Environment Agency Closed Fund

2016 Actuarial Valuation
Valuation Report

March 2017

Richard Warden

Fellow of the Institute and Faculty of Actuaries
For and on behalf of Hymans Robertson LLP

Contents

Executive summary

We have carried out an actuarial valuation of the Environment Agency Closed Fund ('the Fund') as at 31 March 2016. The results are presented in this report and are briefly summarised below.

Whilst we have carried out a conventional actuarial valuation, the calculations are of greatest use as a platform for providing expenditure forecasts to Defra (the Department for Environment, Food and Rural Affairs), and for Defra to place a value on liabilities in its annual accounts (which rely on different assumptions as prescribed by HM Treasury in their annual Public Expenditure System notes). The expenditure forecasts are shown in Appendix H.

Funding position

The table below summarises the funding position of the Fund as at 31 March 2016 in respect of benefits earned by members up to this date (along with a comparison at the last formal valuation at 31 March 2013).

Past Service Position	31 March 2013 (£m)	31 March 2016 (£m)
Past Service Liabilities	860	711
Market Value of Assets	166	219
Surplus / (Deficit)	(694)	(492)
Funding Level	**19%**	**31%**

The improvement in funding position between 2013 and 2016 is mainly due to the fact that benefit payments are met out of Grant-in-Aid (GiA) payments from Defra. Such an improvement is to be expected over time as liabilities are settled. There has been a further reduction in liabilities because higher than expected mortality has meant the total pensions in payment have fallen substantially. The fall in the real discount rate (essentially the difference between the discount rate and the assumed rates of pension increases) has acted the other way by placing a higher value on the remaining liabilities.

Expenditure projections

Benefit projections at the 2016 valuation have reduced compared to the 2013 valuation, because of the higher than expected fall in pensions in payment and the lower rate of pension increase (both since 2013 and assumed in the long term).

The outlook for the future is that

- benefit payments are expected to reduce rapidly over time (but there will be a long tail of payments);
- the duration of the Fund's liabilities will continue to reduce as members age; and
- the Fund's assets are expected to be sufficient to meet the outstanding benefit and expense outgo by 2029, a year earlier than estimated at the 2013 valuation.

The projected benefit expenditure from 1 April 2017 is shown in detail in **Appendix H**.

1 Introduction

We have carried out an actuarial valuation of the Environment Agency Closed Fund ("the Fund") as at 31 March 2016 under Regulation 62 of The Local Government Pension Scheme Regulations 2013 ("the Regulations"). The purpose of the valuation is to assess the value of the assets and liabilities of the Fund as at 31 March 2016 and to estimate the benefit expenditure required to be met by Grant-in-Aid (GiA) payments from Defra for the period from 1 April 2017.

Valuation Report

This report records the high level outcomes of the actuarial valuation as at 31 March 2016. The valuation report is prepared by the actuary to the Fund and is addressed to the Environment Agency as the Administering Authority to the Fund.

Component reports

This document is part of an "aggregate" report, i.e. it is the culmination of various "component" reports and discussions, in particular:

- Correspondence relating to data including the Data Report dated 21 February 2017;
- The Initial Results report (dated 21 February 2017) which outlined the whole fund results;
- The formal agreement by the Administering Authority of the actuarial assumptions used in this document, at a meeting on 15 February 2017 (and summarised in our report "2016 Formal Valuation: Setting the Funding Target", dated 17 February 2017);
- The Funding Strategy Statement.

2 Valuation approach and funding method

The valuation is a planning exercise for the Fund, to assess the monies needed to meet the benefits owed to its members as they fall due. As part of the valuation process the Fund reviews its funding strategy to ensure that an appropriate contribution plan and investment strategy is in place.

It is important to realise that the actual cost of the pension fund (i.e. how much money it will ultimately have to pay out to its members in the form of benefits) is unknown. This cost will not be known with certainty until the last benefit is paid to the last pensioner. The purpose of this valuation is to estimate what this cost will be, so that the Fund can then develop a funding strategy to meet it.

Setting the funding strategy for a defined benefit pension fund such as the Environment Agency Closed Fund is complex. Firstly, the time period is very long; benefits will be paid out over a period of the next 60 years or more to current pensioners, deferred pensioners and their dependants. Secondly, the LGPS remains a defined benefit scheme so there are uncertainties in the final cost of the benefits to be paid.

As per the previous valuation, the method of valuation is based on the projected accrued benefit method. In this method we estimate the payments which will be made from the Fund throughout the future lifetimes of existing deferred pensioners, pensioners and their dependants. These estimates rely on the assumptions described in section 3 and Appendix E, and allow for all expected pension increases. We have then calculated the amount of money which, if invested now, should be sufficient to meet all of these payments in future, assuming that future investment returns are in line with the discount rate. This amount is the estimated cost of members' benefits.

We then compare this figure with the market value of assets at 31 March 2016. By maintaining a link to the market in both cases, we ensure that the assets and liabilities are valued in a consistent manner.

The funding level is the ratio of assets to liabilities at the valuation date. A funding level of less/more than 100% implies that there is a deficit/surplus in the Fund at the valuation date against the funding target.

The level of contributions payable to the Fund is not directly determined from the funding position. Instead, a cash flow approach is used where contributions are paid by Defra every six months, with the aim of covering expected benefits and expenses payable from the Fund over the following six months.

3 Assumptions

Due to the long term nature of the Fund, assumptions about the future are required to place a value on the benefits payable in future.

Broadly speaking, our assumptions fall into two categories when projecting and placing a value on the future benefit payments– financial and demographic.

Financial assumptions typically try to anticipate the **size** of these benefits. For example, how pensions will increase over time. In addition, the financial assumptions help us to estimate how much all these benefits will cost the Fund in today's money by making an assumption about the return on the Fund's investments in the future.

Demographic assumptions typically try to forecast **when** benefits will come into payment and what form these will take. For example, when members will retire (e.g. at their normal retirement age or earlier), how long they will then survive and whether a dependant's pension will be paid. In this valuation of the Fund, we use a single agreed set of demographic assumptions which is set out below and in more detail in **Appendix E**.

For measuring the funding position, the liabilities of the Fund are reported on a single constant set of financial assumptions about the future, based on financial market data as at 31 March 2016.

Financial assumptions

Discount rate

In order to place a current value on the future benefit payments from the Fund, an assumption about future investment returns is required in order to "discount" future benefit payments back to the valuation date. In setting the discount rate the Fund is determining the extent to which it relies on future investment returns required to meet benefit payments in excess of the monies already held at the valuation date.

For this valuation, we have assumed that the discount rate is equal to the yield on the types of assets held by the Fund, i.e. the return on Government bonds ('gilts'). For more details, please see our paper titled "2016 Formal Valuation: Setting the Funding Target", dated 17 February 2017.

Price inflation / pension increases

Pension benefit increases (both in payment and deferment) are in line with Consumer Price Index (CPI) inflation. As there continues to be no deep market for CPI linked financial instruments, the Fund derives the expected level of future CPI with reference to the Retail Price Index (RPI).

Due to further analysis of CPI since 2013, the Fund expects the average long term difference between RPI and CPI to be 1.0% p.a. compared with 0.8% p.a. at the 2013 valuation.

At the previous valuation, the assumption for RPI was derived from market data as the difference between the yield on long-dated fixed interest and index-linked government bonds, with a further reduction of 0.3% p.a. for the distortion in the market due to supply and demand issues. This 'inflation risk premium' has been retained for the 2016 valuation as there is no compelling evidence to suggest that this market distortion is no longer present. The RPI assumption derived from the markets after allowing for the 0.3% inflation risk premium is known as "adjusted RPI".

For further details, please see our paper titled "2016 Formal Valuation: Setting the Funding Target", dated 17 February 2017.

A summary of the financial assumptions underpinning the target funding basis and adopted during the assessment of the liabilities of the Fund as at 31 March 2016 (alongside those adopted at the last valuation for comparison) are shown below.

Financial assumptions	31 March 2013	31 March 2016
Discount rate		
Return on long-dated gilts	3.0%	2.2%
Discount rate	**3.0%**	**2.2%**
Benefit increases		
Market-implied RPI	3.3%	3.2%
Adjusted RPI[1]	3.0%	2.9%
Assumed RPI/CPI gap[2]	(0.8%)	(1.0%)
Benefit increase assumption (CPI)	**2.2%**	**1.8%**

[1] *Allowing for an Inflation Risk Premium of 0.3% p.a.*

[2] *Adjustments are applied arithmetically in 2013 and geometrically in 2016*

Demographic assumptions

Longevity

The main demographic assumption to which the valuation results are most sensitive is that relating to the longevity of the Fund's members. For this valuation, the Fund has adopted assumptions which give the following sample average future life expectancies for members:

	31 March 2013	31 March 2016
Male		
Pensioners	20.8 years	20.6 years
Non-pensioners	21.5 years	21.1 years
Female		
Pensioners	22.7 years	22.7 years
Non-pensioners	24.4 years	23.3 years

Further details of the longevity assumptions adopted for this valuation can be found in **Appendix E**. Note that the figures for non-pensioners assume that they are aged 55 at the valuation date.

Other demographic assumptions

We are in the unique position of having a very large local authority data set from which to derive our other demographic assumptions. We have analysed the trends and patterns that are present in the membership of local authority funds and tailored our demographic assumptions to reflect LGPS experience.

Details of the other demographic assumptions adopted by the Fund are set out in **Appendix E**.

Further comments on the assumptions

As required for Local Government Pension Scheme valuations, our approach to this valuation must include a degree of prudence. This has been achieved by explicitly allowing for a margin of prudence in discount rate.

For the avoidance of doubt, we believe that all other proposed assumptions represent the "best estimate" of future experience. This effectively means that there is a 50% chance that future experience will be better or worse than the chosen assumption.

Taken as a whole, we believe that our proposed assumptions are more prudent than the best estimate.

The rationale behind all the assumptions adopted for the 2016 valuation is explained in greater detail in our paper titled "2016 Formal Valuation: Setting the Funding Target", dated 17 February 2017.

Assets

We have taken the assets of the Fund into account at their market value as informed to us by the Administering Authority.

In our opinion, the basis for placing a value on members' benefits is consistent with that for valuing the assets - both are related to market conditions at the valuation date

4 Results

The Administering Authority has prepared a Funding Strategy Statement which sets out its funding objectives for the Fund. This involves Defra meeting expected future expenditure as it emerges by making GiA payments.

Ultimately, the main valuation objective is to ensure the long-term solvency of the Fund, using a prudent long term view ("the Funding Objective"). This will ensure that sufficient funds are available to meet all members'/dependants' benefits as they fall due for payment.

Funding Position Relative to Funding Target

In assessing the extent to which the Funding Objective was met at the valuation date, we have used the actuarial assumptions described in the previous section of this report for the target funding basis and the funding method also earlier described. The table below compares the value of the assets and liabilities at 31 March 2016. The 31 March 2013 results are also shown for reference.

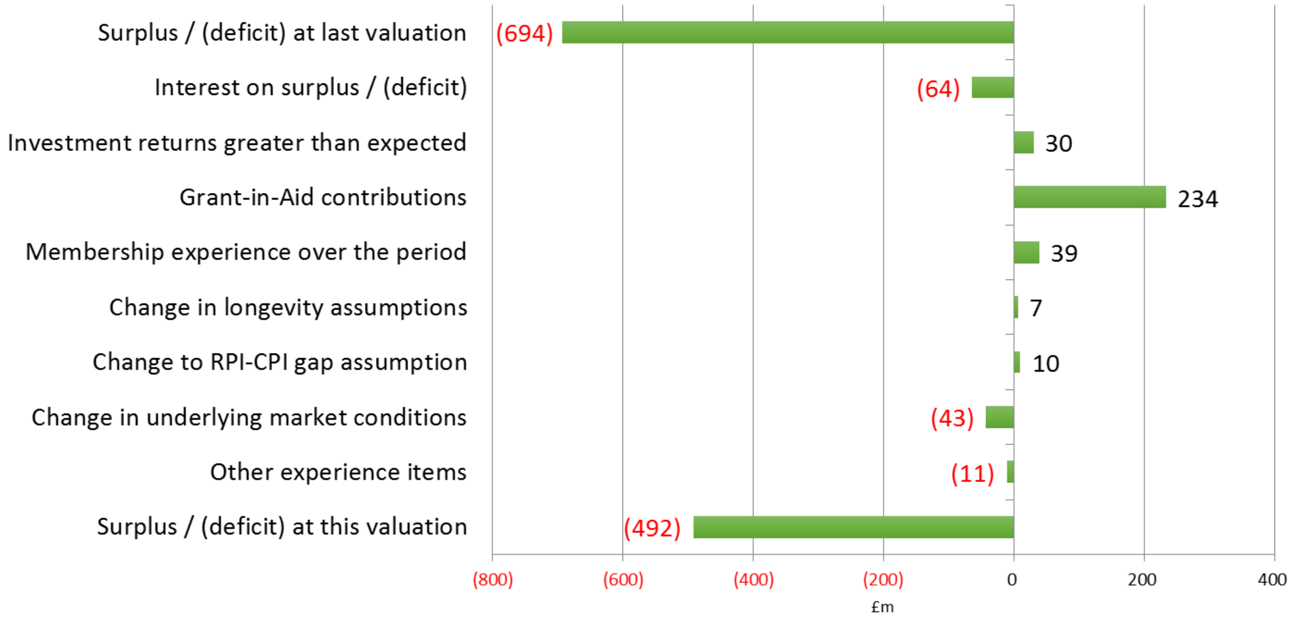
A funding level of 100% would correspond to the Funding Objective being met at the valuation date.

Valuation Date	31 March 2013	31 March 2016
Past Service Liabilities	**(£m)**	**(£m)**
Deferred Pensioners	121	88
Pensioners	739	623
Total Liabilities	**860**	**711**
Assets	**166**	**219**
Surplus / (Deficit)	**(694)**	**(492)**
Funding Level	**19%**	**31%**

As of 31 March 2016 the funding level was 31%.

Summary of changes to the funding position

The chart below illustrates the factors that caused the changes in the funding position between 31 March 2013 and 31 March 2016:



Further comments on some of the items in this chart:

- There is an interest cost of £64m. This is broadly three years of compound interest at 3.0% p.a. applied to the previous valuation deficit of £694m (and can be thought of as the investment return that would have been achieved on the extra assets the Fund would have held if fully funded).
- Investment returns being higher than expected since 2013 have led to a gain of £30m. This is roughly the difference between the actual three-year return (26.0%) and expected three-year return (9.3%) applied to the whole fund assets from the previous valuation of £166m, with a further allowance made for cashflows during the period.
- The membership experience of the Fund has differed to the assumptions made at the 2013 valuation. The table below summarises the significant factors that underlie these differences:

	Expected	Actual	Difference	Impact
Benefit increases (p.a.)	2.2%	1.3%	(0.9%)	Positive
Pensions ceasing (£m)	15.7	18.9	3.2	Positive

- The change in longevity assumptions (baseline and improvements) has given rise to a gain of £7m.
- The change in underlying market conditions has led to a loss of £43m, which has partially been offset by the increase to 1% p.a. of the assumed gap between RPI and CPI (an estimated gain of £10m).
- Other experience items, such as changes in the membership data, have served to increase the deficit at this valuation by around £11m.

Expenditure projections

Defra continue to make payments to the Fund every six months that are calculated to meet projected benefit expenditure over the following six months. The payments for 2015/16 totalled £69.9m for the year.

Projected benefit expenditure includes pension and lump sum benefits payable to pensioners and administration expenses.

Details of the projected benefit expenditure are shown in Appendix H. Contributions payable by Defra over the three years from 1 April 2017 (in respect of “funded” benefits) are expected to be £62.1m for 2017/18, £58.7m for 2018/19 and £55.2m for 2019/20.

5 Risk Assessment

The valuation results depend critically on the actuarial assumptions that are made about the future of the Fund. If all of the assumptions made at this valuation were exactly borne out in practice then the results presented in this document would represent the true cost of the Fund as it currently stands at 31 March 2016.

However, no one can predict the future with certainty and it is unlikely that future experience will exactly match the assumptions. The future therefore presents a variety of risks to the Fund and these should be considered as part of the valuation process. In particular:

- The main risks to the financial health of the Fund should be **identified**.
- Where possible, the financial significance of these risks should be **quantified**.
- Consideration should be given as to how these risks can then be **controlled** or **mitigated**.
- These risks should then be **monitored** to assess whether any mitigation is actually working.

This section investigates the potential implications of the actuarial assumptions not being borne out in practice.

Set out below is a brief assessment of the main risks and their effect on the valuation past service funding position results.

Sensitivity of past service funding position results to changes in assumptions

The table below gives an indication of the sensitivity of the funding position to small changes in the expected future rate of benefit increases:

Benefit increases (% p.a.)			
1.6%	1.8%	2.0%	(£m)
702	711	721	Liabilities
219	219	219	Assets
(483)	(492)	(502)	(Deficit)
31%	31%	30%	Funding Level

The projected benefit payments would also increase or decrease if the benefit increase assumption was different.

The valuation results are also very sensitive to unexpected changes in future longevity. All else being equal, if longevity improves in the future at a faster pace than allowed for in the valuation assumptions, the funding level will decline and the required employer contribution rates will increase.

Recent medical advances, changes in lifestyle and a greater awareness of health-related matters have resulted in life expectancy amongst pension fund members improving in recent years at a faster pace than was originally foreseen. It is unknown whether and to what extent such improvements will continue in the future.

For the purposes of this valuation, we have selected assumptions that we believe make an appropriate allowance for future improvements in longevity, based on the actual experience of the Fund since the previous valuation.

The table below shows how the valuation results at 31 March 2016 are affected by adopting different longevity assumptions.

	Peaked improvements (£m)	Non-peaked improvements (£m)
Liabilities	711	752
Assets	219	219
(Deficit)	(492)	(533)
Funding Level	**31%**	**29%**

The “further improvements” are a more cautious set of assumptions that, in the short term, assume the ‘cohort effect’ of strong improvements in life expectancy currently being observed amongst a generation born around the early and mid-1930s will continue to strengthen for a few more years before tailing off. This is known as “non-peaked”.

This is not an exhaustive list of the assumptions used in the valuation. For example, changes to the assumed level of commutation or the proportion of members married will also have an effect on the valuation results.

Note that the tables show the effect of changes to each assumption in isolation. In reality, it is perfectly possible for the experience of the Fund to deviate from more than one of our assumptions simultaneously and so the precise effect on the funding position is therefore more complex. Furthermore, the range of assumptions shown here is by no means exhaustive and should not be considered as the limits of how extreme experience could actually be.

Regulatory risk

One further risk to consider is the possibility of future changes to Regulations that could materially affect the benefits that members become entitled to. It is difficult to predict the nature of any such changes but it is not inconceivable that they could have a retrospective effect on the past service position.

Managing the risks

Whilst there are certain things, such as the performance of investment markets or the life expectancy of members, that are not directly within the control of the pension fund, that does not mean that nothing can be done to understand them further and to mitigate their effect. Although these risks are difficult (or impossible) to eliminate, steps can be taken to manage them.

Ways in which some of these risks can be managed could be:

- Set aside a specific reserve to act as a cushion against adverse future experience (possibly by selecting a set of actuarial assumptions that are deliberately more prudent).
- Take steps internally to monitor the decisions taken by members (e.g. commutation) in a bid to curtail any adverse impact on the Fund.
- Carry out a bespoke analysis of the longevity of Fund members and monitor how this changes over time, so that the longevity assumptions at the valuation provide as close a fit as possible to the particular experience of the Fund. The Fund has adopted bespoke baseline longevity assumptions at this valuation for each member based on age, gender, salary and postcode information. This will allow changes to the observed longevity of the Fund’s members to be tracked over time.
- Regularly reviewing the Fund’s membership data to ensure it is complete, up to date and accurate.

6 Related issues

The Fund's valuation operates within a broader framework, and this document should therefore be considered alongside the following:

- the Funding Strategy Statement;
- the Investment Strategy Statement (e.g. the discount rate must be consistent with the Fund's asset strategy);
- the general governance of the Fund, such as meetings of the Pensions Committee, decisions delegated to officers, the Fund's business plan, etc;
- the Fund's risk register.

Further recommendations

Valuation frequency

Under the provisions of the LGPS regulations, the next formal valuation of the Fund is due to be carried out as at 31 March 2019. In light of the uncertainty of future financial conditions, we recommend that the financial position of the Fund is monitored by means of interim projection reviews in the period up to this next formal valuation. This will give early warning of changes between actual and expected expenditure projections.

Investment strategy and risk management

We recommend that the Administering Authority continues to regularly review its investment strategy and ongoing risk management programme.

7 Reliances and limitations

Scope

This document has been requested by and is provided to the Environment Agency in its capacity as Administering Authority to the Environment Agency Closed Fund. It has been prepared by Hymans Robertson LLP to fulfil the statutory obligations in accordance with regulation 62 of the Regulations. None of the figures should be used for accounting purposes (e.g. under FRS102 or IAS19) or for any other purpose (e.g. a termination valuation under Regulation 64).

Hymans Robertson LLP accepts no liability to any other party unless we have expressly accepted such liability.

The results of the valuation are dependent on the quality of the data provided to us by the Administering Authority for the specific purpose of this valuation. We have previously issued a separate report confirming that the data provided is fit for the purposes of this valuation and have commented on the quality of the data provided. The data used in our calculations is as per our report of 21 February 2017. However, if any material issues with the data provided are identified at a later date, then the results stated in this report may change.

Actuarial Standards

The following Technical Actuarial Standards[1] are applicable in relation to this report and have been complied with where material:

- TAS R – Reporting;
- TAS D – Data;
- TAS M – Modelling; and
- Pensions TAS.

Richard Warden

Fellow of the Institute and Faculty of Actuaries

For and on behalf of Hymans Robertson LLP

31 March 2017

[1] Technical Actuarial Standards (TASs) are issued by the Financial Reporting Council (FRC) and set standards for certain items of actuarial work, including the information and advice contained in this report.

Appendix A: About the pension fund

The purpose of the Fund is to provide retirement and death benefits to its members. It is part of the Local Government Pension Scheme (LGPS) and is a multi-employer defined benefit pension scheme.

For more details, including the history of the Fund and the unique nature of its participation in the LGPS, please refer to the Funding Strategy Statement.

Defined benefit pension scheme

In a defined benefit scheme such as this, the nature of retirement benefits that members are entitled to is known in advance. For example, it is known that deferred members will receive a pension on retirement that is linked to their final salary and pensionable service at date of leaving according to a pre-determined formula.

However, the precise cost to the Fund of providing these benefits is **not** known in advance. The estimated cost of these benefits represents a liability to the Fund and assets must be set aside to meet this. The relationship between the value of the liabilities and the value of the assets must be regularly assessed and monitored to ensure that the Fund can fulfil its core objective of providing its members with the retirement benefits that they have been promised.

Liabilities

The Fund's liabilities are the benefits that will be paid in the future to its members (and their dependants).

The precise timing and amount of these benefit payments will depend on future experience, such as when members will retire, how long they will live for in retirement and what economic conditions will be like both before and after retirement. Because these factors are not known in advance, assumptions must be made about future experience. The valuation of these liabilities must be regularly updated to reflect the degree to which actual experience has been in line with these assumptions.

Assets

The way the Fund's assets are invested is of fundamental importance to the Fund. The selection, monitoring and evolution of the Fund's investment strategy are key responsibilities of the Administering Authority.

As the estimated cost of the Fund's liabilities is regularly re-assessed, this effectively means that the amount of assets required to meet them is a moving target. As a result, at any given time the Fund may be technically in surplus or in deficit.

Benefit payments are projected forward from each formal valuation to ensure that GiA payments into the Fund are sufficient to meet the cost of benefits until such time as the Fund has sufficient assets to cover all remaining benefit payments.

The long-term nature of the Fund

The pension fund is a long-term commitment and it will still be paying out benefits to existing members and dependants for many decades to come. It is therefore essential that the various funding and investment decisions that are taken now recognise this and come together to form a coherent long-term strategy.

In order to assist with these decisions, the Regulations require the Administering Authority to obtain a formal valuation of the Fund every three years. Along with the Funding Strategy Statement, this valuation will help determine the projected benefit expenditure from 1 April 2017.

Appendix B: Summary of the Fund's benefits

Provided below is a brief summary of the non-discretionary benefits that we have taken into account at this valuation. The Fund has been closed to new benefit accrual since it was created in 1989 so detail is shown only for benefits accrued prior to this point.

Provision	Benefit Structure To 31 March 2008
Normal retirement benefits at Normal Retirement Age	Annual Retirement Pension - 1/80th of pensionable remuneration for each year of pensionable service. Lump Sum Retirement Grant - 3/80th of pensionable remuneration for each year of pensionable service. Pensionable remuneration is normally the remuneration in the employee's final year of service.
Pension increases	All pensions in payment, deferred pensions and dependant's pensions other than benefits arising from the payment of additional voluntary contributions are increased annually. Pensions are increased partially under the Pensions (Increases) Act and partially in accordance with statutory requirements (depending on the proportions relating to pre 88 GMP, post 88 GMP and excess over GMP).
Death after retirement	A spouse's or civil partner's pension of one half of the member's pension (generally post 1 April 1972 service for widowers' pension and post 6 April 1988 for civil partners) is payable; plus If the member dies within five years of retiring and before age 75 the balance of five years' pension payments will be paid in the form of a lump sum; plus Children's pensions may also be payable.

Note: Certain categories of members of the Fund are entitled to benefits that differ from those summarised above.

Discretionary benefits

The LGPS Regulations give employers a number of discretionary powers. The effect on benefits as a result of the use of these provisions as currently contained within the Local Government Pension Scheme Regulations has been allowed for in this valuation to the extent that this is reflected in the membership data provided. No allowance has been made for the future use of discretionary powers.

Appendix C: Government funding agreement

Extract from a letter sent on 15 April 2004 by Paul Boateng (Chief Secretary to the Treasury) to the Rt Hon Margaret Beckett (Secretary of State for the Environment)

Environment Agency Closed Pension Fund

"Thank you for your letter of 18 March requesting a change in the arrangement agreed in the 2002 spending review for funding the liabilities of the Environment Agency Closed Pension Fund. I am prepared to agree to the revised arrangements you suggest for the 2004 spending review baseline year. The funding of the Environment Agency Closed Pension Fund will remain ring-fenced and will reduce over time in line with the un-winding of the liability".

Paul Boateng

Extract from a letter sent on 15 July 2004 by the Rt Hon Margaret Beckett (Secretary of State for the Environment) to Mr John Edmonds (Chairman of the Environment Agency Pensions Committee)

Environment Agency Closed Pension Fund

The Environment Agency Closed Pension Fund is in actuarial deficit. Current valuations indicate that the assets available will not meet its future liabilities and the Fund will be exhausted by autumn 2006. Section 173 of the Water Act 1989 gave me the function of providing funding to enable the liabilities of the Fund – a public service, final salary, funded pension scheme – to be met. I propose to exercise this function through stabilisation of the Fund and annual top-up payments from April 2006.

The assets of the Fund should be allowed to run down (rather than be liquidated) and then stabilised through annual top-up payments using section 173 provisions of the Water Act 1989, thus meeting on-going liabilities on a pay-as-you-go basis. The Chief Secretary to the Treasury has agreed to this and that we should retain financial cover sufficient to fund annual costs from 2006/07.

Actuarial valuations indicate that the Fund will fall below the £100m mark – the equivalent of a little over annual outgoings in the latter half of 2005/06. I therefore propose to top-up the Fund in April/May 2006 and again in September/October 2006 by a total amount equivalent to its annual outgoings as determined by actuarial forecasts. This will be repeated in subsequent years, with the amount proportionate to the actual Fund liabilities.

I confirm that the implementation of these proposals will not either dilute or remove my statutory funding function under section 173 of the Water Act 1989. The Fund pensioners will not see any change in how their individual pensions are paid, and they can be certain that their entitlement will be met. I would therefore commend these arrangements to you, to the Agency's Pensions Committee and to the Fund's members.

Margaret Beckett

Memorandum of understanding

Between:

The Secretary of State for Environment, Food and Rural Affairs of Nobel House, 17 Smith Square, London SW1P 3JR ("the Secretary of State"); and

The Environment Agency – Pensions Committee of Rio House, Waterside Drive, Almondsbury, Bristol, BS32 4UD ("the Agency")

Background

1. The Environment Agency Closed Fund ("the Closed Fund") is vested in, and required to be maintained by, the Environment Agency by regulation 2(1) of the Local Government Pension Scheme (Environment Agency) Regulations 1996.

2. Before 1989, the Water Authorities Superannuation Fund ("WASF") served the former Regional Water Authorities in England and Wales. Under the Water Act 1989 their water supply and sewerage functions were transferred to newly created water companies, together with the relevant employees. The pension liabilities and assets in respect of such employees were transferred from the WASF to the new water company pension schemes. The pension liabilities and assets in respect of the remaining employees, and also of the former employees and pensioners, were transferred with the WASF to the National Rivers Authority ("the NRA"), which set up a pension fund for its own employees ("the Active Fund") into which were transferred the pension liabilities and assets in respect of the said remaining employees.

3. Following the transfer of active employed members to both the water company pension schemes and the Active Fund, the only remaining members of the WASF were deferred and pensioner members. No further members were admitted to it, so that it became a closed scheme ("the Closed Fund"). The Secretary of State and the NRA accepted the possibility that, in due course, the Closed Fund could have insufficient resources to meet its pension liabilities. With effect from 1 April 1996 the Agency assumed the functions of the NRA and the Closed Fund is now known as the Environment Agency Closed Fund.

4. The Closed Fund is maintained for the purposes of Section 7 of the Superannuation Act 1972, and accordingly the Secretary of State has the function conferred by Section 173 of the Act to make such payments into the Closed Fund as may be considered appropriate in respect of the actual and prospective liabilities falling from time to time to be met out of the Closed Fund for the benefit of its members ("the Closed Fund members").

5. As at 31 March 2004, the Closed Fund's FRS 17 valuation indicated that it had a net deficit for accounting purposes of £826,600,000 and its actuarial valuation indicated that it had a funding level of 21% which corresponded to a net past service reserve deficit of £880,000,000. The value of the liability under both valuations is sensitive to future mortality rates, inflation rates, and the discount rate used.

6. This Memorandum of Understanding sets out the mechanism whereby the Secretary of State will exercise the function under section 173 of the 1989 Water Act with a view to addressing the deficit in the Closed Fund.

7. This Memorandum has been agreed between the Secretary of State and the Environment Agency and the arrangements for funding the Closed Fund have been approved by Her Majesty's Treasury pursuant to that section, as indicated in the letter of 15 April 2004 from the Chief Secretary to the Secretary of State, subject to the conditions referred to in that letter.

Payments into the Fund

8. The Closed Fund's funding level continues to deteriorate, and on actuarial advice it is assumed that the value of the assets will reduce to a level of between £50 million and £60 million by about April 2006. With effect from that date the Secretary of State will ensure that cash payments are made into the Fund each year totalling an amount equivalent to its total annual outgoings (defined as total anticipated payments to pensioners, transfers out of the Closed Fund, investment management or other agents' fees, administration costs, and all other liabilities or expenses whatsoever, less interest earned on such cash payments made to the Agency for the Closed Fund during the year) to be calculated and properly certified by the Agency in accordance with actuarial advice received.

9. Such payments will be solely to finance the Closed Fund's annual outgoings and will be treated separately from the Agency's mainstream finances. They will be made every six months, with the sums to be paid equalling the amount of the Fund's outgoings for the previous six months. The first payment into the Fund will be made in April 2006. These payments will continue until the liabilities of the Closed Fund have been met in full. Latest actuarial projections indicate that this will occur in 2062.

10. These payments will be in the form of ring-fenced grant-in-aid from the Secretary of State and will be paid twice each year in April and October through the normal grant-in-aid procedures to the Agency.

11. The Agency will provide the Secretary of State with a copy of actuarial advice received and such information as is reasonably required to illustrate how the payments certified as payable have been calculated. Any assets held in the Closed Fund in excess of the payments will be retained to protect against minor variations in outgoings until a certificate of the actuary to the Closed Fund confirms that their retention is unnecessary. A copy of any such certificate shall be provided by the Agency to the Secretary of State.

12. Payments made by the Secretary of State into the Closed Fund will be reported in Defra's annual accounts together with the Closed Fund's liability in accordance with FRS 17 (or any replacement accounting standard).

Payments to pensioners

13. Nothing in this Memorandum will affect the Agency's role in the making of payments from the Closed Fund which are to be made in accordance with the Local Government Pension Scheme Regulations 1997 ("LGPS Regulations").

Control, monitoring and review

14. The Agency will manage the residual assets of the Closed Fund according to the high standards of financial integrity expected of those responsible for the management of public assets. The Agency will invest any surplus funds, as required by the Local Government Pension Scheme (Management and Investment of Funds) Regulations 1998 and in accordance with the Closed Fund's Statement of investment principles and Funding strategy statement. The Agency's procedures and the accounts of the Fund will continue to be the subject of an annual external audit, and nothing in this Memorandum affects the need for an actuarial valuation of the Closed Fund as required by the LGPS Regulations.

15. For monitoring purposes, the Agency will inform the Secretary of State of the Closed Fund's liabilities at the end of each financial year in accordance with FRS 17 (or any replacement accounting standard).

16. This information will be used to update provisions in the annual accounts of Defra. Significant variations from profiled grant-in-aid payments will be fully justified by the Agency.

17. This Memorandum shall only be amended by the agreement in writing of both the Secretary of State and the Agency.

Brian Bender,
Accounting Officer, Defra
On behalf of the Secretary of State for
Environment, Food and Rural Affairs

Barbara Young,
Accounting Officer,
Environment Agency
On behalf of the Environment Agency

Date of signature: 17 May 2005

Appendix D: Data

This section contains a summary of the membership, investment and accounting data provided by the Administering Authority for the purposes of this valuation (the corresponding membership and investment data from the previous valuation is also shown for reference). For further details of the data, and the checks and amendments performed in the course of this valuation, please refer to our separate data report.

Membership data – whole fund

Deferred pensioners

	31 March 2013		31 March 2016	
	Number	Deferred pension (£000)	Number	Deferred pension (£000)
Total deferred membership	2,709	4,996	2,139	3,326

The figures above also include any "frozen refunds" and "undecided leavers" members at the valuation date.

Current pensioners, spouses and children

	31 March 2013		31 March 2016	
	Number	Pension (£000)	Number	Pension (£000)
Members	9,107	51,706	8,179	43,307
Dependants	6,125	21,289	5,323	19,889
Children	64	87	9	7
Total pensioner members	**15,296**	**73,082**	**13,511**	**63,203**

Note that the membership numbers in the table above refer to the number of records provided to us and so will include an element of double-counting in respect of any members who are in receipt (or potentially in receipt of) more than one benefit.

Membership Profile	Average Age (years)	
	2013	2016
Deferred Pensioners	55.9	57.1
Pensioners	76.5	76.8

The average ages are weighted by liability.

All the membership details shown here are for "Funded" benefits only.

Assets at 31 March 2016

A summary of the Fund's assets provided by the Administering Authority (excluding members' money-purchase Additional Voluntary Contributions) as at 31 March 2016 and 31 March 2013 is as follows:

Asset class	31 March 2013 (Market Value) (£000)	Allocation %	31 March 2016 (Market Value) (£000)	Allocation %
UK index-linked gilts	157	95%	205	93%
Cash and net current assets	9	5%	15	7%
Total	**166**	**100%**	**219**	**100%**

Accounting data – revenue account for the three years to 31 March 2016

Consolidated accounts (£000)	Year to 31 March 2014	Year to 31 March 2015	Year to 31 March 2016	Total
Income				
Grant-in-Aid payments	78,076	74,276	69,919	222,271
Total Income	**78,076**	**74,276**	**69,919**	**222,271**
Expenditure				
Gross Retirement Pensions	71,692	69,220	65,194	206,106
Lump Sum Retirement Benefits	2,769	3,020	1,788	7,577
Death in Deferment Lump Sum	53	0	32	85
Death in Retirement Lump Sum	22	27	8	57
Transfers out (including bulk and individual)	163	242	265	670
Fees and Expenses	893	848	920	2,661
Total Expenditure	**75,592**	**73,357**	**68,207**	**217,156**
Net Cashflow	**2,484**	**919**	**1,712**	**5,115**
Assets at start of year	**166,260**	**165,597**	**212,760**	**166,260**
Net cashflow	**2,484**	**919**	**1,712**	**5,115**
Change in value	**-3,147**	**46,244**	**4,701**	**47,798**
Assets at end of year	**165,597**	**212,760**	**219,173**	**219,173**
Approximate rate of return on assets	**-1.9%**	**27.9%**	**2.2%**	**28.2%**

Note that the figures above are based on the Fund accounts provided to us for the purposes of this valuation, which were fully audited at the time of our valuation calculations.

Appendix E: Assumptions

Financial assumptions

Financial assumptions	31 March 2013 (% p.a.)	31 March 2016 (% p.a.)
Discount rate	3.0%	2.2%
Price inflation	2.2%	1.8%
Pension increases:		
pension in excess of GMP	2.2%	1.8%
post-88 GMP	2.2%	1.8%
pre-88 GMP	0.0%	0.0%
Revaluation of deferred pension	2.2%	1.8%
Revaluation of accrued CARE pension	2.2%	1.8%
Expenses (% of funded benefit payments)	0.8%	1.1%

Longevity assumptions

Longevity assumptions	31 March 2016
Longevity - baseline	Vita
Longevity - improvements	
CMI Model version used	CMI_2013
Starting rates	CMI calibration based on data from Club Vita using the latest available data as at January 2014.
Long term rate of improvement	Period effects: 0.5% p.a. for men and women. Cohort effects: 0% p.a. for men and for women.
Period of convergence	Period effects: CMI model core values i.e. 10 years for ages 50 and below and 5 years for those aged 95 and above, with linear transition to 20 years for those aged between 60 and 80. Cohort effects: CMI core i.e. 40 years for those born in 1950 or later declining linearly to 5 years for those born in 1915 or earlier.
Proportion of convergence remaining at mid point	50%

As a member of Club Vita, the baseline longevity assumptions that have been adopted at this valuation are a bespoke set of VitaCurves that are specifically tailored to fit the membership profile of the Fund. These curves are based on the data the Fund has provided us with for the purposes of this valuation. Full details of these are available on request.

We have used a longevity improvement assumption based on the industry standard projection model calibrated with information from our longevity experts in Club Vita. The starting point for the improvements has been based on observed death rates in the Club Vita data bank over the period up to 2012.

We have used the 2013 version of the Continuous Mortality Investigation (CMI) longevity improvements model, instead of the more recent 2015 version, as we do not believe the increased mortality experience factored into the 2015 model is the start of a new trend. We believe it is more appropriate to use the 2013 version of the model for the 2016 valuation.

In the short term we have assumed that the improvements in life expectancy observed up to 2010 will start to tail off immediately, resulting in life expectancy increasing less rapidly than has been seen over the last decade or two. This could be described as assuming that improvements have 'peaked'.

In the longer term we have assumed that increases in life expectancy will stabilise at a rate of increase of 0.4 years per decade for men and women. This is equivalent to assuming that longer term mortality rates will fall at a rate of 0.5% p.a. for men and women.

However, we have assumed that above age 90 improvements in mortality are hard to achieve, and so the long term rate of improvement declines between ages 90 and 120 so that no improvements are seen at ages 120 and over. The initial rate of mortality is assumed to decline steadily above age 98.

Other demographic valuation assumptions

Retirements in normal health	We have assumed that deferred members retire at age 60.
Family details	A varying proportion of members are assumed to be married (or have an adult dependant) at retirement or on earlier death. For example, at age 60 this is assumed to be 90% for males and 85% for females. Husbands are assumed to be 3 years older than wives.
Commutation	50% of future retirements elect to exchange pension for additional tax free cash up to HMRC

The table below show details of the death in deferment assumption actually used for specimen ages.

Death in Deferment tables:

	Deaths per 1000 active members per annum	
Age	Female	Male
20	0.12	0.21
25	0.12	0.21
30	0.18	0.26
35	0.30	0.30
40	0.48	0.51
45	0.77	0.85
50	1.13	1.36
55	1.49	2.13
60	1.90	3.83
65	2.44	6.38

Appendix F: Events since valuation date

Post-valuation events

These valuation results are in effect a snapshot of the Fund as at 31 March 2016. Since that date, various events have had an effect on the financial position of the Fund. Whilst we have not explicitly altered the valuation results to allow for these events, a short discussion of these "post-valuation events" can still be beneficial in understanding the variability of pension funding.

In the period from the valuation date to early March 2017, the Fund asset returns have been significantly better than expected. However, global expectations for future asset returns have fallen in light of events such as the Brexit vote. Both events have roughly cancelled each other out in terms of the impact on the funding position. However, the day to day volatility is significant.

It should be noted that the benefit projections do not depend on the expectations for future investment performance so are much less affected by these events. However, they do depend on member longevity and future inflation. Inflation expectations have increased slightly since the valuation date, and the Fund will monitor this on an annual basis to ensure that GiA payments remain adequate.

It should be noted that the above is for information only: the figures in this report have all been prepared using membership data, audited asset information and market-based assumptions all as at 31 March 2016. In particular, we do not propose amending any of the benefit projections shown in this report. We do not propose altering the FSS or valuation calculations to include allowance for post-valuation date market changes since a long term view has been taken.

Other events

Other than investment conditions changes above, I am not aware of any material changes at whole fund level or events occurring since the valuation date.

Appendix G: Rates and adjustments certificate

Chairman of the Pensions Committee, Accounting Officer and Director of Finance
Environment Agency

Dear Sirs,

Environment Agency Closed Fund ("the Fund")
Certificate of the actuary regarding solvency position of the Fund

1 On your instruction I have made an actuarial valuation of the Environment Agency Closed Fund as at 31 March 2016. The value of the Fund's assets at that date was £219m.

2 In accordance with regulation 36(1) of the Administration Regulations I have made an assessment of the solvency of the Fund. My results show that the solvency level of the Fund was 31% at 31 March 2016.

3 I hereby certify that as at 31 March 2016 the value of the Fund's existing assets fell short of the value of the Fund's existing and prospective liabilities by £492m.

Yours faithfully,

Signature:

Name: Richard Warden

Date: 31 March 2017

Qualification: Fellow of the Institute and
Faculty of Actuaries

Firm: Hymans Robertson LLP
20 Waterloo Street
Glasgow
G2 6DB

Appendix H: Future projection of Defra GiA Funding

	All figures in £000													
	Closed Fund Funded[1]			Closed Fund Unfunded[2]										
						Water Company Pension Scheme Members' Compensation								
Year to 31st March	CF Members' LGPS Benefits	Admin Expenses net of Interest on Cash Deposits[3]	***Funded Subtotal***	CF Members' Compensation & Gratuities	Lee Conservancy CB Pension Scheme	United Utilities (aka North West)	Northumbrian	Southern	Western Power (aka Welsh or Hyder)	Anglian	Associated (aka Water Associated Employers Pension Scheme (WAEPS) or NRA - Water Research Centre)[4]	*Water Company Sub-Total*	***Unfunded Subtotal***	**TOTAL GIA**
2017	65,779	724	66,502	9,115	91	116	38	55	22	12	0	242	9,448	**75,950**
2018	61,436	676	62,112	8,608	90	113	37	53	22	12	0	236	8,935	**71,047**
2019	58,063	639	58,702	8,090	89	109	36	52	22	12	0	230	8,409	**67,111**
2020	54,641	601	55,242	7,549	88	105	35	50	21	12	0	223	7,860	**63,102**
2021	51,536	567	52,103	6,991	87	101	33	48	21	12	0	215	7,293	**59,396**
2022	47,826	526	48,352	6,424	86	96	32	46	20	11	0	206	6,715	**55,067**
2023	44,839	493	45,333	5,854	84	91	30	43	19	11	0	195	6,134	**51,466**
2024	41,536	457	41,993	5,290	82	85	29	41	19	11	0	184	5,556	**47,549**
2025	38,673	425	39,098	4,738	80	79	27	38	18	11	0	172	4,990	**44,088**
2026	35,738	393	36,131	4,205	77	73	24	35	17	10	0	159	4,441	**40,573**
2027	32,986	363	33,348	3,698	75	66	22	31	16	10	0	145	3,918	**37,266**
2028	30,520	336	30,856	3,221	72	60	20	28	14	10	0	132	3,425	**34,281**
2029	28,150	310	28,460	2,779	69	53	18	25	13	9	0	118	2,966	**31,425**

1. These are funded benefits that members have accrued under LGPS regulations and are statutorily entitled to receive from the Closed Fund.

2. These are additional unfunded benefits to those accrued under LGPS regulations which are recharged back to employers. **These benefits have not been valued or considered as part of the Closed Fund's formal 2016 valuation exercise**. They are based on the data as at 31 December 2015 provided for the March 2016 IAS19 report, with the CF Members' Compensation & Gratuities figures allowing for deaths and new dependants to 31 March 2016.

3. Administration expenses have been calculated as 1.1% of the Funded benefit outgo which represents the average administration expenses, less the interest on cash deposits, over the three years to 31 March 2016.

4. According to the data provided, there are no remaining pensions payable to members of the Associated Water Company schemes.

We estimate that, based on the assumptions used for the 2016 valuation, GiA funding from Defra will be required up to and including 2029. After this we estimate that, based on the asset value at 31 March 2016 and assuming investment returns equal to the valuation discount rate of 2.2% p.a., the Fund's assets will be enough to pay for future funded and unfunded benefits after 2029. This 'cut-off' point will need regular monitoring by the Environment Agency to ensure that the GiA funding mechanism is not stopped too early by Defra. The 'cut-off' point will be reviewed and, if necessary, updated again as part of the 2019 triennial valuation.