barnett Waddingham	20%	19%	0%	21%
Cambridgeshire Pension Fund	Hymans Robertson	31%	20%	-11%	23%
Cardiff and Vale of Glamorgan Pension Fund	Aon	22%	23%	1%	23%
Cheshire Pension Fund	Hymans Robertson	27%	23%	-4%	27%
City and County of Swansea Pension Fund	Aon	22%	22%	0%	25%
City of London Corporation Pension Fund	Barnett Waddingham	17%	17%	0%	21%
City of Westminster Pension Fund	Barnett Waddingham	30%	20%	-10%	29%
Clwyd Pension Fund	Mercer	28%	26%	-2%	28%
Cornwall Pension Fund	Hymans Robertson	30%	21%	-9%	27%
Cumbria Local Government Pension Scheme	Mercer	24%	21%	-3%	21%
Derbyshire Pension Fund	Hymans Robertson	28%	20%	-8%	20%
Devon County Council Pension Fund	Barnett Waddingham	19%	19%	0%	21%
Dorset County Pension Fund	Barnett Waddingham	19%	18%	0%	21%
Durham County Council Pension Fund	Aon	21%	21%	0%	25%
Dyfed Pension Fund	Mercer	18%	16%	-2%	17%

¹⁶ No alternative figure was provided to facilitate comparison

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Pension fund	Firm of actuarial advisors	2013 common contribution rate*	Average employer contribution rate actually paid**	Difference	2016 standard contribution rate*
East Riding Pension Fund	Hymans Robertson	29%	24%	-6%	24%
East Sussex Pension Fund	Hymans Robertson	27%	20%	-7%	22%
Environment Agency Active Fund	Hymans Robertson	24%	14%	-10%	19%
Environment Agency Closed Fund	Hymans Robertson	0%	0%	0%	0%
Essex Pension Fund	Barnett Waddingham	22%	23%	1%	22%
Gloucestershire County Council Pension Fund	Hymans Robertson	33%	28%	-5%	33%
Greater Gwent (Torfaen) Pension Fund	Hymans Robertson	23%	23%	0%	22%
Greater Manchester Pension Fund	Hymans Robertson	22%	18%	-4%	21%
Gwynedd Pension Fund	Hymans Robertson	24%	23%	-1%	21%
Hampshire County Council Pension Fund	Aon	22%	20%	-1%	25%
Hertfordshire County Council Pension Fund	Hymans Robertson	26%	22%	-4%	24%
Isle of Wight Council Pension Fund	Hymans Robertson	31%	23%	-9%	24%
Islington Council Pension Fund	Mercer	28%	20%	-8%	21%
Kent County Council Pension Fund	Barnett Waddingham	20%	21%	1%	20%
Lancashire County Pension Fund	Mercer	23%	20%	-3%	20%
Leicestershire County Council Pension Fund	Hymans Robertson	28%	21%	-8%	25%
Lincolnshire Pension Fund	Hymans Robertson	32%	20%	-12%	24%
London Borough of Barking and Dagenham Pension Fund	Hymans Robertson	31%	23%	-8%	25%
London Borough of Barnet Pension Fund	Hymans Robertson	24%	24%	0%	27%
London Borough of Bexley Pension Fund	Mercer	24%	21%	-3%	21%
London Borough of Brent Pension Fund	Hymans Robertson	39%	28%	-11%	35%
London Borough of Bromley Pension Fund	Mercer	26%	25%	-1%	23%
London Borough of Camden Pension Fund	Hymans Robertson	35%	28%	-7%	33%
London Borough of Croydon Pension Fund	Hymans Robertson	31%	23%	-8%	25%
London Borough of Ealing Pension Fund	Mercer	28%	22%	-6%	24%
London Borough of Enfield Pension Fund	Aon	21%	21%	0%	23%
London Borough of Hackney Pension Fund	Hymans Robertson	35%	38%	3%	33%
London Borough of Hammersmith and Fulham Pension Fund	Barnett Waddingham	22%	22%	0%	23%
London Borough of Haringey Pension Fund	Hymans Robertson	36%	24%	-12%	24%
London Borough of Harrow Pension Fund	Hymans Robertson	34%	20%	-14%	25%
London Borough of Havering Pension Fund	Hymans Robertson	38%	23%	-15%	29%
London Borough of Hillingdon Pension Fund	Hymans Robertson	29%	22%	-7%	24%
London Borough of Hounslow Pension Fund	Barnett Waddingham	19%	20%	1%	21%
London Borough of Lambeth Pension Fund	Hymans Robertson	36%	35%	-1%	28%

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Pension fund	Firm of actuarial advisors	2013 common contribution rate*	Average employer contribution rate actually paid**	Difference	2016 standard contribution rate*
London Borough of Lewisham Pension Fund	Hymans Robertson	36%	18%	-18%	22%
London Borough of Merton Pension Fund	Barnett Waddingham	21%	36%	15%	19%
London Borough of Newham Pension Fund	Barnett Waddingham	25%	24%	-1%	21%
London Borough of Redbridge Pension Fund	Hymans Robertson	28%	25%	-4%	25%
London Borough of Richmond Upon Thames Pension Fund	Barnett Waddingham	28%	26%	-2%	24%
London Borough of Southwark Pension Fund	Aon	21%	22%	1%	21%
London Borough of Tower Hamlets Pension Fund	Hymans Robertson	36%	31%	-5%	29%
London Borough of Waltham Forest	Mercer	27%	24%	-4%	27%
London Pensions Fund Authority Pension Fund	Barnett Waddingham	20%	23%	3%	20%
Merseyside Pension Fund	Mercer	25%	23%	-1%	24%
Norfolk Pension Fund	Hymans Robertson	30%	22%	-8%	27%
North Yorkshire Pension Fund	Aon	21%	21%	0%	21%
Northamptonshire Pension Fund	Hymans Robertson	32%	23%	-10%	24%
Northumberland County Council Pension Fund	Aon	25%	25%	0%	27%
Nottinghamshire County Council Pension Fund	Barnett Waddingham	19%	19%	0%	20%
Oxfordshire County Council Pension Fund	Barnett Waddingham	19%	20%	1%	19%
Powys County Council Pension Fund	Aon	23%	23%	0%	27%
Rhondda Cynon Taf County Borough Council Pension Fund	Aon	21%	21%	0%	24%
Royal Borough of Greenwich Pension Fund	Barnett Waddingham	19%	19%	1%	18%
Royal Borough of Kensington and Chelsea Pension Fund	Barnett Waddingham	18%	18%	0%	18%
Royal Borough of Kingston Upon Thames Pension Fund	Hymans Robertson	31%	25%	-6%	23%
Royal county of Berkshire Pension Fund	Barnett Waddingham	19%	19%	0%	22%
Shropshire County Pension Fund	Mercer	25%	19%	-6%	22%
Somerset County Council Pension Fund	Barnett Waddingham	20%	18%	-3%	23%
South Yorkshire Passenger Transport Pension Fund	Barnett Waddingham	23%	23%	0%	31%
South Yorkshire Pension Fund	Mercer	24%	21%	-3%	22%
Staffordshire Pension Fund	Hymans Robertson	31%	20%	-11%	26%
Suffolk Pension Fund	Hymans Robertson	28%	26%	-3%	26%
Surrey Pension Fund	Hymans Robertson	31%	22%	-9%	23%
Sutton Pension Fund	Barnett Waddingham	35%	23%	-12%	26%
Teesside Pension Fund	Aon	13%	15%	2%	16%
Tyne and Wear Pension Fund	Aon	24%	26%	2%	25%
Wandsworth Council Pension Fund	Barnett Waddingham	19%	19%	0%	18%

Pension fund	Firm of actuarial advisors	2013 common contribution rate*	Average employer contribution rate actually paid**	Difference	2016 standard contribution rate*
Warwickshire Pension Fund	Hymans Robertson	29%	17%	-12%	23%
West Midlands Integrated Transport Authority Pension Fund	Barnett Waddingham	22%	52%	30%	84%
West Midlands Pension Fund	Barnett Waddingham	26%	26%	0%	28%
West Sussex County Council Pension Fund	Hymans Robertson	26%	24%	-2%	25%
West Yorkshire Pension Fund	Aon	16%	16%	0%	19%
Wiltshire Pension Fund	Hymans Robertson	31%	21%	-11%	27%
Worcestershire County Council Pension Fund	Mercer	26%	25%	-1%	26%

*The sum of primary contribution rate and contribution rate in respect of surplus/ deficit

**For Mercer clients, this represents the average employer contribution rate paid over the intervaluation period submitted with the 2016 data. For other funds, this represents the average 2014/15 employer contribution rate submitted in the data for the 2013 dry run.

Data specification

1) MEMBERSHIP DATA

Data split by gender.

- a) Active members: number of members, average age (weighted as appropriate), average period of membership, total rate of annual actual pensionable pay at 31 March 2016 and 31 March 2013, total rate of annual FTE pensionable pay at 31 March 2016 and 31 March 2013,
- b) Pensionable pay definition, has the 2008 or 2014 definition been used to assess pensionable pay for both 31 March 2016 and 31 March 2013
- c) Deferred members: number of members, average age (weighted as appropriate), total annual preserved pension revalued to 31 March 2016 for both 31 March 2016 and 31 March 2013. Note this should exclude undecided members.
- d) Pensioners (former members): number of members, average age (weighted as appropriate), total annual pensions in payment at 31 March 2016 and 31 March 2013
- e) Pensioners (dependants including partners and children): number of members, average age (weighted as appropriate), total annual pensions in payment at 31 March 2016 and 31 March 2013

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2) FINANCIAL ASSUMPTIONS

- f) Provide assumptions used for past service liabilities these have been given for both as at 31 March 2016 and 31 March 2013.
 - i) Nominal discount rate (pre & post retirement separately if applicable)
 - ii) RPI inflation
 - iii) CPI inflation rate
 - iv) Earnings inflation
- g) Provide assumptions used for future contributions, these have been given for both as at 31 March 2016 and 31 March 2013.
 - i) Nominal discount rate (pre & post retirement separately if applicable)
 - ii) RPI inflation
 - iii) CPI inflation rate
 - iv) Earnings inflation
- h) Provide a method by which the discount rates are derived
 - i) CPI+
 - ii) Gilts
 - iii) Weighted Average expected return on assets classes
 - iv) Other (please specify)
- i) Asset Outperformance assumption for both 31 March 2016 and 31 March 2013.
- j) Short term assumptions used in the valuation for year 2016-17,2017-18,2018-19,2019-20
 - i) CPI
 - ii) Salary Increases
 - iii) Discount Rate

ALTERNATIVE FINANCIAL ASSUMPTIONS

- a) Provide assumptions used for past service liabilities these have been given for both as at 31 March 2016 and 31 March 2013.
 - i) Nominal discount rate (pre & post retirement separately if applicable)
 - ii) RPI inflation
 - iii) CPI inflation rate
 - iv) Earnings inflation
- b) Provide assumptions used for future contributions, these have been given for both as at 31 March 2016 and 31 March 2013.
 - i) Nominal discount rate (pre & post retirement separately if applicable)
 - ii) RPI inflation
 - iii) CPI inflation rate
 - iv) Earnings inflation
- c) Provide a method by which the discount rates are derived
 - i) CPI+
 - ii) Gilts
 - iii) Weighted Average expected return on assets classes
 - iv) Other (please specify)
- d) Asset Outperformance assumption for both 31 March 2016 and 31 March 2013.
- e) Short term assumptions used in the valuation for year 2016-17,2017-18,2018-19,2019-20
 - i) CPI
 - ii) Salary Increases
 - iii) Discount Rate

If different assumptions were adopted, there was a separate tab (called Alternative Assumptions) for these other assumptions.

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

- i) Pensioner members aged 65 (for members retiring on normal health) (to 2dp) Rates of Ill-health Retirement from Active service
- ii) Pensioner members aged 65 (for members retiring on ill health) (to 2dp)
- iii) Pensioner members aged 65 (for dependants) (to 2dp)
- iv) Active / deferred members at age 65 if they are currently aged 45 (for members retiring on normal health) (to 2dp)
- v) Active / deferred members at age 65 if they are currently aged 45 (for members retiring on ill health) (to 2dp)

b) Post-retirement Mortality

- i) Baseline (e.g. 100% S1NMA)
- ii) Future improvements (e.g. CMI 2012)
- iii) Long term rate of future improvement (%)

c) Commutation

- i) Pre 2008 pension Commutation Assumptions (as % of maximum lump sum allowed under HMRC rules)*
- ii) Post 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.

d) Promotional Salary Scale (if not included in earnings inflation assumption), this is further split by ages increasing in multiples of 5 from age 20 to 65

If included in earnings assumption, indicate Y

4) ASSETS

These are split to provide information for 31 March 2016 and 31 March 2013

a) Value of Assets (market value)

b) Actual Asset Distribution split into the following:

- i) Proportion of assets held in Bonds (fixed interest government bonds, fixed interest non-government bonds, inflation linked bonds)
- ii) Proportion of assets held in Equities (UK equities, overseas equities, unquoted or private equities)
- iii) The rest in Property, Insurance Policies, Fully insured annuities, Deferred or immediate fully insured annuities, Hedge funds, Cash and net current assets, Commodities, ABC arrangements, Infrastructure – debt type, Infrastructure* – equity type “Other” investments – defensive*, “Other” investments – return seeking

* Please provide details of infrastructure projects undertaken since 1 April 2013, and further plans to increase this on a separate sheet.

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** Please provide information on whether local housing stock is held within the property portfolio, and any future plans to add this asset class.

- c) Value of assets used in valuation
- d) Is a smoothed asset value used? If Yes, an explanation is included

5) LIABILITIES AND FUTURE CONTRIBUTION RATE

These are split to provide information for 31 March 2016 and 31 March 2013;

- i) Local assumptions
 - a) Past service liability – split between Actives, Deferred, Pensioners and Total
 - b) Funding level
 - c) Surplus / deficit
 - d) Deficit recovery period
 - e) Past service liability (on a low risk / gilts basis) – split between Actives, Deferred, Pensioners and Total

Future contribution rates

- f) Primary contribution rate
- g) If primary contribution rate include deficit recovery contributions
- h) Standard contribution rate
- i) Contribution rate in respect of surplus or deficit
- j) 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

6) REVENUE ACCOUNTS

- a) Value of assets at last valuation (after any smoothing or other adjustments)
- b) Value of assets at this valuation (after any smoothing or other adjustments)
- c) Total Income: Employee contributions, normal employer contributions, special employer contributions, transfers in, investment income, other income
- d) Total Expenditure: Pensions paid, retirement lump sums paid, other lump sums paid, transfers out, investment expenses, administration expenses, other outgoings

7) ANALYSIS OF SURPLUS (PAST SERVICE LIABILITY)

- a) Surplus / deficit at last valuation
- b) Interest on surplus/deficit
- c) Difference between contribution paid and cost of benefits accrued
- d) Total experience gains and losses (of which: investment return experience, salary increase experience, pension increase experience, pensioner mortality experience, other demographic experience)
- e) Total change in assumptions (of which: financial assumptions, mortality assumptions, other demographic assumptions)
- f) Other
- g) Surplus / deficit at this valuation

8) ANALYSIS OF CHANGE IN FUTURE SERVICE CONTRIBUTION RATE

- a) Future service rate at last valuation
- b) Total effect of change in assumptions (Of which: financial assumptions, mortality assumptions, other demographic assumptions)
- c) Change due to introduction new benefit design from April 2014
- d) Other
- e) Change in definition of pensionable pay
- f) Future service rate at this valuation (common contribution rate)

9) DEFICIT RECONCILIATION

Complete the three yearly deficit repayments from the last valuation and from this valuation to demonstrate continuity of deficit recovery plan.

- a) Nominal deficit contributions expected to be paid in the three year period for the current valuation (March 2016), previous valuation (March 2013) and the difference: for 2013-2016, 2016-2019, 2019-2022, 2022-2025, 2025-2028, 2028-2031, 2031-2034, 2034-2017, 2037+. The nominal difference should also be included.
- b) Present value of deficit contributions expected to be paid in the three year period: the current valuation (March 2016), previous valuation (March 2013) and the difference: for 2013-2016, 2016-2019, 2019-2022, 2022-2025, 2025-2028, 2028-2031, 2031-2034, 2034-2017, 2037+, Sum of present values, Original deficit disclosed.

10) AVERAGE EMPLOYER CONTRIBUTION RATE

For years 2017/18, 2018/19 and 2019/20

- a) Average employer contribution rate, current benefit accrual (%pay)
- b) Total deficit contributions payable (where expressed as a fixed monetary amount (£))
- c) Projected total deficit contributions (where expressed as a percentage of pay (% pay))
- d) Total deficit contributions (£)
- e) Total deficit contributions (expressed as a % of pay) (% pay)
- f) Average employer contribution rate (% pay)
- g) Total projected pay (£)
- h) Pensionable Pay definition (2008 or 2014 scheme definition)

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- i) Long Stepping Periods – If a longer stepping period than three years, then it should be indicated and an explanation included.

11) POST 2014 SCHEME

- a) Proportion of members assumed to be in 50/50 scheme split by gender

12) DOCUMENTATION REQUIRED

- a) Valuation Report @ 31 March 2016
- b) Relevant related reports
- c) Compliance Extract
- d) Statement of Investment Strategy
- e) Funding Strategy Statement
- f) Other

Explanatory notes

- 1 Membership data:** Average ages should be unweighted, weighted by salary/pension and weighted liability as available. Accrued pensions should include the 2016 Pension Increase Order.
- 3 Demographic Assumptions:** We expect this to be shown at sample ages only which will be specified in our template. For example promotional salary scale we intend to use five-year intervals from 20 to 65.
- 3c Commutation:** 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.
- 5j Assumed member contribution yield:** This is the contribution yield that members are assumed to pay over the valuation period. It will vary by authority due to the tiered member contribution rates.
- 4b Infrastructure - debt type:**
Infrastructure - equity type: Whether local housing stock is held within the property portfolio
- 10** The average employer contribution rate should be calculated as projected employer contributions in 2017/18 divided by projected pensionable pay in 2017/18. The rate for 2018/19 and 2019/20 should be calculated by the same method. We request the following:
- 10a Average employer contribution rates –** current benefit accrual (% pay); weighted average of cost of current accruals (net of employee contributions)
- 10b Total deficit contributions payable** (where fixed monetary amount) (£): Sum of deficit contribution where expressed as a fixed monetary amount. Ignore deficit contributions paid as a proportion of pay for this item
- 10c Projected total deficit contributions payable** (where expressed as a percentage of pay) (£): Projected payment in £ terms – will require an assumption about projected pay. Ignore deficit contribution paid as a fixed monetary amount
- 10d Total deficit contributions (£):** The sum of 10b) and 10c)
- 10e Total deficit contributions expressed a percentage of pay (% pay):** Row 10d) re-expressed as a percentage of pay by dividing by projected pay across the whole fund (i.e. 10d) divided by 10g))
- 10f Average employer contribution rate (% pay):** Sum of 10a) and 10e)
- 10g Projected pay (£): Total projected pay (£):** For all employers in the fund
Since projected pensionable pay (10g)) acts only as the weightings in these weighted averages, it is acceptable to use a simple projection of pensionable pay (eg based on actual pensionable pay at 31 Mar 2016 with a simple factor for increases up to 2020).

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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 2016 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 2016. Details of the SAB standard basis and the standardised best estimate basis can be found in the table below. Differences are highlighted.

Table G1: SAB standard basis¹⁷ and best estimate basis

ASSUMPTION	SAB standard basis	Best estimate basis
Methodology	Projected Unit Methodology with 1 year control period	Projected Unit Methodology with 1 year control period
Rate of pension increases	2% per annum	1.9% per annum
Public sector earnings growth	3.5% per annum	3.9% per annum
Discount rate	5.06% per annum	5.59% per annum
Pensioner baseline mortality	Set locally based on Fund experience	
Mortality improvements	Long term reduction in mortality rates of up to 1.5% per annum	
Changes to state pension age	As legislated	
Age retirement	Set locally based on Fund experience	
Ill health retirement rates	Set locally based on Fund experience	
Withdrawal rates	Set locally based on Fund experience	
Death before retirement rates	Set locally based on Fund experience	
Promotional salary scales	None	Set locally based on Fund experience
Commutation	SAB future service cost assumption of 65% of the maximum allowable amount.	
Family statistics	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 2016. 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.

¹⁷ Details can be found in the Scheme Advisory Board's Cost Management Process at: <http://www.lgpsboard.org/images/PDF/CMBDANov2016/AI5-SABCMP2.pdf>. This document specifies assumptions, some of which have been approximated for the purposes of this exercise (as set out in Table G1).

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Table G2: Implied¹⁸ Life Expectancy best estimate basis

	Implied weighted average life expectancy best estimate basis (years)
Current pensioners	
Male aged 65	22.4
Female aged 65	24.9

¹⁸ This is the weighted average life expectancy of locally derived figures, weighted by pensioner liability. Some actuaries combined ill health pensioners with normal health in their life expectancy calculations. We have not adjusted for this.

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Appendix H: Section 13 of the Public Service Pensions Act 2013¹⁹

13 Employer contributions in funded schemes

- (1) This section 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.

¹⁹ <http://www.legislation.gov.uk/ukpga/2013/25/section/13>

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Appendix I: Extracts from other relevant regulations

Regulations 58 and 62 of 'The Local Government Pension Scheme Regulations 2013'²⁰

Funding strategy statement

- 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 March 2004 by CIPFA, the Chartered Institute of Public Finance and Accountancy and called "CIPFA Pensions Panel Guidance on Preparing and Maintaining a Funding Strategy Statement (Guidance note issue No. 6)²¹"; and
- (b) the statement of investment principles published by the administering authority under regulation 12 of the Local Government Pension Scheme (Management and Investment of Funds) Regulations 2009.

Actuarial valuations of pension funds

- 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

²⁰ <http://www.legislation.gov.uk/ukxi/2013/2356/contents/made>

²¹ ISBN Number 085299 996 8; copies may be obtained from CIPFA at 3 Robert Street, London, WC2N 6RL

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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.

Dear Sirs

Local Government Pension Scheme 2016 Section 13 Valuation

We are writing to you as the responsible authority for the LGPS and Chair of the Local Government Pension Scheme Advisory Board (England and Wales) on behalf of the four firms who provide actuarial advice to LGPS funds regarding the Section 13 review carried out by the Government Actuary's Department (GAD).

We recognise that the initial headline messages in the report are positive about the overall progress being made by the LGPS, and this has been identified in the initial press reports which have emerged since the report's publication. Clearly this is something which we are pleased to see. However, on reading the detail of the report we have some material concerns over its content. We believe that it is important to highlight these, as we do below, and that it is not in the interests of the LGPS for some of GAD's recommendations to be taken forward.

Our concerns relate to GAD's:

- lack of recognition of the LGPS's updated financial position and outlook;
- approach to engagement during the process;
- interpretation of consistency as applied to LGPS funding plans; and
- understanding of LGPS funding plans and expectation of how deficit recovery plans should be set.

We consider each of these areas in turn.

The LGPS Funding Position and Outlook

We believe that the LGPS's financial position has improved significantly over the last few years and, for most local authorities, we do not currently expect that monetary contributions will need to rise following the 2019 valuations (albeit the valuation date is still six months away so that cannot be guaranteed).

The Section 13 report is based on the position as at 31 March 2016. It does acknowledge the significant improvement in funding since 31 March 2013 (from 79% to 85% on average on prudent local bases and from 92% to 106% on average on GAD's best estimate market basis). However, despite being published 18 months after the 2016 valuations were signed off, the report does not acknowledge that the funding position would have been expected to increase further due to continuation of deficit contributions and due to the funds' strong asset performance since 2016. Instead, the report is largely focussed on highlighting perceived failures by Funds against a series of arguably rather arbitrary actuarial metrics, many of which focus on a single point when in fact there are a number of interrelated issues at play.

Our concerns are that readers (particularly lay readers) may conclude that:

- The LGPS is not being well managed from a funding perspective, with more than 20 amber or red flags being allocated.
- There will be significant employer contribution increases at the 2019 valuation based on GAD's asset liability modelling work (work which we believe goes beyond the remit and requirements of Section 13). Based on current financial conditions, this does not reflect what we expect will happen in reality and seems to emanate from GAD's assumption that contributions are set solely based on prevailing market conditions and gilt yields.

Engagement

We recognise that GAD do not carry out valuations of LGPS funds for funding purposes, so all four firms of actuarial advisers have invested considerable time and effort assisting GAD in their work preparing this report.

Our concerns are that:

- Very little of the extensive feedback that we provided has been reflected in the final approach and published report, and similarly for the feedback which has been provided by those clients consulted directly by GAD. It therefore seems to us that GAD have not taken fully into account how the LGPS is funded and how this differs from private sector schemes.
- The metrics are in our view too simplistic and could lead to incorrect/invalid conclusions. Whilst it is accepted that there is a balance to be struck between simplicity by applying metrics (where there is a risk of applying them rigidly despite them potentially offering limited insight) and a detailed bespoke analysis which would offer a more rounded view, in many cases, in our view, there hasn't been sufficient detailed engagement with the administering authority and Fund Actuary to understand local circumstances or the risk management measures already in place to mitigate the identified risks. Readers of the report will see the metrics used as a valid test (especially with the Red/Amber/Green classification used). This could influence funding behaviours in an effort to avoid a future red or amber flag and lead to lay readers drawing incorrect conclusions about the performance of a fund and its officers and committee. Ultimately this could result in actions being taken which are not in the best interests of the LGPS and/or individual funds.

We believe GAD should recognise more explicitly that these metrics are limited in nature and instead undertake a more holistic review of, and commentary on, funding plans with considerably more engagement with key stakeholders at individual funds.

Interpretation of consistency

We have no objection to GAD's recommendation in relation to presentational consistency (Recommendation 1) as long as any "template" reporting is provided in good time to be implemented and is mandatory (since some administering authorities may otherwise refuse to agree to any changes).

However, we fundamentally disagree with how GAD has approached what they call "evidential consistency": the wording in the Public Service Pensions Act is "not inconsistent" implying a focus on identifying outliers which is entirely logical for a review analysing and comparing local LGPS valuations. GAD has instead interpreted their role as requiring a comparison of individual assumptions (focusing on those used to calculate the past service funding level) and commenting on whether or not they are identical. Our concern is that readers will be given a completely false impression of what we understood to be the intentions of Section 13.

In addition, our concerns are that:

- There is very little commentary on the main output from a local LGPS funding valuation, i.e. the employer contributions payable. Given LGPS funds are open, ongoing and long term statutory schemes, the contributions payable are far more relevant and important than the assessment of the past service funding position (on which GAD has focused). We believe that there is far greater consistency in relation to employer contributions and the report as drafted will give readers a false impression of what is most important in the overall funding plan.
- GAD does not acknowledge that different assumptions and funding mechanisms are valid when setting employer contribution rates nor that this diversity in approach allows administering authorities to adopt the approach which maximises the chance that they meet their objectives in light of their appetite for risk and the specific circumstances of the Fund. Equally important, the Fund Actuary is required to have regard to the Funding Strategy Statement when carrying out the valuation. This is an administering authority document and administering authorities may appoint an adviser on the basis of the funding approach adopted. Our concern is that GAD's assertion that house views are responsible for the assumptions adopted for local valuations is misleading, ignores the administering authorities' (and employers') key role within the valuation process and does not provide an appropriately balanced view.

In putting forward Recommendation 2, GAD has neither outlined what the benefits for the LGPS and its stakeholders would be, nor has it considered the potential downsides in terms of the reduced input from the administering authority into the funding process and the fundamental change in governance arrangements which would be involved. A change of this nature needs to be considered from a policy point of view with consultation with all stakeholders, rather than being introduced by the back door. We therefore do not agree with Recommendation 2 and believe that the Scheme Advisory Board should consider the feedback we provided to GAD before taking this recommendation forward.

In particular, we believe that a better focus for the Section 13 review would have been:

- consideration of the consistency of output of the valuation, i.e. employer contribution rates rather than focusing on certain individual assumptions used to calculate funding levels;
- commentary and analysis of the overall funding strategy and assumptions, including level of prudence, rather than a focus on individual assumptions in isolation; and

- a comparison of employer contribution rates against funding levels (assessed on a standardised funding basis), which would give a visual representation of the above two points and some insight into relative prudence of the overall funding approach for each fund.

How deficit recovery periods should be set

Deficit recovery periods can form an important part of the funding strategy, particularly where funding levels are low, but in practice are often not key drivers of the contribution plan. Our concern is that the application of a strict “rules-based” approach could potentially inadvertently lead to the wrong conclusions in cases where the funding plan overall is robust and meets the cost-efficiency requirements. In particular:

- A fund wishing to adopt a more prudent actuarial valuation basis may be reluctant to do so if the result is an increased deficit recovery period and hence a risk of triggering on this measure.
- A fund which feels it can sensibly afford to adopt a more risk-averse investment strategy may decide against doing so if it will give rise to a longer deficit recovery period.
- When deficit recovery periods are relatively short, there comes a point where seeking to shorten them further at every actuarial valuation may lead to increased volatility of contributions and therefore come into conflict with cost-efficiency.
- Funds/employers may fall foul of this trigger simply due to seeking to manage their budgets prudently within their financial constraints (e.g. paying increased contributions whilst it can afford them with a view to reducing them in future years when its financial position is tighter).
- GAD has interpreted CIPFA’s guidance on deficit recovery periods to mean that these should have a fixed end date. However, as GAD has acknowledged, they were not part of discussions when the guidance was drawn up. During these discussions, we have already confirmed to GAD that a deficit recovery period was used to mean a number of years e.g. 20 years, so the intention was for funds to operate with a rolling recovery period which does not extend in the number of years. We are concerned that because GAD has a different interpretation of CIPFA’s guidance, even if funds follow that guidance on our advice, they may still be flagged on this metric.

We think it would make more sense for the deficit recovery period not to be flagged in isolation, but for a more rounded view of the funding plan to be taken in the context of viewing whether a fund meets the cost-efficiency requirement. Rather than Recommendation 5, of the report, we would have preferred to have seen:

- the deficit recovery period at this and the previous valuation being noted; and
- a flag being raised only if it were felt that the cost-efficiency requirement was not being met overall.

We are disappointed that after so many months of discussions we are in a position to have to write this letter to you. However, we feel very strongly that it is important to ensure that the requirements of Section 13 can be met whilst recognising the positive steps taken by local authorities to date so it does not become the driver of LGPS funding plans to the detriment of the vast majority of well-managed LGPS Funds and the public perception of the LGPS. One of the great strengths of the LGPS is that it is

funded, giving it a far greater degree of transparency and accountability particularly when compared with the other public service schemes. We would be more than happy to provide further input and gather further feedback from our administering authority clients if that would assist you in determining how best to respond to GAD's review.

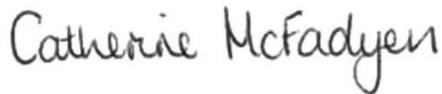
Yours faithfully



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