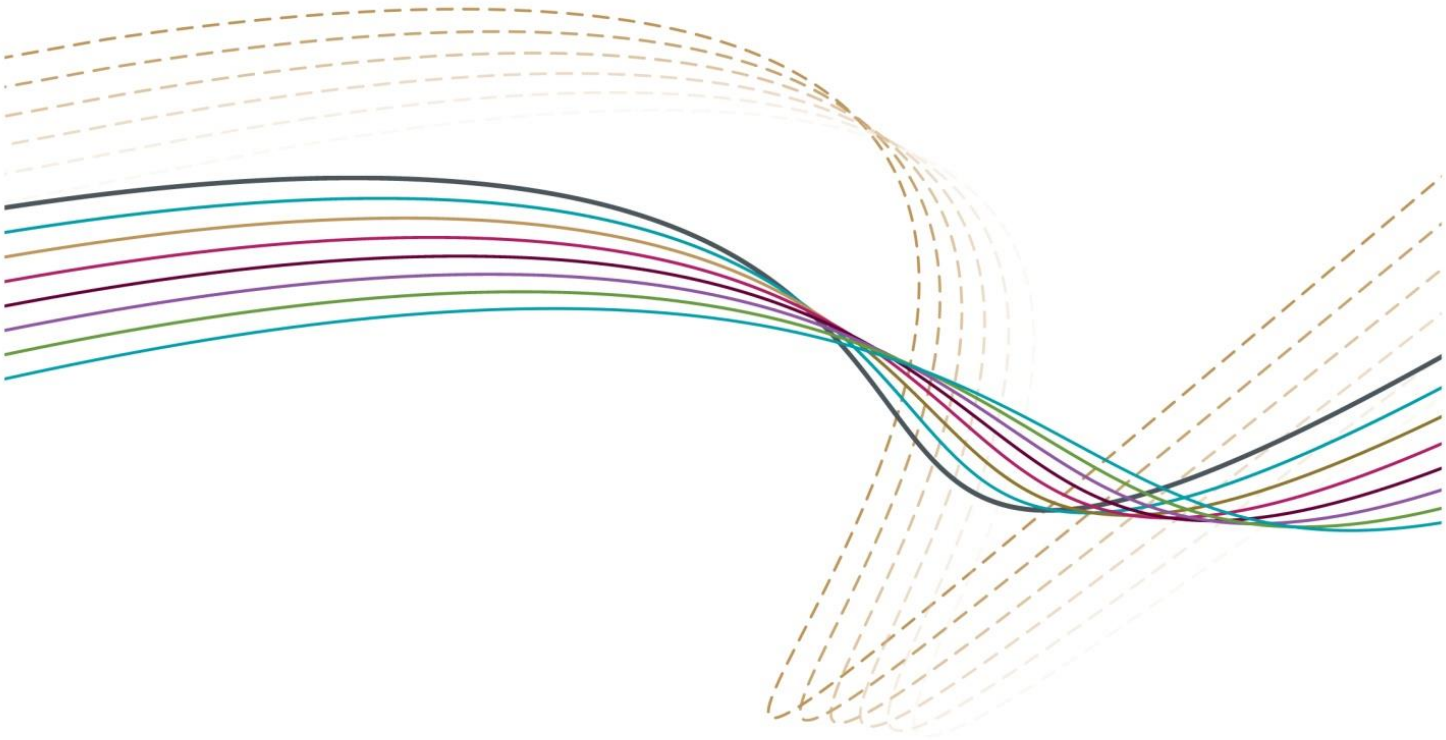
STATE ACTUARY'S OFFICE

Actuarial Investigation of the State Public Sector Superannuation Scheme (QSuper)

as at 30 June 2015



QUEENSLAND TREASURY

Queensland Government

Contents

Tables

Figures

1 Summary and recommendations

This Review has been undertaken in advance of the usual triennial cycle at the request of the Under-Treasurer to provide the most comprehensive and up to date picture of the funding position prior to the 2016-17 Budget[1].

It has revealed that the economic value of QSuper's accrued liabilities exceeded the fund assets by $25.60 billion as at 30 June 2015. This represents the amount (based on the accounting valuation assumptions in Appendix C) at the investigation date of the statutory guarantee provided by the Queensland Government (the State) in respect of its accrued defined benefit obligations. This guarantee forms the basis for QSuper being exempt from the funding and solvency requirements of the Superannuation Industry (Supervision) Act 1993.

However, the State makes advance provision for its employee entitlement liabilities by accumulating investment assets in a reserve (the Employer Fund). Consistent with past practice and the stated and practised position of successive Governments over many years, the assets of the Employer Fund have been assumed to be available exclusively for that purpose. Consequently, this Report has taken into account both the assets in the QSuper fund and the Employer Fund in order to provide a more comprehensive understanding of the overall funding of the scheme.

After inclusion of the Employer Fund, the assets exceeded accrued liabilities by $10.05 billion as at 30 June 2015. This compares with the $5.95 billion surplus disclosed at the 2013 valuation and is primarily the result of strong investment returns since that time, offset by changes in the valuation basis at this Review.

In previous Reviews, I have implicitly recognised the stability in employer contribution rates and have generally allowed the surplus to emerge over time without any specific action. Since the Treasurer's decision to suspend the investment of employer contributions as part of the 2015-16 Budget, the reasons supporting the previous approach no longer apply (see Section 6.6) and so I have taken a more proactive approach to surplus management at this Review, consistent with accepted actuarial practice.

In view of the limited capacity of changes in future employer contributions to affect the surplus (due to the maturity of scheme membership), I have decided to leave the suspension intact and instead have focussed on the potential for "excess" surplus to be repatriated[2] from the Employer Fund. It is important to recognise that there is no single "correct" level of surplus for any defined benefit scheme and that **no guarantee can be provided as to future funding level due to the variability of scheme outcomes**, particularly investment returns. The level of surplus retained to protect against this volatility is necessarily a matter of judgement, taking into account the current and likely future position of the scheme as well as the strength of the employer covenant to provide funding should actual experience be sufficiently adverse. In the latter regard, the explicit guarantee within the Act and the Deed ensures that action can always be taken to repair scheme funding but it is important for the Government to recognise that the "quid pro quo" of surplus repatriation after positive scheme experience is the potential requirement to provide cash when outcomes are not favourable. In effect,

[1] A copy of the letter has been included in Appendix F of this Report.

[2] The term "repatriation" has been used quite deliberately. Surplus can be considered as an over-contribution by the employer sponsor in hindsight, so any return should be considered as a repatriation, rather than a withdrawal.

surplus repatriations and contributions are two sides of the same coin with the only material difference being one of timing, recognising of course that the costs of the scheme are unaffected by such timing.

Based on my assessment of the current and projected future funding position of the scheme, I believe that a **maximum surplus repatriation of $2.0 billion** represents an appropriate response to the high level of surplus, maintaining a reasonable capital buffer to protect the funding position against adverse experience. Based on QIC's asset models, this results in the following expected outcomes over the next five years:

- 5% probability of deficit on the funding basis; compared to 2% prior to the repatriation
- a 1 in 4 chance of an accrued deficit on the accounting basis, up from an estimated 1 in 8 prior to the repatriation.

Whilst the projected surplus figures derived above are technically measured in 2015 dollars, on the grounds of simplicity and recognising the low level of investment returns in the year to date, any adjustment of the surplus repatriation to the date of payment is unnecessary.

It is important to note that the risks of fund deficiency fall upon the State, with the legislative guarantee protecting member entitlements and so the effects of a deficit on member security are insignificant compared to similar funds in the private sector. The recommended level of surplus retention is lower than it would otherwise be on this account.

The Superannuation (State Public Sector) Deed 1990 (the Deed) incorporates a general provision allowing the Board of Trustees to decide, on the advice of the Actuary, the State's contributions to the QSuper fund to meet benefit payments. Accordingly, I have recommended the following funding arrangements to meet the State's share of the defined benefit liabilities:

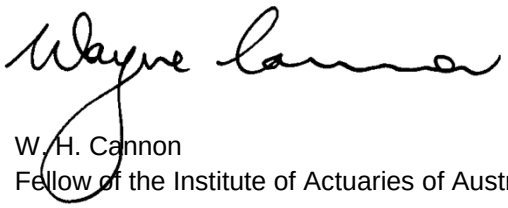
Income protection to be met by State	Income protection benefits to be fully met by the State as required by the Deed
Payments to pensioners from QSuper fund	Consistent with current practice, all payments to pensioners to be met solely from the QSuper fund with no last minute funding drawn from the Employer Fund in respect of them
State to meet 95% of defined benefit payments	Other than the above, the State to meet 95% of defined benefit payments. Benefit payments for this purpose include any transfers to an accumulation category and the present value (see Appendix D) of new pensions that emerge on the exit of defined benefit active members. All payments to pensioners are met solely from the QSuper fund and therefore need to be fully funded at commencement

The proportion to apply to those benefits not fully met from either the QSuper fund or the State will be recalculated as part of each future triennial actuarial valuation. The proportion recommended here has fallen from the 96% at the last valuation primarily due to the strong investment returns within the defined benefit component of the QSuper fund, offset by changes in the valuation basis.

In summary, if the actuarial assumptions are realised, then last minute State contributions as recommended above will fund the balance of all defined benefit liabilities not met from current QSuper fund assets and future member contributions.

As noted above, this Review has been undertaken in advance of the usual triennial cycle at the request of the Under-Treasurer. In accordance with paragraph 14 of prudential standard SPS 160, APRA has determined that QSuper should be subject to a triennial actuarial investigation cycle and so the next review is due as at 30 June 2018. Due to the APRA requirement for that review to be completed within six months of the valuation date, that part of the valuation relating to the decrement and pension analysis (sections B.4, B.5 and B.6) will be conducted as at 30 June 2017.

I would be happy to discuss my recommendations and analysis with you when convenient.



W. H. Cannon
Fellow of the Institute of Actuaries of Australia

31 March 2016

2 Introduction

2.1 Background

The provisions of the Superannuation (State Public Sector) Act 1990 (the Act) and the Superannuation (State Public Sector) Deed 1990 (the Deed) govern the operation of the State Public Sector Superannuation Scheme (QSuper). The Act established the scheme on 13 June 1990 and provided that QSuper conditions are governed by the Deed, which was gazetted on 23 June 1990. Throughout this Report, the assets held within QSuper are referred to as the QSuper fund.

The QSuper Board of Trustees (the Board) is responsible for the management of QSuper. Since 1 July 2007, QSuper Limited (QSL) has provided the scheme's administration, succeeding the Government Superannuation Office (which was a Portfolio Office of Queensland Treasury).

QSuper is a defined benefit scheme and in accordance with the Superannuation Industry (Supervision) Act and Regulations (SIS) and Australian Prudential Regulation Authority (APRA) Superannuation Prudential Standard SPS 160 a regular actuarial review is necessary. Furthermore, Section 19 of the Deed requires an investigation and report as to the state and sufficiency of the fund to be made by the Actuary periodically so that there shall not be a period longer than 3 years between successive such investigations.

Section 19 of the Deed also requires that any such report shall include:

- A statement of the assets of the fund
- A statement as to any liability for benefit payments not expected to be financed out of the assets of the fund or any future contributions to the fund
- Any other matters which the Actuary may consider appropriate generally

This Report presents the results of the actuarial review performed as at 30 June 2015. Mr W.H. Cannon conducted this Review in his capacity as the Queensland State Actuary. This Review has been undertaken in advance of the usual triennial cycle at the request of the Under-Treasurer to provide the most comprehensive and up to date picture of the funding position prior to the 2016-17 Budget[3]. Mr Cannon conducted the last actuarial review of QSuper as at 30 June 2013, which was signed on 20 June 2014 and also released an Interim Review[4] of the scheme as at 30 June 2015 (the *Interim Report*) dated 30 October 2015.

QSuper is a regulated superannuation scheme (effective 9 July 2009) under the prudential supervision of APRA and is subject to the SIS legislation. Prior to becoming regulated, QSuper was an exempt public sector superannuation scheme for the purposes of SIS and was subject to a Heads of Government Agreement covering its conduct that required compliance with the "spirit" of SIS where appropriate.

[3] A copy of the letter has been included in Appendix F of this Report.

[4] See https://www.treasury.qld.gov.au/publications-resources/defined-benefit-scheme/qsuper-2015-interim-valuation-report.pdf

Section 29 of the Act provides for the Government guarantee in respect of the defined benefit payments. This statutory guarantee forms the basis for the specific exemption provided to QSuper from the normal SIS funding and solvency requirements of a regulated fund.

The character of QSuper changed considerably with the introduction of Q2000[5], on 1 May 2000. From that date, new permanent and temporary Queensland public sector employees joined the Comprehensive Accumulation Category by default and were able to transfer to the Standard Defined Benefit Category at any time in the future but on a once only basis. Subsequently, the Standard Defined Benefit Category was closed to new members from 12 November 2008. Standard Defined Benefit Category members are still allowed to transfer to the Comprehensive Accumulation Category on an open-ended basis. Casual employees join the Basic Accumulation Category and most can opt to join the Comprehensive Accumulation Category, which requires member contributions.

2.2 Structure of the Scheme

QSuper has been designed as a "master plan" so that it is able to provide tailored superannuation coverage for all Queensland public sector employees, depending on the requirements of the relevant employing authority. As a result of various scheme mergers in the past, QSuper has retained membership categories for the members of the predecessor schemes who have not elected to transfer to the main categories. Prior to the last Review a new category (Non-Public Sector Accumulation) was introduced to allow non-government employers to make contributions on behalf of existing members. The membership categories are shown in the following table.

[5] Q2000 was the name given to the project implementing the changes described herein. It is used for convenience in this Report to refer to these changes.

Category	Previous Scheme	Current Status
Standard Defined Benefit	QSuper	Closed to new entrants
Comprehensive Accumulation	–	Open to new permanent and temporary employees and transfers from the other categories, including casuals
Basic Accumulation	Government Officers' Superannuation Scheme (Gosuper)	Open to new casual employees, police cadets and others where nominated by non-core public sector employers
QAS Accumulation	Queensland Ambulance Service Superannuation Scheme (QAS Super)	Closed to new entrants
State 58	State Service Superannuation Fund (State Super)	Closed to new entrants
State 72	State Service Superannuation Fund (State Super)	Closed to new entrants
Police 68	Police Superannuation Fund (Police Super)	Closed to new entrants
Police 74	Police Superannuation Fund (Police Super)	Closed to new entrants
Fire	Queensland Fire Service Superannuation Plan (Fire Super)	Closed to new entrants and no active members remain
Parliament 70	Parliamentary Contributory Superannuation Fund (Parliamentary Super)	Closed to new entrants
Non-Public Sector Accumulation	–	Open to existing members where employer is not a unit of the State public sector

This Report concentrates on the investigation of the Standard Defined Benefit Category. However, the experience and the liabilities of the closed defined benefit State, Police, Fire and Parliamentary Categories are included where relevant. In addition, the assets and liabilities in respect of the accumulation categories are incorporated as appropriate.

Whilst the employees of most participating agencies are subject to the same basic benefit structure in the Standard Defined Benefit Category, the Police members have slightly different benefit conditions. In addition, the police have traditionally had higher rates of death and disablement than the remainder of the public sector. For these reasons, the police are considered as a separate sub-category within the Standard Defined Benefit Category and are valued separately with their own investigation assumptions. Consequently, throughout this Report, the "non-police" members of the Standard Defined Benefit Category are referred to as Standard members.

The standard benefit payable from the Standard Defined Benefit Category is a defined benefit lump sum, although a pension benefit is available on exit due to total and permanent disablement (TPD). The standard benefit payable from the accumulation categories is a defined contribution lump sum, whilst the State, Police, and Parliamentary categories pay a variety of pension and lump sum benefits. A description of the standard benefits payable under each of the categories is contained in Appendix A.

The contributions required by the Government in respect of defined benefits are set out in Section 27H of the Deed. This Section requires that the contributions payable by the State to the QSuper fund are the amounts decided by the Board on the advice of the Actuary. Section 27H of the Deed also allows for the State to make additional contributions to the QSuper fund for the efficient and effective operation of the scheme. As required by the Deed, the State meets the entire amount of any income protection benefit.

2.3 Funding Arrangements

2.3.1 Defined Benefit Categories

The defined benefit categories are set up differently to a typical regulated scheme in that only employee contributions (including net salary sacrifice contributions) are deposited into the QSuper fund. Benefit payments from the scheme are determined according to the benefit rules as described in Appendix A. However, the State pays a share of these benefits as a last minute contribution to the QSuper fund. The State makes advance provision for its share of benefits in that, at the same time as member contributions are remitted, employing authorities are required to remit employer contributions to Queensland Treasury, which then deposits them[6] in the Employer Fund[7]. The rate of employer contribution is reviewed at each actuarial investigation.

QSuper's liabilities are effectively limited to the assets in the QSuper fund with the State providing a statutory guarantee in respect of the balance of the defined benefit obligations. However, the total liabilities of the defined benefit categories are the total benefits as described in the Deed and summarised in Appendix A. Consideration of the QSuper fund only would not give a comprehensive understanding of the funding of the scheme and hence, consistent with past practice, this Report considers the overall funding of the scheme taking into account both the QSuper fund and the Employer Fund.

2.3.2 Accumulation Categories

The QSuper accumulation categories provide defined contribution benefits and both member contributions and employer contributions are deposited into the QSuper fund. Each member of the category has an account in their name into which the contributions are recorded. Net investment earnings are applied to the account and administration, insurance and taxation costs are deducted from the account. Benefit payments are made from the member's account. The benefits available to members are summarised in Appendix A.

2.4 Taxation Status

QSuper is a complying superannuation scheme and is taxed accordingly. The QSuper fund is thus liable for tax at the rate of 15% on investment income and employer contributions, less deductions for the notional cost of insurance, expenses, the discount component of realised capital gains and the income earned in respect of pension assets. The QSuper fund receives foreign tax credits and rebates for imputation credits in respect of its franked dividend income.

This Review has been conducted on the assumption that the QSuper fund will continue to be liable to pay tax on employer contributions and investment income at the standard rates.

[6] Unless the investment of employer contributions is suspended by the Treasurer.

[7] Throughout this Report, the term Employer Fund refers to the investment assets accumulated in a reserve by the Government to meet its future superannuation obligations.

2.5 Insurance Arrangements

QSuper self-insures death and disability benefits for members of the Accumulation and Defined Benefit Categories. The Accumulation self-insurance arrangements are subject to annual actuarial review, with reserves maintained by QSuper in accordance with actuarial advice (latest review undertaken by KPMG Actuarial Pty Ltd dated 18 January 2016). With regard to the self-insurance of defined benefit entitlements, I believe that self-insurance remains appropriate, recognising:

- the defined benefit membership is large enough so that variations in death and disability experience from year to year are small relative to the size of the scheme and to variations in other aspects of the scheme's experience;
- the insured component of death and TPD benefits is declining as the membership ages so the risk exposures are declining; and
- the State has a statutory obligation in respect of the defined benefit obligations of the scheme, so insured benefits are effectively guaranteed.

It has been assumed for the purposes of this Review that the balance of the Accumulation self-insurance reserve is sufficient to meet the liability for outstanding claims as at the investigation date and that any excess is considered part of QSuper's overall accumulation reserves and therefore not available to meet defined benefit liabilities. The liability in respect of outstanding defined benefit income protection payments has been estimated and included in the actuarial balance sheet shown in Section 6.1, which also includes a liability for outstanding death and TPD claims within the liability in respect of Former Members.

In view of the effective guarantee provided by the State and the declining risk exposure, I believe that it is reasonable for the scheme not to obtain catastrophe insurance cover.

2.6 Professional Standards and Legislative Compliance

This Report has been prepared in accordance with Professional Standards 400 (dated July 2015) and 402 (dated September 2012) published by the Actuaries Institute (IAAust) relating to the investigation of defined benefit superannuation funds. It has also taken account of the IAAust Superannuation Practice Committee documents: Discussion Note: Actuarial Requirements of Superannuation Prudential Standard 160 and Discussion Note: Self-insurance Arrangements and Superannuation Prudential Standard 160.

QSuper is a regulated superannuation fund under the supervision of APRA and must meet the relevant prudential reporting requirements. These requirements were described in SPS 160 and Prudential Practice Guide SPG 160 to apply from 1 July 2013. It will be noted that QSuper is not considered a fully funded public sector scheme for the purposes of SPS 160 and therefore its disclosure requirements are limited to those listed in paragraph 24 of SPS 160 (see Section 9). In addition, in accordance with paragraph 14 of SPS 160, APRA has determined that QSuper should be subject to a triennial actuarial investigation cycle, although of course shorter review periods are acceptable.

2.7 Financial Accounts

The financial information used in this Review is sourced from:

- the QSuper Financial Statements, which have been audited by the Queensland Auditor-General in the audit report dated 24 September 2015; and
- Queensland Treasury and QIC relating to the Employer Fund.

2.8 Legislative Changes

The only legislative change that had any effect on the Defined Benefit Categories made since the last Review was as follows:

- The Superannuation State Public Sector Amendment of Deed Regulation (No.4) 2013 amended sections 46, 47, 48 and 50 of the Deed to remove the pre-existing condition exclusion for defined benefit default death and total and permanent disability cover and to reduce the pre-existing condition term from 7 to 5 years for defined benefit income protection cover.

Whilst this change is expected to increase the cost of the death, TPD and income protection benefits, the effect is not expected to be material to the results of the valuation and no adjustment has been made.

2.9 Recommendations of Previous Actuarial Investigation

I understand that the recommendations from the previous actuarial Review (report dated 20 June 2014) have been implemented by the Board.

2.10 Post-Investigation Date Events

Due to the timing of this Report, events can occur after the investigation date that have a material effect on the operations of the scheme. These events and their consequences are discussed in the various sections of this Report where relevant. As a summary, the following material post-investigation date events have been considered as part of this Review.

- The Treasurer announced a suspension of the investment of employer contributions for five years from 1 July 2015 as part of the 2015-16 State Budget.
- The financial year to date investment return at the time of writing was approximately -0.3%. It has been decided not to make direct allowance for the actual 2015-16 investment return in the derivation of scheme liabilities as at the investigation date. The use of short term discount rate assumptions adds complexity and distorts the movements in liabilities and funding indices. That said, the stochastic projections undertaken in Section 6.6 are calibrated on experience until the end of January 2016, in order to provide the most up to date picture.

3 Membership

3.1 Data

QSL supplied data for the investigation at the individual member level, rather than on a grouped basis. The fact that membership information is provided to QSuper directly by employers results in a reasonable amount of inaccurate data being stored. QSL has recognised this and has implemented a data integrity program, which has improved the quality of the membership data.

A number of consistency checks have been applied to the data, both internally and compared to previous data. The checks undertaken and details regarding any amendments made to the membership data are shown in Appendix E. Overall, the quality of the membership data is considered acceptable for the purposes of the investigation.

In addition, notwithstanding the fact that the investigation is undertaken as at 30 June 2015, the 1 July 2015 salaries were available and have been used when calculating the scheme's liabilities. This provides a more realistic assessment of the scheme's financial position.

3.2 Membership Statistics

3.2.1 Membership Movements – Contributors – General

Values in the following tables were taken from the data supplied by QSL for the purpose of analysing the scheme's experience. It should be noted that the reconciliations might differ immaterially from the information provided in other QSL reports. The term "involuntary terminations" in the following tables is inclusive of voluntary early retirements (prior to age 55), retrenchments and redundancies.

3.2.2 Membership Movements – Contributors – Standard Defined Benefit Category

The Standard male, female and total membership movements over the period 1 July 2013 to 30 June 2015 are summarised in Table 1, Table 2 and Table 3, respectively. The "Adjustment for discrepancy in opening" refers to the difference between the membership numbers provided at the last Review and the implied numbers based on the latest data and the movements provided by QSL. Whilst it would be preferable for complete reconciliations to be able to be achieved, the discrepancies are small and do not have a material effect on the valuation results.

Table 1 Standard Defined Benefit Category – Number of Standard Male Contributors

	2013-14	2014-15	2013-2015
Membership at beginning of year	**20,897**	**19,067**	**20,897**
Adjustment for exits prior to 1 July 2013	(66)	0	(66)
Adjustment for discrepancy in opening	107	0	107
Adjusted Membership at beginning of year	**20,938**	**19,067**	**20,938**
New Entrants	0	0	0
Exits			
Retirements	1,292	1,024	2,316
Deaths	13	17	30
Total and Permanent Disablements	35	21	56
Permanent and Partial Disablements	1	1	2
Resignations/Dismissals	220	185	405
Involuntary Terminations	288	119	407
Transfers to Accumulation Category	22	24	46
Membership at end of year	**19,067**	**17,676**	**17,676**

Table 2 Standard Defined Benefit Category – Number of Standard Female Contributors

	2013-14	2014-15	2013-2015
Membership at beginning of year	**31,240**	**29,036**	**31,240**
Adjustment for exits prior to 1 July 2013	(121)	0	(121)
Adjustment for discrepancy in opening	205	0	205
Adjusted Membership at beginning of year	**31,324**	**29,036**	**31,324**
New Entrants	0	0	0
Exits			
Retirements	1,474	1,286	2,760
Deaths	13	11	24
Total and Permanent Disablements	47	30	77
Permanent and Partial Disablements	4	0	4
Resignations/Dismissals	411	384	795
Involuntary Terminations	305	87	392
Transfers to Accumulation Category	34	34	68
Membership at end of year	**29,036**	**27,204**	**27,204**

Table 3 Standard Defined Benefit Category – Number of Standard Contributors

	2013-14	2014-15	2013-2015
Membership at beginning of year	**52,137**	**48,103**	**52,137**
Adjustment for exits prior to 1 July 2013	(187)	0	(187)
Adjustment for discrepancy in opening	312	0	312
Adjusted Membership at beginning of year	**52,262**	**48,103**	**52,262**
New Entrants	0	0	0
Exits			
Retirements	2,766	2,310	5,076
Deaths	26	28	54
Total and Permanent Disablements	82	51	133
Permanent and Partial Disablements	5	1	6
Resignations/Dismissals	631	569	1,200
Involuntary Terminations	593	206	799
Transfers to Accumulation Category	56	58	114
Membership at end of year	**48,103**	**44,880**	**44,880**

The membership movements for the Police members of the Standard Defined Benefit Category over the period 1 July 2013 to 30 June 2015 are summarised in Table 4.

Table 4 Standard Defined Benefit Category – Number of Police Contributors

	2013-14	2014-15	2013-2015
Membership at beginning of year	**4,481**	**4,296**	**4,481**
Adjustment for exits prior to 1 July 2013	(3)	0	(3)
Adjustment for discrepancy in opening	(25)	0	(25)
Adjusted Membership at beginning of year	**4,453**	**4,296**	**4,453**
New Entrants	0	0	0
Exits			
Retirements	95	93	188
Deaths	5	2	7
Total and Permanent Disablements	15	19	34
Permanent and Partial Disablements	4	7	11
Resignations/Dismissals	31	34	65
Involuntary Terminations	1	1	2
Transfers to Accumulation Category	6	5	11
Membership at end of year	**4,296**	**4,135**	**4,135**

At 30 June 2015, there were 3,286 male Police contributors and 849 female Police contributors.

The membership movements across all contributors of the Standard Defined Benefit Category over the period 1 July 2013 to 30 June 2015 are summarised in Table 5.

Table 5 Standard Defined Benefit Category – Number of Contributors

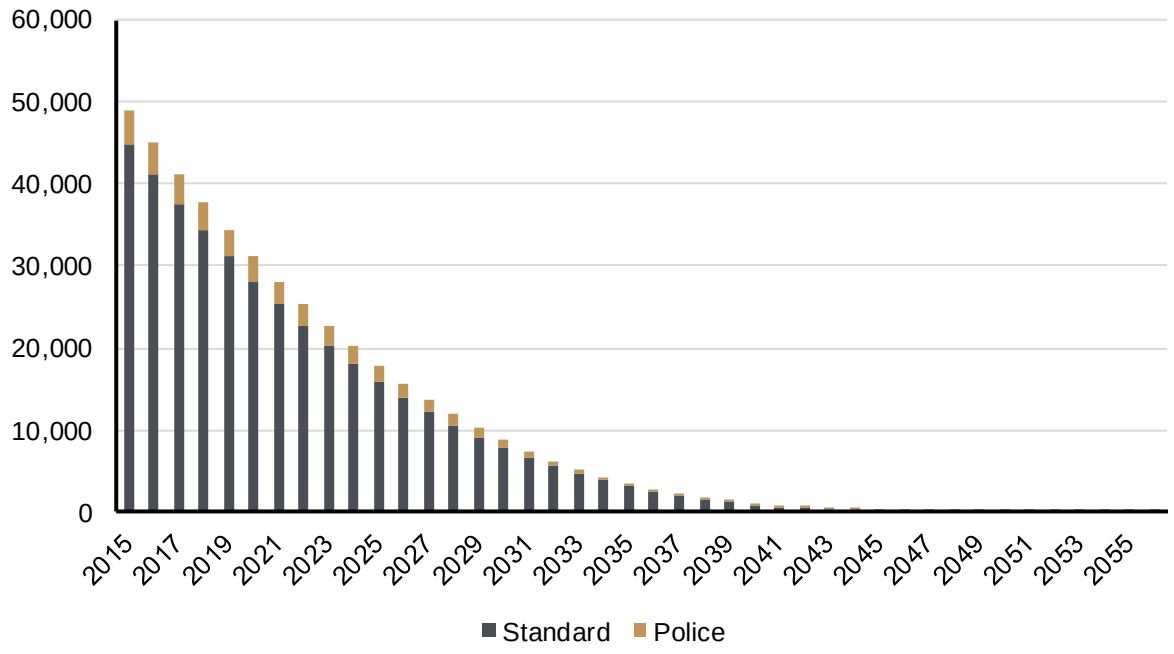
	2013-14	2014-15	2013-2015
Membership at beginning of year	**56,618**	**52,399**	**56,618**
Adjustment for exits prior to 1 July 2013	(190)	0	(190)
Adjustment for discrepancy in opening	287	0	287
Adjusted Membership at beginning of year	**56,715**	**52,399**	**56,715**
New Entrants	0	0	0
Exits			
Retirements	2,861	2,403	5,264
Deaths	31	30	61
Total and Permanent Disablements	97	70	167
Permanent and Partial Disablements	9	8	17
Resignations/Dismissals	662	603	1,265
Involuntary Terminations	594	207	801
Transfers to Accumulation Category	62	63	125
Membership at end of year	**52,399**	**49,015**	**49,015**

At the valuation date, the youngest and oldest members were aged 27 and 74 respectively.

3.2.3 Projections – Contributors – Defined Benefit Category

Based on the assumptions listed in Appendix C, the projected number of members of the Defined Benefit Category is shown in Figure 1. This figure demonstrates the expected continued decline in active membership over time, with around 10% of the members leaving each year.

Figure 1 Defined Benefit Category – Projected Number of Contributors



3.2.4 Membership Movements – Contributors – State Category

The number of active members in the State Category has continued to decrease over the period since the last Review. The membership movements over the period 1 July 2013 to 30 June 2015 are summarised in Table 6.

Table 6 State Category – Number of Contributors

	Males	Females	Persons
Membership at 30 June 2013	**185**	**336**	**521**
Adjustment for discrepancy in opening	(15)	(9)	(24)
Adjusted Membership at 30 June 2013	**170**	**327**	**497**
New Entrants	0	0	0
Exits			
Retirements	29	29	58
Deaths	1	0	1
Ill-Health Retirements	3	3	6
Resignations	1	0	1
Involuntary Terminations	0	0	0
Membership at 30 June 2015	**136**	**295**	**431**

At the valuation date, the youngest and oldest members were aged 42 and 76 respectively, with the average age 54 years.

3.2.5 Membership Movements – Contributors – Police Category

The number of active members of the Police Category has also continued to decrease over the period since the last Review. The membership movements for the period 1 July 2013 to 30 June 2015 are summarised in Table 7.

Table 7 Police Category – Number of Contributors

	Males	Females	Persons
Membership at 30 June 2013	**113**	**22**	**135**
Adjustment for discrepancy in opening	4	1	5
Adjusted Membership at 30 June 2013	**117**	**23**	**140**
New Entrants	0	0	0
Exits			
Retirements	9	2	11
Deaths	1	0	1
Ill-Health Retirements	2	2	4
Resignations	1	0	1
Involuntary Terminations	1	1	2
Membership at 30 June 2015	**103**	**18**	**121**

At the valuation date, the youngest and oldest members were aged 41 and 60 respectively, with the average age 49 years.

3.2.6 Membership Movements – Contributors – Parliamentary Category

The number of active members of the Parliamentary Category has also continued to decrease over the period since the last Review. The membership movements for the period 1 July 2013 to 30 June 2015 are summarised in Table 8.

Table 8 Parliamentary Category – Number of Contributors

	Persons
Membership at 30 June 2013	**19**
New Entrants	0
Exits	
Retired	8
Defeated/Lost Preselection	1
Death	0
Disablement	0
Membership at 30 June 2015	**10**

At the valuation date, the youngest and oldest members were aged 47 and 60 respectively, with the average age 55 years.

3.2.7 Membership Movements – Fire Category

At the investigation date, there were only 2 partial incapacity pensioners remaining in the defined benefit section of the Fire Category. The liability in respect of these pensioners has been included in this Review, however it is clearly of trivial magnitude in the context of QSuper overall.

3.2.8 Membership Movements – Pensioners – Standard Defined Benefit Category

There are relatively few pensioners in the Standard Defined Benefit Category because the vast majority of benefits provided by the Category are lump sums. The membership movements over the period 1 July 2013 to 30 June 2015 are summarised in Table 9.

Table 9 Standard Defined Benefit Category – Number of Pensioners

	Total and Permanent Disablement		Children and Orphans	Total
	Males	Females		
Pensioners at 30 June 2013	**186**	**250**	**365**	**801**
Adjustment for discrepancy in opening	(1)	-	-	(1)
Adjusted Membership at 30 June 2013	**185**	**250**	**365**	**800**
New Pensioners	33	50	87	170
Exits	3	4	180	187
Pensioners at 30 June 2015	**215**	**296**	**272**	**783**

At the valuation date, the age distributions of the different pension types are shown in Table 10.

Table 10 Standard Defined Benefit Category - Pensioner Age Distribution

	Total and Permanent Disablement		Children and Orphans
	Males	Females	
Average	57	56	16
Youngest	36	38	2
Oldest	74	76	33

3.2.9 Membership Movements – Pensioners – State Category

The number of pensioners in the State Category has fallen gradually over the last two years. Table 11 shows the movement in pensioner numbers over the period since the last Review.

Table 11 State Category – Number of Pensioners

	Age	Ill-Health	Spouse	Family Law	Child	Comm-uters	Total
Pensioners at 30 June 2013	**611**	**288**	**311**	**-**	**10**	**24**	**1,244**
Adjustment for discrepancy in opening	-	(1)	1	-	-	(3)	(3)
Adjusted Pensioners at 30 June 2013	**611**	**287**	**312**	**-**	**10**	**21**	**1,241**
New Pensioners	47	7	14	-	1	-	69
Pensions terminated by							
Death	42	18	38	-	-	6	104
Ineligibility	-	-	-	-	6	-	6
Other	1	2	-	-	-	-	3
Pensioners at 30 June 2015	**615**	**274**	**288**	**-**	**5**	**15**	**1,197**

"Commuters" refers to those members who commuted their pension at retirement prior to 27 February 1984 but whose spouses retain widows' pension rights. Other terminations include suspension due to no response from the pensioner or commuter.

At the valuation date, the age distributions of the different pension types are shown in Table 12.

Table 12 State Category - Pensioner Age Distribution

	Age	Ill-Health	Spouse	Family Law	Child	Comm-uters
Average	74	64	82	-	19	93
Youngest	56	46	53	-	18	92
Oldest	102	81	104	-	23	96

3.2.10 Membership Movements – Pensioners – Police Category

The number of pensioners in the Police Category has fallen slightly over the last two years. Table 13 outlines the movement in the number of pensioners for the period 1 July 2013 to 30 June 2015.

Table 13 Police Category – Number of Pensioners

	Age	Ill-Health	Spouse	Family Law	Child	Comm-uters	Total
Pensioners at 30 June 2013	**48**	**95**	**61**	**2**	**2**	**8**	**216**
Adjustment for discrepancy in opening	(1)	2	-	-	-	(2)	(1)
Adjusted Pensioners at 30 June 2013	**47**	**97**	**61**	**2**	**2**	**6**	**215**
New Pensioners	2	1	6	-	2	-	11
Pensions terminated by							
Death	7	4	6	-	-	3	20
Ineligibility	-	-	-	-	1	-	1
Other	-	-	-	-	-	-	-
Pensioners at 30 June 2015	**42**	**94**	**61**	**2**	**3**	**3**	**205**

At the valuation date, the age distributions of the different pension types are shown in Table 14.

Table 14 Police Category - Pensioner Age Distribution

	Age	Ill-Health	Spouse	Family Law	Child	Comm-uters
Average	73	57	80	57	17	93
Youngest	59	42	51	52	13	88
Oldest	95	76	100	63	21	96

3.2.11 Membership Movements – Pensioners – Parliamentary Category

The number of pensioners in the Parliamentary Category has risen over the last two years as a significant proportion of active members opt for a pension upon exit. Table 15 outlines the movement in the number of pensioners for the period 1 July 2013 to 30 June 2015.

Table 15 Parliamentary Category – Number of Pensioners

	Leaving Service	Ill-Health	Spouse	Family Law	Suspen-ded	Comm-uters	Total
Pensioners at 30 June 2013	**103**	**-**	**17**	**2**	**1**	**9**	**132**
New Pensioners	8	1	3	1	-	-	13
Pensions terminated by							
Death	4	-	2	-	-	1	7
Ineligibility	-	-	-	-	-	-	-
Suspension	-	-	-	-	-	-	-
Pensioners at 30 June 2015	**107**	**1**	**18**	**3**	**1**	**8**	**138**

At the valuation date, the age distributions of the different pension types are shown in Table 16.

Table 16 Parliamentary Category - Pensioner Age Distribution

	Leaving Service	Ill-Health	Spouse	Family Law	Comm-uters
Average	63	45	81	66	78
Youngest	38	45	68	65	72
Oldest	86	45	99	67	86

3.2.12 Membership Numbers – Deferred Members – Standard Defined Benefit Category

When a member withdraws from the Standard Defined Benefit Category prior to age 55, that part of their defined benefit corresponding to their own contributions with interest is transferred to an accumulation account (subject to SIS preservation requirements) with the balance (the Deferred Retirement Benefit, or DRB) preserved in QSuper. The DRB is indexed in line with Average Weekly Ordinary Time Earnings until age 55 or earlier death or TPD. However, at any time members can choose an investment linked option (ILO) based on the discounted value of their DRB which will then be transferred to an accumulation account.

The movements of all members with a DRB over the period 1 July 2013 to 30 June 2015 are summarised in Table 17.

Table 17 Deferred Retirement Benefit Category – Number of Members

	2013-14	2014-15	2013-2015
Membership at beginning of year	**38,475**	**36,951**	**38,475**
Adjustment for discrepancy in opening	(92)	0	(92)
Adjusted Membership at beginning of year	**38,383**	**36,951**	**38,383**
New Members	765	509	1,274
Exits			
Deaths	18	42	60
Total and Permanent Disablements	45	30	75
Transfer on Reaching Age 55	1,660	1,672	3,332
Transfer pre Age 55	474	538	1,012
Membership at end of year	**36,951**	**35,178**	**35,178**

At the valuation date, the youngest and oldest members were aged 22 and 55 respectively, with the average age 46 years.

3.2.13 Membership Numbers – Preserved Members – State Category

As at 30 June 2015 there were 275 former State Category members with a preserved benefit. This represents a decrease of 78 from the balance of 353 at the last Review.

At the valuation date, the youngest and oldest members were aged 42 and 55 respectively, with the average age 50 years.

3.2.14 Membership Numbers – Preserved Members – Police Category

As at 30 June 2015 there were 17 former Police Category members with a preserved benefit. This represents a decrease from the balance of 22 at the last Review.

At the valuation date, the youngest and oldest members were aged 42 and 54 respectively, with the average age 46 years.

3.2.15 Membership Profile – Standard Defined Benefit Category

The membership characteristics of the Standard Defined Benefit Category Standard members as at 30 June 2013 and at 30 June 2015 are summarised in Table 18. All averages are weighted by the relevant 1 July salary.

Table 18 Standard Defined Benefit Category – Standard Membership Profile[8]

	30 June 2013			30 June 2015		
	Males	Females	Persons	Males	Females	Persons
Average Age (years)	52.1	50.4	51.1	53.1	51.6	52.2
Average Age At Entry (years)	29.3	29.8	29.6	28.9	29.1	29.0
Average Membership (years)	22.8	20.6	21.5	24.2	22.5	23.2
Average Review Date Salary	$88,630	$81,097	$84,117	$94,198	$86,211	$89,357
Average 1 July Salary	$91,148	$83,264	$86,424	$96,679	$88,732	$91,862
Average Contribution Rate (%)	4.94	4.87	4.90	4.96	4.90	4.93
Average Part-Time Ratio	0.991	0.916	0.948	0.990	0.913	0.945

From this table, the following observations about the Standard membership can be made:

- Average age has increased by another 1.1 years since the last Review and is now over 52.
- Average service has increased by 1.7 years with males having longer average membership than females.
- Males continue to have significantly higher average salaries than females.
- The average contribution rate has increased marginally since the last Review, with females contributing at slightly lower average rates than males.
- Female members continue to work part-time to a greater extent than males. The extent of part-time work for Standard Females has increased since the last Review and the male ratio has also increased marginally.

The membership characteristics of the Police members as at 30 June 2013 and at 30 June 2015 are summarised in Table 19. All averages are weighted by the relevant 1 July salary.

[8] Review Date Salary refers to the salary used for benefit purposes at 30 June of the relevant year; i.e. the superannuable salary as at the preceding 1 July or later entry. 1 July Salary refers to the salary on the subsequent 1 July; i.e. 1 day after the investigation date of 30 June.

Table 19 Standard Defined Benefit Category – Police Membership Profile

	30 June 2013			30 June 2015		
	Males	Females	Persons	Males	Females	Persons
Average Age (years)	47.1	42.5	46.2	48.5	44.3	47.7
Average Age At Entry (years)	23.9	24.6	24.0	23.7	24.4	23.9
Average Membership (years)	23.2	18.0	22.2	24.8	19.8	23.8
Average Review Date Salary	$86,202	$80,428	$85,030	$91,382	$85,656	$90,206
Average 1 July Salary	$88,720	$82,964	$87,552	$93,800	$88,105	$92,630
Average Contribution Rate (%)	5.98	5.98	5.98	5.99	5.98	5.99
Average Part-Time Ratio	0.999	0.951	0.990	0.999	0.949	0.989

From this table, the following observations can be made:

- Male members are 4.2 years older on average than females.
- Although male and female police entered the scheme at about the same age, males have significantly longer average membership than females.
- Male Police members have significantly higher average salaries than female Police members.
- Females tend to contribute at similar rates to males and average contribution rates for both genders have remained stable since the last Review. The vast majority of Police members contribute at the standard rate of 6% of salary.
- The extent of part-time work for the police is very limited with the level of females' part-time work increasing since 2013 whilst remaining higher than males.

As discussed in Appendix B, despite the differences in profile between male and female Police members, it is not practical to consider the groups separately due to the relatively small number of female police. Consequently, the Police members of QSuper are considered as a group throughout the remainder of this Report.

4 Investments and accounts

4.1 Fund Accounts

Over the two years to 30 June 2015, the QSuper fund has risen from $43,768 million to $58,683 million. The transactions of the QSuper fund over this period are summarised in Table 20.

Table 20 QSuper Consolidated Financial Statements

	$ million
Net Assets Available to Pay Benefits at 30 June 2013	**43,768**
Income	
Investment Revenue	11,077
Members' Contributions	2,138
Employer Contributions	9,091
Transfers from Other Funds	1,901
Other Revenue	0
Total Income	24,207
Expenditure	
Benefit Payments	7,025
General Administration Expenses	382
Insurance Premiums	112
Income Tax Expense	1,773
Total Expenditure	9,292
Net Assets Available to Pay Benefits at 30 June 2015	**58,683**

The market value of the assets in the Employer Fund as at 30 June 2015 was $29,014 million.

4.2 Investment Policy

In accordance with the legislative requirements of SIS, the Board has formulated an Investment Policy Statement (IPS) covering both the defined benefit and accumulation categories.

The accumulation categories operate under a Member Investment Choice structure, with clear communication of asset allocations and investment constraints to members. I have reviewed the unit pricing and crediting rate policies for the scheme and believe them to be suitable mechanisms for crediting investment earnings to members' accounts. Accordingly, no further comment regarding the investment policies for the accumulation categories is warranted for the purposes of this Review.

The IPS recognises the statutory guarantee provided by the State in respect of the defined benefits and that the assets to meet these are predominantly held in the Employer Fund. The investment policy for the Employer Fund assets is set by the Long Term Assets Advisory Board (LTAAB), an advisory Board constituted under the Queensland Treasury Corporation Act. Accordingly, the IPS is set in liaison with LTAAB and is applicable to the total defined benefit assets. The investments are managed by QIC, with whom LTAAB and the Board have each concluded Investment Management Agreements.

The objectives that inform the investment management decisions of the defined benefit assets have been summarised in a "scorecard" guide and are expressed as liability relative rather than absolute return objectives. The two primary objectives can be broadly defined as a funding objective that seeks to maximise the probability that the scheme earns a sufficient return to pay the future liabilities within the current employer contribution rates and a risk objective that controls the amount of risk that can be taken on in order to meet the funding objective.

An independent liability hedging approach has been adopted with effectively two portfolios, an "asset" portfolio to generate return and a "liability hedge" portfolio, largely implemented through derivatives, to manage the interest rate and inflation risk exposures inherent in the liabilities. These two portfolios combine to achieve the overall investment objectives of the defined benefit assets.

The Board and LTAAB have concluded that the asset allocation ranges and long term target portfolio percentages shown in Table 21 are appropriate for the asset portfolio.

Table 21 Asset Allocation Ranges

Asset Class	30 June 2015	Range
Equities	**20.2%**	**10% - 30%**
Diversified Alternatives	20.3%	5% - 25%
Infrastructure	6.8%	5% - 15%
Private Equity	7.6%	0% - 10%
Real Estate	8.4%	5% - 15%
Total Alternatives	**43.1%**	**15% - 55%**
Cash	34.6%	10% - 50%
Global Fixed Interest	2.1%	0% - 25%
Total Fixed Interest and Cash	**36.7%**	**10% - 60%**
Currency	0.0%	-2% - 20%

There are additional controls on the diversified alternatives, real estate, global fixed interest allocations and liquidity exposures.

The Board and LTAAB have determined that the long term target exposures and ranges (expressed in terms of liabilities rather than assets) shown in Table 22 are appropriate for the liability hedge portfolio.

Table 22 Liability Hedge Portfolio

Liability Hedge	30 June 2015	Range
Interest Rate Exposure	21.1%	10% - 70%
Inflation Exposure	45.8%	30% - 70%

Subject to the above constraints, the investment manager may vary the actual portfolio weights and liability exposures from the long term targets in response to current market valuations and its outlook (commonly referred to as dynamic asset allocation).

In view of the guarantee provided by the State, the investment policy does not materially affect the security of beneficiary entitlements and should reflect the risk preferences of the Government through LTAAB. The policy described above achieves that objective and can therefore be considered appropriate given the nature of the scheme's liabilities.

5 Investigation of assets and liabilities

5.1 Purpose of the Investigation

The purpose of an actuarial investigation is to examine the long and short term financial position of a superannuation scheme. Normally, the major reason for an investigation is to determine the level of employer contributions required to provide for the benefits payable from a scheme. However, as discussed in Section 2.3.1, the defined benefit categories are set up differently to most schemes in that employer (i.e. State) contributions are accumulated in the Employer Fund. Benefits payable from QSuper are effectively limited to the assets in the QSuper fund with the balance of the benefits met by the State as a last minute contribution through transfers from the Employer Fund to the QSuper fund. However, since the defined benefit liabilities of the scheme are based on the total benefits described in Appendix A, consideration of the QSuper fund only would not give a comprehensive understanding of the funding and financial position of the scheme. It is therefore appropriate to consider the level of State contribution necessary to provide the benefits payable from the scheme.

Since Q2000, it had been the Government's intention that the contribution levels to the Comprehensive Accumulation Category and the Standard Defined Benefit Category were equivalent and this approach has been used for all prior Reviews. However, subsequent to the decision by the Treasurer to suspend the investment of employer contributions in the 2015-16 Budget, the contribution rate nexus no longer applies. The resulting variation in contribution rates is consistent with actuarial practice in defined benefit schemes generally and will provide more flexibility in managing the funding position of the scheme. In view of the limited effectiveness of variation in employer contribution levels to affect the funding of the scheme (due to the maturity of the membership), I have also considered whether any surplus repatriation is appropriate in order to manage the funding position of the Scheme.

Similar to previous Reviews, in recognition of the small size of the other defined benefit liabilities (State, Police and Parliamentary categories), the existing contribution levels to these plans have been assumed to be consistent with the corresponding component of the Defined Benefit Category where relevant, with the Parliamentary scheme contribution level maintained at the level recommended at its last direct assessment in 2005, noting the triviality of the Parliamentary liabilities within the Defined Benefit Categories as a whole, subject to any scheme-wide suspensions of contribution investment.

An additional requirement of this investigation is to recommend a methodology to determine the last minute contributions to be made from the Employer Fund to the QSuper fund to meet the State's share of the defined benefit payments. This is discussed in Section 6.5.

5.2 Funding and Actuarial Assumptions

Funding is the making of advance provision to meet the cost of accruing benefits. This provides a degree of security for members' benefits and also spreads the cost of providing these benefits over their membership. This setting aside of contributions as benefits accrue is what differentiates between funded and unfunded superannuation schemes. Whilst QSuper is technically an unfunded superannuation scheme, the funding arrangements and the assets maintained in the Employer Fund mean that, for the purposes of actuarial review, it can be regarded as a funded scheme.

It is important to note that the *cost* of the defined benefit scheme is the amount of benefit payments, administration expenses and taxation; i.e. the liabilities listed in the balance sheets shown in Section 6.1. The funding of the scheme is intended to meet these costs in a smooth and equitable manner over time but does not affect the cost of the scheme. Consequently, employer contributions and surplus repatriations are simply two sides of the same coin, linked by the fact that higher repatriations at any point in time increase the likelihood of greater contributions in future; i.e. there is an effective trade-off between them with the material difference being one of timing.

The actuarial review process continually re-evaluates the progress of the scheme funding and makes adjustment over time to target the liabilities. In theory, the intent is to ensure that there is exactly the right amount to pay the last benefit liability of the fund after the last member exits. In practice of course, scheme experience (particularly investment returns) varies from expectation and so surpluses or deficits emerge. Just as adjustments need to be made to react to deficits, it is also appropriate to react to large surpluses, which effectively represent an over contribution in hindsight; i.e. they represent an intergenerational transfer.

In order to place a value on a defined benefit superannuation scheme's liabilities and to determine the contribution rates likely to meet the cost of benefits, it is necessary to make certain actuarial assumptions regarding the future experience of the scheme. These assumptions are based not only on the past experience of the scheme but also, inter alia, on views regarding the likely future values of economic factors such as the rate of investment return and salary inflation. Whilst each assumption should be reasonable in its own right, it is important to consider the actuarial basis as a whole as variations in one or more assumptions are often counterbalanced by consequent changes in other aspects of the basis.

In this Review, I have also considered liabilities derived in accordance with the relevant accounting standard within the Government's financial statements; viz. AASB 119. It requires that liabilities and expenses for certain employee entitlements (defined benefit superannuation, long service leave) be measured using actuarial techniques which incorporate specific assumptions regarding the discount rate applicable to the liability, financial variables such as salary and benefit inflation, and demographic variables such as turnover and mortality which affect the timing and amount of benefit payments. Whilst all of these assumptions are important, the discount rate and financial assumptions have the most effect on the results, with these listed in Appendix C.

The AASB 119 net discount rate of 3.0% is well below the 6.0% assumed investment return that has been used to calculate the superannuation liability under the funding basis. For the purpose of determining a funding strategy for superannuation, it is common actuarial practice that the present value of the liability should be based on the long-term earnings rate likely to be achieved through the actual investment strategy. Given a strategic asset allocation for defined benefit assets that includes a material allocation to growth assets, it is expected that the long-term earnings rate will exceed the long-term bond rate.

Whilst the funding basis is commonly used as part of the budgeting process underlying contribution rate recommendations, as I noted in my previous Reviews, the AASB 119 liabilities can provide useful information in assessing the funding position of the scheme, as discussed in Section 6.6.

It is important to note that AASB 119 applies to the financial statements of the employer sponsor and does not apply to the superannuation scheme, or the Board. The accounting standard for superannuation schemes (AASB 1056) has recently been promulgated, materially changing the disclosure requirements for the scheme compared with the previous standard AAS 25. As expected in

the last Review, AASB 1056 requires liabilities to be calculated on a basis broadly consistent with AASB 119 and this has been confirmed with QSL.

The experience and assumptions employed in this Review are summarised in Appendices B and C respectively.

5.3 Valuation Method

The valuation method used in this Review is based on the aggregate funding method, although a considerable amount of flexibility is applied to the setting of contribution policy and surplus management.

The employer contribution would generally be expressed as a percentage of members' salaries. Whilst these contribution rates are provided in Table 29 and Table 30, it should be recognised that this Review has been undertaken on the basis that the suspension of the investment of employer contributions for five years announced by the Treasurer in the 2015-16 Budget will continue with investment recommencing in 2020-21. It should also be noted that the valuation also considers the level of contributions paid from the Employer Fund to the QSuper fund as part of the last minute funding arrangements.

5.4 Value of Assets

The value placed on the QSuper fund assets for this Review was the market value at 30 June 2015 from the QSuper audited financial statements, viz. $58,683 million. After allowing for the other membership Categories within QSuper, the notional assets held in respect of the Defined Benefit Categories was estimated to be $5,071 million.

The market value at the investigation date of the assets in the Employer Fund of $29,014 million was used where relevant to achieve an understanding of the total funding and financial position.

6 Investigation results

6.1 Investigation Balance Sheet

The results of the investigation in respect of existing members (including former members with preserved or pension entitlements) at the investigation date on a whole of scheme basis can be summarised in the balance sheet shown in Table 23.

Table 23 Overall Balance Sheet as at 30 June 2015[9]

	$ millions		
	Past Service	Future Service	Total Service
Value of Assets and Future Member Contributions			
Market Value of QSuper Fund Notional DB Assets	58,683	0	58,683
Market Value of Employer Fund Assets	29,014	0	29,014
Member Contributions	0	1,580	1,580
Employer Contributions at Current Rates after 2019-20	0	2,048	2,048
Total Value of Assets (A)	**87,697**	**3,628**	**91,325**
Value of Benefits, Tax & Expenses			
Active Defined Benefit Members	17,227	5,723	22,950
Current and Contingent Pensioners	1,155	0	1,155
Former Defined Benefit Members	2,433	0	2,433
Accumulation Benefits	39,539	0	39,539
Account Based Pensions	12,934	0	12,934
Disability Income Benefit	16	196	212
Surcharge Provision	(53)	0	(53)
Expenses	574	179	753
Reserves	1,161	0	1,161
Value of Net Contributions Tax	2,654	735	3,390
Total Value of Benefits, Expenses & Tax (B)	**77,642**	**6,833**	**84,475**
Surplus / (Deficit) (A) - (B)	**10,055**	**(3,204)**	**6,850**

The balance sheet has been constructed on the basis that, subsequent to the cessation of the suspension period, invested future employer contributions will be consistent with the rates recommended at the 2013 Review. This is not well defined for the Standard Defined Benefit Category because the amount is dependent upon each member's contribution rate and part-time status. It has been assumed for this purpose that the average member contribution rate and part-time ratio will remain constant for each of the main membership groups, viz. Standard Males, Standard Females and Police.

All reserves held in respect of accumulation categories have been included as an accrued liability in the balance sheet. It will also be noted that future service liabilities have not been incorporated into the

[9] Reserves include the accumulated premiums in respect of the capital guarantee provided to members of the closed VPP option within the Accumulation Category.

balance sheet in respect of accumulation categories. As these categories are fully funded, these liabilities would be exactly offset by corresponding assets resulting from future employer and member contributions and so the net financial position of the scheme is unaffected.

The balance sheet shown in Table 23 incorporates all of the sub-funds within QSuper. This Review is substantially concerned with the defined benefit components of the scheme and so I have recast the balance sheet with all non-defined benefit assets and liabilities removed, as shown in Table 24.

Table 24 Defined Benefit Balance Sheet as at 30 June 2015 – Funding Basis

	$ millions		
	Past Service	Future Service	Total Service
Value of Assets and Future Member Contributions			
Market Value of QSuper Fund Notional DB Assets	5,071	0	5,071
Market Value of Employer Fund Assets	29,014	0	29,014
Member Contributions	0	1,580	1,580
Employer Contributions at Current Rates after 2019-20	0	2,048	2,048
Total Value of Assets (A)	**34,085**	**3,628**	**37,713**
Value of Benefits, Tax & Expenses			
Active Defined Benefit Members	17,227	5,723	22,950
Current and Contingent Pensioners	1,155	0	1,155
Former Defined Benefit Members	2,433	0	2,433
Disability Income Benefit	16	196	212
Surcharge Provision	(29)	0	(29)
Expenses	574	179	753
Value of Net Contributions Tax	2,654	735	3,390
Total Value of Benefits, Expenses & Tax (B)	**24,030**	**6,833**	**30,863**
Surplus / (Deficit) (A) - (B)	**10,055**	**(3,204)**	**6,850**

Table 24 shows that, on the assumptions underlying the funding basis, the defined benefit scheme is in a very healthy financial position. The employer contribution suspension only took effect from 1 July 2015 and therefore has not affected the accrued component of the balance sheet at the valuation date. It will be noted that this position differs from that demonstrated in the Interim Report due to the updated assumptions underlying this Review as well as being based on the final version of the membership data.

In order to gain a more comprehensive understanding of the financial position of the scheme, it is also important to consider the corresponding balance sheet derived in accordance with the accounting basis used in the Government's financial statements, as shown in Table 25.

Table 25 Defined Benefit Balance Sheet as at 30 June 2015 – Accounting Basis

	$ millions		
	Past Service	Future Service	Total Service
Value of Assets and Future Member Contributions			
Market Value of QSuper Fund Notional DB Assets	5,071	0	5,071
Market Value of Employer Fund Assets	29,014	0	29,014
Member Contributions	0	1,906	1,906
Employer Contributions at Current Rates after 2019-20	0	2,772	2,772
Total Value of Assets (A)	**34,085**	**4,678**	**38,763**
Value of Benefits, Tax & Expenses			
Active Defined Benefit Members	21,823	8,396	30,218
Current and Contingent Pensioners	1,661	0	1,661
Former Defined Benefit Members	2,871	0	2,871
Disability Income Benefit	16	238	254
Surcharge Provision	(29)	0	(29)
Expenses	727	257	984
Value of Net Contributions Tax	3,581	1,137	4,718
Total Value of Benefits, Expenses & Tax (B)	**30,650**	**10,027**	**40,677**
Surplus / (Deficit) (A) - (B)	**3,435**	**(5,349)**	**(1,914)**

Similarly to the funding basis, the balance sheet shown in Table 25 is different to that underlying the figures disclosed in the Interim Report and the Government's financial statements as at 30 June 2015. This reflects the updated final membership data and the new decrement and other assumptions underlying this Review, noting that the financial assumptions in the accounting basis are undisturbed.

The difference in the surplus positions between the funding and accounting bases is effectively the present value of the risk premia expected to be earned from the asset allocation over the remaining time until the defined benefit liabilities are eventually extinguished. Whilst these returns are based on reasonable expectations, they are of course not available until earned. In the usual context where contribution rates are the key mechanism for defined benefit funding management, they can be considered as a budgeting estimate, which are adjusted as investment returns and other aspects of scheme experience emerge over time.

The accounting basis can be considered to provide a view of the solvency position of the scheme in that it does not require the sponsor and therefore future generations of taxpayers to guarantee investment returns above risk-free rates. The extent of intergenerational risk transfer is linked to the strategic investment strategy for the assets, which is selected by the Board and Government, taking into account their collective risk preferences. Putting aside the conceptual differences between the two bases, it is important to recognise the practical reality that the Government is required to include the accounting liabilities within its overall balance sheet. Consequently, whilst the accounting view does not drive recommendations of contribution rates, it can provide useful context when considering funding recommendations.

As noted in Section 2.3.1, the Government has a legislative obligation to fund the defined benefit liabilities over and above the assets held within the QSuper fund. The difference between the economic value of the defined benefit liabilities (as proxied by the accounting value) and the assets held in the QSuper fund in respect of the defined benefit members can be considered as an estimate

of the value of the Government's statutory guarantee. At the valuation date, the value of the Government guarantee in respect of accrued service was $25.60 billion.

The deficit in respect of future service when contributions are made at the current rates under either basis is indicative that the value of future accruals is greater than the existing employer contribution rates. This shortfall is not problematic in itself and is taken into account with the accrued and projected surplus positions when considering the recommendations of this Review. It will also be noted that the effect of the suspension of employer contribution investment is demonstrated in the larger future service deficits than observed in previous Reviews.

6.2 Cash Flow Profile

The expected cash flows underlying the liabilities shown in Table 23 and Table 24 are shown in Figure 2. Only the first forty years have been shown.

Figure 2 Projected Benefit Cash Flows

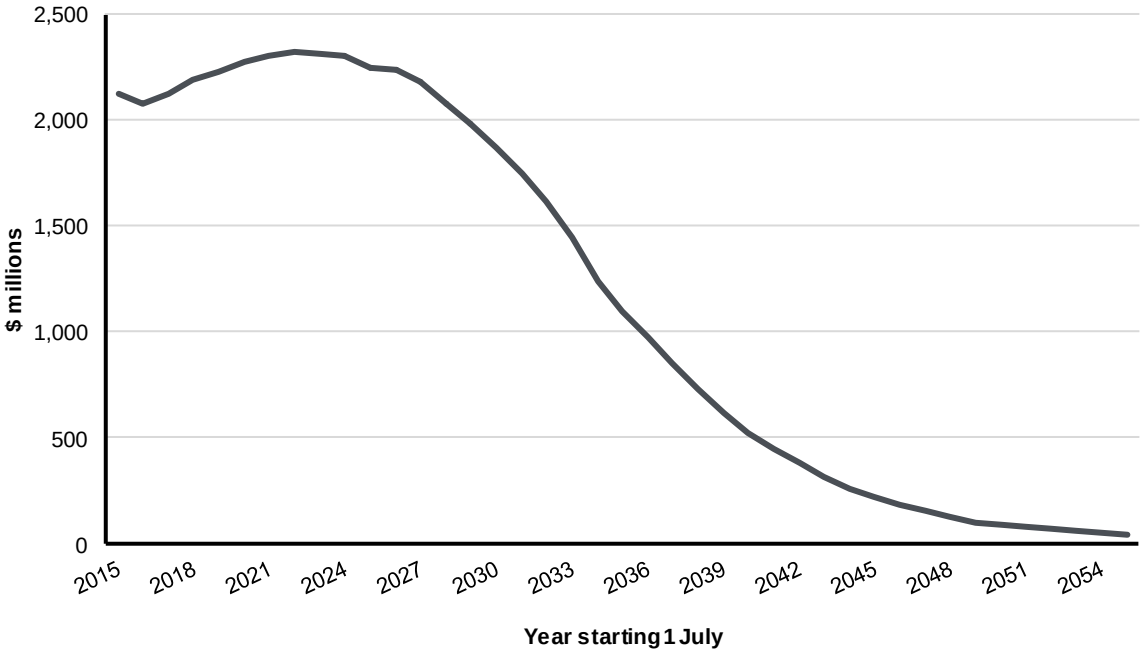


Figure 2 demonstrates that annual cash flows will remain high for some years with expected annual benefit payments over $1 billion for over twenty years and consequently that the effective "life" of the defined benefit scheme is still quite long.

6.3 Sensitivity of Investigation Results

The balance sheets shown in Table 23 and Table 24 are based on the actuarial assumptions listed in Appendix C without any loading to allow for possible adverse experience. Before determining the final recommendations, it is important to consider the effect of departures from the actuarial assumptions.

Table 26 illustrates the alternative scenarios considered and their effects on the liabilities. It is important to note that the scenarios shown are not considered equally likely nor do they reflect any particular percentile of the distributions of possible scheme experience, especially any lower or upper bound. They are simply shown to demonstrate the sensitivity of the valuation results to the various assumptions, expressed both as an increase in the past service liabilities and as a percentage of the future salaries for liabilities relating to service after the investigation date.

Table 26 Sensitivity of Investigation Results on Past and Future Service Liabilities

Scenario	Description	Increase in Past Service Liability ($ m)	Additional Future Service Cost (% of salaries)
1	1% Lower "Gap"	1,788	1.28%
2	Retirement Rates - 50% Higher Than Assumed	480	0.30%
3	Involuntary Termination Rates - 50% Higher Than Assumed	43	0.03%
4	Resignation Rates - 50% Lower Than Assumed	-109	-0.08%
5	Transition to Retirement Rates - 100% Higher Than Assumed	79	0.09%
6	Administration Expenses - 50% Higher Than Assumed	333	0.31%
7	Promotional Salary Scale - 10% Higher Than Assumed	37	0.02%

The first scenario refers to a reduction in the “gap” between the assumed rate of salary inflation and the discount rate used to derive the present value of projected future cash flows. This is a critical assumption within any actuarial investigation and it is important to understand the effect of changes in this parameter, recognising that the balance sheet derived on the accounting basis illustrates the component of the “gap” reflecting risk premia.

The next two scenarios increase by 50% the assumed rates of leaving work due to age retirement and involuntary termination. This illustrates the potential effect of people leaving at greater rates than assumed. Scenario four quantifies the effect of resignation rates being lower than assumed in this Review. This illustrates the potential effect of people staying in service longer.

One of the incentives offered by the Commonwealth Government to retain older workers has been the ability to commence drawdown of superannuation benefits whilst still working (Transition to Retirement or TtR pensions). Scenario five doubles the TtR rates assumed in this Review to ascertain the effect of potential variations.

The recent rises in Administration Expenses have necessitated an increase in the assumed levels going forward. I have therefore considered the effects of a further 50% rise on the valuation balance sheet.

Finally, the sensitivity to the assumed level of promotional salary increases has been considered. Since the flow of new entrants to the Standard Defined Benefit Category slowed materially in 2000 and then ceased in 2008, the estimation of salary growth due to promotional growth has become problematic (see Section B.3). However, as the membership has subsequently “aged”, this

assumption is becoming less important, as demonstrated by the limited sensitivity of the liabilities shown in Table 26.

In summary, the cost of benefits for current active members is not very sensitive to the assumptions regarding disablement, involuntary termination, resignation, TtR and the promotional scale and somewhat sensitive to the assumptions regarding age retirement and administration expenses. However the cost of benefits is extremely sensitive to the gap between investment returns and salary inflation. These sensitivities need to be borne in mind when considering the funding level of the scheme (see Sections 6.6 and 6.7).

6.4 Superannuation Guarantee

The Superannuation Guarantee (Administration) Act (1992) (SG Act) requires that, from 1 July 1992, employers contribute a specified minimum percentage of salary to a complying superannuation scheme on behalf of each employee. This payment must be fully vested (i.e. available to the employee unconditionally) and preserved in the scheme until the person meets a condition of release.

The rate of employer contribution currently exceeds that required by the SG Act at all member contribution levels for a comparable salary definition. However, the SG Act was changed so that the effective salary definition from 1 July 2008 for SG purposes is Ordinary Time Earnings (OTE) and in addition the SG rates have been legislated to increase over time to 12%. It should be noted that the progression in minimum contribution levels has changed since the 2013 Review, with the rate remaining at 9.5% until 2021 before increasing gradually to 12% by 2025.

The Deed was amended so that if the contribution paid on behalf of a member in a pay period after 1 July 2008 is less than the notional employer contribution rate (currently 9.5%) applied to OTE, the difference is paid by the employer into the member's accumulation account. However, for those QSuper members employed in core government agencies, this test applied from 1 July 2006. In a sense this top-up contribution can be considered as a pre-payment of any potential additional benefits that would have otherwise been payable as a result of the comparison of standard QSuper benefits with the SG equivalent minimum requisite benefit and the SG Certificate reflects this.

Given this approach, and the relatively high level of benefit accrual within QSuper for most members, the possibility of further additional benefit payments over and above the standard benefits plus the accumulated top-up contributions is relatively remote. The possible circumstances where such payments might be required have been analysed and a combination of the following attributes are required:

- OTE materially greater than superannuable salary;
- Low member contribution rate;
- Long membership (equivalently young age at entry, below age 30) and/or late retirement);
- Recent entry (noting that the plan was closed to new entrants in November 2008); and
- High investment returns over long periods

Whilst these situations are very unlikely to occur in respect of the current membership, they are not impossible and in addition, the level of the top-ups is asymmetrically related to a number of the parameters listed above. Consequently, I have modelled the potential additional top-ups using a Monte Carlo simulation, with the existing membership used to calibrate the potential parameter space

and investment returns assumed to follow a normal distribution with mean 6% (i.e. the funding basis discount rate) and standard deviation 7% divided by the square root of the projection period. The expected present value of additional top-up payments relative to the present value of Standard Defined Benefit entitlements has been estimated to be 0.10%, including a margin for model uncertainty. This amount has been included in the balance sheets shown above within the liabilities relating to active Standard Defined Benefit Category members. This assumption is lower than the 0.15% assumed in the previous Review, primarily as a result of the lower progression of SG rates and the lower investment return assumed at this Review.

Similar issues apply to the State and Police Categories although even less commonly, except for situations where a resigning member does not choose the preserved benefit. As it has been assumed that all such members choose that benefit, in line with the experience of the scheme, and considering the relatively minor component of the overall liabilities, no further explicit allowance has been made for these Categories. There are no additional payments expected in respect of the Parliamentary Category.

6.5 Employer Fund Share of Defined Benefit Payments

The Deed was amended in February 2011 such that contributions payable to meet the State's share of defined benefits not provided by the QSuper fund assets are decided by the Board on the advice of the Actuary. This amendment generalised the funding provisions and removed the specific provisions that previously applied to each of the defined benefit categories.

For a number of years all payments to pensioners have been met from the QSuper fund with no last minute contribution drawn from the Employer Fund in respect of them and I recommend that this arrangement continue. All benefits in respect of accumulation categories are also fully met from the QSuper fund following the asset reallocation described in Section 2.9 of the 2013 Valuation Report.

The Deed further requires that all income protection benefits in respect of defined benefit members be fully met by the State.

Other than pension and accumulation benefits (fully met from the QSuper fund) and defined benefit income protection benefits (fully met by the State), I recommend that as from 1 July 2016, transfers from the Employer Fund equal to 95% of defined benefit payments (whether paid directly to a member or to an accumulation category) be made as last minute contributions by the State. This proportion is slightly lower than the 96% recommended at the last Review, primarily on account of the strong investment return achieved within the defined benefit component of QSuper, offset by changes in the valuation basis.

It should be noted that defined benefit member voluntary contributions are excluded as they are funded within the accumulation assets and that the CF proportion includes an allowance for contributions tax and hence there should be no grossing up of the amounts to be transferred. "Defined benefit payments" for this purpose explicitly include:

- Preserved benefits in respect of State/Police members on transfer to an accumulation category
- Member balances transferred to an accumulation account in respect of DB category members who resign before age 55
- DRB benefits transferred to an accumulation category as a result of a conversion to an ILO, death or TPD or reaching age 55

New pensions that commence payment upon an active member's exit should be fully funded at emergence since all payments made to pensioners are to be met from the QSuper fund with no last minute contribution in respect of them. A contribution from the Employer Fund equal to 95% of the estimated present value at the commencement of each new pension (derived as shown in Appendix D) should therefore also be made.

If the actuarial assumptions are realised, then last minute State contributions as described above will fund the balance of all defined benefit liabilities (including those that arise in respect of service after the investigation date) not met from the current QSuper fund assets and future member contributions.

It should be noted that the defined benefit liabilities include contributions tax and expenses in addition to benefit payments to which the recommended proportion is applied. The proportion to apply to those benefits not *fully* met from either the QSuper fund or the State will continue to be recalculated as part of each future triennial actuarial valuation. In addition, whilst the change in Employer Fund share does not occur until 1 July **2016**, I have not made any adjustment to the balance sheet to reflect that timing, given its triviality.

6.6 Level of Surplus

As discussed in Section 6.1, the surplus position of the defined benefit plan depends critically on the assumptions used to calculate the present value of benefit payments. On the funding basis, used in this and past Reviews to assess the level of required contributions on the assumption that investment risk premia are achieved, the plan has an accrued surplus of $10.05 billion and an overall actuarial surplus (allowing for future State contributions at the current rates) of $6.85 billion, or 20% of defined benefit assets.

On the accounting basis used within the Government's financial statements, the picture is quite different, with an accrued surplus of $3.43 billion and an actuarial deficit of $1.91 billion. This position compares extremely favourably with other Australian Governments and I note that there is no requirement or practice within Australia to fund defined benefit schemes to the levels indicated by the accounting basis.

In the previous Review, a relatively large funding surplus was retained on the basis that:

- the surplus would provide a buffer against adverse investment returns;
- consistency with the contribution rates in the Accumulation plan would be maintained;
- stability in budgeted contribution rates for employers is beneficial; and
- the more stringent solvency position recognised in the Government's financial statements showed an actuarial deficit at the valuation date, although that was expected to be broadly offset by subsequent strong investment returns.

In view of the Treasurer's decision to suspend the investment of employer contributions for five years from 30 June 2015, the second and third of these reasons no longer apply, in the sense that employer contributions are no longer made to the Employer Fund. The funding surplus is now sufficiently large that it is reasonable to consider whether it remains appropriate to retain it or whether further adjustment to the funding of the scheme should be undertaken. The obvious options available to the Treasurer are an extension of the suspension of contribution investment or a repatriation of a portion of the surplus, recognising the need to target full funding of defined benefit liabilities in accordance with the Government's stated intention.

Whilst the extension of the contribution suspension provides a more flexible approach as it is easier to adjust for any adverse future experience (particularly investment returns), the maturity of the scheme membership means that future contributions are relatively small and so extension of the suspension does not have much effect on scheme funding. Consequently, I have considered the levels of retained surplus necessary to provide a reasonable buffer against adverse experience as well as the expected funding levels over the next several years.

As a baseline, the projected assets and liabilities of the defined benefit scheme over the next five years are shown in Figure 3. The accounting basis liabilities are based on Queensland Treasury's forecasts of discount rates from the 2015-16 Budget, as shown in Table 27, whilst assets are projected to provide a return consistent with the funding basis discount rate of 6.0% p.a., after fees and taxes. Whilst I recognise that these forecasts may not indeed eventuate and there will be differing views as to their accuracy, as there always is with forecasts of this nature, it is important to recognise that this comparison is only one component of the overall analysis used to inform the expected surplus levels within the scheme.

Figure 3 Historical and Projected Defined Benefit Assets and Liabilities ($m) - Baseline

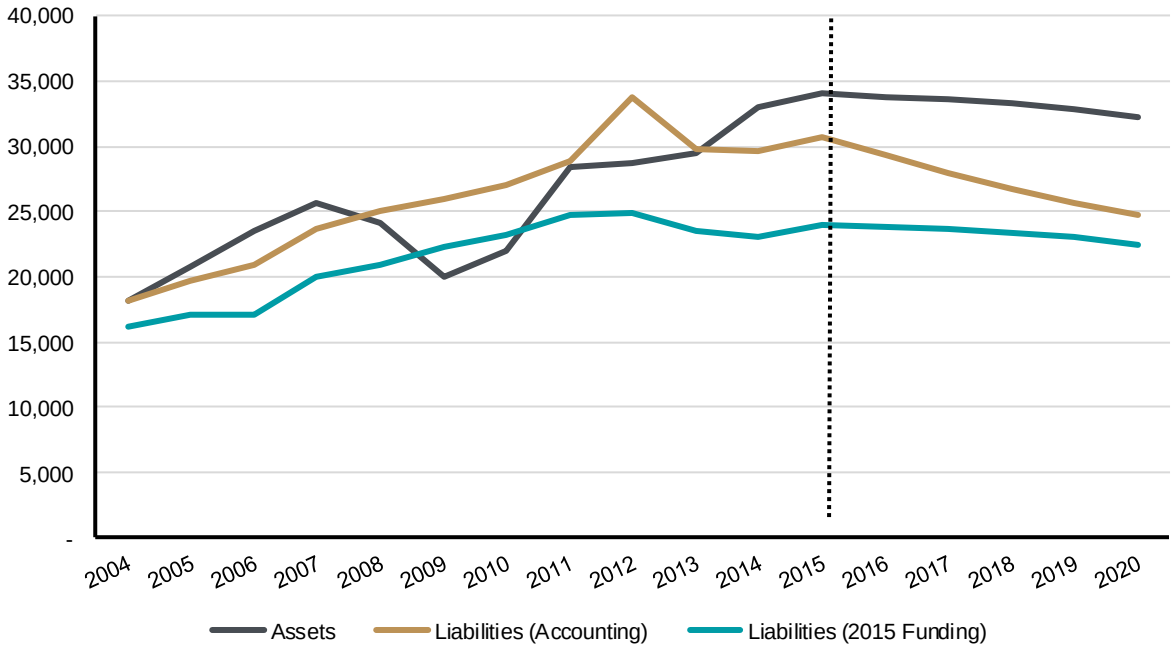


Table 27 Forecast Gross Discount Rates from 2015-16 Budget

As at 30 June	Gross Discount Rate
2015	3.10%
2016	3.45%
2017	3.85%
2018	4.20%
2019	4.45%
2020	4.60%

Figure 3 indicates that, based on the assumptions described above, the accounting surplus is expected to grow and the funding basis surplus is expected to be maintained over the next several years, even allowing for the suspension of employer contribution investment. Importantly, Figure 3

also demonstrates that the liabilities are expected to have peaked in dollar terms at the valuation date. This is consistent with the reducing duration of the liabilities as the membership ages and the liabilities begin to run down.

So, the baseline projections of the funding position of the defined benefit scheme suggest that the overall funding position is expected to improve from the already extremely strong position shown in this Review. This suggests that there is scope to repatriate some part of the surplus whilst still maintaining a reasonable buffer to protect the funding position against adverse experience. Also relevant here is the likelihood of subdued salary growth over the short to medium term, potentially further reducing the liabilities relative to that shown above.

In order to determine the "right" level of surplus repatriation, QIC has undertaken some stochastic modelling of the funding position, so that I can assess the distribution of potential outcomes and allow for more extreme positions than the baseline projection shown above. These models incorporate QIC's assessment of asset class returns, volatility and correlation, as well as realised inflation and prospective inflation and interest rates. They are based on expectations applying from the end of January 2016 and so have taken account of the return and interest rate movements from the valuation date until that time.

QIC's median net return for the five year period of 5.4% is lower than the 6.0% p.a. assumed in the Baseline projection shown in Figure 3, mainly as a result of the relatively low expectations for 2015-16, incorporating the low return year to date. Subsequent to 2015-16, the annual returns are more consistent with the strategic returns assumed by QIC (see Section B.2.1). The cumulative implied CPI and salary inflation median outcomes from the QIC models are 2.4% p.a. and 3.5% p.a. respectively, demonstrating reasonable consistency with the deterministic assumptions underlying this valuation.

In addition, QIC's models produce discount rates different to those used by Treasury within the Budget process. However, it should be noted that the Treasury projections were undertaken in around June 2015, whilst the QIC models are based on market conditions at the end of January 2016. During the intervening period, interest rates have remained subdued and so it is not surprising that QIC's models are implicitly projecting lower discount rates than the Baseline. To assist in reconciling the two approaches, I have added the corresponding figures from the Baseline deterministic projection shown in Figure 3 to Figure 4 to Figure 7 below.

Before considering the distributions of potential outcomes for the funding position of the scheme it is worth noting the uncertainties implicit within QIC's models, or any such asset-liability models for that matter. These models reflect reasonable expectations as to future returns and volatility but they are subject to specification and calibration errors and cannot be expected to demonstrate the entire range of possible outcomes; i.e. **it is certainly possible for outcomes outside the distributions shown to occur in practice**. Whilst they provide useful input for decisions regarding funding strategies, it is important for all stakeholders to recognise that the **modelled outcomes are not subject to any guarantees**.

It is also worth commenting on the forecast horizon over which to assess these projections. I have chosen five years, reflecting a reasonable period to allow for the models to perform at their best[10] as well as a medium term horizon for decision making that is not overly reactive to short term issues.

[10] The economic and other relationships underlying QIC's models are more reflective of medium term outcomes and so the projected outcomes are more meaningful over 3-5 years than in the shorter term.

Longer periods would be subject to one of the major risks with such models where mean reversion assumptions tend to underestimate the "tail" of return distributions, particularly on the downside.

The distribution of potential outcomes for the funding position (i.e. the relativity of total defined benefit assets to the accrued liabilities on the relevant basis) over the next five years for both the funding and accounting bases are shown in Figure 4 and Figure 5, respectively. Each line represents a percentile of the distribution of possible outcomes. For example, the line labelled "50%" represents the median outcome with a 50% chance of a higher outcome and 50% chance of lower. The line labelled "5% represents the fifth percentile, the amount where there is a 5% or 1 in 20 chance of a lower outcome.

Figure 4 Projected Funding Position (%) – Funding Basis

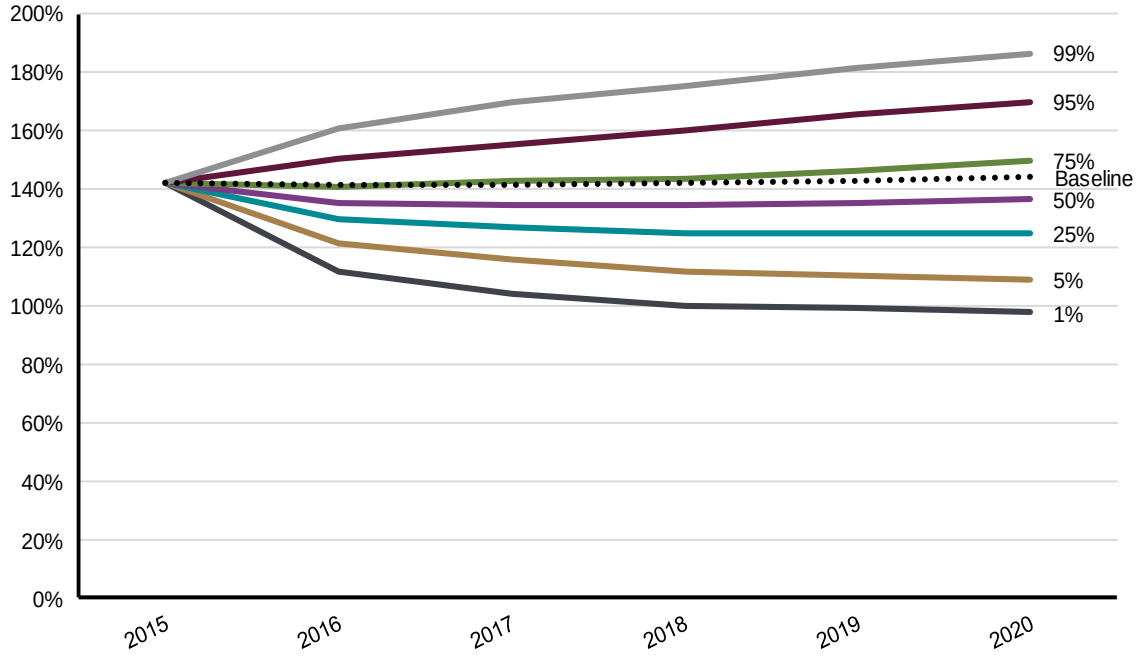
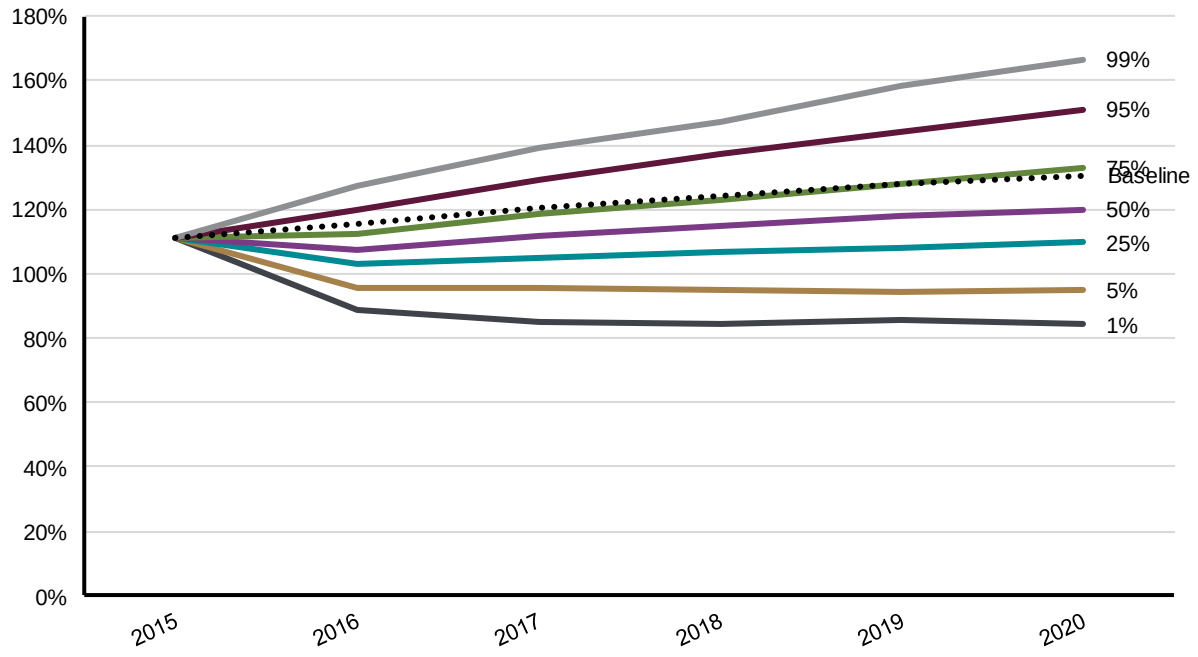


Figure 5 Projected Funding Position (%) – Accounting Basis



On the funding basis (with fixed financial assumptions), the Baseline projection is above the median projection. This is consistent with the fact that the implied cumulative returns within QIC's model over 2015-2020 are a little below the deterministic assumption of 6.0% used in the funding basis. This is substantially due to the lower return expectations for 2015-16, as noted in Section 2.10.

These charts demonstrate the volatility in the funding position with a 9 in 10 chance that it will be between 109% and 170% on the funding basis, a range of 61%. Even over one year, the corresponding range is 29%. In view of the fact that the funding basis projections are based on fixed discount rates and prospective inflation assumptions, that volatility is substantially related to investment risk. The smaller corresponding range for the accounting basis (56%) reflects the correlations between the assets (particularly the hedging component of the portfolio) and the interest rates used to determine the discount rates underlying the accounting liability.

Figure 4 indicates that the funding position is so strong that there is a 2% chance that the scheme will be in deficit in five years. Even on the more stringent accounting basis, the projections suggest about a 1 in 8 chance of a deficit emerging. Prima facie these measures would indicate some scope for a surplus repatriation. To quantify such a repatriation, I have considered the corresponding charts measuring the present value of the projected surplus position on each basis, shown in Figure 6 and Figure 7. The present value has been obtained by discounting the projected surplus position using the return path that produced each potential simulated outcome. This means that the numbers can be interpreted as being measured in dollars as at the valuation date and also explains why the trends in these charts are lower than the corresponding percentage figures shown above.

Figure 6 Projected Funding Position ($ bn) – Funding Basis

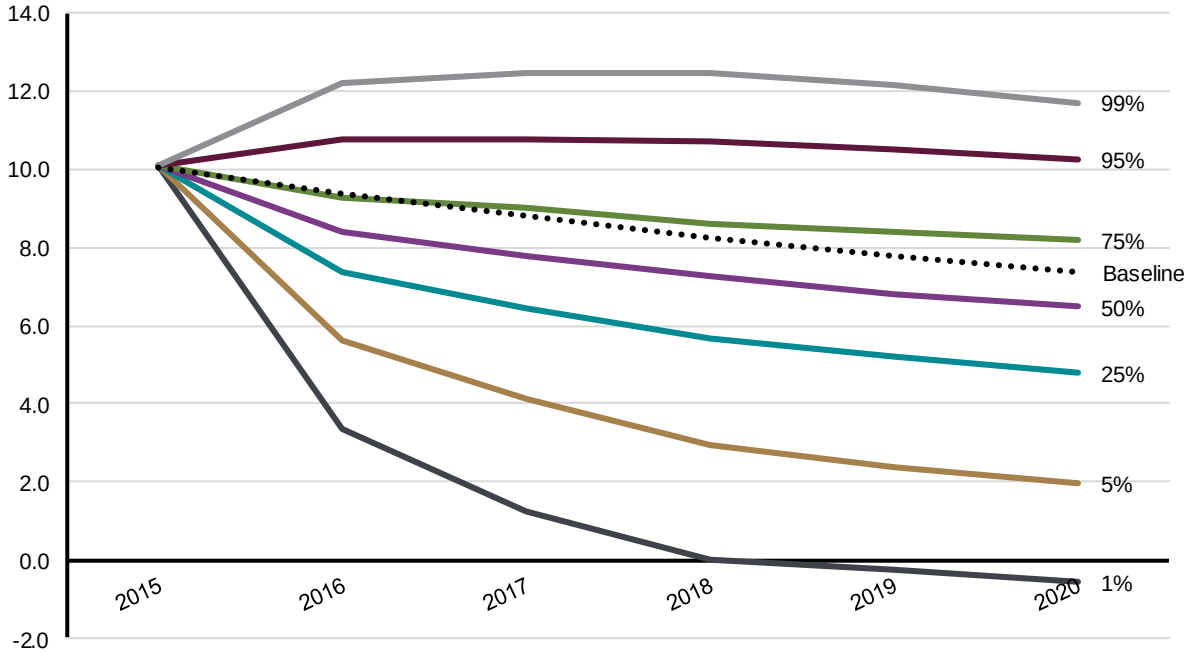
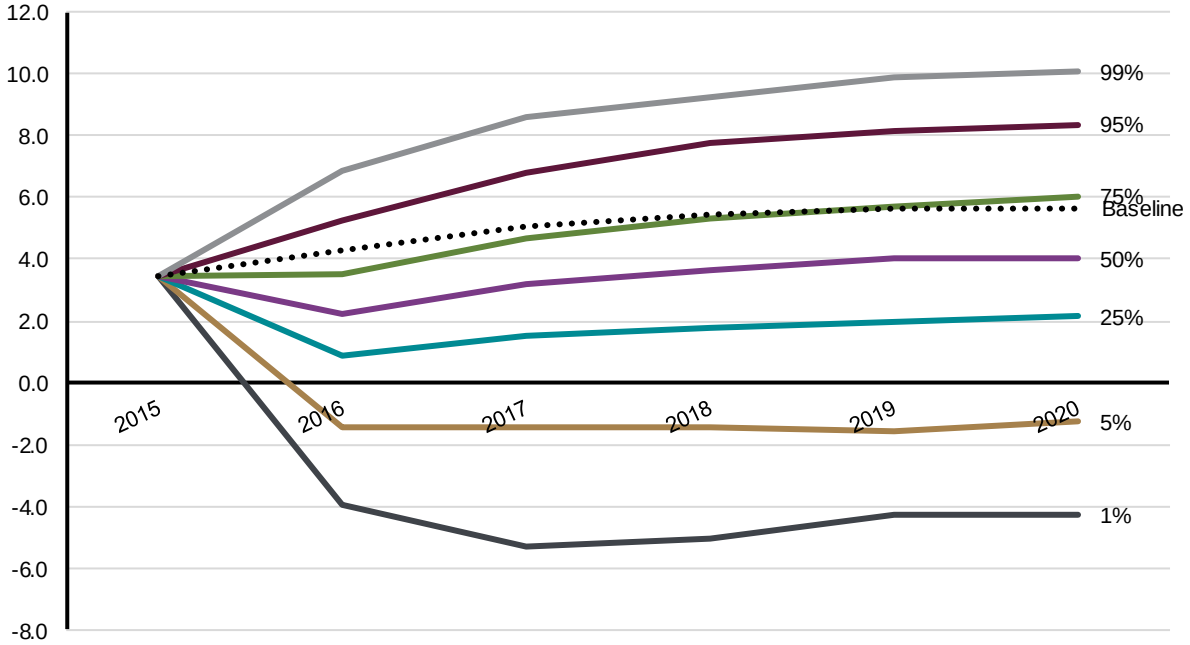


Figure 7 Projected Funding Position ($ bn) – Accounting Basis



As noted above, the accounting basis projections imply the deterministic baseline using the Treasury discount rates is somewhat optimistic compared to QIC's models, with the Baseline in the top quartile of simulated outcomes, higher than demonstrated on the funding basis.

Again the volatility of the potential outcomes is demonstrated with a 90% confidence interval width of $8.3 billion on the funding basis and $9.6 billion on the accounting basis. There is no one single "right" answer to the question of surplus repatriation as the future experience of the scheme (indeed any

defined benefit scheme) is uncertain, with **no guarantee of full funding even if no such repatriation occurs**. The decision is instead a matter of judgement taking into account all of the information shown above as well as the strength of the sponsor covenant to provide funding should future experience be sufficiently adverse. In the latter regard, the explicit guarantee within the Act and the Deed ensures that action can always be taken to repair scheme funding but it is important for the Government to recognise that the "quid pro quo" of surplus repatriation after positive scheme experience is the potential requirement to provide cash when outcomes are not favourable.

As discussed throughout this Report, the liabilities on both the funding and accounting bases have been considered, as both provide useful input to the assessment of scheme health. However, as noted in Section 5.2, common actuarial practice focusses (unsurprisingly) on the funding basis when determining the funding of the scheme. Whilst the accounting basis provides useful information, it is intended for a specific purpose unrelated to funding and so should not be overemphasised when considering the level of retained surplus.

Finally, it is important to note that the risks of fund deficiency fall upon the State, with the legislative guarantee protecting member entitlements and so the effects of a deficit on member security are insignificant compared to similar funds in the private sector. The recommended level of surplus retention is lower than it would otherwise be on this account.

A summary of the expected outcomes for various potential levels of surplus repatriation is shown in Table 28.

Table 28 Deficit Risks for Various Surplus Repatriation Options

Surplus Repatriation ($ bn)	Probability of Accrued Deficit at 30 June 2020	
	Funding Basis	Accounting Basis
4	19%	50%
3	12%	36%
2	5%	24%
1	3%	18%
0	2%	12%

Based on my assessment of the current and projected future funding position of the scheme, I believe that a **maximum surplus repatriation of $2.0 billion** represents an appropriate response to the high level of surplus, maintaining a reasonable capital buffer to protect the funding position against adverse experience. Based on QIC's asset models, this results in the following expected outcomes over the next five years:

- 5% probability of deficit on the funding basis; compared to 2% prior to the repatriation
- a 1 in 4 chance of an accrued deficit on the accounting basis, up from an estimated 1 in 8 prior to the repatriation.

It will be noted that, whilst the projected surplus figures derived above are technically measured in 2015 dollars, on the grounds of simplicity and recognising the low level of investment returns in the year to date, any adjustment of the surplus repatriation to the date of payment is unnecessary.

6.7 Recommended Contribution Rates

As noted in Section 5.1, this Review has been undertaken on the basis that the suspension of investment of employer contributions announced by the Treasurer in the 2015-16 Budget continues for five years, with investment to recommence thereafter. Those employer contribution rates for Standard and Police members of the Standard Defined Benefit Category and the Comprehensive Accumulation Category are shown in Table 29.

Table 29 Employer Contribution Rates - Defined Benefit and Comprehensive Accumulation Categories

Member Contribution Rate	Employer Contribution Rate	
	Standard	Police
2%	9.75%	-
3%	10.75%	12.0%
4%	11.75%	14.0%
5%	12.75%	16.0%
6%	-	18.0%

With regard to the other defined benefit categories, it has been assumed that the employer will contribute at the equivalent rate to the corresponding group in the Standard Defined Benefit Category as shown in Table 30. It will be noted that the Parliamentary Category does not have a corresponding group with the Defined Benefit Category and so its contribution level has been determined using the last direct assessment in 2005, noting the triviality of the Parliamentary liabilities within the Defined Benefit Categories as a whole.

Table 30 Employer Contribution Rates - State, Police and Parliamentary Categories[11]

Category	Employer Contribution Rate
State	4.75% of Salary + 1.00 x Member Contributions
Police	3.00% of Salary + 2.00 x Member Contributions
Parliamentary	5.00 x Member Contributions

[11] The employer contribution rates for the State and Police categories are equivalent to the contribution rates in respect of the relevant Defined Benefit Plan members less the 3% contribution to the Basic Accumulation Plan.

7 Factors affecting the accrued surplus

The last Review revealed a surplus of assets over accrued liabilities of $5,952 million as at 30 June 2013.

The balance sheets illustrated in Table 23 and Table 24 show an accrued surplus position of $10,055 million which is an increase of $4,103 million from that disclosed at the previous Review. The main sources of this change have been identified as follows:

- Asset Movements and Investment Returns

  The actual investment returns achieved over the last two years have been significantly higher than the levels assumed at the last Review. The surplus from asset movements and investment returns has been estimated to be $3,879 million.

- Accumulated Surplus

  The surplus at the last Review would have been expected to increase at the previous Review discount rate by approximately $862 million.

- Salary Inflation

  The growth in salaries since the last Review was lower than assumed in the 2013 valuation, resulting in a surplus of approximately $604 million.

- Changes in the Actuarial Basis

  The actuarial valuation basis has changed from that used in the 2013 Review, with the reasons for this discussed in detail in Appendix B. The basis changes have decreased the surplus by approximately $1,059 million.

- Cost of Accruals

  The deficit arising from the cost of accruals being greater than employer contributions over the inter-investigation period has been estimated to be $260 million.

8 Funding status

This section of the Report looks at the extent to which QSuper would be able to meet benefits accrued to date, without taking into account future contributions, by deriving various indices comparing assets with different benefit amounts. In order to allow a meaningful comparison to be made, the QSuper fund and the Employer Fund have been combined when determining the market value of assets for the purposes of calculating the various indices.

In addition, some of the indices have been projected for the ten years following the investigation date. These projections have assumed the employer contribution rates are maintained, subject to any investment suspension and that the valuation assumptions are exactly realised. In addition, the indices relating to active members only have been approximated using proportions observed at the valuation date. Whilst this adds to the uncertainty within the projections, the broad trends are still considered meaningful.

8.1 Vested Benefits

"Vested Benefits" are the benefits that would be payable had all members voluntarily resigned on the investigation date. Total vested benefits would usually be regarded as the bare minimum that should be covered by a scheme. Whilst paragraph 23 of SPS 160 does not apply to QSuper, the coverage of vested benefits is nevertheless an important indicator of a scheme's short term financial condition and so I have followed the spirit of SPS 160 in this regard. This relationship is usually expressed as an index defined as the ratio of assets to vested benefits, or VBI.

It is an interesting consequence of the benefit design of the Standard Defined Benefit Category that the vested benefit is generally greater than the present value of accrued liabilities and consequently, in the absence of an accrued surplus, the vested benefits would be expected to be greater than scheme assets. However, with a Government sponsor assured of perpetual existence and also given the funding arrangements of the scheme and statutory guarantee, a VBI of less than 100% does not necessarily require specific action.

The vested benefits have been calculated as the total of all resignation benefits or, for eligible members (including the accumulation categories), early retirement benefits that would have been payable to members at the investigation date plus the value of former members' preserved benefits and pensions in payment. In determining the value of resignation benefits in the Defined Benefit Category, deferred retirement benefits have been discounted in line with the funding basis. The value of the vested benefits has also been adjusted to reflect the contribution tax liability that would become payable if all members were to resign.

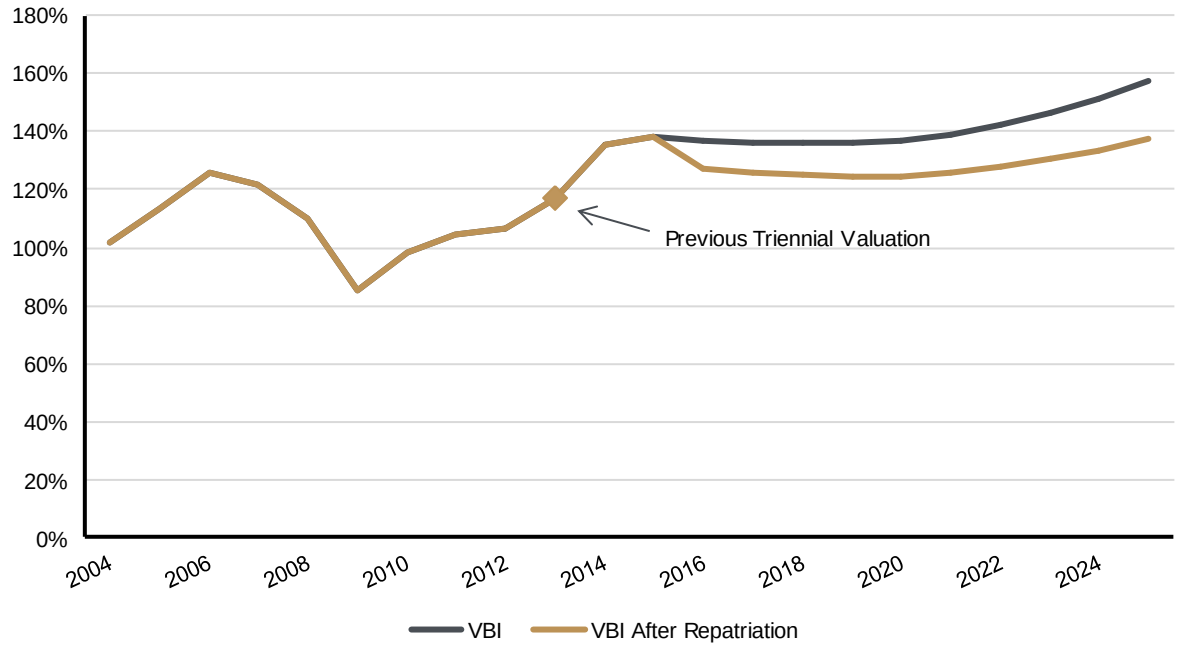
As at 30 June 2015, the value of the vested benefits was $80,385 million implying a total scheme VBI of 109.1%, including Accumulation and former members. In respect of **active defined benefit members only**, the VBI was 138.2%.

It is usual to look at the progress of the various indices from Review to Review. An increase in an index would generally indicate a strengthening of a scheme's financial position while a decrease would indicate a weakening. The VBI for active defined benefits members at the last Review was 117.1%. This improvement is due mainly to the strong investment returns achieved since the last Review, offset by changes in the valuation basis.

Figure 8 shows the vested benefits index for the last several years as well as its projection for the ten years following the investigation date. As noted above, the vested benefits depend on the actuarial valuation assumptions because the withdrawal benefit for defined benefit members is the deferred AWOTE linked retirement benefit. Consequently, the values over time aren't strictly comparable but the broad trends are still meaningful.

I have also included a possible alternative path demonstrating the effect of the recommended repatriation described in Section 6.6. This chart demonstrates that the vested benefits of active members are expected to remain adequately covered by the corresponding overall scheme assets for the next several years, at least on the basis of the assumptions made within the funding basis.

Figure 8 Historical and Projected Vested Benefits Index – Active Members – Funding Basis



8.2 Accrued Retirement Benefits

For the purpose of assessing the progress of a scheme towards funding the members' normal age retirement benefits it is useful to compare the value of the scheme's assets to the level of normal age retirement benefits accrued at the date of the investigation. This comparison gives the "Accrued Retirement Benefits Index" or ARBI. The ARBI excludes the assets and liabilities in respect of the accumulation categories, deferred benefits and pensioners.

The value of the accrued benefits has been determined as the member's retirement benefit based on the 1 July 2015 salary and service to the investigation date. The accrued retirement benefits have been adjusted to take into account the estimated accrued contributions tax liability.

The accrued retirement benefits are not benefits that are immediately payable. They are not liable to be paid until the member has reached retirement age. With a positive gap between the rate of investment income and salary inflation, the assets would grow at a faster rate than the accrued benefits and so the ratio of assets to accrued retirement benefits should increase over time. Hence, it

would be expected that the ARBI would generally be less than 100% during the active service of the collective membership.

The ARBI for active defined benefit members at the Review date was 132.9%, compared to the equivalent ARBI at the last Review of 110.4%. As the average age of the membership has grown since the last Review, the ARBI would have been expected to increase, other things being equal. However its strong growth is indicative of the improved funding position, caused substantially by the high investment returns since the last Review.

8.3 Discounted Accrued Retirement Benefits

To illustrate the effect of the gap between investment earnings and salary inflation, a further calculation was made in which the accrued benefit for each active member was discounted, for each year prior to age 55, by the gap between salary inflation and the discount rate assumed in the funding basis. The ratio of the assets to these “discounted accrued benefits” is another indicator of the degree to which members’ retirement benefits are funded. The “discounted accrued benefits” index at this valuation was 145.7%.

The equivalent index at the last Review was 124.5%. Its increase is further indication of the strengthening of QSuper’s funding position since the last Review, consistent with the other funding indices.

8.4 Actuarial Value of Accrued Benefits

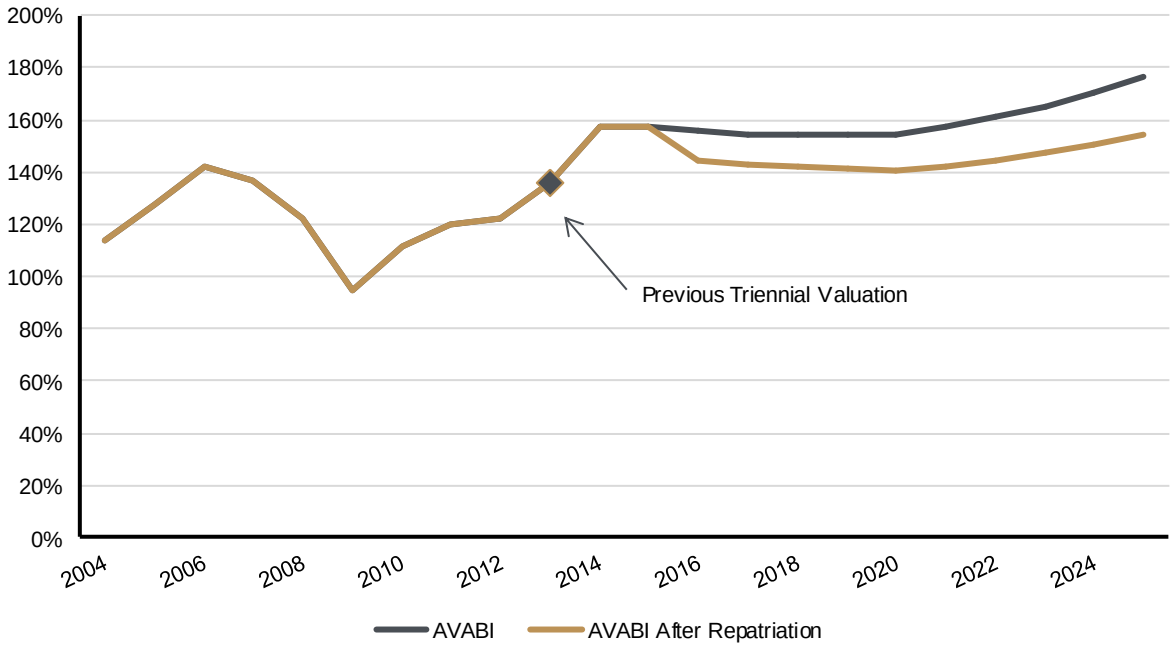
An additional funding indicator which takes into account the liability accrued from service prior to the investigation date for all types of benefit (i.e. not only age retirement) is the present value of accrued liabilities. The present value of accrued liabilities (including current pensions, preserved benefits and adjusted for accrued taxation liabilities) on the funding basis at the investigation date was $77,642 million, as shown in Table 23.

Another way of presenting this figure is in the form of an index defined similarly to those described above. As at the investigation date, the actuarial value of accrued benefits index (AVABI) for the total scheme was 113.0%. In respect of **active defined benefit members only** the AVABI was 157.4%.

The equivalent index in respect of active defined benefit members at the last Review was 135.8%. The increase in the actuarial value of the accrued benefits index is again indicative of the strengthening of the scheme’s financial position and is largely due to the high investment returns since the last Review. It should also be noted that the AVABI has been measured at the valuation date on the valuation basis described in this Report which, other things equal, has reduced the value of the index. This dependence on the valuation basis, particularly the financial assumptions, means that the levels of the AVABI over time are not strictly comparable, however the broad trends can still be meaningful.

The historical and projected AVABI for the ten years following the investigation date is shown in Figure 9. I have also included a possible alternative path demonstrating the effect of the recommended repatriation described in Section 6.6. This chart demonstrates that, on the basis of the assumptions made within this Review, the funding position in respect of active members is expected to remain strong for the next several years, even after the recommended surplus repatriation.

Figure 9 Historical and Projected Actuarial Value of Accrued Benefits Index – Active Members – Funding Basis



Given that, as noted above, the VBI and AVABI depend on the financial assumptions underlying the basis, I have also included the corresponding charts on the accounting basis, noting that these calculations were not undertaken in previous Reviews, in Figure 10 and Figure 11.

Figure 10 Projected Vested Benefit Index – Active Members – Accounting Basis

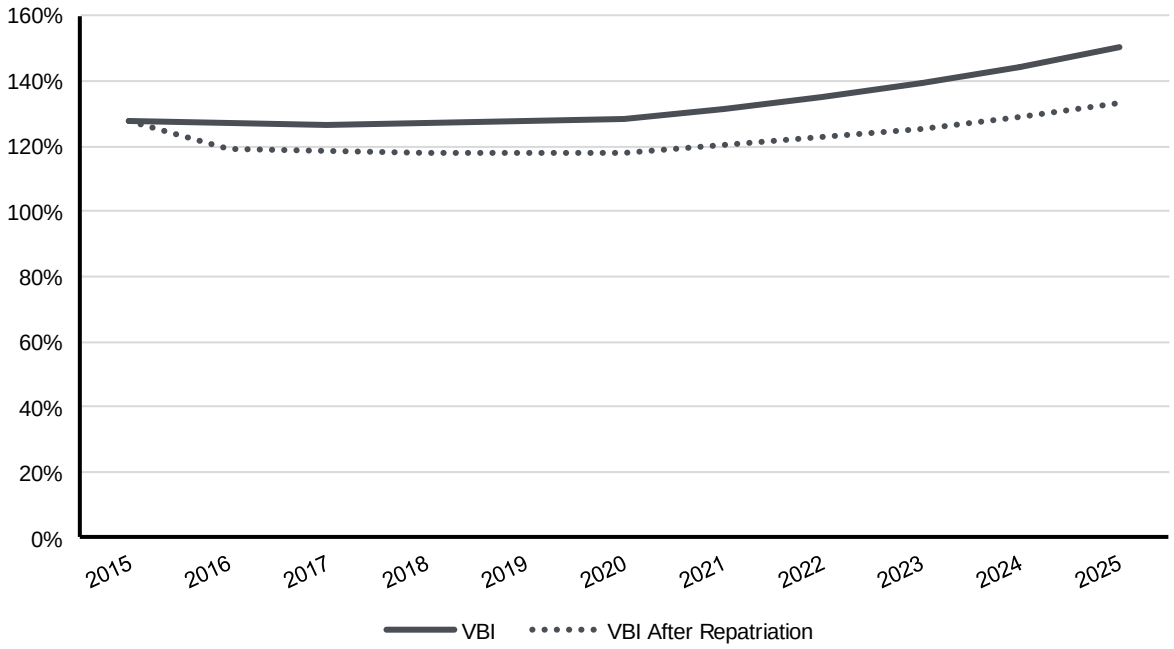
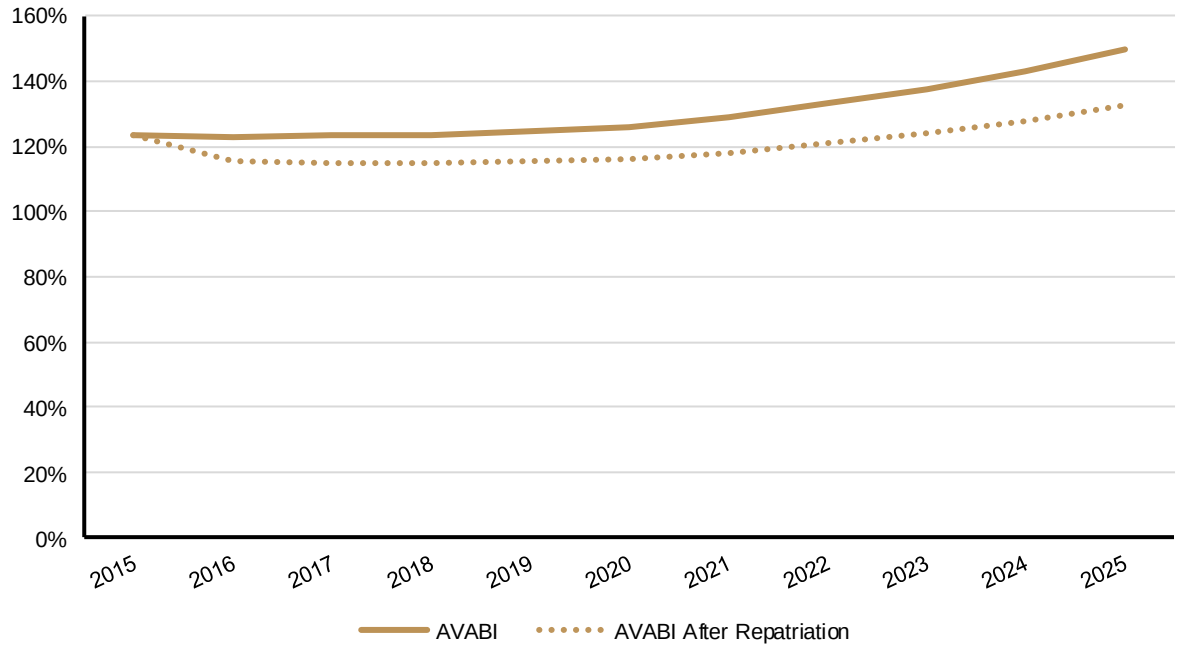


Figure 11 Projected Actuarial Value of Accrued Benefits Index – Active Members – Accounting Basis



8.5 Summary

The indices have increased since the last Review, primarily as a result of the higher than assumed investment returns over the last two years. Their absolute levels are all high and indicative of the very strong funding position, measured on the funding basis. I have also shown the expected progress of the funding positions on the basis that the surplus repatriation recommended in Section 6.6 is made as at 30 June 2016, demonstrating the expected continued strong position after that repatriation, based on the assumptions made in this Review.

9 Required statements

Section 19 of the Deed requires the following statements:

- The assets of the QSuper fund as at 30 June 2015 were $58,683 million.
- It is expected that the assets of the QSuper fund and future member and employer contributions will finance all liabilities for benefit payments as at 30 June 2015.

The requirements of paragraph 23 of SPS 160 are not appropriate to QSuper in view of the funding arrangements of the scheme. With regard to paragraph 24 of SPS 160, I make the following statements:

- The value of the assets of the fund at the valuation date, excluding any amount held to meet the Operational Risk Financial Reserve (ORFR) was $58,533 million.
- I recommend that employer contributions from the Employer fund to QSuper be made as follows:

Income protection to be met by State	Income protection benefits to be fully met by the State as required by the Deed
Payments to pensioners from QSuper fund	Consistent with current practice, all payments to pensioners to be met solely from the QSuper fund with no last minute funding drawn from the Employer Fund in respect of them
State to meet 95% of defined benefit payments	Other than the above, the State to meet 95% of defined benefit payments. Benefit payments for this purpose include any transfers to an accumulation category and the present value (see Appendix D) of new pensions that emerge on the exit of defined benefit active members. All payments to pensioners are met solely from the QSuper fund and therefore need to be fully funded at commencement

- These recommendations are based on accrued liabilities that have been determined using assumptions and valuation methods that are appropriate to the liabilities of QSuper.
- Section 29 of the Act requires that the Treasurer must contribute the amounts necessary to meet defined benefit payments that do not relate to past member and employer contributions. The contributions described above are consistent with that requirement and therefore I consider that the liabilities are adequately funded.
- An event prescribed under section 342(4)(a) of the SIS Act and listed in regulation 12.10 of the SIS Regulations has not occurred.

QSuper self-insures death and disability benefits for members of the Accumulation and Defined Benefit Categories. The Accumulation self-insurance arrangements are subject to annual actuarial review, with reserves maintained by QSuper in accordance with actuarial advice. With regard to the self-insurance of defined benefit entitlements, I believe that self-insurance remains appropriate, recognising:

- the State has a statutory obligation in respect of the defined benefit obligations of the scheme, so insured benefits are effectively guaranteed;
- the defined benefit membership is large enough so that variations in death and disability experience from year to year are small relative to the size of the scheme and to variations in other aspects of the scheme's experience; and
- the insured component of death/TPD benefits is declining as the membership ages so the risks are declining.

With regard to APRA reporting standard SRS 160.0, I note the following:

- The long term investment return assumption was 6.0%.
- The long term wage growth assumption was 3.2%.
- The long term consumer price index assumption was 2.2%.
- The weighted average term of projected defined benefit liabilities was 8.8 years.
- The relevant date for the above items was 30 June 2015.

The following amounts are required for accounts prepared in accordance with the accounting standard AAS25:

- The value of vested benefits as at 30 June 2015 was $80,385 million.
- The value of accrued benefits as at 30 June 2015 was $77,642 million.

10 Material risks

The Actuaries Institute professional standard governing the valuation of defined benefit schemes (PS 400) requires a discussion of the material risks relevant to the scheme. In my view, the major risks affecting the defined benefit plan within QSuper are as follows:

- Investment risks resulting from the mismatch between the current investment strategy and the liabilities. Whilst the Board and Government have reduced this mismatch in recent years, it remains material and represents the single largest risk to the funding position of the scheme.
- As noted in Section 2, I have undertaken this Review on the basis that the assets held in respect of employee entitlement liabilities within the Consolidated Fund will continue to be exclusively available for that purpose, subject to any recommendations made via the actuarial review process. Whilst this has been the stated and practised position of successive Governments over many years, this approach is not legislatively required. Should the Government choose to utilise some or all of these assets for other purposes outside of the actuarial review, the funding position of the scheme will obviously be reduced.
- Most of the scheme's liabilities are linked to members' salaries and therefore the funding position of the scheme can also be adversely affected by an increase in liabilities resulting from unexpected public sector wages growth. Similarly, the liabilities linked to AWOTE (deferred retirement benefits of former members) and CPI (pensions) are also subject to the risk of high inflation levels, although the effects are much less.

In view of the legislative guarantee provided by the State, these risks manifest as a funding risk for the Government, rather than practically affecting beneficiary security. Nevertheless, overseas experience has demonstrated that even Government guarantees are not inviolable and so all stakeholders need to be aware of them.

Appendix A Benefit and contribution conditions

QSuper is designed on a "master trust" concept, which permits state public sector employing authorities to provide unique scheme conditions for their employees. Some employing authorities have opted for benefit conditions slightly different to the standard QSuper benefits but the vast majority of members of the scheme receive the standard benefits set out below.

Over the years a number of government superannuation schemes have been merged into QSuper. Each of the merged schemes now operates as a category of QSuper with existing members' benefits and conditions carried through substantially unaltered.

A full description of the benefit and contribution conditions of the scheme is contained in the Deed. This summary is intended to provide a broad overview only.

In accordance with the Commonwealth Family Law Act, QSuper is required to transfer benefits to member spouses in certain circumstances. The Board has received approval to use a "valuation and payout" methodology where a member's interest is valued at the relevant date. The valuation method for the defined benefit categories[12] has been specified as the value payable upon transfer to an accumulation category, whilst the member's account balance is used for accumulation category members (i.e. the default method prescribed by the Family Law Regulations). Following a family law split, the member's entitlements are reduced proportionately and then they continue to accrue benefits normally, thus implementing a "clean break" between the parties to the split.

Since 1 July 2006, members have been able to crystallise part or all of their defined benefit and transfer the resulting amount to a "transition to retirement" (TtR) pension. The basis upon which the crystallisation is undertaken is equivalent to that applying to Family Law split; i.e. the basis used for transfers to an accumulation category. I have analysed the effect of TtR transfers in this Review in Section B.4.

A.1 QSuper Standard Defined Benefit Category

A.1.1 Eligibility

The Standard Defined Benefit Category was closed to new entrants from 12 November 2008, although there was a 6 month window for late elections to occur.

Non-casual members of the Comprehensive Accumulation Category were previously allowed a once-only option to transfer to the Standard Defined Benefit Category.

In addition, members who retained their entire benefit within QSuper after a previous exit were able to return to the Standard Defined Benefit Category upon re-joining the Queensland public sector. However, since the closure of the latter category this option is no longer available, except for members

[12] The Parliamentary Category uses a different methodology for Family Law valuation and also splits certain benefit payments using the "percentage only" technique described in the relevant regulations.

who are re-appointed to the Government within one month of exit who are essentially deemed to have continued their original membership.

A.1.2 Review Date

The accounting year for QSuper is the financial year ended 30 June. However, salaries for benefit and contribution purposes in the Standard Defined Benefit Category are updated on 1 July of each year (the Annual Review Date). Salary is defined in the Deed and is usually the base salary or wages of a member although various subgroups have allowances included within superannuable salary.

A.1.3 Retirement Date

There is no Normal Retirement Date for the Standard Defined Benefit Category. Members over age 65 who work for more than 40 hours in a 30 consecutive day period are allowed to contribute until age 75. This Review has incorporated allowance for members retiring after age 65 (see Section B.4.2).

A.1.4 Final Average Salary/Final Salary

Final Average Salary is the average of the review date salaries over the previous year, having regard to the period of time for which they were applicable.

Final Salary is the review date salary applicable immediately prior to the occurrence of the relevant event unless this occurs in the year preceding the member's 55th birthday, in which case the final salary is equal to the average of review salaries since age 54.

A.1.5 Benefit Accruals

During each Annual Review Year, members accrue an Annual Compulsory Contribution Accrual, which depends on the rate of the member's contributions, and an Annual Basic Benefit Accrual. Both of these are expressed as a percentage of salary.

The Annual Compulsory Contribution Accrual for Standard members is calculated as follows:

$$\textit{Annual Compulsory Contribution Accrual} = 12.5\% \times \frac{\textit{Compulsory Contributions During Year}}{\textit{Annual Review Date Salary}} \div 5\%$$

The Annual Basic Benefit Accrual for Standard members is calculated as follows:

$$\textit{Annual Basic Benefit Accrual} = 8.5\% \times \textit{The proportion of the Annual Review Year during which compulsory contributions have been received in respect of the member}$$

This can be summarised as 8.5% plus 2.5 times member contribution rate.

For Police members, the accruals are defined as follows:

$$\textit{Annual Compulsory Contribution Accrual} = 21.0\% \times \frac{\textit{Compulsory Contributions During Year}}{\textit{Annual Review Date Salary}} \div 6\%$$

$$\text{Annual Basic Benefit Accrual} = 3.5\% \times \text{The proportion of the Annual Review Year during which compulsory contributions have been received in respect of the member}$$

This can be summarised as 3.5% plus 3.5 times member contribution rate.

Thus, a Standard member who contributes at the standard rate of 5% of salary will accrue a benefit of 21% of salary per annum. Similarly, Police who contribute at the standard rate of 6% accrue benefits at 24.5% of salary per annum.

A.1.6 Retirement Benefit

Where a member retires or otherwise leaves service on or after their 55th birthday, a lump sum benefit is payable that is calculated as follows:

$$\text{Benefit} = \text{Final Average Salary} \times \text{The sum of the member's Annual Compulsory Contribution Accruals and Annual Basic Benefit Accruals}$$

A.1.7 Total and Permanent Disablement Benefit

Where a member becomes totally and permanently disabled (TPD) prior to age 55, the member has the choice of taking a lump sum benefit or a pension benefit. The lump sum benefit is calculated as follows:

$$\text{Benefit} = \text{Retirement Benefit} + \text{Prospective Membership Benefit}$$

The retirement benefit is calculated using Final Salary rather than Final Average Salary. The prospective membership benefit for Standard members is as follows:

$$\text{Prospective Membership Benefit} = \text{Final Salary} \times 21\% \times \text{Potential Membership from date of disablement to member's } 55^{th} \text{ birthday}$$

The prospective membership benefit for Police members is as follows:

$$\text{Prospective Membership Benefit} = \text{Final Salary} \times 24.5\% \times \text{Potential Membership from date of disablement to member's } 55^{th} \text{ birthday}$$

Members may elect to take an annual pension benefit, which is calculated as follows:

$$\text{Annual Pension} = \frac{\text{Lump Sum Benefit}}{9.8} \quad \text{(Standard member)}$$

$$\text{Annual Pension} = \frac{\text{Lump Sum Benefit}}{11.43} \quad \text{(Police member)}$$

The annual pension is limited to 75% of Final Salary. This pension is adjusted annually in line with increases in the Brisbane All Groups Consumer Price Index. On the death of the pensioner before the pension has been paid for five years, a lump sum benefit is payable equal to the current annual rate of the pension multiplied by the number of years and fractions of a year until the five year term is reached.

The Deed was amended on 1 July 2006 to provide for the children of members who die within one year of TPD to receive pensions equivalent to those payable had the member died in service (see Section A.1.9).

A.1.8 Permanent and Partial Disablement Benefit

Where a member becomes permanently and partially disabled (PPD) prior to age 55 a lump sum benefit is payable which is calculated as for the retirement benefit but using Final Salary rather than Final Average Salary.

A.1.9 Death Benefit

Where a member dies prior to age 55, a lump sum benefit equal to the lump sum on total and permanent disablement is payable.

In addition, a child's pension is payable to each child of the deceased member.

A.1.10 Benefit on Involuntary Termination

Where a member's employment is terminated involuntarily a lump sum benefit is payable that is equal to the benefit payable on permanent and partial disablement. Involuntary termination includes voluntary early retirements, redundancies and retrenchments.

A.1.11 Benefit on Withdrawal

Where a member ceases employment and is not entitled to any other benefit, the benefit payable is calculated as for the retirement benefit but using Final Salary rather than Final Average Salary. This benefit comprises two components:

- An amount equal to the member's contributions accumulated with interest. This component is transferred to an accumulation category and a portion may, subject to SIS preservation requirements, be immediately accessible as cash.
- The balance of the benefit (the Deferred Retirement Benefit or DRB) must be preserved until a preservation cashing condition is satisfied. Members can choose two options for indexation of the DRB. The default option is for the benefit to be increased in line with Average Weekly Ordinary Time Earnings (AWOTE) until age 55, at which time it is transferred to an accumulation category. Alternatively, the DRB can at any time be converted to a cash equivalent amount (the Investment Linked Option or ILO) that will be transferred to an accumulation category. The ILO is calculated by discounting the AWOTE linked benefit by 2.88% compound for each year from conversion until age 55.

A.1.12 Minimum Benefit

The minimum benefit payable for any reason shall not be less than the defined Withdrawal Benefit as at the date of exit. In addition, benefits payable since 1 July 1992 must not be less than the Minimum Requisite Benefit defined in the Superannuation Guarantee Benefit Certificate for the scheme.

A.1.13 Income Protection Benefit

Where a Standard member becomes temporarily disabled and has been absent from duty on sick leave without salary for a continuous period of 14 days, the member may be entitled to receive a pension of 75% of Final Salary for the period of temporary disability. Whilst in receipt of an Income Protection benefit, a member is deemed to have contributed at the Standard Contribution Rate for benefit accrual purposes. The pension ceases when the pension has been paid in respect of a single condition for a period of two years or the member is deemed PPD or TPD. Police members of the Standard Defined Benefit Category, magistrates and Parliamentarians do not have access to the Income Protection benefit.

A.1.14 Member Contributions

The Standard Contribution Rate to the Standard Defined Benefit Category is 5% of salary. However, members are able to choose the level at which they contribute within the range 2% to 8% provided that contributions in excess of 5% are only allowed in order to “catch up” for having previously contributed at a rate below 5%. Members are able to salary sacrifice their member contributions by grossing up their contribution by dividing by 85%; e.g. a 5.88% salary sacrifice contribution is equivalent to a 5% after-tax contribution.

The standard rate of contribution for Police members is 6% of salary, with rates allowed between 3% and 9%.

A.1.15 Transfer to the Accumulation Category

Members of the Standard Defined Benefit Category are able to transfer to the Comprehensive Accumulation Category at any time on an open-ended basis. The transfer benefit is equivalent to the cash equivalent withdrawal benefit described in A.1.11. Having transferred from the Standard Defined Benefit Category, members are unable to transfer back from the Comprehensive Accumulation Category.

A.2 QSuper Accumulation Categories

A.2.1 Eligibility

Since 1 May 2000, all new public sector employees have joined an accumulation category by default. Non-casual members were previously allowed a once-only option to transfer to the Standard Defined Benefit Category, but following the closure of this category from 12 November 2008 this option is no longer available.

A.2.2 Benefits

A lump sum benefit is available to members when they permanently retire at or after their preservation age. The benefit is equal to the balance of the member's account at retirement. The member's account is comprised of member and employer contributions and interest. Deductions are made for administration costs, taxation and insurance premiums.

On resignation, all or part of a member's account must be preserved until a preservation cashing condition is satisfied.

If a member dies or becomes TPD before age 65, the benefit provided is equal to the member's account balance plus any additional insurance proceeds. Non-casual members (other than police and Parliamentarians) also have access to income protection insurance.

A.2.3 Member Contributions

Generally, all non-casual employees contribute 5% of their salary. The standard contribution level may be varied, from 2% to 5%, and members (including those in defined benefit categories) may make additional voluntary contributions.

There are some non-casual employees (wages employees with commencement dates prior to 1 May 2000) who have elected not to make contributions. These employees are not compelled to change. However, the option to contribute remains open for these employees and there is no time limit for this choice. If they commence contributions they must continue to contribute. The option not to contribute is unavailable for non-casual employees who commenced after 1 May 2000.

Casual employees do not have to contribute. If they choose to contribute, they are eligible to receive the same level of employer contributions as non-casual employees.

A.2.4 Employer Contributions

Members who contribute to an accumulation category receive employer contributions at the rate of 7.75% of salary plus a matching of their own net contributions up to 5% of salary.

For non-contributory members, the employer contribution rate is in line with the Commonwealth's Superannuation Guarantee requirements.

Where the employee is a member of either the State or Police Category, the employer contributes 3% of salary to an accumulation account (formerly known as "GOSUPER").

A.2.5 Transfer to Standard Defined Benefit Category

With the closure of the Standard Defined Benefit Category, this option is no longer available.

A.3 QSuper State Category

Since 1 January 1991, new members have not generally been able to enter the State Category. An exception to this occurs when a previous member who has retained a preserved benefit in the category re-joins the public sector. They are allowed the option of continuing their previous membership or joining the Comprehensive Accumulation Category. Due to changes in benefit design over the lifetime of the scheme, the complexity of some benefit conditions and the operation of transitional arrangements, the category does not lend itself to a simple and concise summary of the benefit and contribution conditions.

The following summarises the benefit and contribution conditions for a member who entered the category after 30 June 1988.

A.3.1 Normal Retirement Age

The normal retirement date is the 65th birthday for all members. Members who remain as public sector employees after their 65th birthday, or after 42.5 years of membership from age 20, do not continue to accrue benefits within the category and the QSuper fund component of their normal retirement benefit is paid from that date. The member is then moved to the Comprehensive Accumulation Category where all future contributions are deposited. The remainder of the benefit is paid on retirement.

A.3.2 Final Average Salary

Final average salary (FAS) is defined as the average fortnightly salary received by the contributor during the year immediately preceding the member's exit from the scheme. However, any increases in salary in the two years prior to retirement which are in addition to Award increases are averaged over two years.

A.3.3 Service to Count

Service starts accruing from the later of the date of joining the category and the member's 20th birthday.

The maximum amount of service to count is 42.5 years.

A.3.4 Categories of Membership

There are two categories of membership – category A and category B. These are medical categories based on a medical examination of the member on entry to the category.

The benefits of the two categories are basically the same except that the ill-health and death benefits for category B members are restricted during the first 10 years of their membership if the cause of ill-health or death is related to the reason for being classified as category B.

A.3.5 Pensions

Pensions payable are indexed annually according to the increase in the Brisbane All Groups Consumer Price Index (CPI).

Where a pensioner dies leaving a spouse, a lump sum benefit is payable that may be converted to a 2/3rds reversionary pension at the discretion of the spouse. In certain circumstances, child and orphan pensions are also payable.

A.3.6 Retirement Benefit

The retirement benefit is available after the member has reached age 60.

The benefit is defined as a pension but this can be commuted to a lump sum.

The fortnightly amount of the pension is calculated as follows:

$$\textit{Fortnightly Pension} = \frac{3}{200} \times \textit{Service to date of retirement} \times \textit{FAS}$$

The lump sum payable in lieu of the pension is calculated by multiplying the above pension by a commutation factor that varies depending on the member's age in years and complete months. At age 60 the commutation factor equals 313. It then reduces linearly to 261 at age 65.

A.3.7 Early Retirement Benefit

The early retirement benefit is available after the member has reached age 55 but before age 60. It is defined as a lump sum benefit; however, this can be converted to a pension at the member's choice.

The amount of the lump sum benefit is calculated as follows:

$$\textit{Benefit} = \frac{3}{200} \times \textit{Service to date of early retirement} \times \textit{FAS} \times 313 \times (1 - 2\% \times [60 - \textit{Age at Retirement}])$$

The fortnightly pension payable in lieu of the lump sum benefit is equal to the lump sum benefit divided by a factor. This factor is equal to 365 at age 55 and reduces linearly to 313 at age 60.

A.3.8 Death Benefit

The death benefit is payable as a lump sum or a pension.

The lump sum benefit payable is as follows:

$$\textit{Benefit} = \frac{3}{170} \times \max(\textit{Service to date of death}, \textit{Potential service to age 60}) \times \textit{FAS} \times T$$

T is a factor dependent on the age of the member at death. For a member aged 25 or less at death, T equals 137. It rises linearly to 235 at age 50, remains constant until age 60 and then falls to equal 196 at age 65.

The spouse's pension is calculated as follows:

$$Benefit = \frac{3}{170} \times Potential\ service\ to\ age\ 65 \times FAS \times \frac{2}{3}$$

Orphan and child pensions are also payable where applicable.

The death benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the State account.

A.3.9 Ill-Health Benefit

A short term incapacity benefit is payable to members commencing after 2 weeks of approved sick leave without pay. This benefit is a pension calculated as follows:

$$Fortnightly\ Pension = \frac{3}{170} \times Potential\ service\ to\ age\ 65 \times FAS$$

On ill-health retirement a pension is payable calculated as for the short term benefit.

Where the Board is satisfied with the member's medical competency to deal with a lump sum, the pension may be commuted. In this situation, the lump sum payable is the same as that payable had the member died.

The ill-health benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the State account.

A.3.10 Resignation Benefit

On resignation the member has the option to take a withdrawal benefit or to preserve the entire benefit in QSuper.

The withdrawal benefit is equal to member contributions plus interest, and the required level of superannuation guarantee contributions as referred to in Section A.3.11. A portion of the benefit is, subject to SIS preservation requirements, immediately accessible in cash. The balance of the withdrawal benefit is transferred to an accumulation account and must be preserved until a preservation cashing condition is satisfied.

The benefit payable if the member takes the preservation option is calculated as follows:

$$Benefit = Retirement\ Benefit\ payable\ at\ 55 \times \frac{Service\ to\ date\ of\ exit}{Service\ to\ age\ 55}\ X\ Discount$$

Where,

$$Discount = 1 - 2\% \times (55 - Age\ at\ Exit)$$

The benefit as calculated above is preserved in accordance with SIS requirements until a preservation cashing condition is met and earns interest at the crediting rate of the Balanced member investment option in the accumulation category while it remains in the State Category.

A member who has previously elected the preserved option and whose benefit remains within the State Category may subsequently choose to take the withdrawal benefit instead, in which case the benefit will be determined as described above for the latter option.

The preserved benefit is transferred to an accumulation account or another complying superannuation fund at age 55, on becoming incapacitated or earlier at the option of the member.

The amount calculated above under the preserved option is payable on involuntary termination.

A.3.11 Superannuation Guarantee

Since 30 June 1992, a minimum requisite benefit (MRB) has been defined in accordance with the Superannuation Guarantee Administration Act (1992). Every benefit payable from QSuper is subject to a minimum of the MRB. In practice, an increase in benefit is usually only payable when a resigning member chooses not to take the preserved benefit defined above (see Section 6.4). In this case, an additional benefit is paid and preserved in accordance with the SIS requirements.

A.3.12 Member Contributions

The level of contributions paid by a member is a percentage of the member's salary as at the previous review date (1 October) or later date of joining the category. The percentage depends on the member's age at the review date and is as set out in Table 31.

Table 31 State Category Level of Members' Contributions

Age	Member Contribution Rate
Under 20	2.0%
20-24	4.0%
25-34	4.5%
35 or greater	5.0%

A.3.13 Existing Members' Benefit Design

There are several differences between the benefit design described above and that for existing members. The differences with the greatest financial significance are:

- Members who joined the category prior to 1 July 1988 have an accrual rate of 3/170 for service prior to that date for the purposes of age and early retirement benefits.
- Male members who joined the category prior to 27 February 1984 and who commute their pension benefit on retirement are paid an endowment benefit in lieu of a spouse's pension.
- For female members who joined the category prior to 27 February 1984 the commutation factors for converting the retirement pension to a lump sum are higher than for other members. This is illustrated in the Table 32.

Table 32 State Category Retirement Pension Commutation Factors

Age	Pre 27/2/84 Females	Other Members
60	13	12
65	11	10

A.3.14 Transfer to the Accumulation Category

Members of the State Category are able to transfer to the Comprehensive Accumulation Category at any time on an open-ended basis. The transfer benefit is equivalent to the preserved withdrawal benefit described in A.3.10. Having transferred from the State Category, members are unable to transfer back from the Comprehensive Accumulation Category.

A.4 QSuper Police Category

Since 1 January 1993, new members have not generally been able to enter the Police Category. An exception to this occurs when a previous member who has retained a preserved benefit in the category re-joins the police service. They are allowed the option of continuing their previous membership or joining the Comprehensive Accumulation Category. Due to changes in benefit design over the lifetime of the Police Category, the complexity of some benefit conditions and the operation of transitional arrangements, the category does not lend itself to a simple and concise summary of the benefit and contribution conditions.

The following summarises the benefit and contribution conditions for a member who entered the category after 30 June 1988.

A.4.1 Normal Retirement Age

The normal retirement date is the 60th birthday for all members. The Superannuation Legislation Amendment Act 1995 removed the previous specific variations for the Commissioner and Deputy Commissioner for whom the 65th and 62nd birthday respectively were considered as the normal retirement date. Members are now able to continue their membership after age 60 but in practice most retirements occur at or before age 60.

A.4.2 Final Average Salary

FAS is defined as the average fortnightly salary received by the contributor during the year immediately preceding the member's exit from the category except that any increases in salary in the two years prior to retirement which are in addition to Award increases are averaged over two years.

A.4.3 Service to Count

Service starts accruing from the later of the date of joining the category and the member's 20th birthday.

A.4.4 Pensions

Pensions payable are indexed annually according to the increase in the Brisbane All Groups CPI.

Where a pensioner dies leaving a spouse, a lump sum benefit is payable, which may be converted to a 2/3rds reversionary pension at the discretion of the spouse.

A.4.5 Retirement Benefit

The retirement benefit is payable when the member reaches age 60.

The benefit is defined as a pension but this can be commuted to a lump sum.

The fortnightly amount of the pension is calculated as follows:

$$\textit{Fortnightly Pension} = \frac{1}{62.5} \times \textit{Service to date of retirement} \times \textit{FAS}$$

The lump sum payable in lieu of the pension is calculated by multiplying the above pension by a commutation factor of 313.1.

A.4.6 Early Retirement Benefit

The early retirement benefit is available after the member has reached age 55. It is defined as a pension benefit, however this can be converted to a lump sum if the member wishes.

The fortnightly amount of the pension is calculated as follows:

$$\textit{Fortnightly Pension} = \frac{1}{62.5} \times \textit{Service to date of early retirement} \times \textit{FAS} \times (1 - 3\% \times [60 - \textit{Age at Retirement}])$$

The lump sum payable in lieu of the pension benefit is equal to the pension benefit multiplied by a commutation factor. This factor is equal to 365.3 at age 55 and reduces linearly to 313.1 at age 60.

A.4.7 Death Benefit

The death benefit is payable as a lump sum or a pension.

The lump sum benefit payable is as follows:

$$\textit{Benefit} = \frac{3}{160} \times \max(\textit{Service to date of death}, \textit{Potential service to age 55}) \times \textit{FAS} \times T$$

T is a factor dependent on the age of the member at death. For a member aged 25 or less at death, T equals 139. It rises linearly to 235 at age 50 and remains constant until age 60.

The spouse's pension is calculated as follows:

$$\textit{Fortnightly Pension} = \frac{3}{160} \times \textit{Potential service to age 60} \times \textit{FAS} \times \frac{2}{3}$$

Orphan and child pensions are also payable where applicable.

The death benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the Police account.

A.4.8 Ill-Health Benefit

On ill-health retirement a pension is payable calculated as follows:

$$\textit{Fortnightly Pension} = \frac{3}{160} \times \textit{Potential service to age 60} \times \textit{FAS}$$

Where the Board is satisfied with the member's medical competency to deal with a lump sum, the pension may be commuted. In this situation, the lump sum payable is the same as that payable had the member died.

The ill-health benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the Police account.

A.4.9 Resignation Benefit

On resignation the member has the option to take a withdrawal benefit or to preserve the entire benefit in QSuper.

The withdrawal benefit is equal to member contributions plus interest, and the required level of superannuation guarantee contributions as referred to in Section A.4.10. A portion of the benefit is, subject to SIS preservation requirements, immediately accessible in cash. The balance of the withdrawal benefit is transferred to an accumulation account and must be preserved until a preservation cashing condition is satisfied.

The benefit payable if the member takes the preservation option is calculated as follows:

$$\textit{Benefit} = \textit{Retirement Benefit payable at 55} \times \frac{\textit{Service to date of exit}}{\textit{Service to age 55}} \; \textit{X Discount}$$

Where,

$$\textit{Discount} = 1 - 2\% \times (55 - \textit{Age at Exit})$$

The benefit as calculated above is preserved in accordance with SIS requirements until a preservation cashing condition is met and earns interest at the crediting rate of the Balanced member investment option in the accumulation category while it remains in the Police Category.

A member who has previously elected the preserved option and whose benefit remains within the Police Category may subsequently choose to take the withdrawal benefit instead, in which case the benefit will be determined as described above for the latter option.

The preserved benefit is transferred to an accumulation account or another complying superannuation fund at age 55, on becoming incapacitated or earlier at the option of the member.

The amount calculated above under the preserved option is payable on involuntary termination.

A.4.10 Superannuation Guarantee

Since 30 June 1992, a MRB has been defined in accordance with the Superannuation Guarantee Administration Act (1992). Every benefit payable from QSuper is subject to a minimum of the MRB. In practice, an increase in benefit is usually only payable when a resigning member chooses not to take the preserved benefit defined above (see Section 6.4). In this case, an additional benefit is paid and preserved in accordance with the SIS requirements.

A.4.11 Member Contributions

The level of contributions paid by a member is a percentage of the member's salary. Here "salary" is the member's salary as at the preceding review date (1 October) or later entry. The percentage depends on the member's age at the review date or later entry as set out in Table 33.

Table 33 Police Category Level of Members' Contributions

Age	Member Contribution Rate
Under 20	2.0%
20-24	6.0%
25-34	6.5%
35 or greater	7.0%

A.4.12 Existing Members' Benefit Design

There are several differences between the benefit design described above and that for existing members. The differences with the greatest financial significance are:

- Members who joined the category prior to 1 July 1988 have an accrual rate of 3/160 for service prior to that date for the purposes of age and early retirement benefits.
- Members who were members under the 1968 Act receive unit benefits in respect of the level of their salary as at 31 December 1974 and receive benefits as described above only in respect of their salary increases since that date.
- Male members who joined the category prior to 27 February 1984 and who commute their pension benefit on retirement are entitled to an endowment benefit in lieu of a spouse's pension.

A.4.13 Transfer to the Accumulation Category

Members of the Police Category are able to transfer to the Comprehensive Accumulation Category at any time on an open-ended basis. The transfer benefit is equivalent to the preserved withdrawal benefit described in Appendix A.4.9. Having transferred from the Police Category, members are unable to transfer back from the Accumulation Category.

A.5 QSuper Parliamentary Category

Since the closure of the Standard Defined Benefit Category, new Parliamentarians have become members of the Comprehensive Accumulation Category. On 30 June 2007, all assets and liabilities of the Parliamentary Contributory Superannuation Fund were transferred to the QSuper fund. Consequently, all contributing members and pensioners became members of QSuper at that date.

Due to changes in benefit design over the lifetime of the Parliamentary Scheme, the complexity of some benefit conditions and the operation of transitional arrangements, the category does not lend itself to a simple and concise summary of the benefit and contribution conditions.

The following summarises the main benefit and contribution conditions applying to most members.

A.5.1 Pensions

Pensions payable from the Scheme are indexed annually according to the increase in the Brisbane All Groups CPI for members exiting prior to 17 December 2004. For those members active at 17 December 2004 who later become eligible for a pension, the pension is indexed annually according to the increase in backbenchers' salary.

A.5.2 Leaving Service Benefit

(a) If the member left voluntarily with less than 11 years membership:

$$Benefit = 2 \quad \frac{1}{6} \quad \times Member's\ Aggregate\ Contributions$$

If the member left with less than 8 years membership due to defeat at an election, failure to gain preselection (i.e. the member left involuntarily), or for other reasons that satisfy the Board:

$$Benefit = 3 \quad \frac{1}{3} \quad \times Member's\ Aggregate\ Contributions$$

(b) In any other case:

$$Annual\ Pension = Basic\ Salary \times [0.50 + \frac{0.025}{12} \times (t - 96)] \times \frac{Total\ Salary\ Received}{Total\ Basic\ Salary}$$

Where:

t is complete months of membership with a maximum value of 240; and

Basic Salary is the annual salary of a backbencher

This pension may be converted to a lump sum (provided the member is less than 75 years old) using a commutation factor of 10 for a member aged less than 71. The commutation factor is reduced by 0.5 for each year of age in excess of 70.

A.5.3 Death Benefit for Current Member

(a) Less than 8 years of membership:

Annual Pension = 40% of Basic Salary at the date of the member's death

(b) 8 or more years of membership:

The greater of the following two pensions:

Annual Pension = 40% of Basic Salary at the date of the member's death

$$\textit{Annual Pension} = \frac{2}{3} \textit{ of Leaving Service pension payable at the member's death}$$

The spouse has the option of receiving a lump sum benefit in lieu of the above. The commutation factor to apply to the annual pension amount depends on the age of the spouse at the date of the member's death. These factors are listed in Schedule 29 of the Deed.

A.5.4 Death Benefit for Former Member

The greater of the following two pensions:

Annual Pension = 40% of Basic Salary at the date of the member's death

$$\textit{Annual Pension} = \frac{2}{3} \textit{ of pension payable on leaving service}$$

The benefit payable to spouses of former members is in proportion to the amount of pension the former member took on leaving service.

The spouse has the option of receiving a lump sum benefit in lieu of the above. The commutation factor to apply to the annual pension amount depends on the age of the spouse at the date of the member's death. These factors are listed in Schedule 29 of the Deed.

A.5.5 Ill-Health Benefit

The benefit payable is calculated as for leaving service for those with over 8 years membership. For those with less than 8 years membership, the benefit payable is a pension calculated as for leaving service except that a minimum of 50% of basic salary is applied. The resulting pension may be commuted to a lump sum using a commutation factor of 9.

A.5.6 Superannuation Guarantee

Since 30 June 1992, a MRB has been defined in accordance with the Superannuation Guarantee Administration Act (1992). Every benefit payable from the Scheme is subject to a minimum of the MRB. In practice, an increase in benefit from that described above is not expected (see Section 6.4).

A.5.7 Member Contributions

Members contribute a net 11.5% of their salary until their 70th birthday.

Appendix B Analysis of experience

B.1 General

As the liabilities in respect of the closed State and Police defined benefit categories represent a small and declining share of QSuper's overall liabilities, a detailed analysis of the experience of these categories was not undertaken. The Standard and Police member groups within the Standard Defined Benefit Category essentially represent the successor plans to the State and Police categories. Therefore, the decrement and salary growth assumptions for the State and Police categories have been based on those derived from the experience of the relevant groups within the Standard Defined Benefit Category.

With regard to the closed Parliamentary Category, recognising its insignificance in the context of QSuper, the decrement assumptions have been based on those derived from the experience of the relevant groups within the Standard Defined Benefit Category. The only exceptions are with regard to pension factors (see Section B.6) and the probabilities of exit at each election (see Section B.4.24).

As mentioned in Section 2.2, the Police members of QSuper are treated as a separate sub-category of the Standard Defined Benefit Category for investigation purposes. There are substantially more male police than females and the female experience is generally too sparse to produce reliable inferences. Therefore, the analysis of member based experience is performed on the following sub-groups: Standard Males, Standard Females and Police.

It will also be noted that throughout Appendix B, graphs of various elements of the experience of Standard Defined Benefit Category members are displayed. In all these graphs, the relevant item from the previous (2013) actuarial Review is shown in **dotted maroon** and the corresponding item selected for this Review is shown in **maroon**. Where the points and/or lines coincide (because all or part of the previous basis element is being retained), only the 2015 (**maroon**) selection is shown.

B.2 Financial Assumptions

As discussed in Section 5.2, liabilities have been calculated on two different bases within this Report; viz. the funding basis and the accounting basis. These bases consist of the same demographic and member behaviour assumptions but use different financial assumptions (discount rate, price and salary inflation) in line with their different purposes. This Section concentrates on the funding basis, as the accounting assumptions have been chosen by Queensland Treasury[13], based on my advice. For completeness, these assumptions are shown in Table 34.

[13] See Note 51 in https://www.treasury.qld.gov.au/publications-resources/state-finances/2014-15/state-finances-report-2014-15.pdf.

Table 34 Accounting Financial Assumptions

Gross Discount Rate	3.1%
Net Discount Rate (allowing for investment taxation)	3.0%
Salary Inflation	3.2%
Price (CPI) Inflation	2.2%

It is important to note that the assumptions used for accounting purposes are consistent with the requirements of the relevant accounting standard (AASB 119) and are not strictly comparable with those used in the funding basis, as discussed in Section 5.2. However, I have taken a slightly different approach at this Review in that I have used consistent assumptions for price and salary inflation in both the accounting and funding bases. This is discussed further in Section B.2.2.

When setting the discount rate and inflation assumptions to be used in the funding basis, it is not so much their absolute value that is important but their relative levels. This is mainly due to the simple mathematics of inflation and discounting, where adjustments to both the assumptions effectively cancel out but also because the intrinsic economic relationships between the parameters are more stable than their absolute levels.

The assumptions made in the previous actuarial Review (funding basis) are shown in Table 35.

Table 35 Previous Review Funding Basis Financial Assumptions

Discount Rate (Net Investment Return)	7.00%
Salary Inflation	3.75%
Price (CPI) Inflation	2.75%

The implied real salary inflation rate was therefore 1.0% and the net real investment return was assumed to be 4.25%, with the gap between investment return and salary inflation at 3.25%.

Whilst each of these assumptions are considered in turn, it is important to emphasise that, whilst the assumed level of each parameter should be reasonable in its own right, the relativities between the financial assumptions are more important.

B.2.1 Investment Returns and Taxation

Net investment returns earned by the combined QSuper fund and Employer Fund since the last Review are summarised in Table 36.

Table 36 Observed Net Rates of Investment Return

Year Ending 30 June	Investment Return
2014	17.8%
2015	7.4%
Average 2013-2015	**12.5%**

The annual return over the investigation period has therefore been approximately 12.5% p.a. In addition, as discussed in Section 2.10, the year to date return for 2015-16 is substantially lower than the assumed level. Nevertheless, the fund earning rate assumed in the Review is not necessarily

based on past experience but should be a realistic estimate of the long term average rate of return to be earned in the future.

QIC's latest asset class return models (adjusted for consistency with the Consumer Price Index (CPI) assumption used in this Review) imply a net return for the current asset portfolio described in Section 4.2 of approximately 6.1% p.a. over the next five years (recognising current market conditions at the time of determination) and 6.6% in the long term equilibrium. At this Review, I have placed greater importance on the nearer term return expectations, reflecting the distribution of liability cash flows. Allowing for a small prudential margin, I have decided to assume a long term net return of 6.0% p.a. in order to discount projected cash flows within the funding basis.

B.2.2 Price (CPI) Inflation – Funding Basis

The level of price inflation is not a critical assumption in itself, as only a small proportion of the scheme's liabilities are CPI linked. However, the analysis concentrates on the levels of real salary inflation and real investment return and so the price inflation assumption forms an important component of the financial basis.

The starting point when setting an assumption for future inflation is commonly the midpoint of the 2%-3% range targeted by the Reserve Bank (RBA). This is not unreasonable given the credible record that the RBA has built in containing inflation within that band, although I have traditionally also taken into account commentary from the Reserve Bank and forecasts from QIC when setting the inflation assumption in the funding basis.

However I have concluded that the complexity of differential price and salary inflation assumptions in the funding and accounting bases is not justified, especially given the importance of the "gap" and the relatively simplistic approach previously used to calibrate the inflation assumption for funding purposes. Consequently, a single set of price and salary inflation assumptions will be used for both bases, with just the discount rate differing, in line with their different purposes. This approach also has the useful benefit of materially reducing the complexity of the valuation calculations whilst retaining the integrity of the overall process.

So, for both accounting and funding bases, I have assumed price inflation of 2.2% p.a.

For completeness, the rationale underlying the selected CPI inflation in the accounting basis is shown in Section B.2.3 below.

B.2.3 Price (CPI) Inflation – Accounting Basis

One method of determining the level of price inflation implied by the market is to consider the difference between yields on nominal and inflation linked Commonwealth bonds of similar maturity, generally referred to as break-even inflation. Break-even inflation is not, however, an unbiased estimate of the market's expectation of future price inflation, since nominal bond investors would be

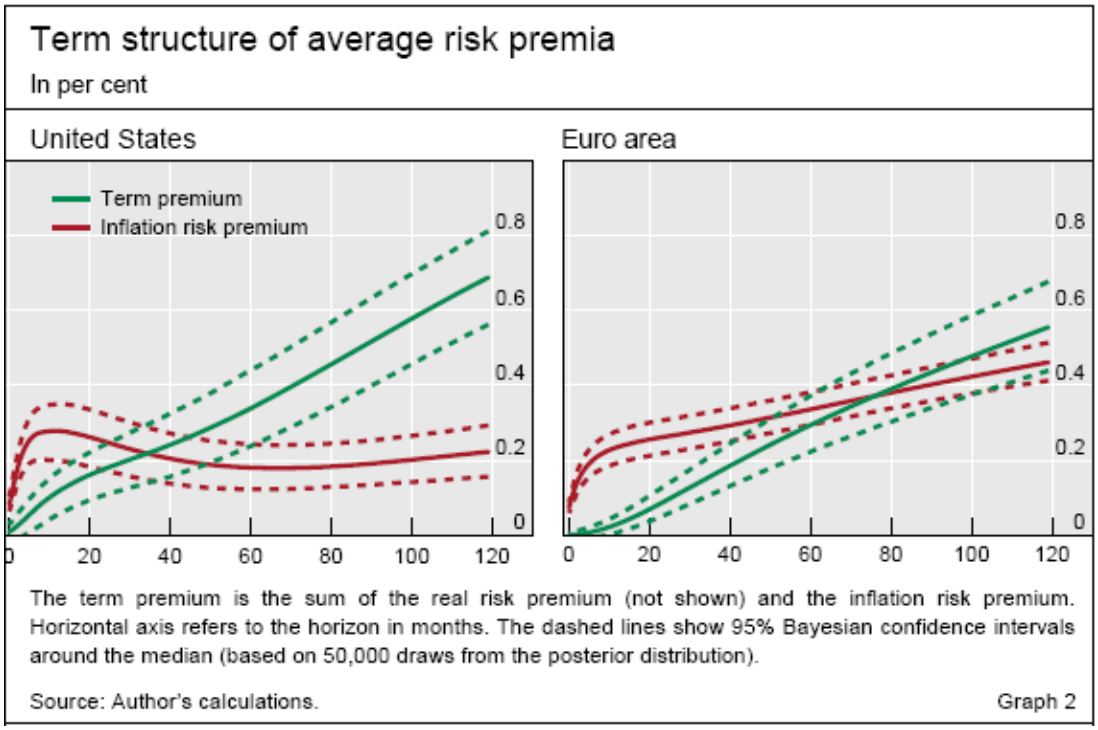
expected to demand a premium above their expectations to compensate them for bearing inflation risk. This relationship can be expressed as [14]:

Nominal Yield = Inflation-linked Yield + Expected inflation + Inflation Risk Premium

where *Inflation Risk Premium* (*IRP*) is the risk premium that holders of nominal bonds should receive to cover the risk of unanticipated inflation reducing the real value of the nominal asset. QIC estimates the inflation risk premium to be around 25bps in equilibrium but note that it can vary materially over time.

Various research has attempted to quantify the IRP and a consensus estimate has not emerged that can be applied in the current context. For example, 2008 research [15] by Peter Hördahl produced estimates of the average IRP term structure for US and Euro markets, as follows (taken from Hördahl's paper):

Figure 12 Average IRP Term Structure



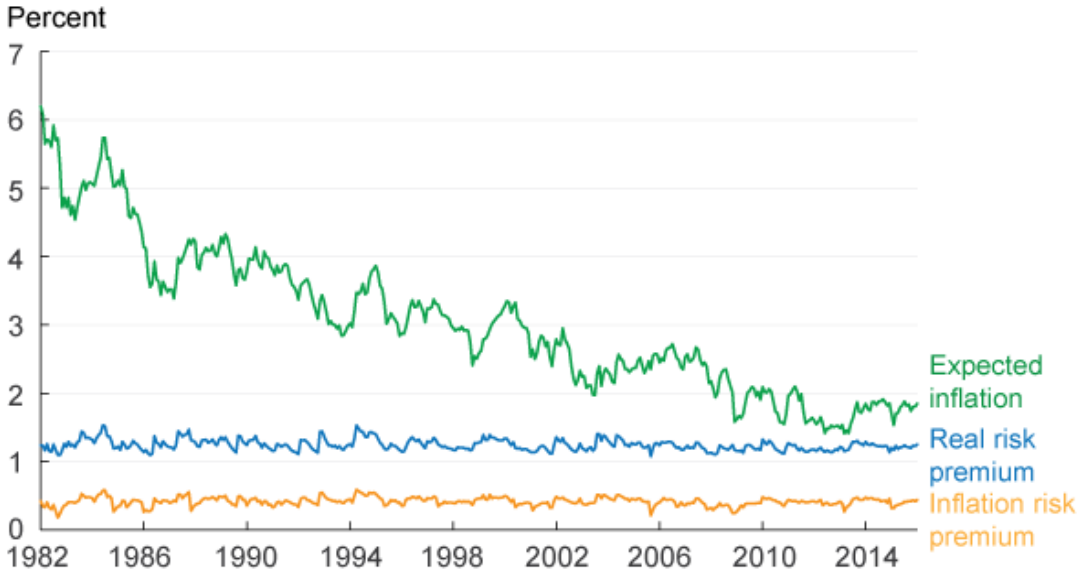
The Federal Reserve Bank of Cleveland produces a comprehensive model of market consistent inflation expectations within the US market and derives an explicit estimate of the US IRP over time[16]. At the time of writing, their estimates of ten year inflation expectations and IRP were as follows:

[14] See http://www.treasury.gov.au/~/media/Treasury/Publications%20and%20Media/Publications/2012/Economic%20Roundup%20Issue%202/Downloads/01_Measuring_market_inflation_exp.ashx for a comprehensive discussion.

[15] See http://www.bis.org/publ/qtrpdf/r_qt0809e.pdf

[16] See https://www.clevelandfed.org/Our%20Research/Indicators%20and%20Data/Estimates%20of%20Inflation%20Expectations

Figure 13 Expectations of Inflation and the IRP



Whilst it is known that the IRP for a given term varies over time as market assessments of future inflation volatility vary, the estimates are difficult to obtain in practice and, in any event, are not currently available for the Australian market. In my view, there is sufficient evidence to incorporate allowance for the IRP when determining the market estimate of expected future inflation. Taking into account the research discussed above, I believe it is reasonable to assume an IRP of 0.25%.

Another factor affecting this approach for estimating inflation expectations is the so-called scarcity or liquidity bias in indexed versus nominal bonds in Australia as a result of the relative scarcity of and strong demand for the former. After discontinuing the issuance of inflation linked bonds in 2003, the Commonwealth recommenced in 2009 [17] and committed in the 2011 Budget to ongoing issuance. The Australian Financial Markets Reports indicated a significant increase in turnover of indexed bonds relative to nominal bonds in 2009-10 and 2010-11, although this relativity reduced during 2011-12. Consequently, the scarcity bias is expected to have reduced somewhat in 2009-2011 before rising again during 2012.

This issue was examined in a NERA Economic Consulting Report in March 2007 [18] where they estimated that the “relative bias” in indexed versus nominal Commonwealth bonds was of the order of 20 bps in the Australian market, as a result of the relative scarcity of and the substantial demand for indexed bonds.

[17] See http://aofm.gov.au/operational-notice/operational-notice-treasury-indexed-bonds-resumption-of-issuance-and-participation-in-syndicate/

[18] See https://www.aer.gov.au/sites/default/files/NERA%20report%20-%20Bias%20in%20indexed%20CGS%20yields%20as%20a%20proxy%20for%20the%20CAPM%20risk%20free%20rate%20-%20March%202007.pdf

It must also be recognised that the design of inflation linked Commonwealth bonds is such that prices embed not only expected future inflation, but also in part known past CPI [19]. The two most recent quarters have demonstrated lower levels of annualised inflation than the breakeven rate and consequently it can be argued that the implied market estimate of prospective inflation should be somewhat higher than breakeven. I have estimated this effect to be around 10 bps.

An alternative approach is to use the zero coupon inflation swap curve (ZCIS) to derive market inflationary expectations, as described in a paper by Reserve Bank economists Richard Finlay and David Olivan [20]. A comparison of the ZCIS rates and break even inflation estimates shown in that paper, as well as the swap rates as at 30 June 2015 [21] are shown in Table 37

Table 37 Break Even Inflation Estimates & Swap Rates

Zero Coupon Inflation Swap Rates at 30 June 2015	
Tenor (years)	ZCIS Rate
1	2.429%
2	2.499%
3	2.508%
4	2.510%
5	2.553%
6	2.550%
7	2.610%
8	2.603%
9	2.625%
10	2.660%
15	2.754%
20	2.812%
25	2.838%
30	2.864%

The correlation between the two approaches is clearly very strong, although inflation expectations from the swap market are somewhat higher than break-even inflation. The gap was greater during the turmoil in bond markets in the first half of 2009 but has declined more recently. Finlay and Olivan attribute this difference to the scarcity bias discussed earlier and also note another related potential cause; market intermediaries hedging their positions in the inflation-indexed bond market may require compensation for the relatively lower liquidity in that market. Further, they note that the implied inflation rates from swaps can also be biased by the variable level of the IRP. Devlin and Patwardhan[14] however assert that “inflation swap rates are not subject to the kind of liquidity premia that can affect bond market break-evens” but that there are other reasons why the swap rates provide a biased estimate of inflation expectations, as follows:

[19] For example, an interest payment in August 2014 would be based on the average of known CPI increases in the preceding March and December quarters. Similarly a payment in November 2014 would be based on the average of the preceding known March and (not yet known) June quarter CPI.

[20] See http://www.rba.gov.au/publications/bulletin/2012/mar/pdf/bu-0312-6.pdf

[21] Source: Bloomberg

1. inflation swap rates likely incorporate some premia for inflation risk — compensation demanded by the inflation payer for potential volatility in realised inflation over the term of the swap

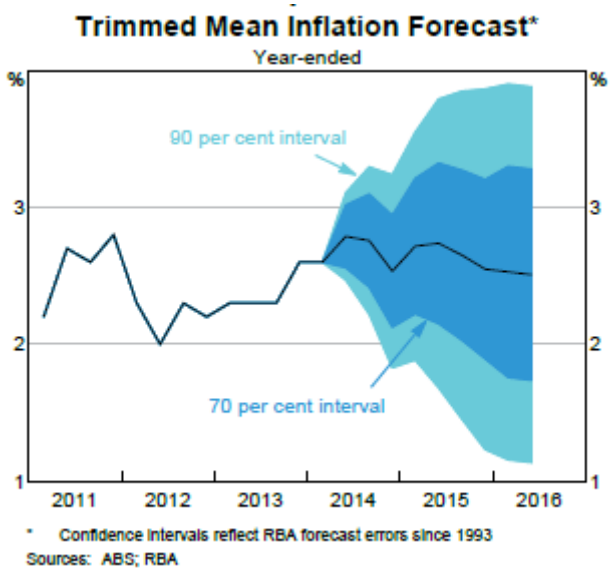
2. while inflation swaps are more liquid than Treasury indexed bonds in the sense that they can be created as required, the tailoring of contracts and their bilateral nature makes inflation swaps less liquid 'on the way out' — since the holder of an inflation swap who wished to exit the contract early would have to renegotiate terms with the original issuer, who may or may not be willing to do so

3. regulatory changes enacted in recent years have meant that banks dealing in the inflation swaps market are required to set aside significantly more capital against any derivatives exposures. Compensation demanded by banks for these higher capital charges may also have introduced a systematic bias into inflation swap rates

Whilst these factors will generally result in the swap rates overestimating the market's underlying inflation expectations, their effects are not quantifiable and so the adjustment necessary to produce an unbiased and mutually compatible estimate of price inflation is not clear.

A final point to provide context to this issue is provided by the RBA, when they demonstrate the uncertainty of their short term predictions for the trimmed mean CPI (a smoothed measure of price inflation), as follows:

Figure 14 Variability of RBA Inflation Forecast



In summary, there is not a single objective and widely accepted estimate of market consistent inflation expectations. I have taken all of the above into account and estimated the market consistent level of price inflation over the term of the liabilities to be 2.2%.

B.2.4 Salary Inflation

A comparison of actual to expected increases in salaries over the investigation period is shown in Table 38.

Table 38 Observed Rates of Salary Inflation

Year Ending 1 July	Standard Males		Standard Females		Police		Total	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
2014	2.7%	4.4%	3.0%	4.4%	2.8%	4.8%	2.9%	4.4%
2015	2.6%	4.4%	2.9%	4.4%	2.7%	4.7%	2.8%	4.4%
Average 2013-2015 (p.a.)	2.7%	4.4%	3.0%	4.4%	2.8%	4.8%	2.8%	4.4%

From the above it can be seen that total salary increases over 2013-15 for all membership groups were lower than those assumed. Overall, the increases observed are consistent with the relatively subdued public sector wage growth observed since 2012.

Looking forward, the amount of salaries received by members in the future will be affected by the following two factors:

- Inflationary increases; and
- Promotional increases due to increasing seniority etc.

For a scheme with a broadly stable membership profile, changes in average salaries are largely unaffected by promotional salary changes and can be used to estimate inflationary salary increases. However, this is not the case for the Standard Defined Benefit Category since it was closed to new entrants in November 2008 and there have been comparatively few new entrants since 2001. As such, changes in average salaries reflect both inflationary and promotional effects.

Furthermore, there are a multitude of Certified Agreements and the distribution of these can differ significantly by age, gender and for the Defined Benefit Category compared with the overall QSuper membership. Realised salary inflation would therefore not be expected to be uniform for the different sub-groups and thus can only be estimated.

If promotional salary increases during the last triennium are assumed to have been consistent with the assumptions made at the last Review, an estimate of salary inflation over the period can be derived, as shown in Table 39.

Table 39 Estimated Rates of Salary Inflation

Year Ending 1 July	Estimated Inflationary Salary Increase
2014	2.2%
2015	2.2%
Average 2013-2015 (p.a.)	2.2%

As can be seen from the table, if promotional increases were as previously assumed, then inflationary salary increases would have been lower than the 3.75% p.a. adopted at the previous Review.

Given the difficulties in determining past salary inflation rates and recognising that future inflation is not necessarily related to the recent past, the level of real salary growth has been considered in some detail.

Firstly, the levels of salary inflation in the broader market such as Average Weekly Ordinary Time Earnings (AWOTE) have been examined. The historical rates of real salary growth as measured by the excess of Queensland AWOTE over Australia All Groups CPI[22] for various periods ending on the valuation date are shown in Table 40.

Table 40 Real Salary Growth

Number of Years to Dec 2014	Real Qld AWOTE Increase (p.a.)
5	1.3%
10	2.0%
15	1.9%
20	1.9%
25	1.8%
29	1.3%

Whilst the longer term level of real salary growth has been just over 1% p.a., over the last ten years the level has been around 2% p.a. Patrick D'Arcy and Linus Gustafsson of the RBA also note that[23] "sustained changes in the terms of trade mean that real income growth per hour worked can diverge from productivity growth for a period of time" and that "the boom in the terms of trade over the past decade has allowed national income to grow at a faster pace than productivity." The Governor of the RBA, Glenn Stevens, stated in his media release of 3 July 2012 that "Australia's terms of trade have peaked, though remain historically high." The real income growth in excess of productivity growth that occurred over the last decade from the improvement in Australia's terms of trade is thus unlikely to be repeated.

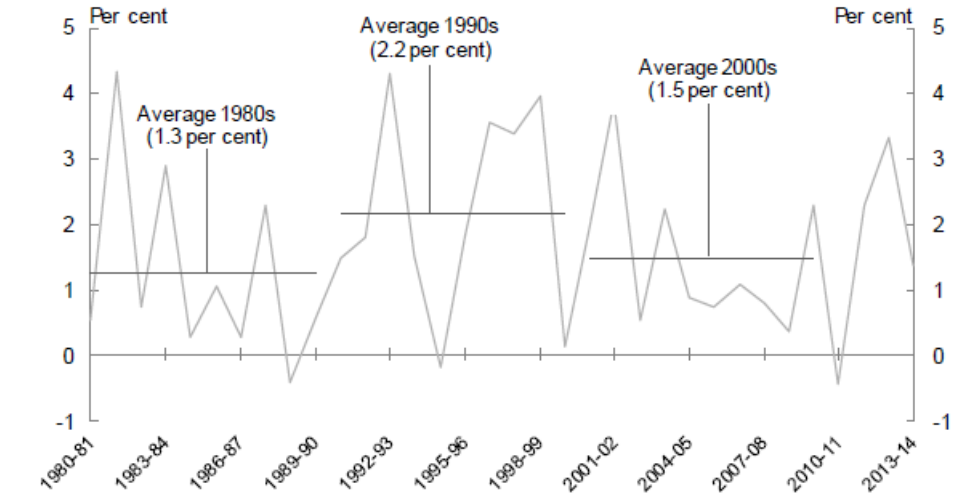
As noted above, economic theory asserts that long-run real salary growth should be closely related to labour productivity growth[23]. The most recent Intergenerational Report[24] assumed a rate of productivity growth of 1.5% p.a. based on that observed through the 2000s, shown in the following graph, taken from that Report.

[22] The measure of price inflation incorporated in inflation-linked bonds is the All Groups weighted average capital cities, commonly considered as "Australia CPI".

[23] Patrick D'Arcy and Linus Gustafsson, in an article entitled "Australia's Productivity Performance and Real Incomes" published in the June 2012 RBA Bulletin observe "*In the long run, growth in productivity is the primary determinant of growth in real income.*"

[24] See http://www.treasury.gov.au/~/media/Treasury/Publications%20and%20Media/Publications/2015/2015%20Intergenerational%20Report/Downloads/PDF/2015_IGR.ashx

Figure 15 Average Labour Productivity Growth Rates



Source: ABS cat. no. 5206.0.

Another source of information regarding real salary growth is the forecasts produced by Deloitte Access Economics[25]. Their projections for growth in various inflation measures for Queensland and Australia for the next several years are shown below.

Table 41 Wage and Price Inflation Forecasts by Deloitte Access Economics

Year	Qld AWE	Qld Wage Price Index	Australia AWE	Australia AWOTE	Australia Wage Price Index	Australia CPI
2014-15	1.8%	2.7%	1.9%	2.7%	2.6%	1.5%
2015-16	3.0%	2.9%	3.0%	2.9%	2.6%	2.2%
2016-17	3.2%	3.2%	3.1%	3.7%	2.9%	2.8%
2017-18	3.8%	3.6%	3.6%	4.1%	3.4%	2.5%
2018-19	3.9%	3.7%	3.8%	4.3%	3.6%	2.5%
Average	3.1%	3.2%	3.1%	3.5%	3.0%	2.3%

Whilst Deloitte do not produce a Queensland AWOTE forecast, Table 41 demonstrates that the Queensland and Australian forecasts of AWE growth are very similar, whilst Australian AWOTE is expected to increase at a higher rate. This suggests an expected level of real Queensland salary growth above Australian price inflation of around 1.2% over the forecast period.

Queensland Treasury also produces inflation forecasts as part of the Budget papers[26], as follows:

[25] Source: Deloitte Access Economics Business Outlook March 2015

[26] See page 31 of http://www.budget.qld.gov.au/budget-papers/2014-15/bp2-2-2014-15.pdf

Table 42 Queensland Treasury Inflation Forecasts

Year	Queensland CPI	Queensland Wage Price Index
2014-15	2.75%	3.00%
2015-16	2.50%	3.25%
2016-17	2.50%	3.50%
2017-18	2.50%	3.50%
Average	2.60%	3.30%

The Wage Price Index measures changes in the price of labour over time unaffected by measurable changes in the quantity or quality of work performed; i.e. it effectively excludes labour productivity growth. Consequently, these forecasts would imply a greater rate of real increase in AWOTE than the 0.7% p.a. indicated.

Another source of information regarding this relationship is the corresponding assumptions used by actuaries in similar contexts, as follows:

Table 43 Summary of Real Salary Growth Assumptions Used

Year	Scheme	Real Salary Growth Assumption
2011	Defence Force Pension Schemes	1.50%
2012	NDIS Costings Review	1.50%
2012	NSW Report on State Finances - State Super Funds	0.00%
2012	NSW Report on State Finances - Energy Industry Super Fund	1.00%
2013	Australia Post Superannuation Scheme	1.00%
2014	ASIC Superannuation Calculator	1.00%

Finally, I note the general expectation that salary increases for Queensland public servants are likely to be constrained over the next few years resulting in lower real salary increases over the duration of the liabilities than would be expected for the general community. In this regard I note the comments of the RBA in its May 2013 Statement on Monetary Policy[27], as follows:

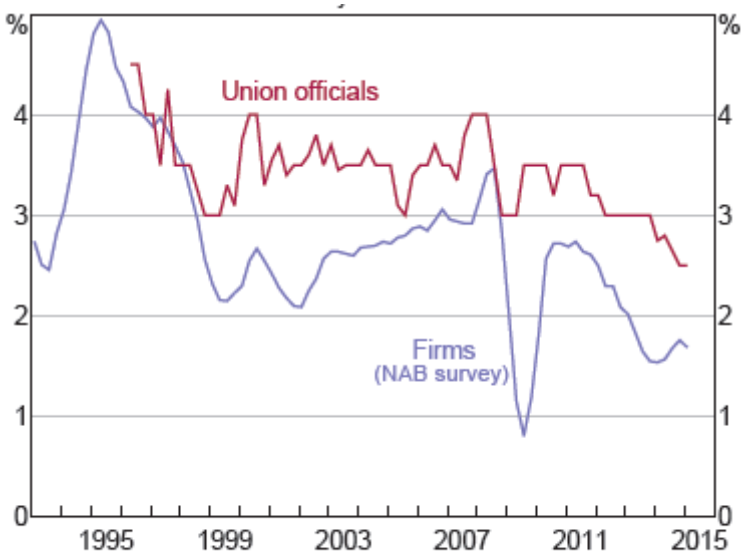
> *Fiscal restraint continues to keep public sector wages contained, with year-ended growth in public sector wages near or below 3 per cent in all states except Western Australia.*

Further support for the assertion of relatively subdued wage growth going forward comes from a recent RBA paper[28], which includes the following chart of wage expectations:

[27] See http://www.rba.gov.au/publications/smp/2013/may/pdf/0513.pdf

[28] See http://www.rba.gov.au/publications/bulletin/2015/jun/pdf/bu-0615-2.pdf

Figure 16 Expected Wage Growth One Year Ahead



Sources: Australian Council of Trade Unions; Employment Research Australia; NAB; RBA; Workplace Research Centre

Taking all of the above into account, I have concluded that a reasonable estimate of the level of salary/AWOTE growth is 1.0% p.a. in excess of the rate of CPI. This results in an assumed market consistent annual rate of salary inflation of 3.2%.

I am cognisant that the wages policy underlying many existing bargaining agreements would suggest a lower salary inflation assumption than I have derived above. However, it must be recognised that the assumption applies over the duration of the liabilities on average and not just the period over which current and planned agreements will apply. Whilst it can be argued that public sector wage growth can be held lower than the broader economy over the short to medium term, there is no evidence to suggest that such an outcome can be sustained over the longer timeframes underlying the liabilities.

The resulting gap between salary inflation and investment return of 2.8% is lower than the 3.25% assumed at the last Review. This is consistent with the progress towards a more de-risked investment strategy (see Section 4.2) which would, other things equal, suggest a lower real return should apply. In addition, QIC's and many commentators' return expectations are lower than previously and I have taken greater recognition at this Review of the shape of the liability cash flows. As the baby boomers have commenced retirement in recent years, there is a relative increase in outflows over the next several years, so that greater emphasis is needed on the nearer term return expectations.

In summary, the financial assumptions chosen for the funding basis at this Review are shown in Table 44, with the previous assumptions shown for comparison.

Table 44 Current and Previous Funding Basis Financial Assumptions

	Previous	Current
Discount Rate (Net Investment Return)	7.00%	6.00%
Salary Inflation	3.75%	3.20%
Price (CPI) Inflation	2.75%	2.20%

B.3 Promotional Increases

For the 1998 Review, the estimated actual promotional increases were calculated by considering the group of members who were present throughout the investigation period (cohort method). Estimates of salary inflation were removed from the overall salary increases so that the remaining increase represents promotional effects. However, this method assumes that the membership is in a state of equilibrium with regard to the distribution of salary levels. Whilst the Standard Defined Benefit Category was open to new entrants prior to Q2000, this assumption generally held and the cohort method was appropriate. The resulting breakdown in the equilibrium has meant that the cohort method cannot be applied after 1 July 2000.

This has meant that snapshots of the salary distribution at review dates have had to be used to analyse the promotional salary scale. The snapshot salary scale represents the cumulative effect of all the promotions that have been awarded to the membership as at the calculation date, whilst the cohort scale illustrates the promotional effects occurring over the period analysed. Because it concentrates on the more recent experience of the membership, the cohort method is generally preferred to the snapshot method, although both can assist in the analysis. In this regard, I have considered the relationship between the cohort and snapshot methods demonstrated in the 2001 and 2004 Reviews when determining whether any changes are necessary to the current assumed scales.

In previous Reviews, promotional salary scales were seen as likely to become increasingly important for the Standard Defined Benefit Category as, a priori employees who believe their promotional prospects to be better than average would be more likely to elect to join the Standard Defined Benefit Category. Consequently, the promotional salary scale would be expected to steepen over time as the membership moves towards the new equilibrium level derived from this new “type” of entrant (i.e. those who choose to join the Standard Defined Benefit Category). However, new entrant numbers have been low until the scheme was closed in 2008, so the “selection” effect described above has not been material. In addition, the membership has aged relatively and promotional salary growth at the higher ages is expected to be fairly limited so that the effect of this assumption has now lessened (see Section 6.2).

For the Police Members however, the vast majority of whom are subject to a single Collective Agreement, the cohort method described above has been able to be used to determine promotional increases over 2013-15.

The estimated promotional salary increases over the investigation period and the adopted promotional scales for this valuation are discussed below and are summarised in the service tables presented in Appendix C.

B.3.1 Promotional Increases – Standard Members

In the previous Review it was assumed that salaries would progress age by age on the basis of a salary scale. Figure 17 and Figure 18 illustrate the snapshot salary scales for Standard Male and Female members respectively, as at each review date during the analysis period, compared to the assumptions used in the previous Review. Consideration has been restricted to those members over age 30, as there are trivial numbers below this age and the experience is consequently quite volatile, without adding much to the analysis.

Figure 17 Promotional Increases by Age – Standard Male Members

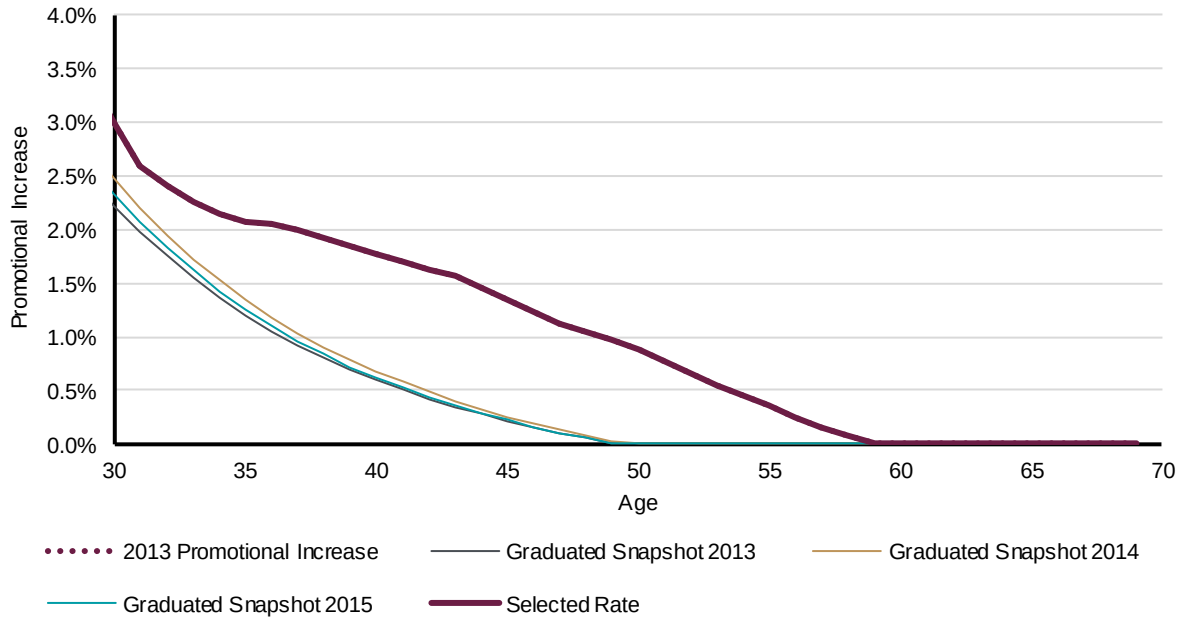
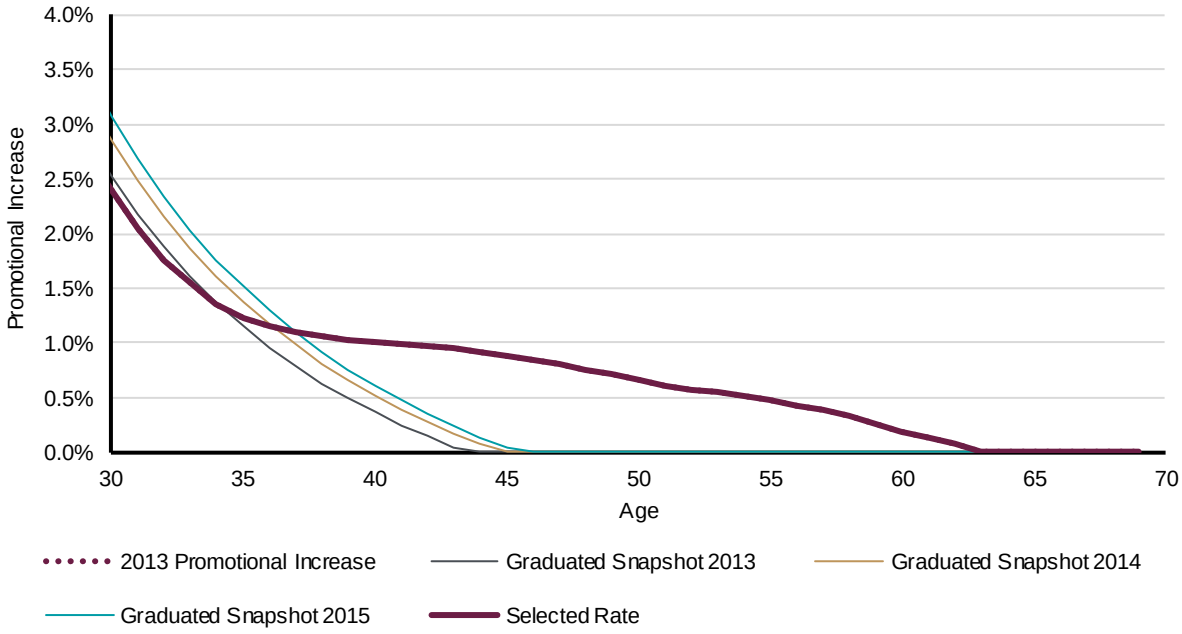


Figure 18 Promotional Increases by Age – Standard Female Members



It can be seen from the above that the snapshot salary scales above age 35 are significantly below the scales assumed in the last several Reviews, which were based on the cohort method. Noting that the Category has effectively been closed to new entrants for many years now, this is similar behaviour to that observed in 2004, where the snapshots underestimated the promotional increases based on the conceptually more accurate cohort model, as noted in that Report:

"The snapshot scales present a similar shape to the cohort method but at a generally lower level for ages above about 25. The similarity of the scales for the younger ages is due to the fact that most of these members will have entered the Defined Benefit Category in the last few years and so both methods give similar results. Older age groups are made up of more diverse service profiles and consequently the snapshots illustrate a mixture of promotional effects."

In view of the similarity between the snapshot scales over the last several years, there is not sufficient evidence to justify any changes to the assumed levels of promotional salary increase. Consequently, the previous salary scale has been retained for this Review, as illustrated in Figure 17 and Figure 18.

B.3.2 Promotional Increases – Police Members

The promotional salary increases for Police members have been derived by subtracting the inflationary component estimated from an analysis of the relevant Certified Agreements, estimated to have averaged 2.2% p.a. over the intervaluation period, as follows.

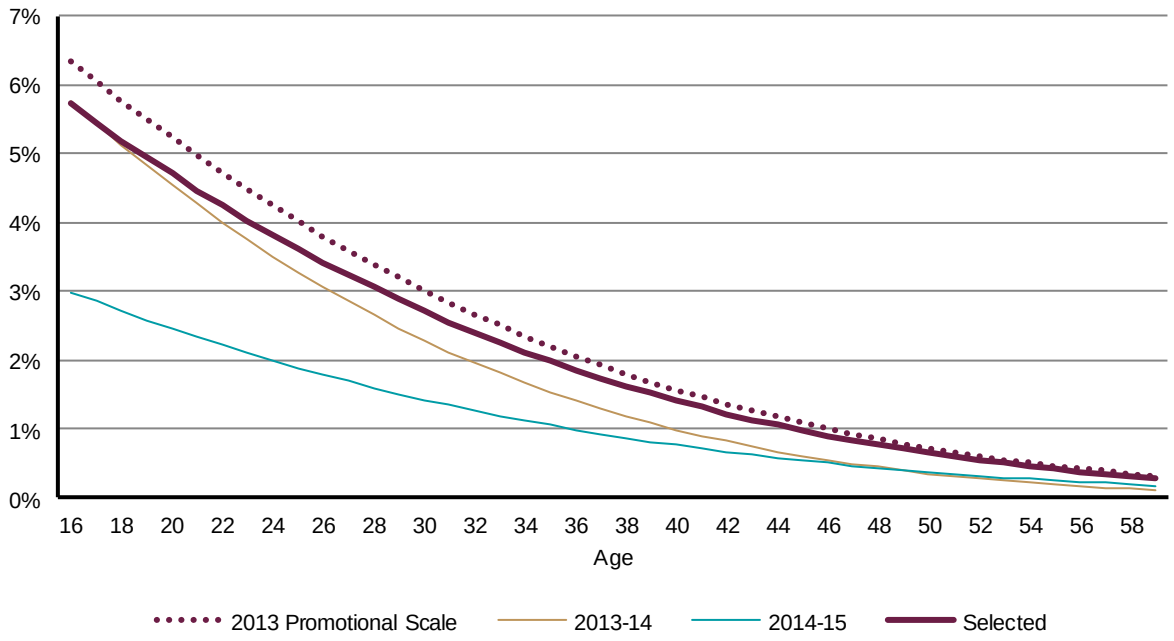
Table 45 Estimated Salary Inflation for Police Members

Year Ending 1 July	Overall Salary Increase
2014	2.2%
2015	2.2%
Average 2013-2015 (p.a.)	**2.2%**

Figure 19 shows the resulting promotional salary increases over 2013-15 as well as the 2013 salary scale assumption.

The implied promotional salary scales for 2013-14 and 2014-15 are at broadly similar levels above age 40 but below the scale assumed in the last several Reviews. I believe that this reflects the continued subdued environment for salary growth (including promotions) within the public sector. The 2013 assumption has therefore been reduced for this valuation to take into account the latest experience.

Figure 19 Promotional Increases by Age – Police Members



B.4 Decrement Experience – Active Members

B.4.1 General

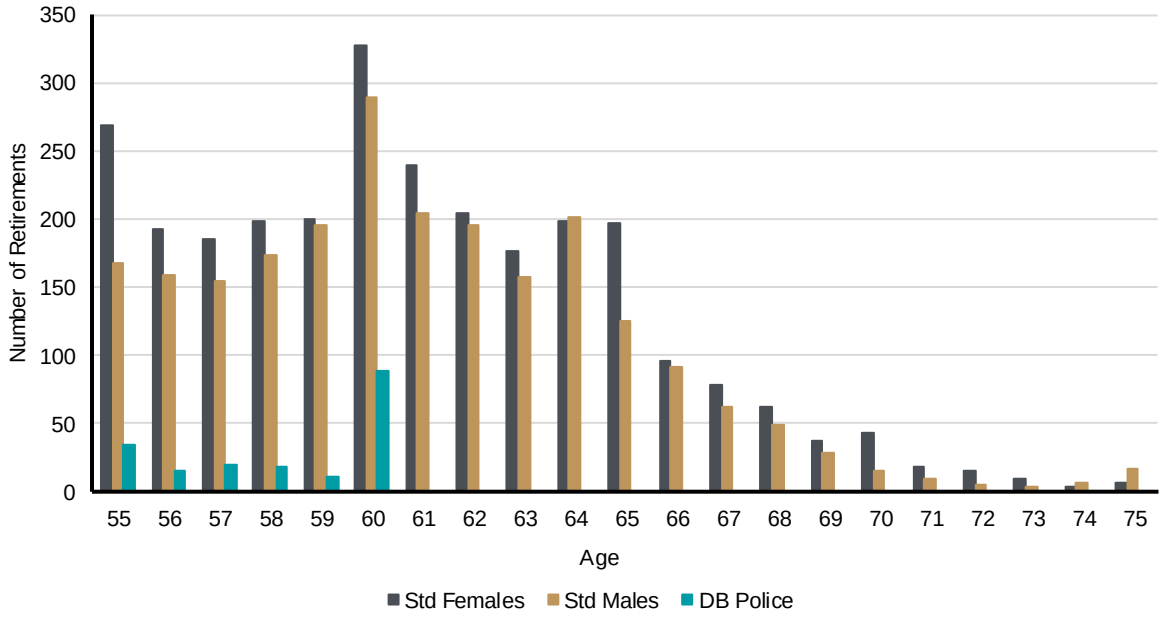
As mentioned in Section B.1, the analysis of member based experience has been performed separately for Standard Males, Standard Females and Police. The expected rates for Standard members and Police members are those assumed in the 30 June 2013 Review of QSuper.

The selected decrement rates are presented in the service tables in Appendix C.

B.4.2 Age Retirement – Standard Male Members

As indicated in Section A.3 there is no normal retirement date for Standard Defined Benefit Category members. In practice, the vast majority of members retire at or before age 65, however Figure 20 shows that there are still significant numbers of retirements until age 70, with quite limited numbers at higher ages. Consequently, I have retained the previous de facto normal retirement age for Standard members at age 70.

Figure 20 Age at Retirement during 2013-15



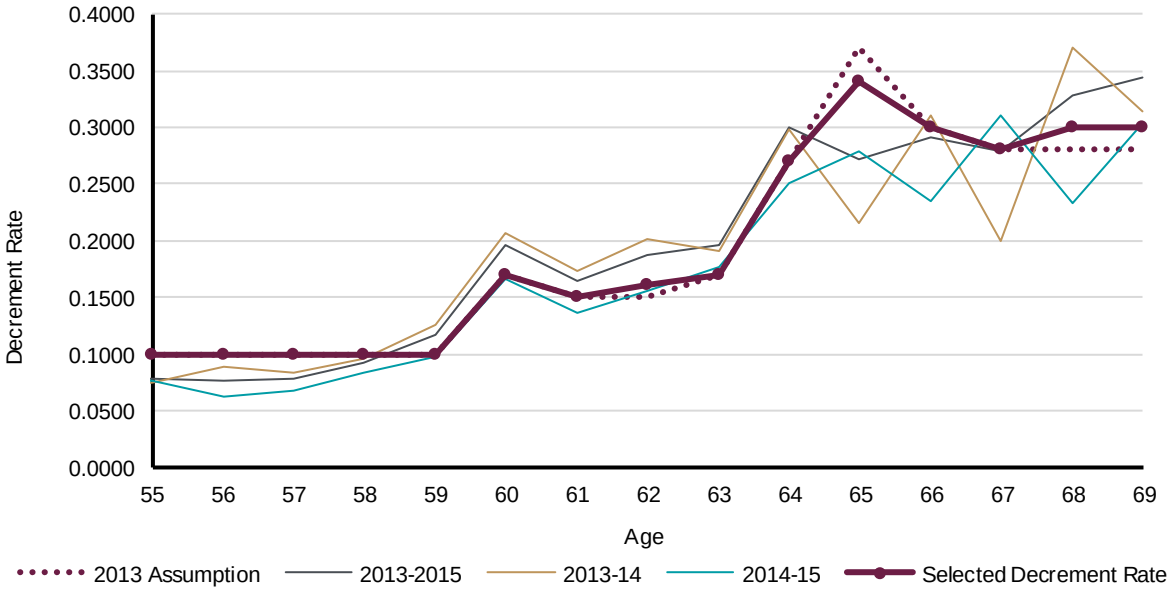
A comparison of actual to expected retirements of Standard male members over the investigation period is contained in Table 46. The expected number of retirements has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 46 Actual vs Expected Age Retirements – Standard Male Members

Age	Actual Retirements	Expected Retirements	Ratio of Actual to Expected
55	168	217	78%
56	159	206	77%
57	155	199	78%
58	174	189	92%
59	195	167	116%
60	290	251	115%
61	205	187	109%
62	196	157	125%
63	158	137	115%
64	201	181	111%
65	126	171	74%
66	91	94	97%
67	62	62	100%
68	49	42	117%
69	29	24	123%
Total	**2,258**	**2,284**	**99%**

The retirement rates for Standard male members have been close to expected overall, with a mixture of higher and lower than expected at individual ages. The year by year movements have been considered in order to assess whether any trends can be ascertained as demonstrated in Figure 21.

Figure 21 Age Retirement Rates by Year – Standard Male Members



There is some similarity in the shape for each year but they are at different levels. The volatility in the observed retirement rates has reduced since the last Review, which was primarily due to the public sector workforce changes.

Whilst it is conservative to overestimate the rates, there is now sufficient evidence to increase the assumed retirement rates at ages 62, 68 and 69 and reduce the assumed retirement rate at age 65, with the detailed rates shown in Appendix C.

B.4.3 Age Retirement – Standard Female Members

A comparison of actual to expected retirements of Standard female members over the investigation period is contained in Table 47. The expected number of retirements has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 47 Actual vs Expected Age Retirements – Standard Female Members

Age	Actual Retirements	Expected Retirements	Ratio of Actual to Expected
55	269	330	82%
56	193	233	83%
57	186	221	84%
58	199	206	96%
59	200	189	106%
60	328	288	114%
61	240	226	106%
62	204	188	108%
63	176	197	89%
64	198	198	100%
65	197	187	105%
66	96	112	86%
67	79	87	91%
68	63	59	108%
69	37	39	96%
Total	**2,665**	**2,761**	**97%**

Similarly to the Standard Males, the retirement rates have been close to that expected over the last two years. Again, the year by year movements in the retirement rates can be observed, as illustrated in Figure 22.

Figure 22 Age Retirement Rates – Standard Female Members

This shows a similar pattern to the Standard Males. Whilst it is conservative to overestimate the rates, there is now sufficient evidence to decrease the assumed retirement rate at age 55, with the detailed rates shown in Appendix C.

B.4.4 Age Retirement – Police Members

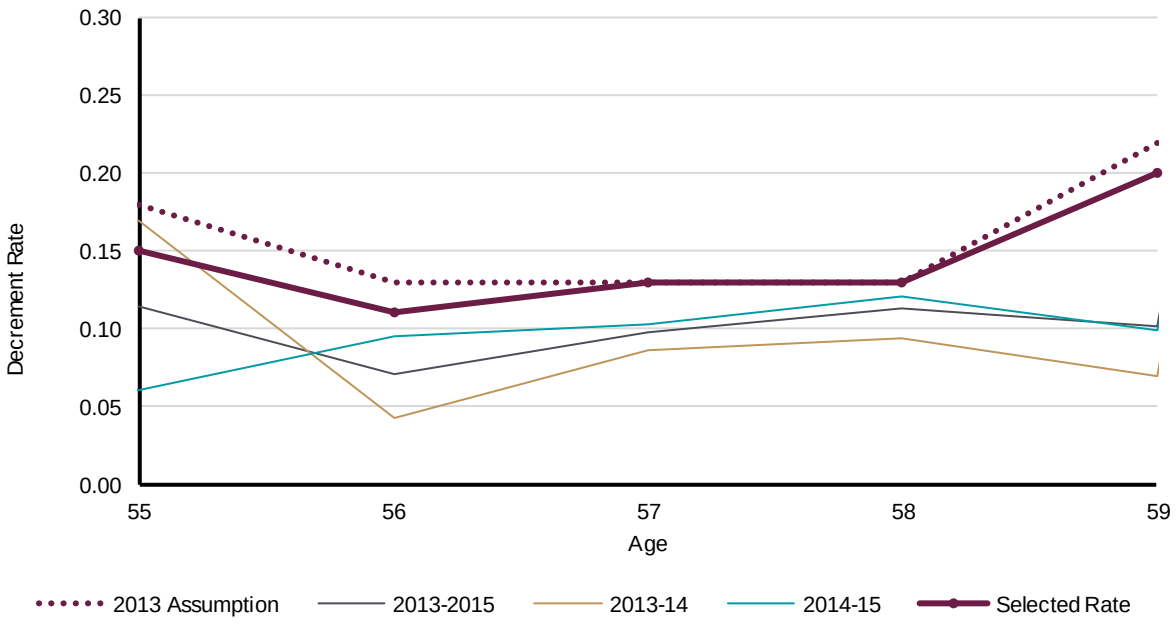
A comparison of actual to expected retirements of Police members over the investigation period is contained in Table 48. The expected number of retirements has been calculated on the basis of the assumptions used in the last actuarial Review. It will be noted that, in practice, the vast majority of members retire at or before age 60 in line with the previous experience of Police Super (see Figure 20).

Table 48 Expected vs Actual Age Retirements – Police Members

Age	Actual Retirements	Expected Retirements	Ratio of Actual to Expected
55	34	53	64%
56	16	30	54%
57	20	27	75%
58	18	21	87%
59	11	24	46%
Total	**99**	**154**	**64%**

The experience is lower than expectation for Police members. As the numbers are smaller, the year by year retirement rates for Police members are volatile and so it is difficult to ascertain any trends, as shown in Figure 23. Whilst it is conservative to overestimate the rates, there is now sufficient evidence to decrease the assumed retirement rate at ages 55, 56 and 59, with the detailed rates shown in Appendix C.

Figure 23 Age Retirement Rates – Police Members



B.4.5 Mortality – Standard Male Members

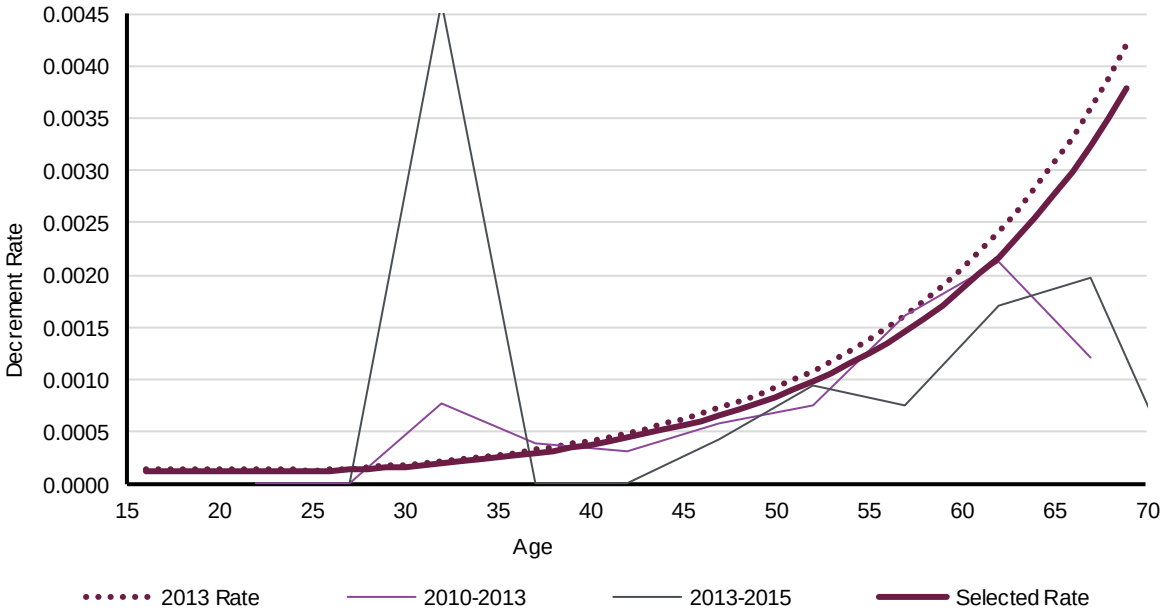
A comparison of actual to expected deaths of Standard male members over the investigation period is contained in Table 49. The expected number of deaths has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 49 Actual vs Expected Mortality – Standard Male Members

Age Group	Actual Deaths	Expected Deaths	Ratio of Actual to Expected
30-34	1	0	1960%
35-39	0	1	0%
40-44	0	2	0%
45-49	3	5	58%
50-54	9	10	86%
55-59	7	15	47%
60+	10	15	69%
Total	**30**	**48**	**62%**

Table 49 shows that the actual experience during the intervaluation period has been below the previous assumption, however there is not a great deal of experience and so I have considered the previous triennium as well, as shown in Figure 24. This shows that the 2013 assumption is higher than the experience during the five year period and so I have reduced it for this valuation.

Figure 24 Mortality Rates – Standard Male Members



B.4.6 Mortality – Standard Female Members

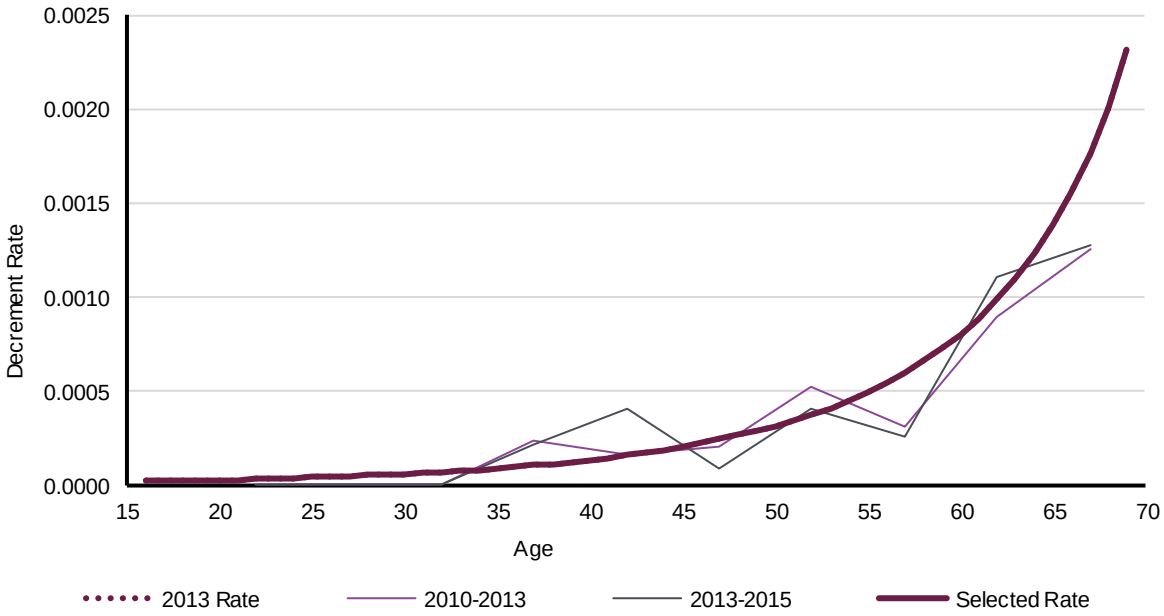
A comparison of actual to expected deaths of Standard female members over the investigation period is contained in Table 50. The expected number of deaths has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 50 Actual vs Expected Mortality – Standard Female Members

Age Group	Actual Deaths	Expected Deaths	Ratio of Actual to Expected
35-39	1	1	196%
40-44	4	2	253%
45-49	1	3	37%
50-54	5	5	106%
55-59	3	7	43%
60+	9	9	104%
Total	**23**	**25**	**92%**

The mortality experience of Standard Females has been slightly lower than expected, although closer to expectation than Standard Males. Taking into account the experience over the last five years shown in Figure 25, the 2013 assumption is quite consistent with that experience and so I have retained the assumption.

Figure 25 Mortality Rates – Standard Female Members



B.4.7 Mortality – Police Members

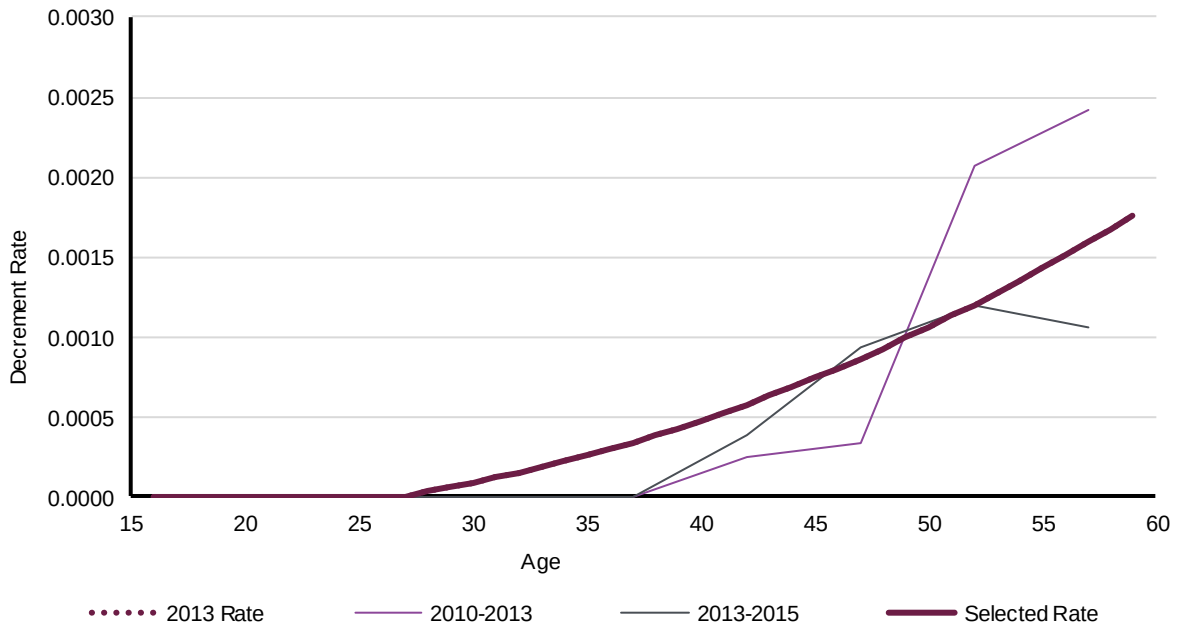
A comparison of actual to expected deaths of Police members over the investigation period is contained in Table 51. The expected number of deaths has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 51 Actual vs Expected Mortality – Police Members

Age Group	Actual Deaths	Expected Deaths	Ratio of Actual to Expected
40-44	1	2	66%
45-49	2	2	108%
50-54	2	2	100%
55-59	1	1	68%
Total	**6**	**7**	**88%**

There is very limited mortality experience for Police members and I have again considered the last five years in order to assess the merit of the 2013 assumption. Figure 26 demonstrates that the assumption has been broadly consistent with the scheme experience over this period and so I have retained it for this valuation.

Figure 26 Mortality Rates – Police Members



B.4.8 Permanent and Partial Disablement – Standard Male Members

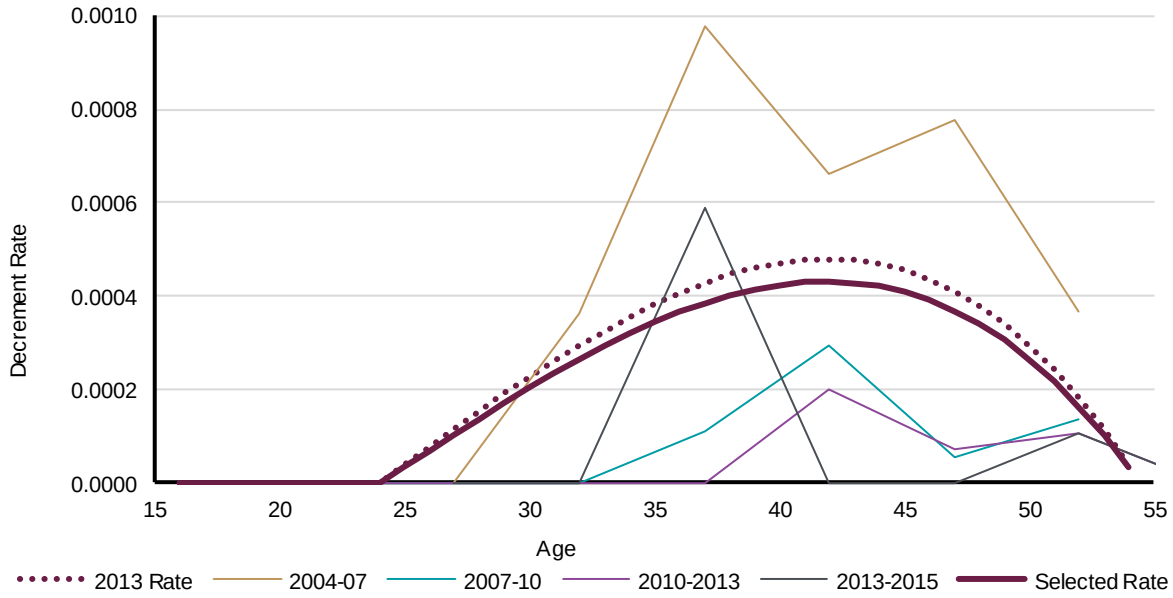
A comparison of actual to expected permanent and partial disablements (PPD) of Standard Male members during the investigation period is contained in Table 52. The expected number of PPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 52 Actual vs Expected Rates of PPD – Standard Male Members

Age Group	Actual PPDs	Expected PPDs	Ratio of Actual to Expected
30-34	0	0	0%
35-39	1	1	135%
40-44	0	2	0%
45-49	0	3	0%
50-54	1	2	63%
Total	**2**	**7**	**27%**

There is very limited PPD experience for Standard Males upon which to assess the validity of the 2013 assumption. Consequently, I have considered the experience of the last four triennium, as shown in Figure 27. Whilst the rates in each triennium are quite low, the earlier three year period showed higher rates than the last eight years. Recognising the low rates and the volatility in the experience, this shows that the 2013 assumption is higher than the experience during the eight year period and so I have reduced the assumption for this valuation.

Figure 27 PPD Rates – Standard Male Members



B.4.9 Permanent and Partial Disablement – Standard Female Members

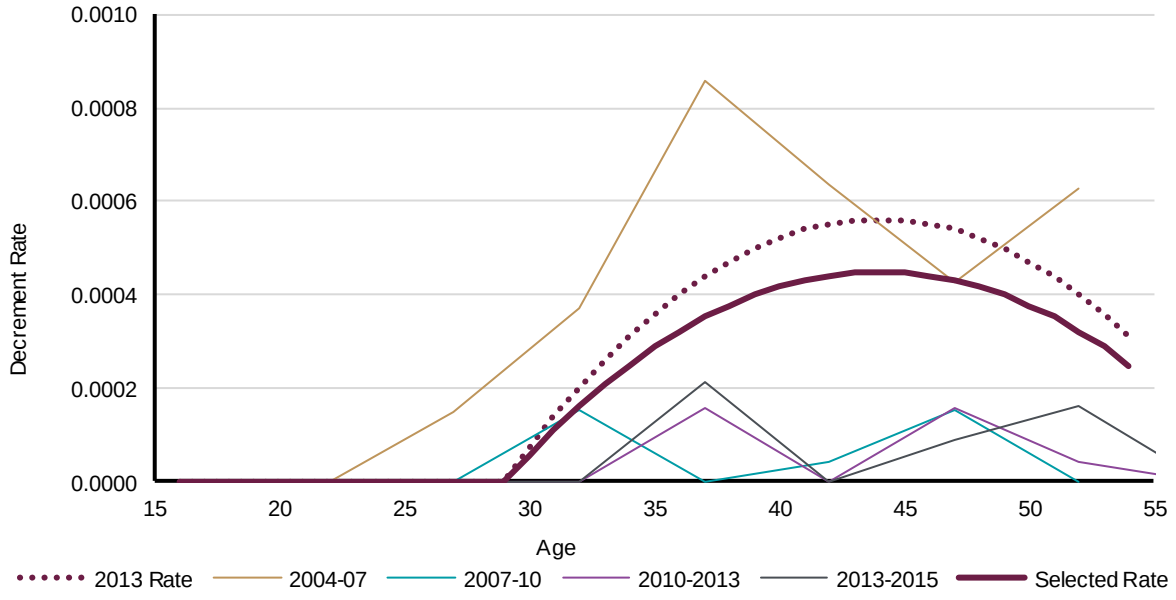
A comparison of actual to expected PPDs of Standard female members during the investigation period is contained in Table 53. The expected number of PPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 53 Actual vs Expected Rates of PPD – Standard Female Members

Age Group	Actual PPDs	Expected PPDs	Ratio of Actual to Expected
30-34	0	0	0%
35-39	1	2	47%
40-44	0	5	0%
45-49	1	6	17%
50-54	2	5	41%
Total	**4**	**18**	**22%**

Similarly to Standard Males, there is very limited PPD experience for Standard Females. Consequently, I have considered the experience of the last four trienniums, as shown in Figure 28. The pattern is quite similar to that observed for the Standard Males, with the 2013 assumption higher than the experience during the eight year period and so I have reduced the assumption for this valuation.

Figure 28 PPD Rates – Standard Female Members



B.4.10 Permanent and Partial Disablement – Police Members

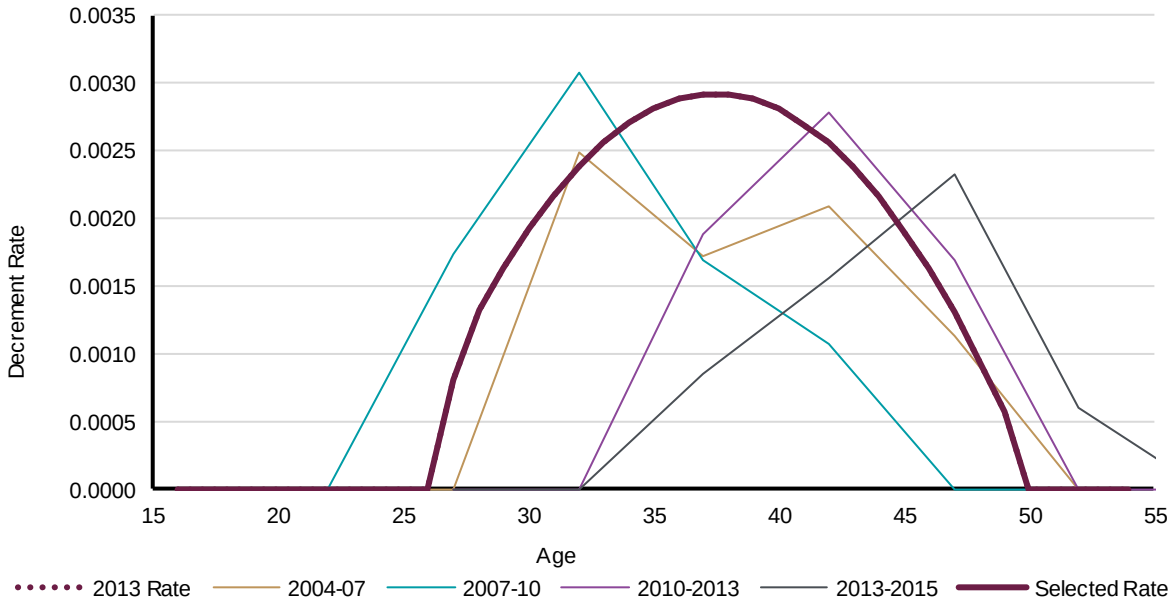
A comparison of actual to expected PPDs for Police members during the investigation period is contained Table 54. The expected number of PPDs has been calculated based on the last Review.

Table 54 Actual vs Expected PPD Rates – Police Members

Age Group	Actual PPDs	Expected PPDs	Ratio of Actual to Expected
35-39	1	3	30%
40-44	4	6	62%
45-49	5	3	177%
50-54	1	0	0%
Total	**11**	**13**	**87%**

Whilst the Police experience is more substantial than for Standard members, there are still very limited numbers of PPDs. Consequently, I have considered the experience of the last four Reviews, as shown in Figure 29. Whilst the patterns are quite volatile, the 2013 assumption looks to be a reasonable fit, as exemplified by the relatively close agreement shown in Table 54. Consequently, I have retained the assumption at this valuation.

Figure 29 PPD Rates – Police Members



B.4.11 Total and Permanent Disablement – Standard Male Members

A comparison of actual to expected retirements due to total and permanent disablement (TPD) of Standard male members during the investigation period is contained in Table 55. The expected

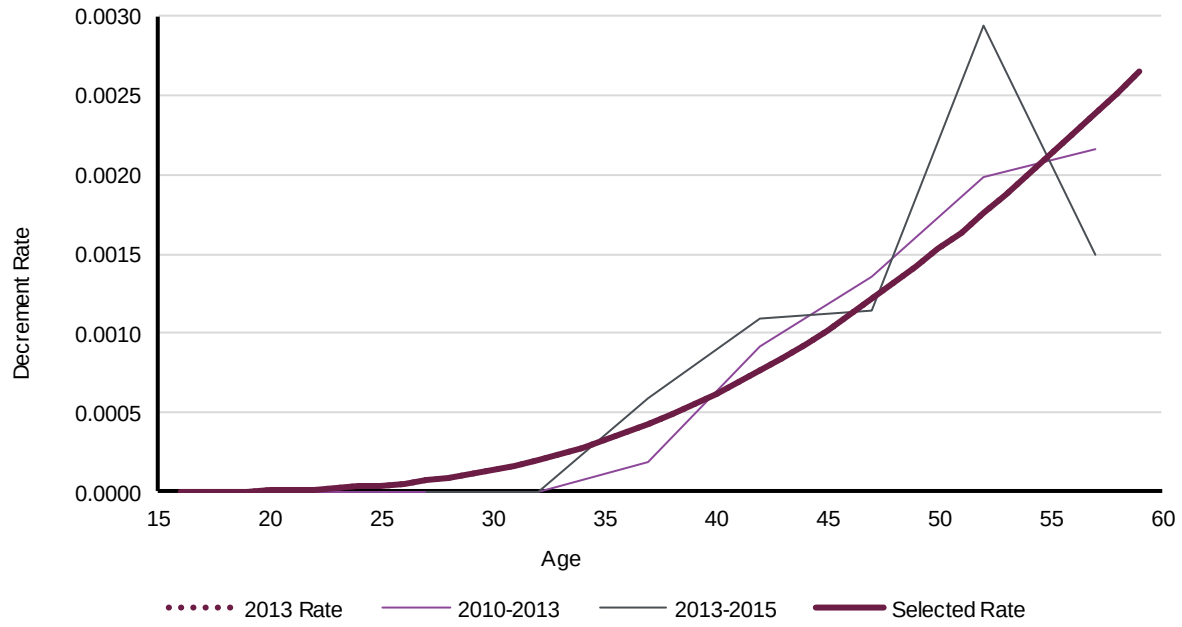
number of TPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 55 Actual vs Expected TPD Rates – Standard Male Members

Age Group	Actual TPDs	Expected TPDs	Ratio of Actual to Expected
35-39	1	1	127%
40-44	5	4	139%
45-49	8	9	93%
50-54	28	17	166%
55-59	14	22	63%
60+	0	0	0%
Total	**56**	**52**	**108%**

Table 55 shows that the actual experience during the intervaluation period has been slightly above the previous assumption, however there is not a great deal of experience and so I have again considered the previous triennium as well, as shown in Figure 30. This shows that the experience during the five year period has been a similar shape to the 2013 assumption and so I have retained the previous assumption.

Figure 30 TPD Rates – Standard Male Members



B.4.12 Total and Permanent Disablement – Standard Female Members

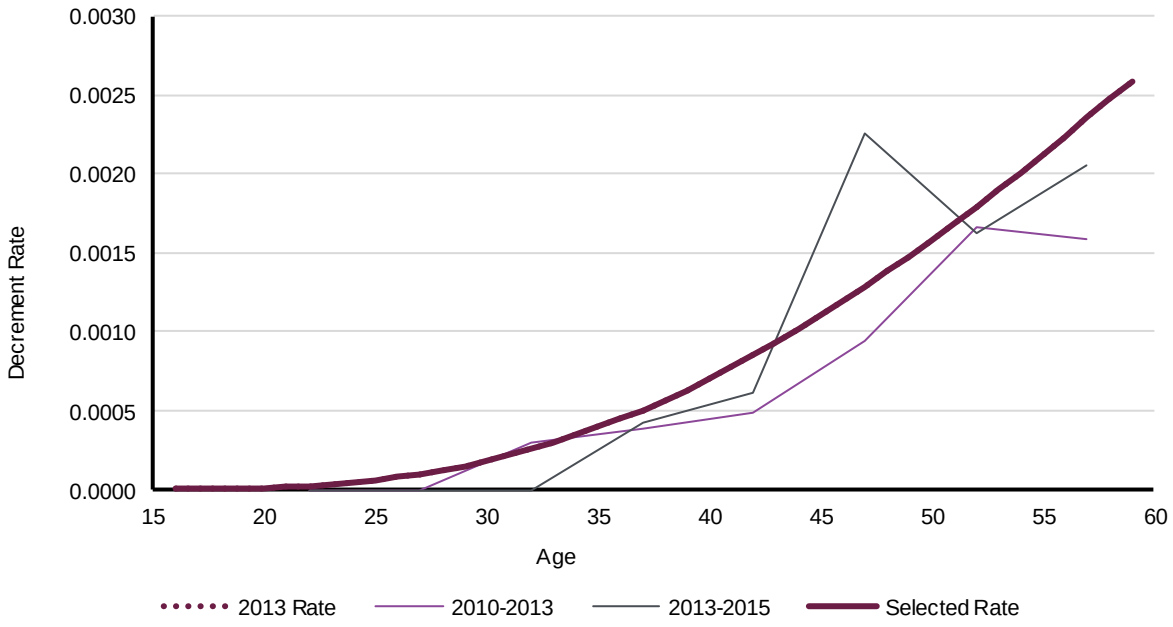
A comparison of actual to expected retirements due to TPD of Standard female members during the investigation period is contained in Table 56. The expected number of TPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 56 Actual vs Expected TPD Rates – Standard Female Members

Age Group	Actual TPDs	Expected TPDs	Ratio of Actual to Expected
35-39	2	3	80%
40-44	6	8	71%
45-49	25	14	175%
50-54	20	22	90%
55-59	24	27	88%
60+	0	0	0%
Total	**77**	**75**	**103%**

The actual experience during the intervaluation period has been slightly above the previous assumption, however there is not a great deal of experience and so I have again considered the previous triennium as well, as shown in Figure 31. This shows that the experience during the five year period has been a similar shape to the 2013 assumption and so I have retained the previous assumption.

Figure 31 TPD Rates – Standard Female Members



B.4.13 Total and Permanent Disablement – Police Members

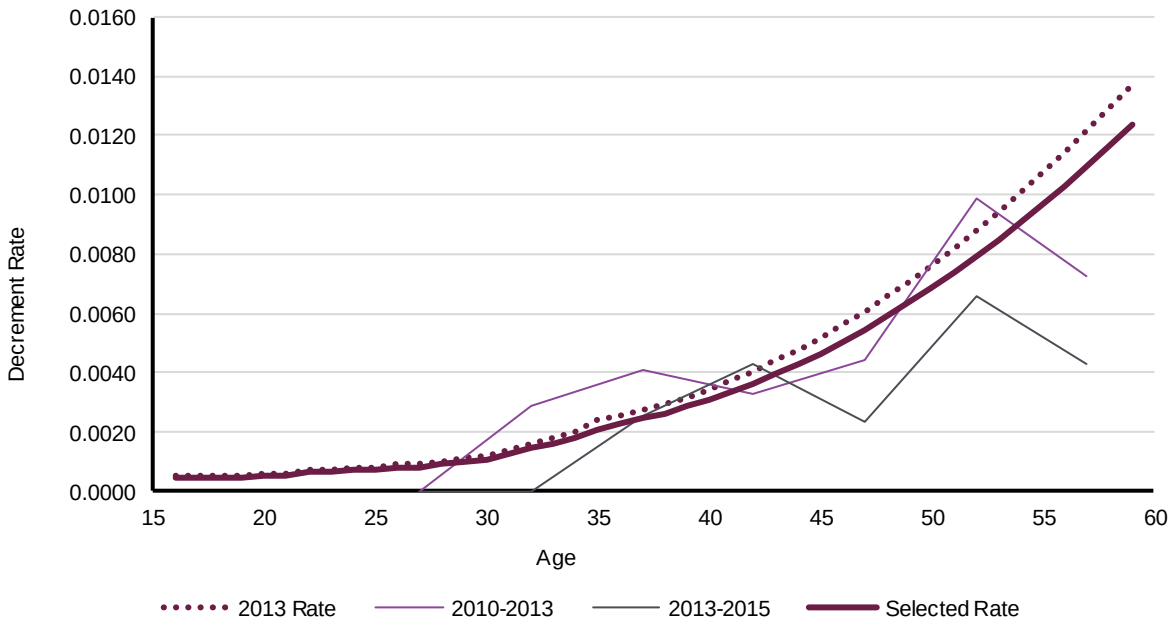
A comparison of actual to expected retirements due to TPD of Police members during the investigation period is contained in Table 57. The expected number of TPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 57 Actual vs Expected TPD Rates – Police Members

Age Group	Actual TPDs	Expected TPDs	Ratio of Actual to Expected
35-39	3	3	90%
40-44	11	11	104%
45-49	5	13	39%
50-54	11	15	75%
55-59	4	11	36%
Total	**34**	**53**	**65%**

The TPD rates for Police members have been much lower than expectation, as is demonstrated in Figure 32, which shows the experience for the last five years. The 2013 assumption is higher than the experience during the five year period and so I have reduced the assumption for this valuation.

Figure 32 TPD Rates – Police Members



B.4.14 Resignation – Standard Male Members

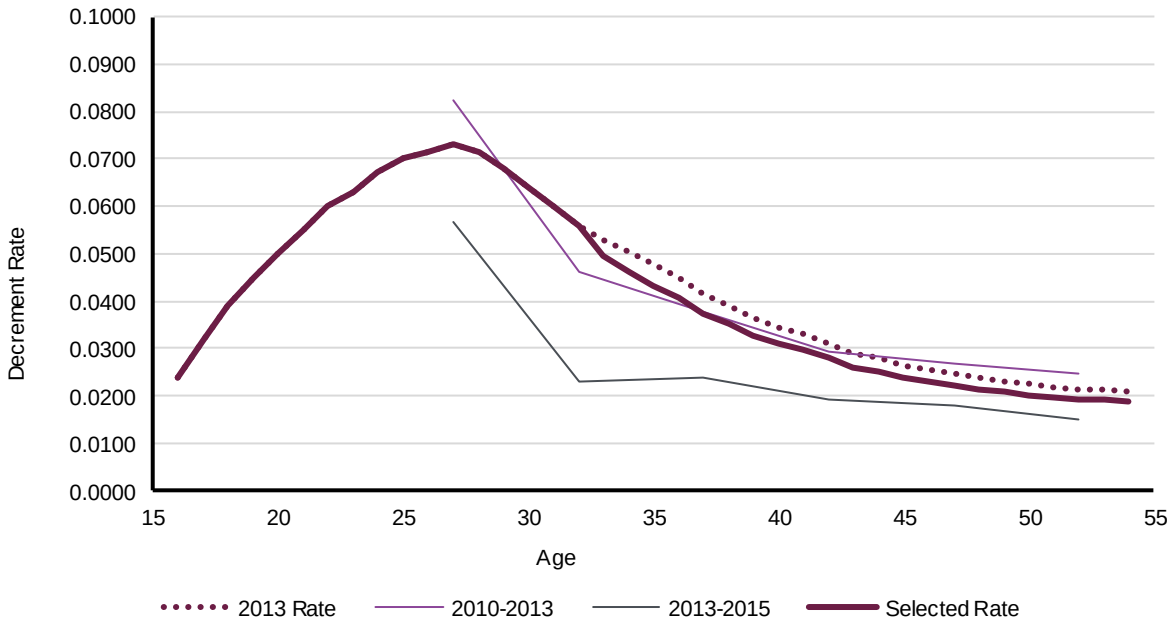
A comparison of actual to expected resignations for Standard Males over the investigation period is contained in Table 58. The expected number of resignations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 58 Actual vs Expected Resignations – Standard Male Members

Age Group	Actual Resignations	Expected Resignations	Ratio of Actual to Expected
25-29	1	1	80%
30-34	5	12	43%
35-39	41	69	59%
40-44	89	141	63%
45-49	125	172	73%
50-54	144	206	70%
Total	**405**	**602**	**67%**

Overall, the experience has been much lower than expectation, as demonstrated in Figure 33, where the experience over the last five years has been shown. Recognising the volatility at the younger ages where there is very little experience, the 2013 assumption has been reduced for this valuation to take account of recent experience.

Figure 33 Resignation Rates – Standard Male Members



B.4.15 Resignation – Standard Female Members

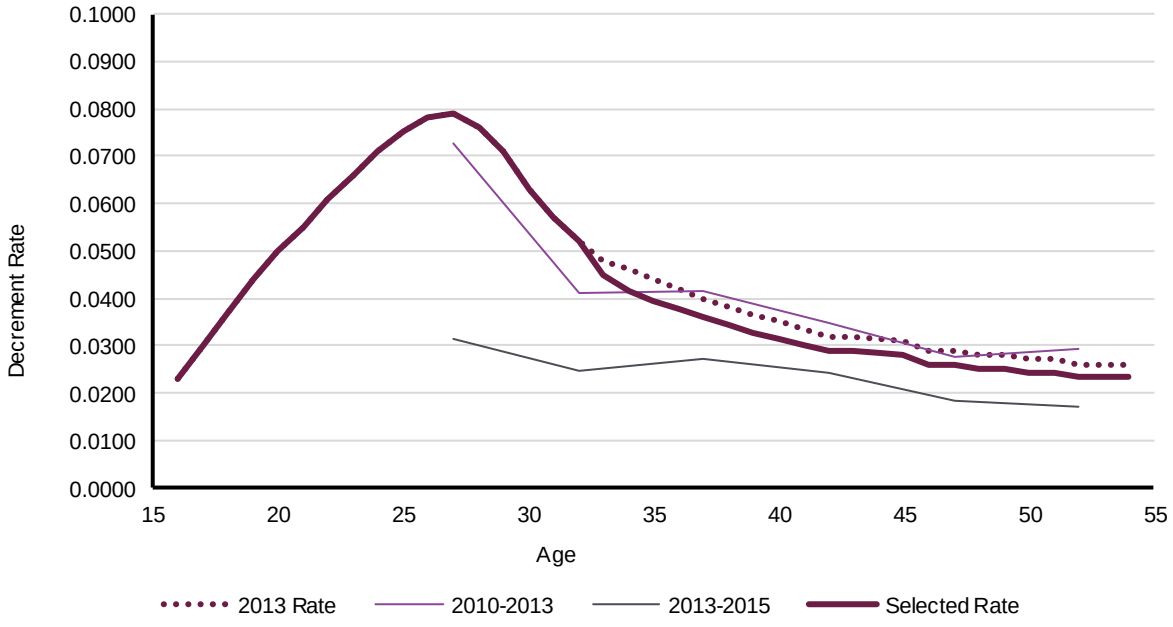
A comparison of actual to expected resignations for Standard Females over the investigation period is contained in Table 59. The expected number of resignations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 59 Actual vs Expected Resignations – Standard Female Members

Age Group	Actual Resignations	Expected Resignations	Ratio of Actual to Expected
25-29	1	2	42%
30-34	9	18	50%
35-39	128	185	69%
40-44	240	324	74%
45-49	206	325	63%
50-54	211	328	64%
Total	**795**	**1,182**	**67%**

Overall, the experience has been below expectation, as demonstrated in Figure 34, where the experience over the last five years has been shown. Recognising the volatility at the younger ages where there is very little experience, the 2013 assumption has been reduced for this valuation to take account of recent experience.

Figure 34 Resignation Rates – Standard Female Members



B.4.16 Resignation – Police Members

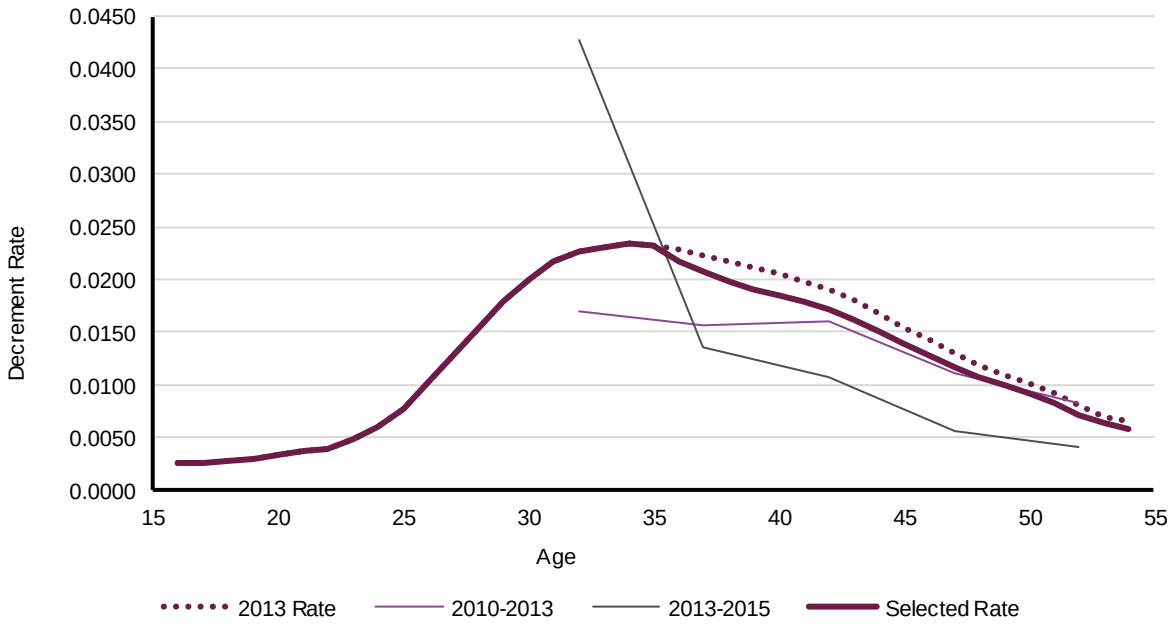
A comparison of actual to expected resignations for Police members over the investigation period is contained in Table 60. The expected number of resignations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 60 Actual vs Expected Resignations – Police Members

Age Group	Actual Resignations	Expected Resignations	Ratio of Actual to Expected
30-34	2	1	185%
35-39	16	26	62%
40-44	28	49	57%
45-49	12	28	42%
50-54	7	14	51%
Total	**65**	**118**	**55%**

Overall, the experience has been below expectation, as demonstrated in Figure 35, where the experience over the last five years has been shown. Recognising the volatility at the younger ages where there is very little experience, the 2013 assumption has been reduced for this valuation to take account of recent experience.

Figure 35 Resignation Rates – Police Members



B.4.17 Involuntary Termination – General

Due to the ad-hoc nature of involuntary terminations, it is difficult to determine their likely future level. However, they need to be considered since the involuntary termination benefit is greater than the actuarial reserve, although the liabilities are not particularly sensitive to variations in this assumption and will become increasingly less so as the active membership continues to age. Involuntary termination includes voluntary early retirements (prior to age 55), retrenchments and redundancies.

B.4.18 Involuntary Termination Experience – Standard Male Members

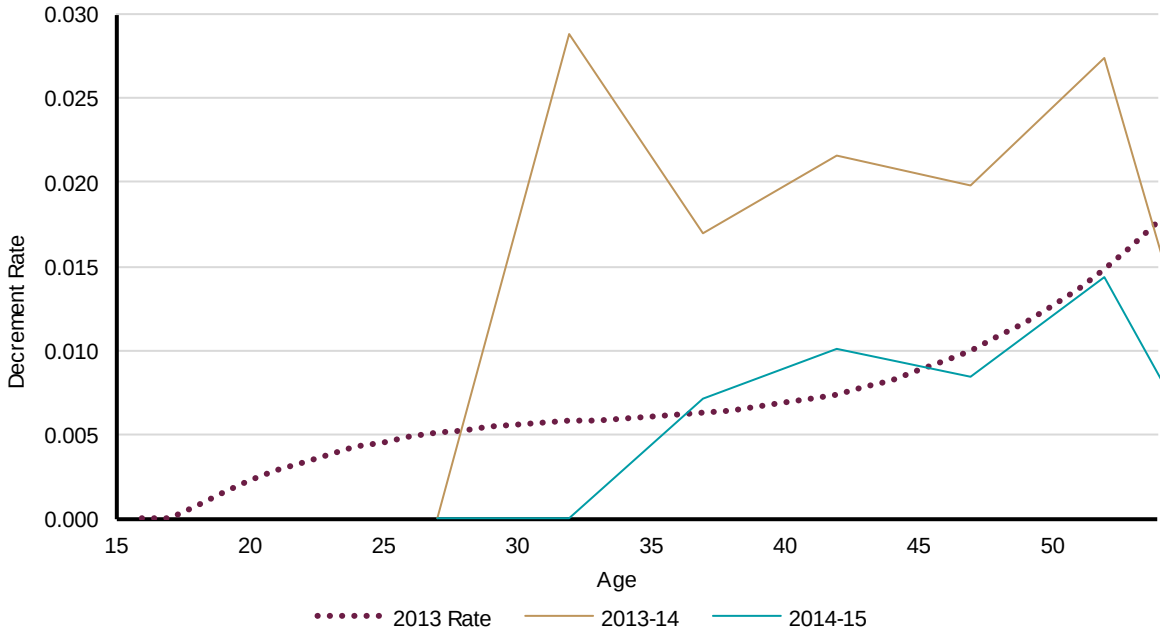
A comparison of actual to expected involuntary terminations for Standard Males under age 55 over the investigation period is contained in Table 61. The expected number of involuntary terminations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 61 Actual vs Expected Involuntary Terminations – Standard Male Members

Age Group	Actual Involuntary Terminations	Expected Involuntary Terminations	Ratio of Actual to Expected
25-29	0	0	0%
30-34	4	1	313%
35-39	22	11	202%
40-44	75	35	216%
45-49	101	71	141%
50-54	205	146	141%
Total	**407**	**264**	**154%**

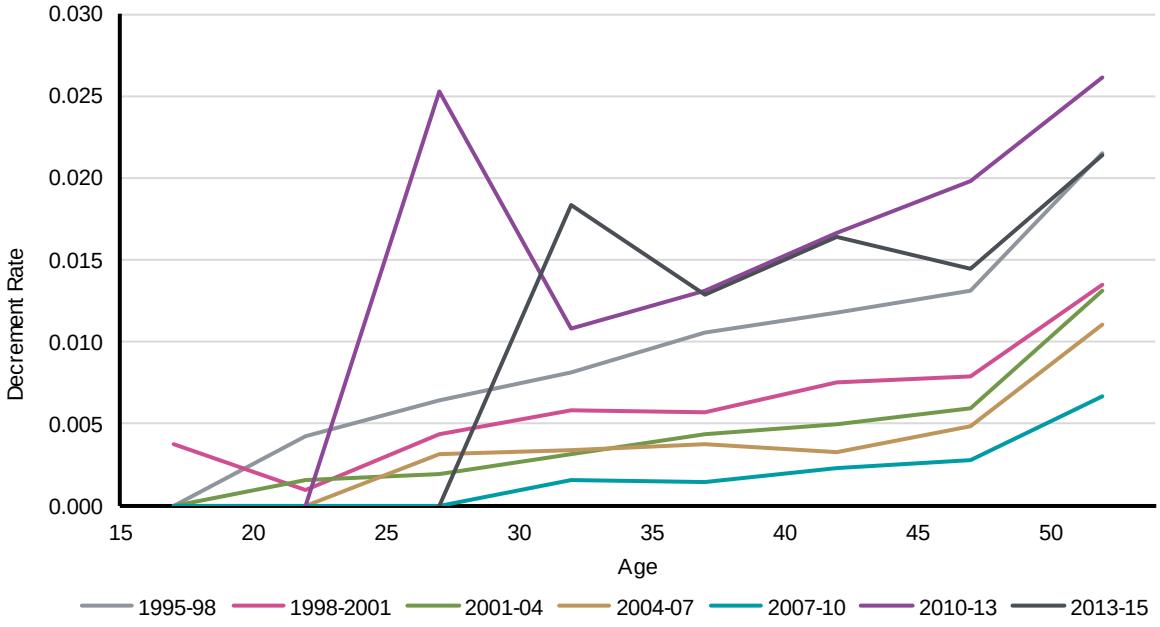
The levels of involuntary terminations over the intervaluation period have been higher than assumed in the last valuation, as illustrated in Figure 36.

Figure 36 Involuntary Termination Rates for Standard Males – 2013-15



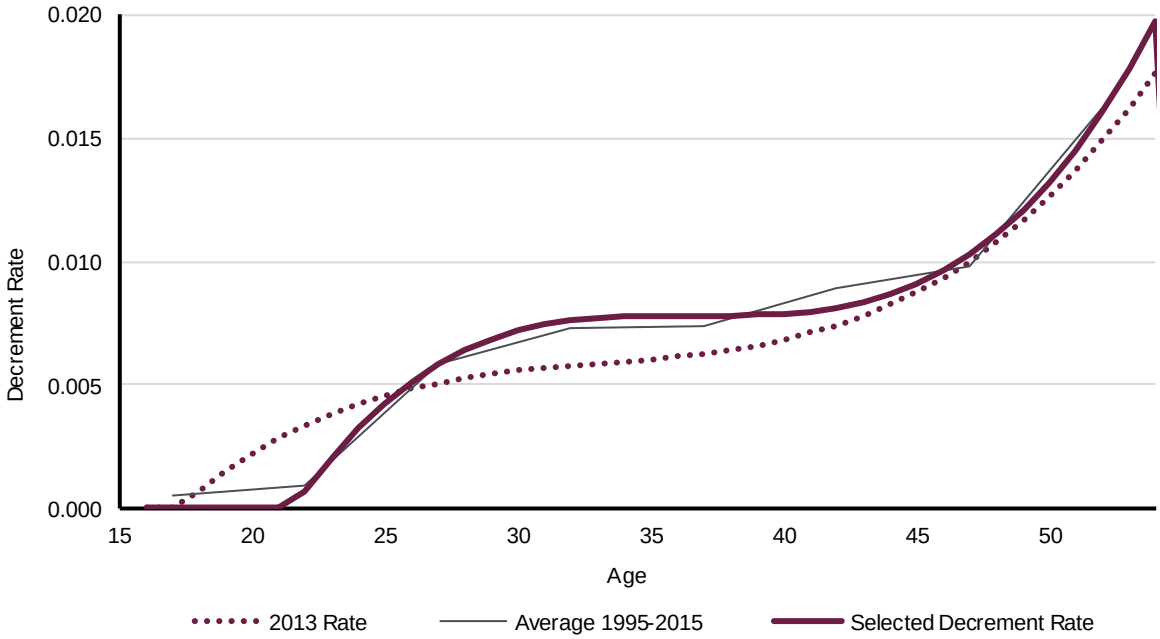
Noting the year by year volatility of involuntary termination rates, I have adopted a similar approach to previous valuations and considered the experience over the longer term. Figure 37 shows the history since 1995 and shows that there is a broadly increasing trend with age but that the levels are quite volatile over time, reflecting the “one off” nature of these programs.

Figure 37 Historical Involuntary Termination Rates – Standard Male Members



Consequently, I have decided to base the assumption on the long-term average since 1995, as shown in Figure 38.

Figure 38 Average and Selected Involuntary Termination Rates – Standard Male Members



B.4.19 Involuntary Termination Experience – Standard Female Members

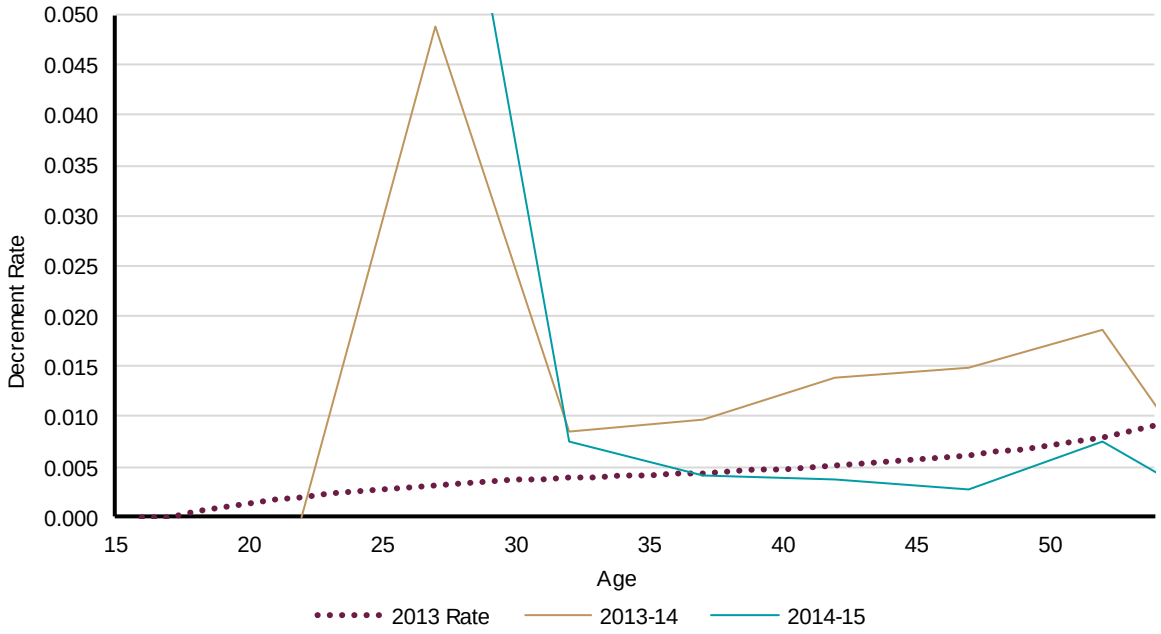
A comparison of actual to expected involuntary terminations for Standard Females under age 55 over the investigation period is contained in Table 62. The expected number of involuntary terminations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 62 Actual vs Expected Involuntary Terminations – Standard Female Members

Age Group	Actual Involuntary Terminations	Expected Involuntary Terminations	Ratio of Actual to Expected
25-29	2	0	1873%
30-34	3	1	206%
35-39	34	21	163%
40-44	89	50	177%
45-49	99	69	143%
50-54	165	100	165%
Total	**392**	**242**	**162%**

Once again, the experience is much greater than expectation and this is confirmed in Figure 39.

Figure 39 Involuntary Termination Rates for Standard Females – 2013-15



Similarly to Standard Males, I have considered the longer term experience and selected the assumption based on that, as shown in Figure 40 and Figure 41.

Figure 40 Historical Involuntary Termination Rates – Standard Female Members

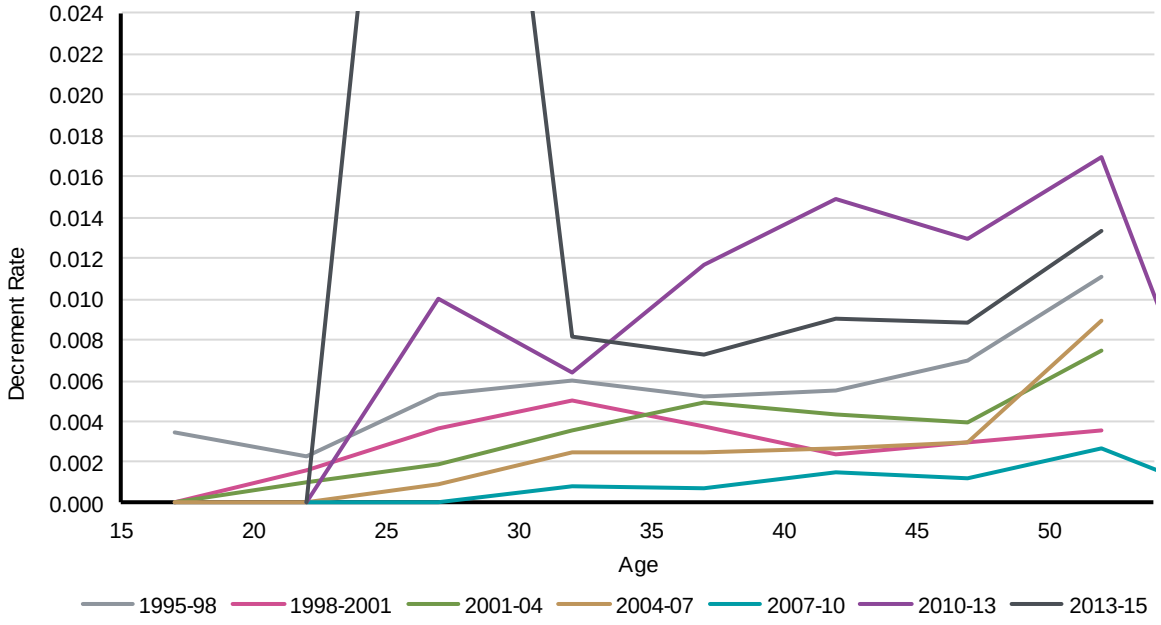
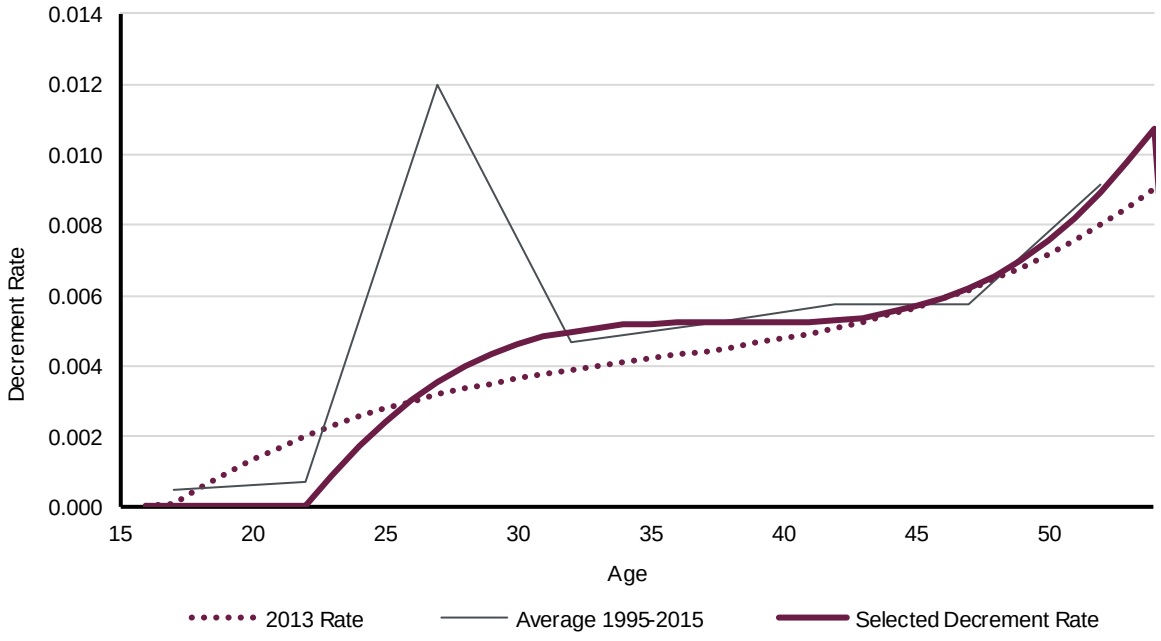


Figure 41 Average and Selected Involuntary Termination Rates – Standard Female Members



B.4.20 Involuntary Termination Experience – Police Members

A comparison of actual to expected involuntary terminations for Police members under age 55 over the investigation period is contained in Table 63. The expected number of involuntary terminations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 63 Actual vs Expected Involuntary Terminations – Police Members

Age Group	Actual Involuntary Terminations	Expected Involuntary Terminations	Ratio of Actual to Expected
25-29	0	0	0%
30-34	0	0	0%
35-39	0	0	0%
40-44	1	1	161%
45-49	0	4	0%
50-54	1	17	6%
Total	**2**	**22**	**9%**

Whilst the number of involuntary terminations for Police is below expectation, the numbers are too small to make statistical inferences. Similarly to Standard Males, I have considered the longer term experience and selected the assumption based on that, as shown in Figure 42 and Figure 43.

Figure 42 Historical Involuntary Termination Rates – Police Members

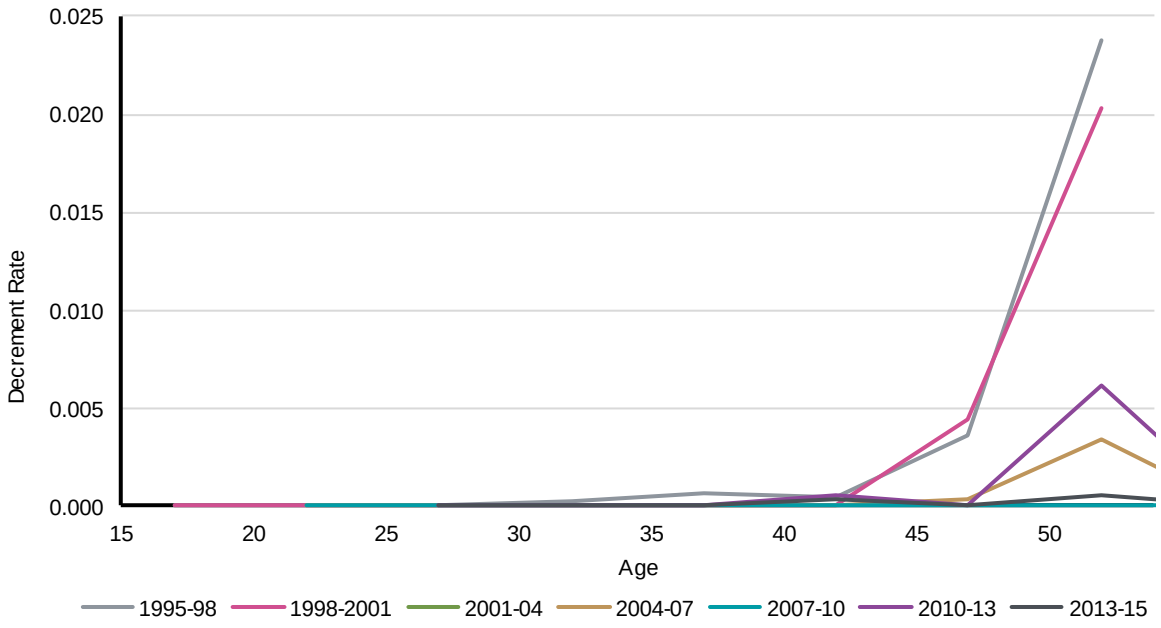
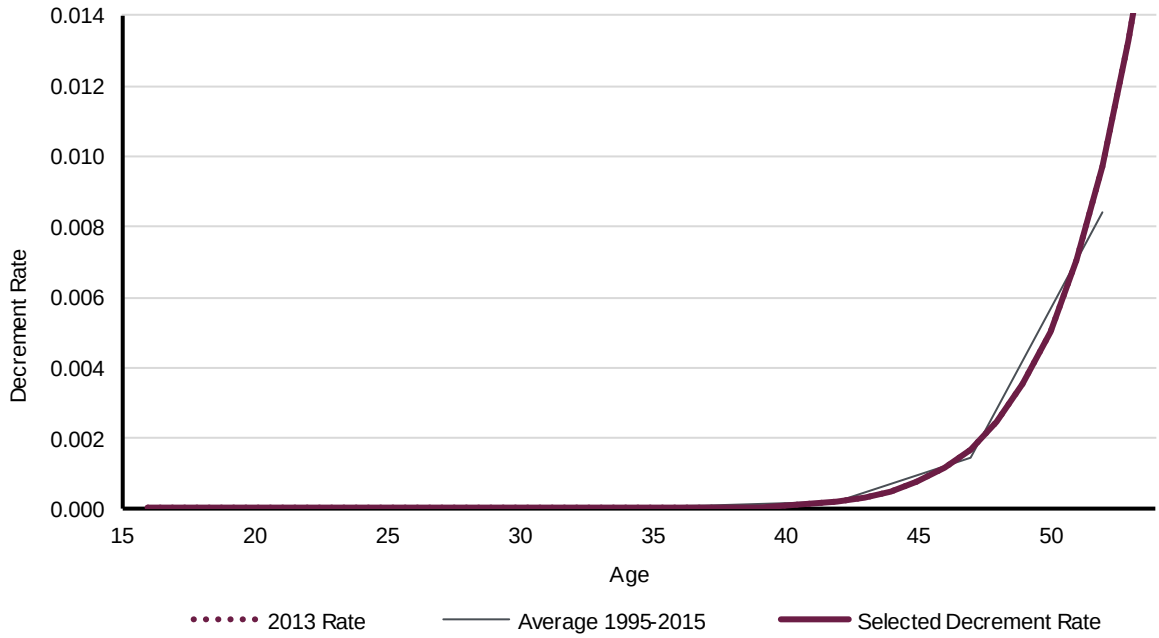


Figure 43 Average and Selected Involuntary Termination Rates – Police Members



B.4.21 Transfers to the Comprehensive Accumulation Category - General

The benefit offered to members of the Standard Defined Benefit Category who transfer to the Comprehensive Accumulation Category is equivalent to the Investment Linked Option (ILO) benefit payable on resignation. Since the option to transfer is available on an open-ended basis, future transfers have a similar financial effect to resignations (although it is possible for resigning members to transfer their entitlements away from QSuper, in practice this occurs rarely). As the rate of transfer does not vary significantly by member type I have considered this at an overall level.

A comparison of actual to expected transfer rates for all members under age 55 over the investigation period is contained in Table 64. The expected number of transfers has been calculated on the basis of the assumptions used in the last actuarial Review.

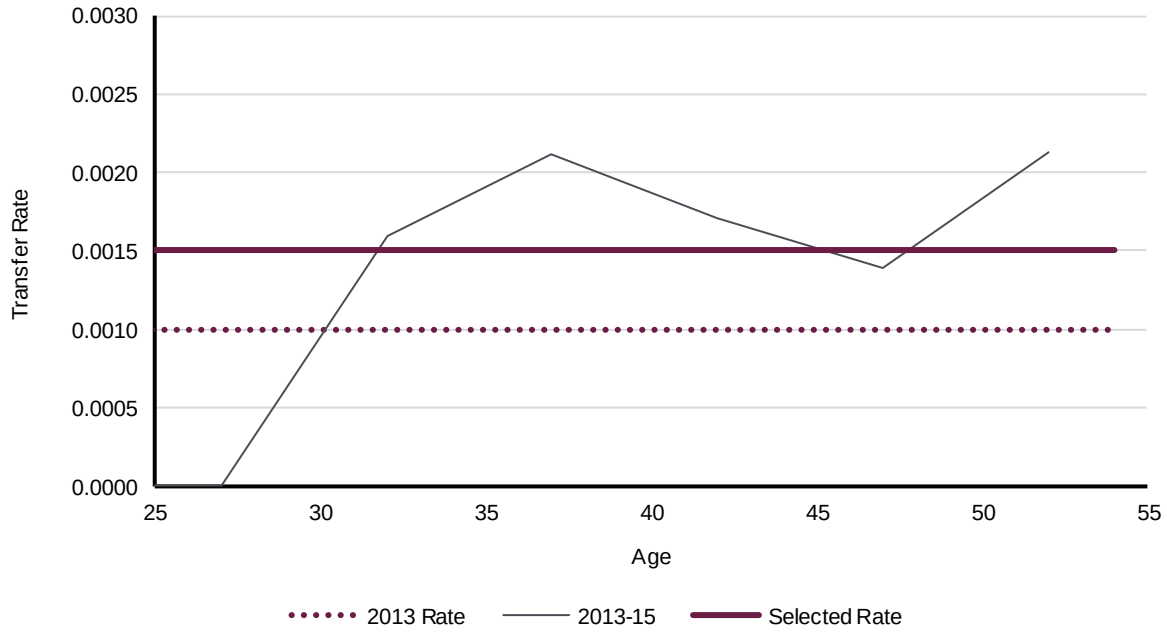
Table 64 Actual vs Expected Transfers – All Members

Age Group	Actual Transfers	Expected Transfers	Ratio of Actual to Expected
25-29	0	0	0%
30-34	1	1	160%
35-39	16	8	212%
40-44	29	17	171%
45-49	28	20	139%
50-54	50	24	213%
Total	**124**	**69**	**180%**

The transfer rates have been consistently above expectation over all age groups over the recent valuation experience, possibly reflecting the amendments to the Deed dated 1 July 2013 which allowed Accumulation members to transfer their entitlements from QSuper whilst remaining employed (portability).

Whilst the transfer rates are still very low and consequently have little effect on the valuation, I have nevertheless decided to increase the assumption to nearer the more recent experience. The experience and the previous new assumed rates are shown in Figure 44.

Figure 44 Transfer Rates – All Members



B.4.22 Family Law Splits and Transition to Retirement Pensions

As noted in Section A.1, members are able to (or may be required to) crystallise part or all of their defined benefit entitlement as a result of a Family Law split or when converting to a Transition to Retirement pension. These events effectively result in an “in-service” benefit payment as the member remains in the Standard Defined Benefit Category and continues to accrue benefits in the usual manner.

The yearly proportions of benefits crystallised under a Family Law split during the investigation period are shown in Figure 45 and the corresponding number of splits in Table 65.

Figure 45 Family Law Proportions Under Age 55 – Experience

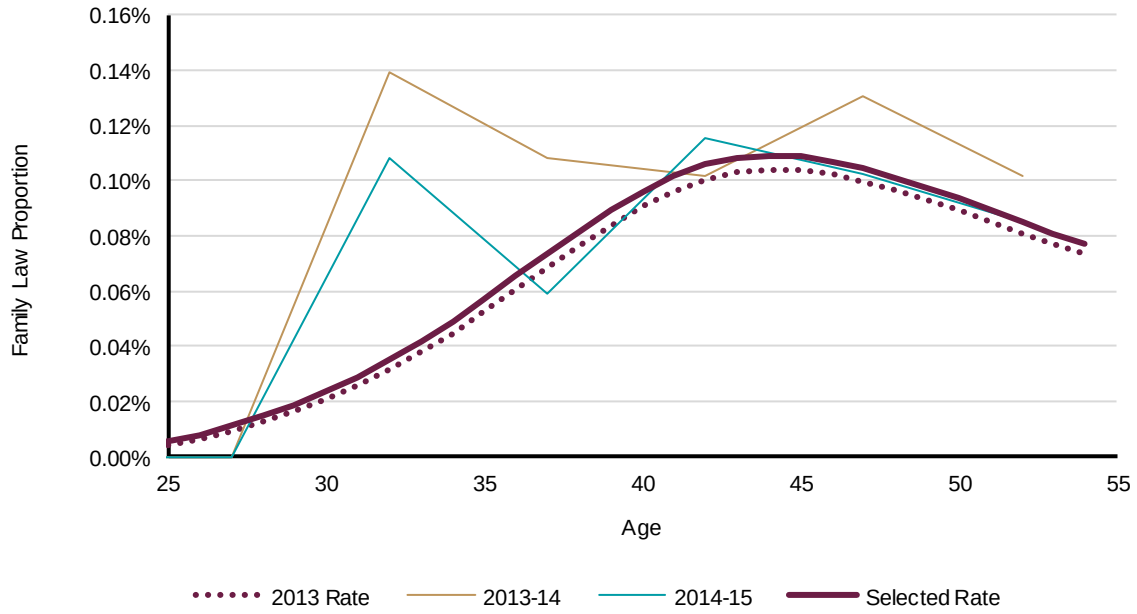


Table 65 Number of Family Law Splits – Under Age 55

Year Ending 30 June	Number of Family Law Splits
2014	106
2015	95
Total	**201**

There is reasonable stability over time and, not surprisingly, an age based trend. The rates are broadly similar in shape over time although at different levels and somewhat higher than assumed in the 2013 Review. Consequently, the assumed proportions of benefits crystallised under a Family Law split have been increased, as shown in Figure 45.

Over age 55, the annual scheme experience for Family Law splits and transition to retirement (TtR) transfers are shown in Figure 46 and the corresponding number of splits and TtR transfers in Table 66.

Figure 46 Family Law and TTR Proportions Over Age 55 – Experience

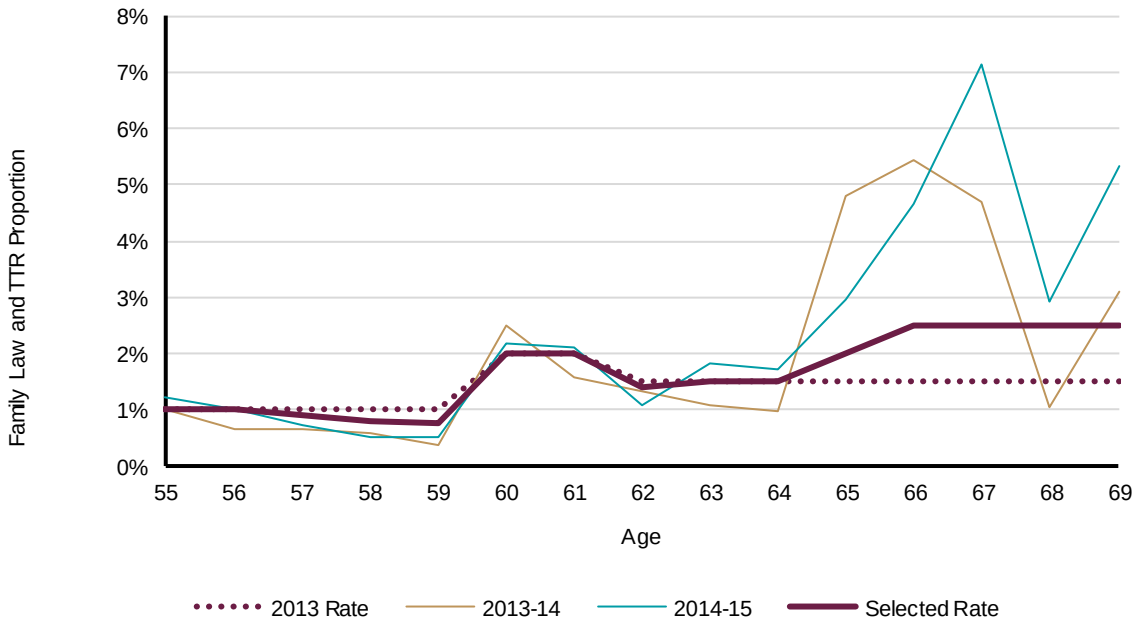


Table 66 Number of Family Law Splits and TtR Conversions - Over Age 55

Year Ending 30 June	Number of Family Law Splits	Number of TTRs
2014	31	663
2015	33	834
Total	**64**	**1,497**

The rates are broadly similar in shape over time although quite volatile and lower than assumed in the 2013 Review over most ages below age 65 and higher than that assumed over most ages above age 65. Consequently, the assumed proportions of benefits crystallised under a Family Law split or a TtR have been adjusted to reflect more recent experience, as shown in Figure 46.

B.4.23 Leaving Service – Parliamentary Category

As noted is Section B.1, the decrement assumptions for the Parliamentary Category have been based on those derived from the experience of the relevant groups within the Standard Defined Benefit Category, due to the insignificance of these liabilities in the overall context of QSuper. However, an important assumption for the Parliamentary members, which cannot be inferred from any analysis of the Standard Defined Benefit Category, is the probability of exit at each election.

At the 2015 election, approximately 47% of members retired or were defeated. It might be expected a priori that both the probability of voluntary retirement and election loss might be correlated with the number of times already elected and therefore the member's service prior to the election. However, even the relatively large number of exits at a number of recent elections does not provide a sufficiently large sample of data on which to base statistically valid inferences. A detailed investigation of the leaving service experience for the previous 8 elections was conducted at the last Review and this

analysis has been extended to include the experience from the latest election on 31 January 2015, as illustrated in Table 67.

Table 67 Percentage of Members Exiting by Years of Service

Years of Service at Election	Election									
	1992	1995	1998	2001	2004	2006	2009	2012	2015	1992-2015
0-4	13%	19%	44%	44%	18%	0%	0%	0%	0%	22%
4-8	8%	19%	0%	20%	0%	19%	0%	0%	0%	11%
8-11	0%	0%	23%	33%	0%	7%	25%	50%	29%	22%
11+	36%	18%	39%	40%	22%	37%	38%	67%	54%	39%
Total	**17%**	**16%**	**29%**	**38%**	**15%**	**21%**	**24%**	**62%**	**45%**	**27%**

As can be seen from Table 67, there has been considerable variation in the probabilities of exit from election to election with no real trend evident. Overall though, there would appear to be justification to assume varying probabilities of exit depending on service prior to the election.

In view of the relative insignificance of this assumption for QSuper overall, I have decided to base this assumption on the most recent election experience, and noting that there are no members remaining with service under 11 years, so that the 11+ service band is now the only relevant service band. These resulting probabilities are shown in Table 68.

Table 68 Percentage of Parliamentary Category Members Exiting at Future Elections

Years of Service at Election	Probability of Exit at Election
0-4	0%
4-8	0%
8-11	0%
11+	60%

B.5 Deferred Retirement Benefit

As discussed in Section A.1.11, Standard Defined Benefit Category members receive an AWOTE indexed benefit (the deferred retirement benefit or DRB) on leaving employment prior to age 55. This benefit can be converted at any time to a cash equivalent amount (ILO) invested in the Basic Accumulation Category earning investment returns in line with the member's choice of investment strategy. The conversion involves discounting the balance of the AWOTE indexed benefit by 2.88% compound for each year below age 55.

Where the assumed real discount rate in the actuarial valuation is different from 2.88%, allowance needs to be made for the effect of the ILO, both in respect of the existing DRB population and also the future DRB members who are projected to withdraw from the Standard Defined Benefit Category.

The rates at which existing members with deferred retirement benefits have converted to the investment linked option over the investigation period are shown in Table 69.

Table 69 ILO Conversion Rates for Existing DRB Members

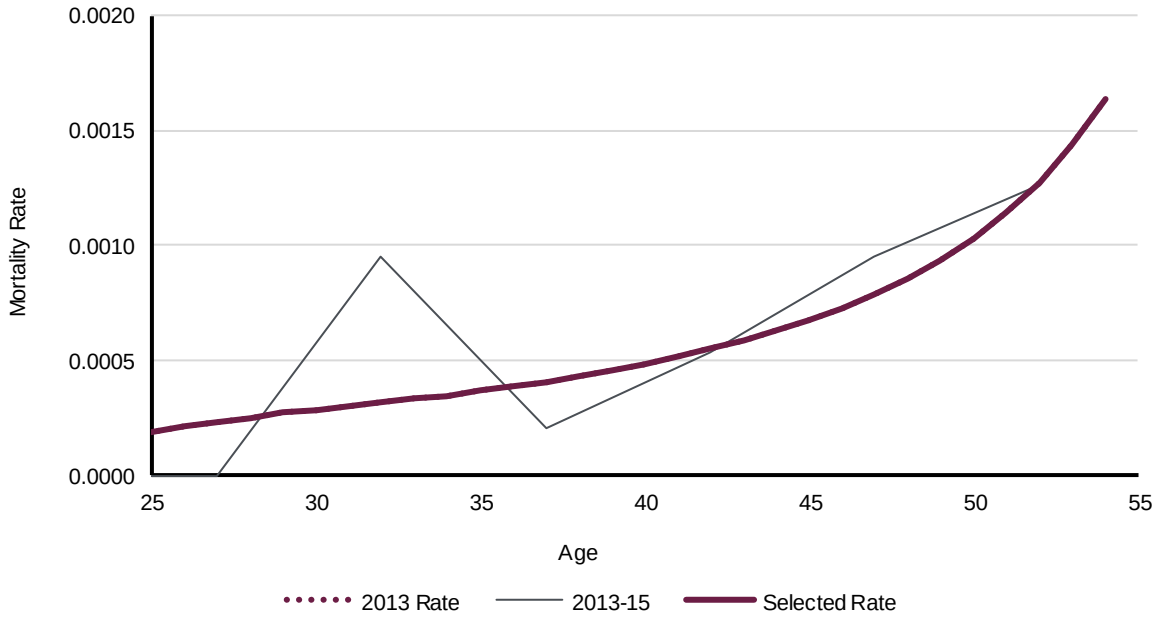
Year	Average
2013-2014	1.2%
2014-2015	1.5%
2013-2015	**1.4%**

Whilst there is some evidence to suggest that age-based rates are warranted, the additional complexity is not justified given the minimal impact on the scheme's liabilities. The rates over the inter-valuation period have been lower than assumed in the 2013 Review, continuing a trend observed in the last Review. Consequently, I have reduced the assumed rate at which members convert their DRB to the ILO in future from 1.7% to 1.5%.

The liability for existing DRB members has been calculated by projecting their benefits with AWOTE until age 55, but allowing for the conversion of their benefits to the ILO at the assumed rate of 1.5% per year and also for the payment of the face value on death or permanent disablement prior to age 55.

The graduated rates of DRB members exiting due to mortality or disablement over the inter-valuation period have been derived and compared with the previous assumptions. The mortality rates of existing members with deferred retirement benefits are illustrated in Figure 47.

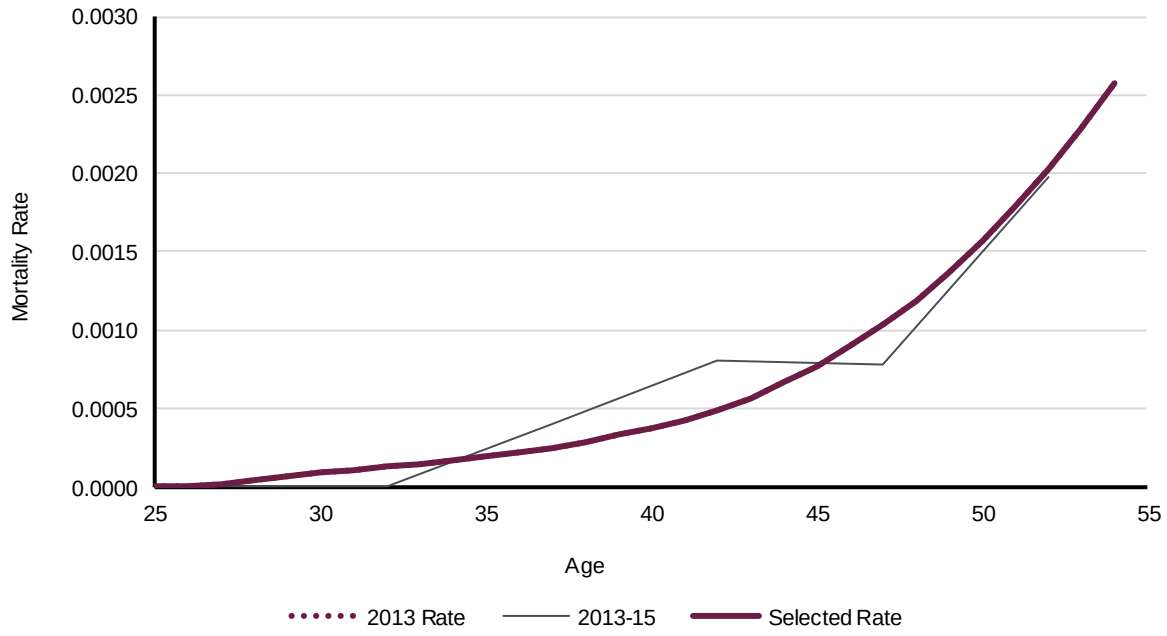
Figure 47 Mortality Rates for Existing DRB Members



Noting that the mortality rates at the younger ages are volatile due to the small numbers of DRB members at these ages, the experience during the intervaluation period has been quite consistent with the 2013 assumption. Consequently, it has been retained for this valuation.

The TPD rates of existing members with deferred retirement benefits are illustrated in Figure 48.

Figure 48 TPD Rates for Existing DRB Members



The TPD rates for existing DRB members have been consistent with those previously assumed. Consequently, the assumed TPD rates for existing DRB members have been retained, as shown in Figure 48.

The difference between the liability in respect of existing DRB benefits at the investigation date as described above and that obtained by simply discounting the existing balances at the real investigation discount rate to age 55 measures the effect of the future ILO conversion option and the implicit insurance provided on death and TPD. Based on the membership with a DRB benefit at the investigation date, the loading necessary to allow for ILO conversion and the implicit insurance has been estimated to be 0.1%. This represents a decrease from that assumed in the 2013 Review, noting that the real discount rate has decreased at this Review and is now closer to the ILO discount rate of 2.88%.

It has been assumed that future DRB members will have similar characteristics to the existing DRB members with regard to their propensity to subsequently convert to the ILO and their death and disablement rates. The relative increase in the liability estimated above in excess of that calculated ignoring the ILO option and the death and disablement decrements can therefore be used as a loading for projected DRB liabilities emerging on future resignations.

It is also possible to examine the experience of resigning members who have the option of converting their (default) DRB into the ILO immediately upon exit. The proportions of exiting members choosing the ILO over the investigation period are displayed in Table 70.

Table 70 Proportion of Resigning DB Members Choosing the ILO at Exit

Year	Average
2013-2014	3.1%
2014-2015	1.2%
2013-2015	**2.4%**

Whilst there is some evidence to suggest that age-based rates are warranted, the additional complexity is not justified as the impact on the scheme's liabilities is minimal. Given the experience over the inter-valuation period it was decided to retain the assumption regarding the number of DB members who would select the ILO rather than the default DRB at resignation at 2.0%.

B.6 Pensions

B.6.1 Pensioner Mortality

The mortality of pensioners has minimal impact on the overall QSuper liability and there is relatively little data. At the 2010 valuation, a broad analysis was undertaken to determine the suitability of the age ratings applied to the population mortality rates, with the results shown in Table 71. In view of the immateriality of these assumptions and the lack of data from which to justify any change, I have decided to retain the previous assumptions.

Table 71 Pensioner Mortality Age Ratings

Type of Pension	Males	Females
Age Retirement	- 2 years	- 2 years
Ill-Health Retirement	+ 4 years	+ 4 years
Spouse	- 2 years	- 2 years

The base mortality rates used were derived from the Queensland Life Tables 2012-2014 (Males or Females as appropriate with the Male values used for Police) as produced by the Australian Bureau of Statistics.

When valuing current and future pensions, it is prudent to allow for expected future improvements in mortality because the liabilities would otherwise be undervalued. The Australian Government Actuary published mortality improvement rates based on the last 25 and 125 years of population mortality experience in the Australian Life Tables 2010-2012. There are no definitive reasons to choose either set of rates, although I note that Mercer's study of public sector pensioner mortality[29] used the 25 year assumption when projecting forward past mortality rates in their analysis and the use of the 25 year rates in the 2013 valuation. In the absence of compelling evidence to the contrary, the 25 year expected mortality improvements have been retained for this Review. These rates are shown in Appendix C.

An assumption as to the proportion of future pensioners who are married is needed in order to value the pension entitlement of spouses. The pension is more valuable to a member when they are married due to the reversion that is paid to the spouse on the member's death. It is therefore more likely that those members who choose the pension are married. Therefore the assumption used in the last Review (viz. that all future pensioners are married) has been retained for this Review. Assumptions are also made regarding the proportion of spouses who would commute their pension on the death of the former member.

[29] See http://actuaries.asn.au/Library/Events/FSF/2014/BoyfieldWilsonMortalityPaper140505.pdf

B.6.2 Pension Increases

There are two categories of pensions. The majority of pensions are increased annually by CPI. There are a small number of pensions that are increased annually by the change in the Parliamentary backbencher salary. Both types of pensions are increased annually in the first full fortnight in August. Pensions that are linked to CPI are increased according to the percentage increase in the Brisbane All Groups CPI for the year to the previous June quarter. Pensions that are linked to the Parliamentary backbencher salary are increased according to the percentage increase in the Parliamentary backbencher salary over the financial year. Table 72 shows the increases experienced in the last 2 years.

Table 72 Pension Increases since 30 June 2013

Year Ending 30 June	Increase in CPI linked Pensions	Increase in Salary linked Pensions
2014	3.2%	8.5%
2015	1.5%	0.0%
Average 2013-2015	**2.4%**	**4.2%**

As can be seen from Table 72, CPI linked pension increases have been slightly lower than the average 2.75% p.a. assumed at the last Review, whereas those linked to Parliamentary backbencher salary have been higher than the 3.75% p.a. assumption.

For this Review it has been assumed that CPI linked pensions will increase at the rate of 2.2% p.a. and salary linked pensions will increase at the rate of general salary inflation of 3.2% p.a. (as discussed in Section B.3.1).

B.6.3 Proportion Taking Pensions – Standard Defined Benefit Category

The proportion of TPD exits who selected the pension option on exiting the Standard Defined Benefit Category throughout the last two years was 62.4%.

At the last Review it was assumed that 50% of members exiting due to TPD would take a pension, having been increased from 25%, recognising the greater cost of pension benefits compared to the lump sum and the increase in consumer preferences towards pensions in recent years. It should be acknowledged however that only one year of experience contributed to the average experience being greater than that assumed. On this basis, the assumed proportion has been retained at 50%.

B.6.4 Proportion Taking Pensions – State Category

It is necessary to make an assumption as to what proportion of contributors and also what proportion of pensioner spouses will choose a pension benefit. This parameter has a significant effect on the value of the Category's liabilities and is the only one that has been investigated in detail for the State and Police categories.

A comparison of the expected and observed proportions of State Category retirees not commuting their pension entitlement is shown in Table 73. When determining the proportions taking pensions, partial commutations were assumed to be 50% on average.

Table 73 Proportion Taking Pensions – State Category[30]

Type of Pension	Number taking Full Pension	Number Fully Commuting	Number Partial Commutation	Total Number	Proportion Taking Pension	2013 Valuation Assumption
Age - Males	22	7	0	29	76%	75%
Age - Females	14	13	2	29	52%	75%
Age - Persons	**36**	**20**	**2**	**58**	**64%**	**75%**
Ill-Health - Males	3	0	0	3	100%	75%
Ill-Health - Females	2	1	0	3	67%	75%
Ill-Health - Persons	**5**	**1**	**0**	**6**	**83%**	**75%**
Spouse on Death of Contributor	**0**	**1**	**-**	**1**	**0%**	**50%**
Spouse on Death of Pensioner or Commuter	**14**	**21**	**-**	**35**	**40%**	**50%**

The proportion electing pensions for Age and Ill-Health retirement and for reversionary pensioners over the last two years has been broadly consistent with the 2013 valuation assumption, whilst the number of spouse's pensions on contributors' death has been below expectation. On the basis of these trends indicated in Table 73 and recognising the materiality of this assumption within the overall valuation, it has been decided to retain the previous pension proportions, viz

- 75% of age retirees will take the pension;
- 75% of ill-health retirees will take the pension;
- 50% of pensioner spouses will take the pension.

B.6.5 Proportion Taking Pensions – Police Category

A comparison of the expected and observed proportions of Police Category retirees not commuting their pension entitlement is shown in Table 74.

Table 74 Proportions Taking Pension – Police Category

Type of Pension	Number taking Pension	Number Fully Commuting	Number Partial Commutation	Proportion Taking Pension	2013 Valuation Assumption
Age - Males	3	6	0	33%	50%
Age - Females	0	2	0	0%	50%
Age - Persons	**3**	**8**	**0**	**27%**	**50%**
Ill-Health - Males	1	1	0	50%	50%
Ill-Health - Females	0	2	0	0%	50%
Ill-Health - Persons	**1**	**3**	**0**	**25%**	**50%**
Spouse on Death of Contributor	**0**	**1**	**-**		**50%**
Spouse on Death of Pensioner or Commuter	**6**	**5**	**-**	**55%**	**50%**

[30] Data on the numbers of spouses partially commuting their benefits was not available.

On the basis of the trends indicated in Table 74, the scarcity of relevant experience and the effect of this parameter on the Review as a whole, it has been decided to retain the previous assumed pension proportions, viz

- 50% of age retirees will take the pension;
- 50% of ill-health retirees will take the pension;
- 50% of pensioner spouses will take the pension.

B.6.6 Proportion Taking Pensions – Parliamentary Category

The experience of the Parliamentary Category for the last 7 elections is illustrated in Table 75.

Table 75 Proportion Taking Pensions – Parliamentary Category

Election	Proportion Taking Pension
1995 or earlier exit	24.9%
1998 or earlier exit	67.3%
2001 or earlier exit	36.4%
2004 or earlier exit	79.2%
2006 or earlier exit	78.5%
2009 or earlier exit	83.4%
2012 or earlier exit	95.1%
2015 or earlier exit	75.1%

At the last Review it was assumed that 90% of those members eligible would take a pension. The average pension proportion has decreased since the last Review however it is considered likely that the proportion of members taking pensions in the future will continue to be high due to the attractiveness of the salary indexed pension. It has therefore been decided to retain the assumption to 90% for this Review.

There have not been any deaths in service and only limited numbers of deaths of pensioners (eight over the last eight years) who all elected to receive the pension. It was therefore decided to assume that all Parliamentary spouses would choose a pension; viz.100%.

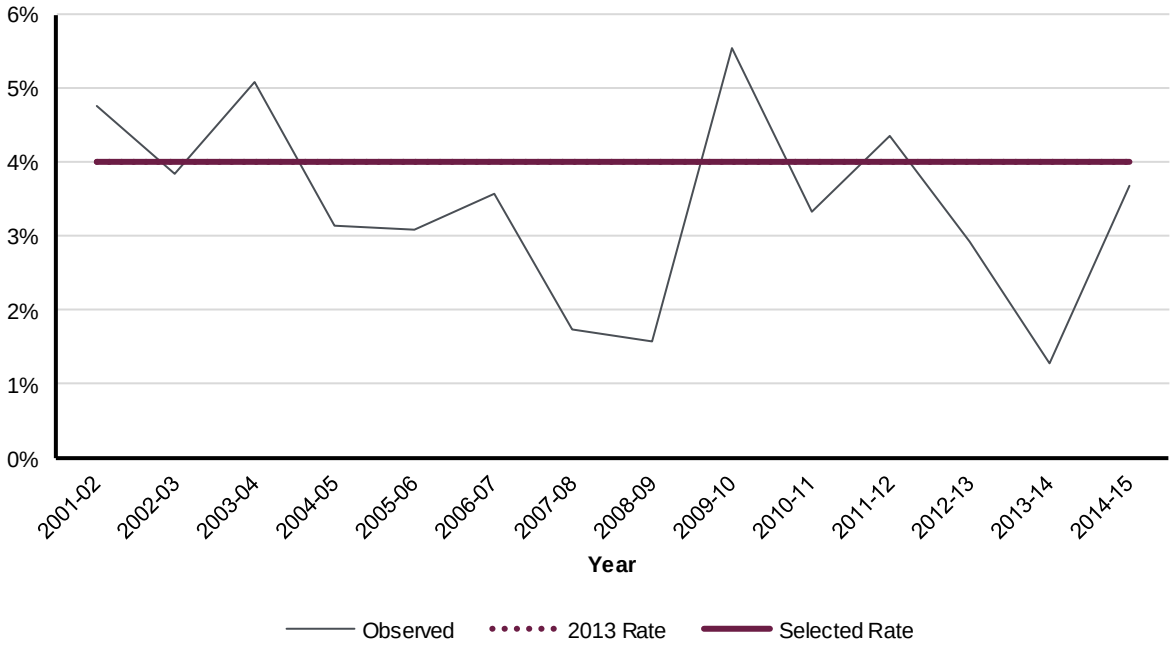
B.6.7 Child and Orphan Pensions

The cost of child and orphan pensions commencing in each year as a percentage of the death benefits paid in that year for the Standard Defined Benefit Category was 2.3% over the investigation period. The child pensions have been valued ignoring mortality and assuming that the pension continues until age 20 if a child is currently aged under 20 and until age 25 for children currently aged 20 or older. Further, the Deed provides that children who, in the opinion of the Board, have a disability as defined under the Disability Services Act 2006 are entitled to a lifetime pension, but the number of expected claims is low and considered immaterial in the context of the valuation.

The latest experience is slightly lower than the 4% rate chosen at the last Review, however the longer term trends are considered in Figure 49, which indicate that the previous assumption remains

reasonable. Consequently, I have decided to retain the assumption that the value of child pensions will be 4% of the level of future lump sum death benefits.

Figure 49 Child Pensions as Proportion of Lump Sum Death Benefits



Due to the size of the Standard Defined Benefit Category relative to the State and Police Categories it was decided to also use this experience as the basis for the loading assumed for these Categories. It has therefore been assumed that the value of child and orphan pensions will be equivalent to 4% of the value of lump sum death benefits paid from each of these Categories.

B.7 Income Protection Benefit

In order to determine the accrued liabilities relating to income protection claims prior to the valuation result as well as the estimated incurred cost of these benefits in future, a payments per active claim (PPAC) model has been applied, separately for Standard Males and Standard Females [31]. The effects of past benefit indexation have been removed when determining the benefit as a percentage of salary and then future inflation has been explicitly projected. The model projects the number of active claims (i.e. claims in receipt of payment) and average salary per claim at any point in time and applies a benefit percentage which is dependent on the time of payment.

It should be noted that this analysis does not cover the income protection benefit provided within the Comprehensive Accumulation Category. Based on experience with the self-insurance arrangements within the Accumulation Category, I believe that the PPAC approach provides a more robust assessment of the underlying trends in claim payments and therefore justifies its additional complexity.

[31] Police members are not eligible for an income protection benefit, as the Police Service uses a sick leave bank arrangement for temporary incapacity.

B.7.1 Payments Per Active Claim Method

The payments per active claim (PPAC) projection method models the relationship between the size of monthly gross benefit payments and average salaries at claim commencement and the continuance of a claim from incident to finalisation.

Historical salaries at claim commencement are divided by the number of active claims in each development month[32] and these average salaries are then averaged again by incident month, resulting in an effective weighted average by claim activity, S_I for incident period *I*.

Historical payments are divided by the total salaries at claim commencement of active claims in each development month to produce benefit proportion values of the form:

$$BenProp_{I,t} = \frac{P_{I,t}}{S_{I,t}}$$

where

$P_{I,t}$ are the claim payments made in the period *t-1* to *t* for incident period *I,* deflated to remove the effects of CPI increases to benefits in payment at each July 1

$S_{I,t}$ are the total salaries in respect of active claims in the period *t-1* to *t* for incident period *I*

are derived from the historical experience. *BenProp* selections are then made for each development period.

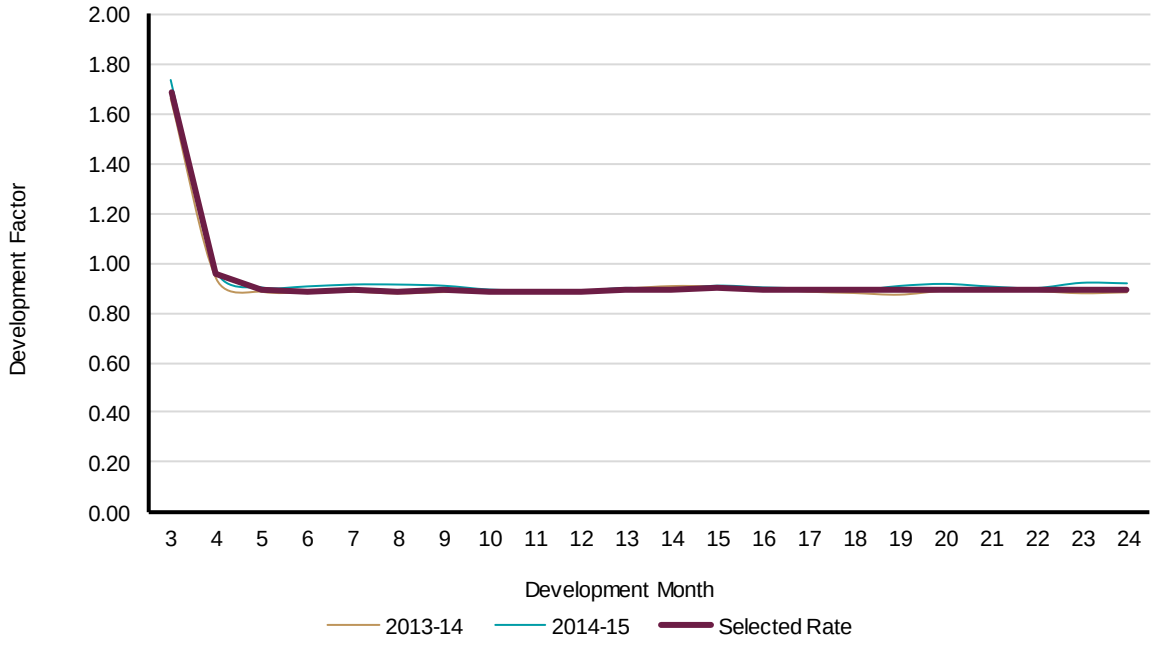
Future payments (current values) by incident period and development period are then projected by multiplying the *BenProp* selection for each development period by the average salary (S_I) for the incident period and by the projected number of future active claims. The future payments are then inflated to allow for the assumed level of CPI inflation and reduced to allow for the assumed level of recoveries to produce expected net benefit payments by incident period and development period. These projected payments are then discounted using the relevant assumption to give the estimated outstanding claims liability.

B.7.2 Claim Continuance Rates

The selected active claim number continuance rates against the experience of the last two payment years are shown in Figure 50. As noted above, continuance rates represent the proportion of claims at each development month expected to remain in force in the subsequent month. Rates have been smoothed for presentation purposes.

[32] Development month refers to the number of months since the incident date. For example, active claims between two and three months after the initial incident would be allocated to development month three.

Figure 50 Income Protection – Active Claim Continuance Rates by Payment Year



The active claim development above shows that after around 7 months, continuance rates become very stable at around 0.90 per month. Projected numbers of active claims in each future month may be derived for each month of incidence by applying the selected continuance rates to the numbers of active claims at the review date.

B.7.3 Average Salary per Active Claim

Salary is recorded at the commencement of a claim and does not change through the payment period. Consequently, any variation in the average as claims develop is due to changes in the mix of active claims. I did not observe any particular trend by development month, although the average salary rose by incident month, in line with general levels of salary growth. Consequently, average salary per active claim was modelled as an increasing function of incident month.

Figure 51 shows the change in average active claimant salary by development month, averaged over all incident months and separately for the latest incident year. Figure 52 shows the average over development periods of the average claimant salary ratio by incident month.

Perhaps not surprisingly, Figure 51 and Figure 52 both demonstrate the stability of average active claimant salary over time and I have therefore assumed no change in average salary by development month.

Figure 51 Income Protection – Ratio of Average Active Claimant Salary by Development Month

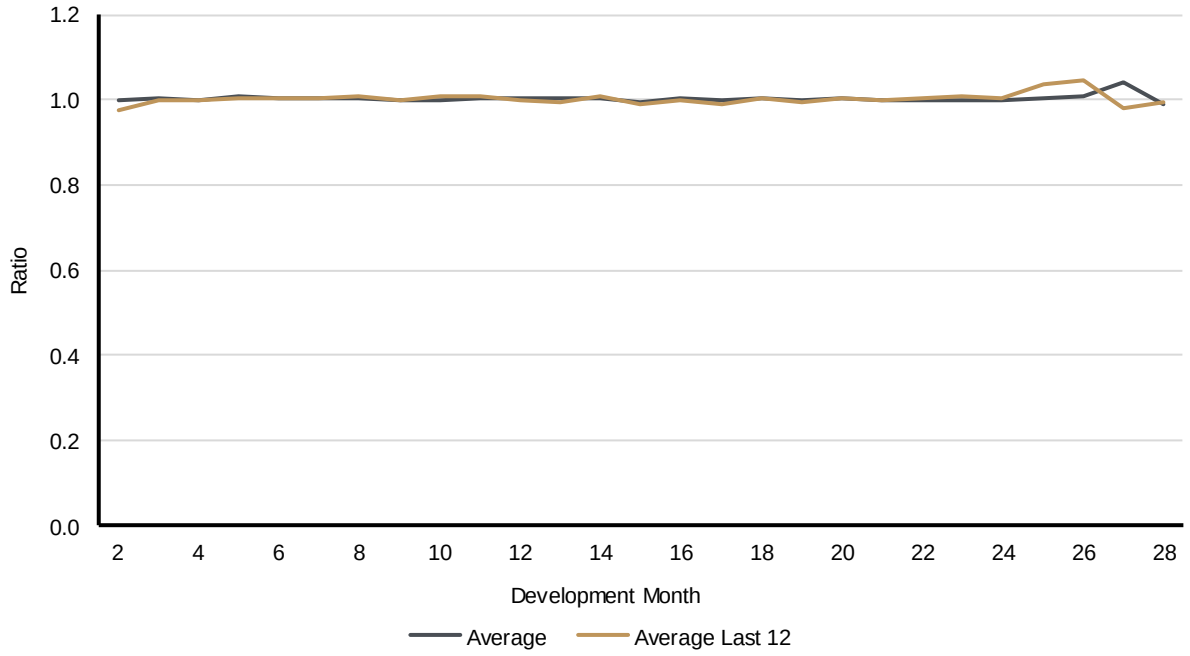


Figure 52 Average Claimant Salary Ratio by Incident Month

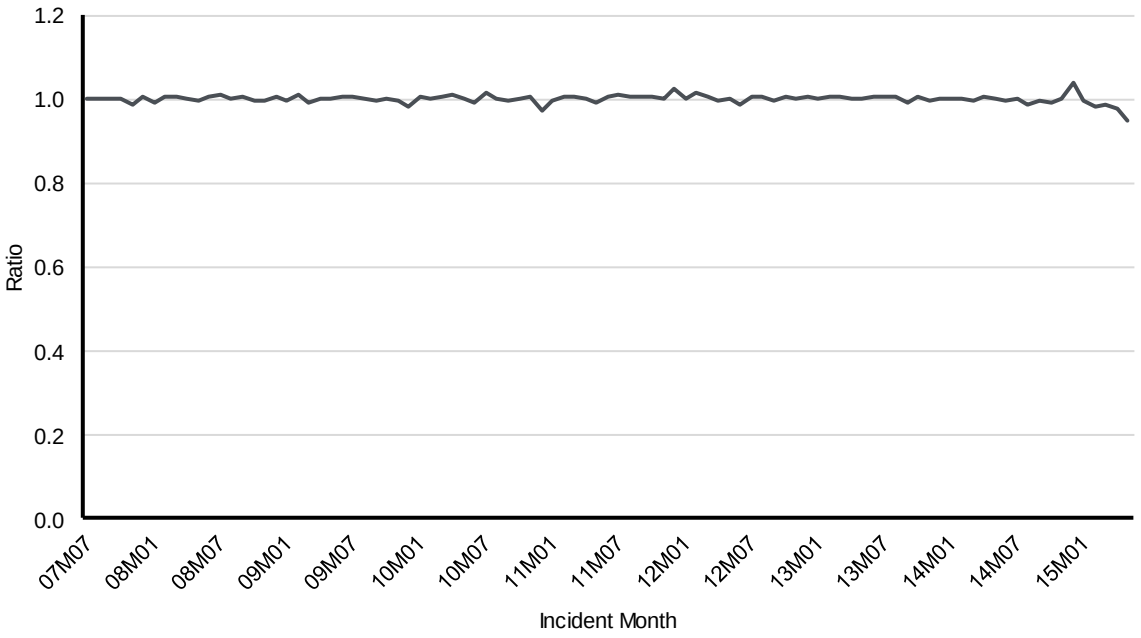
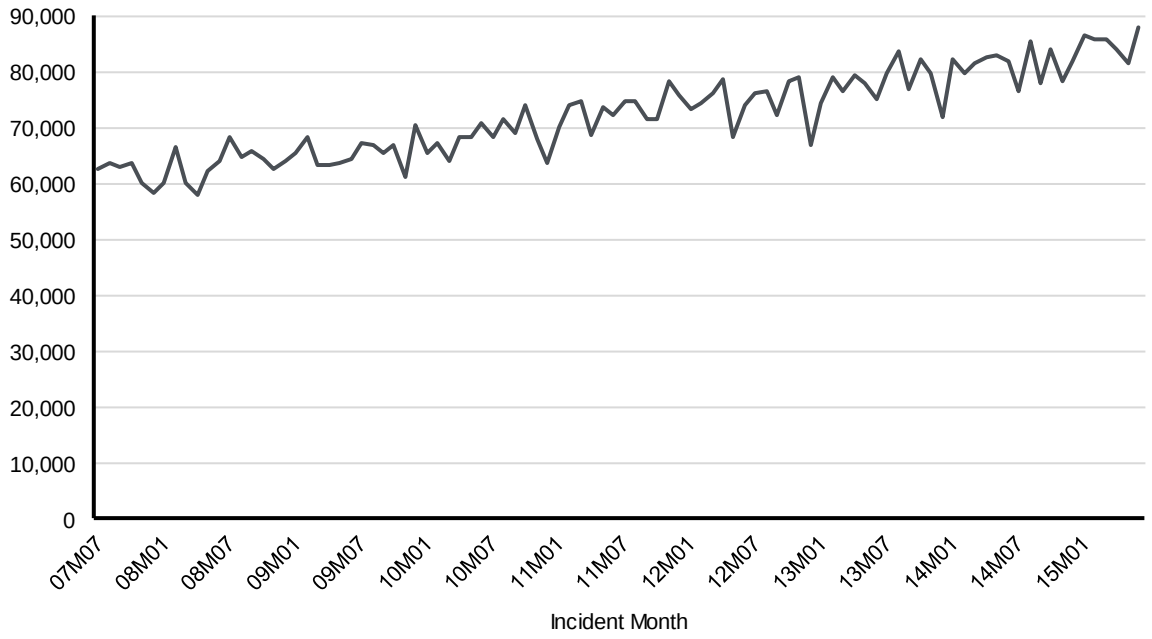


Figure 53 shows the average salaries at commencement for members receiving income protection benefits by incident month. These levels were used as the basis for the projection of benefit amounts in each future payment month.

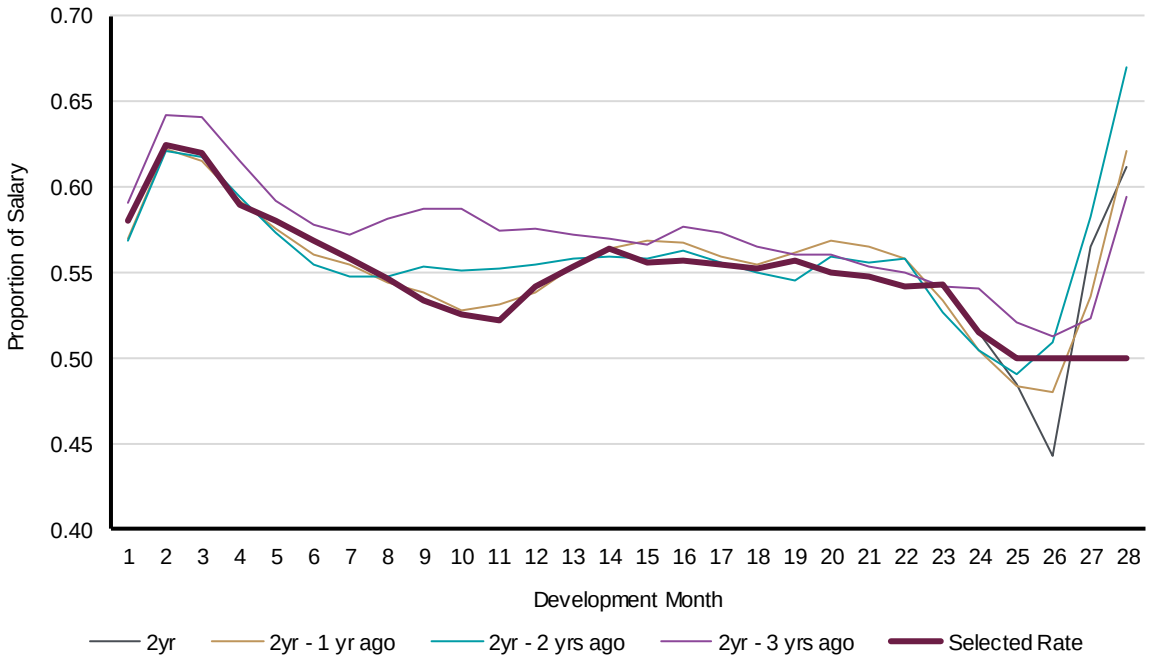
Figure 53 Average Active Claimant Salary by Incident Month



B.7.4 Benefit Percentage

The remaining factor from which to project future benefit payments is the benefit as a proportion of the assumed salary at commencement. This was derived by firstly removing the effects of inflation indexation on past benefit payments and then observing the relationship between these deflated benefit payments and the average salary of active claimants. This relationship has been more stable than that observed at the previous Review, with the twelve month and two year averages being fairly similar in level. Therefore, two year averages have been chosen as the basis for the selections, with some smoothing towards the end of the benefit period, as shown in Figure 54. The benefit percentage has a maximum of 75% of salary at commencement of claim but is usually lower on average, due to the increasing levels of rehabilitation programs, which reduce the benefit proportionately.

Figure 54 Average Benefit per Active Claim as Proportion of Average Salary



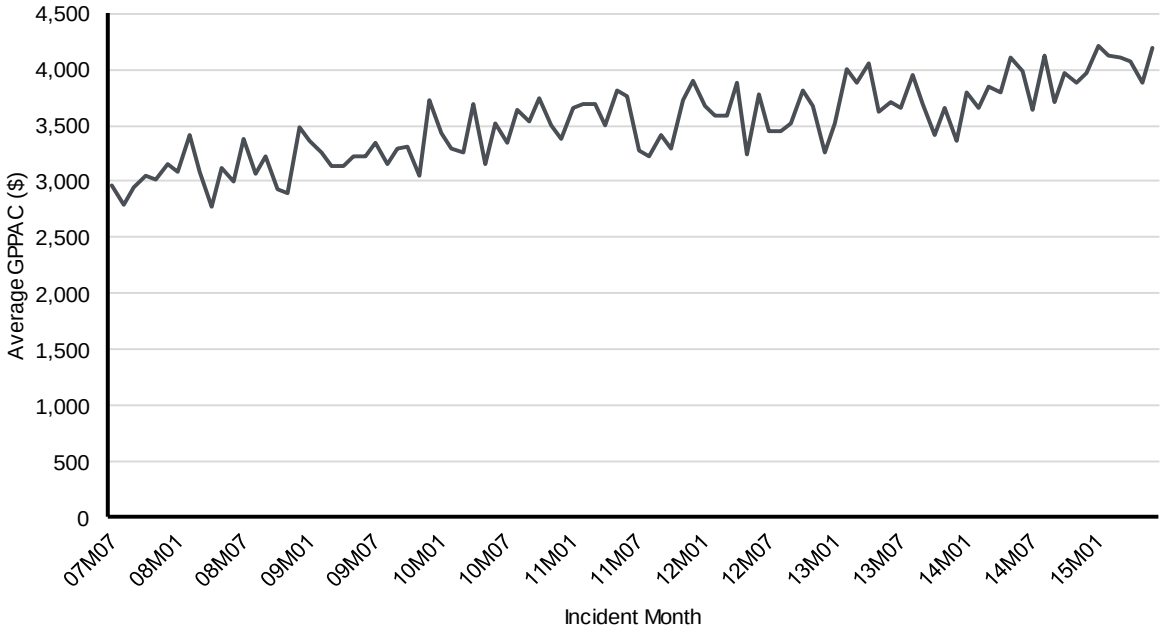
The benefit proportions have been reasonably stable over time and the averages over the most recent two year period have been chosen as the assumption going forward. The “kick up” after development month 25 in the latest two year period reflects a number of lump sum payments in respect of re-opened old claims, likely as a result of legal involvement. I have decided not to project these types of payments going forward on the basis that they are inherently difficult to predict and may reflect a one-off “catch up” of re-opened claims prompted by legal advertising etc.

B.7.5 Gross Payments per Active Claim

Using the above selections, gross (of recoveries) payments per active claims (GPPAC) by incident and development month are then able to be projected, as shown in Figure 55.

The GPPACs are then applied to the active claim projections to produce gross real benefit payments and projected inflation as at each July 1 is then added to produce gross benefit payments by incident and development month.

Figure 55 Average Gross Payments per Active Claim (GPPAC) by Incident Month



B.7.6 Recoveries

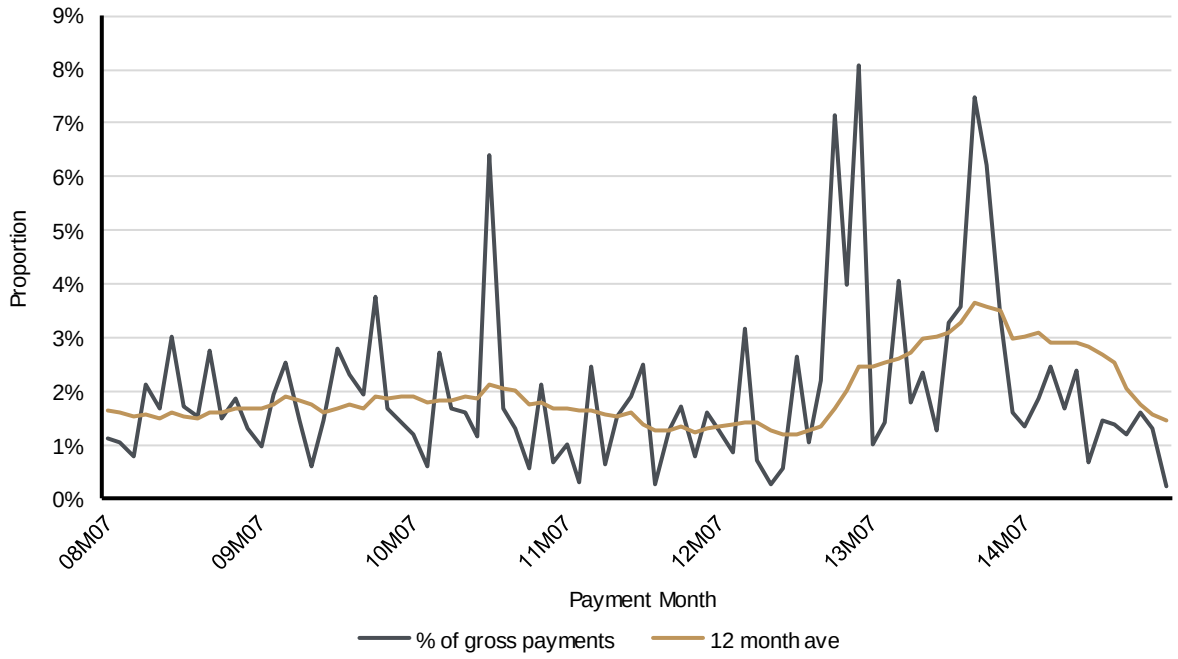
Recoveries mostly relate to payments reclaimed from members where overpayments have occurred due to unreported changes in members' status. Previously, some recoveries were made in the event of WorkCover payments; however, changes in the administrative processes over time have reduced these overpayments substantially.

Recoveries in the future have explicitly been allowed for by basing the analysis on claim payments gross of recoveries and applying an assumed rate of recoveries to apply to future gross payments excluding contribution replacement. Table 76 shows recoveries as a proportion of gross payments for the last several payment years.

Table 76 Recoveries

Payment Year	Gross Claim Payments (excl Contribution Replacement) ($m)	Recoveries ($m)	Recoveries as a Proportion of Gross Claim Payments
2009-10	25.9	0.5	1.9%
2010-11	31.1	0.5	1.7%
2011-12	29.8	0.4	1.3%
2012-13	28.4	0.7	2.5%
2013-14	25.4	0.8	3.0%
2014-15	26.4	0.4	1.5%
6 Year Weighted Average (pa.)			**1.9%**
3 Year Weighted Average (pa.)			**2.3%**

Figure 56 Recoveries as a Proportion of Gross Income Protection Payments



The long term experience has shown that recoveries are around 2% of gross claim payments, with some volatility over time. Given the delay in recognition of some recoveries, I am hesitant to overemphasise the most recent higher experience and so have chosen a level of 2% for recoveries as a percentage of future gross payments. A factor of 98% has therefore been applied to the projected gross benefit payments in order to produce the estimated net benefit payments.

B.7.7 Outstanding Claim Payments

The actual and projected claim payments for income protection based on the PPAC model described above are shown in Table 77. The outstanding claims payments in the Table exclude contribution replacement benefits.

Table 77 Actual and Projected Income Protection Claims (excl Contribution Replacement)

Incident Year	Development Year Paid ($m) 1	2	3	4+	Total ($m)	Outstanding Claims ($m)
2009-10	11.6	13.8	2.7	0.2	28.3	-
2010-11	14.3	14.0	3.2	0.0	31.6	-
2011-12	12.4	12.1	2.2	0.1	26.8	-
2012-13	12.1	11.4	2.9	**0.1**	26.5	0.1
2013-14	11.0	11.1	**2.6**	**0.1**	24.8	2.7
2014-15	11.9	**11.0**	**2.3**	**0.1**	25.3	13.4

The payments made after development year two relate to back payments for members where the claim approval process was lengthened due to pre-existing conditions, late claim lodgements or claims with broken benefit periods, i.e. go off claim and restart at a later period but related to the same incident (generally teachers around school holidays). Some development beyond the maximum two

year benefit period has been allowed for as these "late" payments do occur although they are relatively small.

B.7.8 Number of Ultimate Claims

The ultimate numbers of Income Protection claims are required to calculate claim frequencies as part of the decomposition of the ultimate claims cost. These have been derived using the chain ladder projection method, as follows:

Development factors of the form:

$$M_{i,t} = \frac{C_{i,t}}{C_{i,t-1}}$$

where $C_{i,t}$ are the cumulative claim numbers at time *t* for incident period *i*

are derived from the historical experience. Development factor selections are then made for each development period. Projected cumulative claim numbers at the end of each development period are then projected by applying the appropriate development factor. Incremental claim numbers can then be derived by taking the difference of successive cumulative values.

The incidence of claim numbers has also been considered in addition to the payments shown above. This will assist in the decomposition of overall claims cost into its constituent components as well as demonstrating the changes in underlying claim frequency over time, as shown in Table 78.

Table 78 Actual and Projected Income Protection Claim Numbers

Incident Year	Development Year Payment Commenced 1	2	3	4+	Total	Claim Frequency
2009-10	885	113	3	0	1,001	1.40%
2010-11	910	111	3	0	1,024	1.51%
2011-12	863	87	1	0	951	1.52%
2012-13	799	66	3	**0**	868	1.55%
2013-14	703	66	**1**	**0**	770	1.54%
2014-15	674	**47**	**1**	**0**	723	1.56%

B.7.9 Components of Income Protection Cost

To understand the cost in more detail, the various components of the income protection benefits have been examined and these are shown in Table 79.

Table 79 Components of Income Protection Costs (incl Contribution Replacement Benefit)

Incident Year	Ultimate Claim Frequency	Salary Relativity^	Benefit as Proportion of Salary	Ultimate Claim Duration (weeks)	Overall Claim Cost (as % of salary)
2009-10	1.40%	0.89	58.8%	37.5	0.54%
2010-11	1.51%	0.89	60.0%	37.7	0.60%
2011-12	1.52%	0.90	56.0%	35.4	0.53%
2012-13	1.55%	0.90	55.9%	37.3	0.57%
2013-14	1.54%	0.92	54.7%	38.0	0.58%
2014-15	1.56%	0.92	56.7%	38.9	0.62%

^ This is the relativity of the average salary of claimants to that of all members covered for Income Protection benefits.

The claim cost for the 2014-15 incident year shown above may, for example, be decomposed as follows:

$$0.62\% = 1.56\% \times 0.92 \times 56.7\% \times (38.9/52.18) \times (1+CRB) \times \text{PV Factor}$$

where *CRB* is the Contribution Replacement Benefit loading of 0.067 i.e. 5%/75%; and

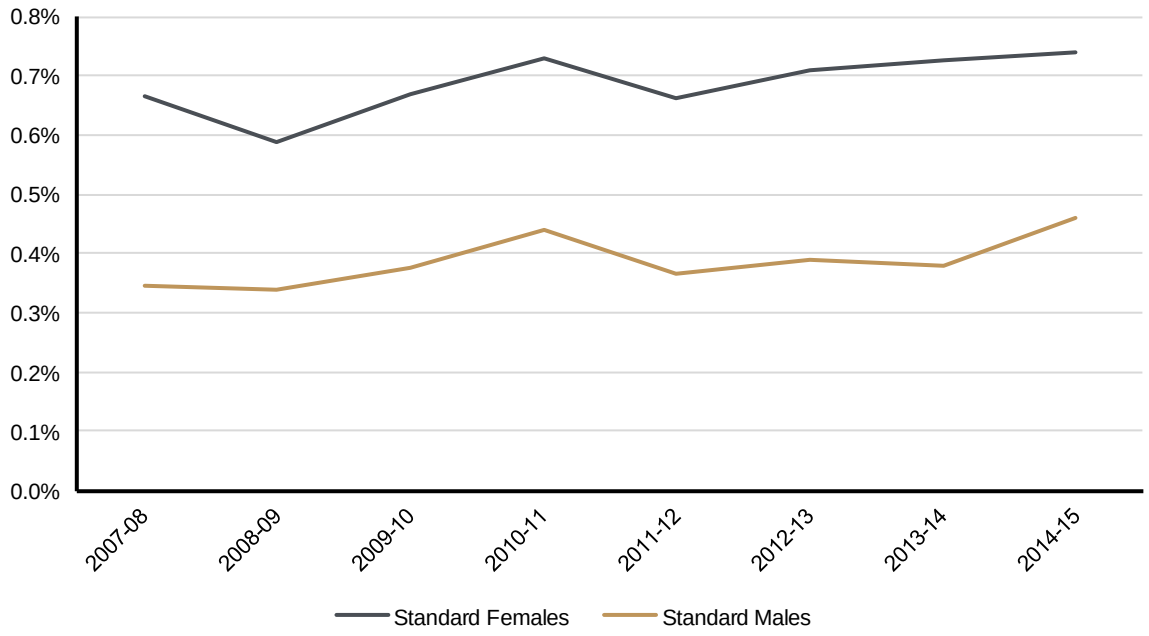
PV Factor is the factor to discount the benefits to the average date of the premium receipt and is approximately 96.9% for 2014-15. Periods during which benefits are suspended (e.g. school holidays for teachers) have been excluded in the calculations of claims duration.

Table 79 shows that the main driver of the increase in claims costs has been a combination of increasing claim duration and claim frequency. Salary relativity and rehabilitation rates (which directly impact the benefit proportion) have been reasonably stable, particularly since 2010-11. These trends are discussed further below.

B.7.10 Gender Specific Rates

As noted above, the incurred cost of the income protection benefit has been assessed separately for Standard Males and Females, as they exhibit materially different costs. Whilst the analysis shown above has been aggregated for simplicity, the claims costs for the last several years for each gender are shown in Figure 57.

Figure 57 Cost of Standard Defined Benefit Category Income Protection Benefit



Given that the insured population has been ageing over time and the increases observed within the broader group life market over recent years, the increases in overall claims costs for both genders is not surprising. As has been observed in past Reviews, Standard Females have significantly higher claim costs than Standard Males.

Similarly to previous Reviews, analysis of the claims for the current investigation period showed that whilst costs increase in line with age, the rate of increase is significantly less than expected for salary continuance benefits offered in the wider market. As discussed in previous Reviews, this is due to the likely correlation between the level of sick leave accrued and the member's age. Given the cross subsidisation that occurs in a defined benefit scheme and the relative stability of the costs versus age, the complexity of having the costs vary by age does not seem warranted.

The cost of the Income Protection benefit over the investigation period, including an allowance for the cost of foregone member contributions whilst in payment, was 0.41% of salaries for Standard Males and 0.72% of salaries for females. This compares with the assumed rates at the last Review of 0.40% and 0.70% respectively.

In light of the trends illustrated in Figure 57 and analysis described above, it has been decided to increase the allowance for the cost of the income protection benefit to 0.45% for Standard Males and 0.75% for Standard Females.

It should be noted that Police members of the Standard Defined Benefit Category and members of the Police Category do not have access to the income protection benefit.

At the previous Review it was assumed that the cost of the income protection benefit paid to members of the State Category would be 1.30% of salaries. There are comparatively few income protection claims for the State Category due its relatively small and declining membership. Furthermore, the impact on overall QSuper liabilities is trivial and a detailed analysis was therefore not undertaken. The following approach was taken to estimate the cost of this benefit:

- Estimate the number of claims incurred in each year of "cover" (this allows for claims that are incurred but not reported at the end of each year, thus matching the claims costs to the exposure during the year);
- Estimate the average duration of claims;
- Estimate the proportion of salary represented by the average pension payment; and
- Multiply the above together and add an allowance for the contribution replacement benefit that is also paid when a member of the State Category receives the Income Protection benefit.

The estimated cost of the total income protection benefits using this method is 1.04% of salaries. Whilst this is somewhat lower than the previous assumption of 1.30% of salaries, I have decided to retain the previous assumption, as the recent experience is quite sparse and costs would be expected to generally rise with the ageing of the membership.

B.8 Expenses

I have continued the practice of the previous Review in which administration expenses have been analysed separately for pensions and other benefits, with non-pension expenses expressed relative to defined benefit payments and pension expenses relative to pension payments. In addition, for the first time, I have also separately analysed the administration costs of the income protection benefits.

QSL provided splits of the Administration Expenses and QInvest Financial Planning Fees between the Defined Benefit and Accumulation Categories, as shown in Table 80.

Table 80 Defined Benefit Proportion of Administration Expenses

Year Ending 30 June	DB Proportion of Administration Expenses	DB Proportion of QInvest Financial Planning Fees
2011	34.1%	16.8%
2012	32.4%	13.6%
2013	34.4%	21.2%
2014	31.2%	20.0%
2015	31.9%	15.6%

These proportions were then applied to the Administration Fees and QInvest Financial Planning Fees from the financial statements (excluding allowance for insurance administration, which is discussed below), shown for convenience in Table 81.

Table 81 Overall QSuper Administration Expenses and QInvest Financial Planning Fees

Year Ending 30 June	Administration Expenses ($'000)	QInvest Financial Planning Fees ($'000)
2011	83,907	14,667
2012	100,464	16,002
2013	124,940	17,520
2014	156,051	16,439
2015	174,349	18,532

The derived amounts of Defined Benefit expenses were then apportioned between pensions and non-pensions in line with the average funding basis liabilities for each year.

At this valuation, QSL have also provided a breakup of the insurance management expenses into income protection (Defined Benefit and State categories) and Death and TPD benefits, as shown in Table 82.

Table 82 QSuper Insurance Administration Expenses

Year Ending 30 June	Insurance Administration Expenses ($'000)	DB Income Protection Administration Expenses ($'000)	DB Death and TPD Administration Expenses ($'000)
2011	10,530	2,527	652
2012	13,027	2,776	844
2013	14,264	2,651	744
2014	17,461	2,680	760
2015	20,241	3,101	659

The Death and TPD costs were then added to the non-pension costs estimated above to produce the estimated allocations of administration expenses shown in Table 83.

Table 83 Administration Expense Apportionment Summary

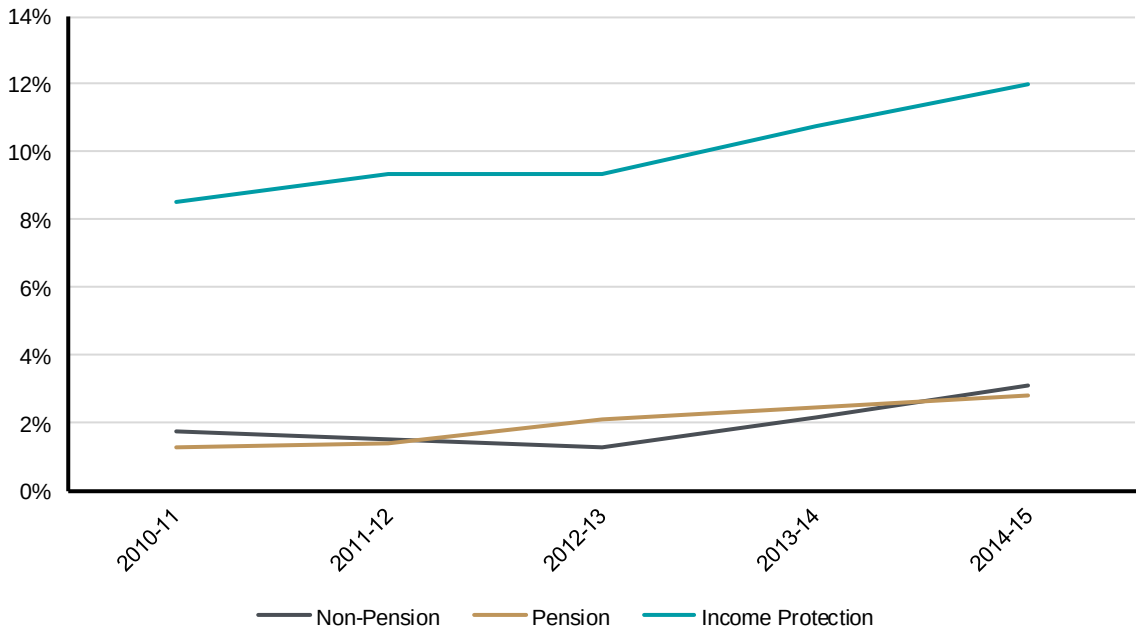
Year Ending 30 June	Non-Pension Administration Expenses ($'000)	Pension Administration Expenses ($'000)	Income Protection Administration Expenses ($'000)
2011	27,105	1,027	2,527
2012	30,112	1,224	2,776
2013	40,637	1,930	2,651
2014	44,951	2,389	2,680
2015	49,862	2,816	3,101

These costs were then compared with the annual benefit payments of the relevant types to observe their relativity, as shown in Table 84 and Figure 58.

Table 84 Observed Administration Expense Ratios by Benefit Type

Year Ending 30 June	Non-pension Administration Expenses as Proportion of Annual Benefit Payments	Pension Administration Expenses as Proportion of Annual Pension Payments	Income Protection Administration Expenses as Proportion of Annual Income Protection Benefits
2011	1.8%	1.3%	8.5%
2012	1.5%	1.4%	9.3%
2013	1.3%	2.1%	9.3%
2014	2.1%	2.5%	10.8%
2015	3.1%	2.8%	12.0%

Figure 58 Observed Administration Expense Ratios by Benefit Type



Based on the trends observed in Figure 58, I have selected prospective ratios to apply to projected benefit payments in order to estimate future administration expenses, as shown in Table 85.

Table 85 Selected Administration Expense Ratios by Benefit Type

	Selected Ratio
Non-pension Administration Expenses as Proportion of Annual Benefit Payments	2.75%
Pension Administration Expenses as Proportion of Annual Pension Payments	2.75%
Income Protection Administration Expenses as Proportion of Annual Income Protection Benefits	11.00%

It will be noted that the rates shown in Table 85 are materially greater than assumed in the previous Review, reflecting the increases in administration expenses incurred by QSuper. I considered selecting assumptions that did not take as much account of the experience over the last two years but Defined Benefit administration expenses have almost doubled since 2010-11, rising around 17% p.a. QSL have advised that these increases are attributable to member and employer service uplifts as well as costs associated with new technologies implemented in line with the Board approved group strategy.

It is of course a matter for the Board to decide the level of service provision to Defined Benefit members and the appropriate expenditure on that service. I understand that QSL will undertake a review into the expense allocation methodology within the scheme, particularly between the Accumulation and Defined Benefit categories and I look forward to the outcome of that review. The recent increases have had a material effect on the liabilities of the scheme so it is critical to ensure that the cost allocation is as accurate and therefore equitable as practically possible.

Appendix C Investigation assumptions

C.1 Financial Assumptions

C.1.1 Interest

The assumed long term earning rate on the fund's assets after tax and investment expenses is 6.0% p.a.

C.1.2 Salary Growth

Long term salary growth due to inflation and changes in Average Weekly Ordinary Time Earnings are assumed to be at the rate of 3.2% p.a.

Salary growth due to promotion is assumed to be in accordance with the salary scale set out in the service tables (Table 89, Table 90 and Table 91).

C.1.3 Inflation

This assumption is relevant for the purpose of valuing pensions that are increased in line with increases in the Consumer Price Index. Pensions in payment have been assumed to increase at the rate of 2.2% p.a.

C.1.4 Financial Assumptions Underlying Accounting Basis

The responsibility for selection of the key assumptions underlying employee entitlement liabilities under AASB 119 rests with the reporting entity. The assumptions chosen by the Government, based on my advice, necessary to derive figures in accordance with AASB 119 as at 30 June 2015 were as follows:

- The gross discount rate for all the Government's employee entitlement schemes is the annually convertible yield of a notional duration matched Commonwealth Government nominal bond at the relevant date. As at 30 June 2015, this was 3.1%.
- A net discount rate of 3.0% was used to determine the non-pension defined benefit obligations of QSuper as at 30 June 2015. This produced substantially the same total obligation as an explicit allowance for investment tax when added onto the liability valued at the gross discount rate.
- The level of price inflation was 2.2%.
- The level of salary inflation for QSuper was an amount 1.0% p.a. above the level of the price inflation assumption. As at 30 June 2015, this was 3.2%.

C.2 Demographic Assumptions

C.2.1 Active Members

The decrement rates used for the Standard Defined Benefit Category are based on the scheme's own experience and are illustrated in the service tables (Table 89, Table 90 and Table 91). The decrement rates for the State, Police and Parliamentary Categories are based on these rates where appropriate.

It is assumed that 2.0% of resigning Standard Defined Benefit Category members choose the investment linked option (ILO). For those members who retain the deferred retirement benefit on withdrawal, subsequent conversions to an ILO and early payment on death and total and permanent disablement are not explicitly modelled. However a 0.1% loading was applied to allow for the implicit insurance provided and the ILO option.

The assumption as to the probability of leaving at future elections for the Parliamentary Category is shown in Table 86.

Table 86 Parliamentary Category – Proportion Assumed to Leave at Future Elections

Years of Service at Election	Probability of Exit at Election
0-4	0%
4-8	0%
8-11	0%
11+	60%

For completeness, the above table includes an assumed probability of exit for all years of service, although it is noted that no member in the Parliamentary Category had fewer than eleven years of service at the investigation date.

C.2.2 Deferred Members

The decrement rates used for the Deferred Retirement Benefit Category are based on the scheme's own experience and are illustrated in Table 92.

C.2.3 Pensioners

The base mortality rates for all Defined Benefit, State, Police and Parliamentary Category pensioners are those of Queensland Life Tables 2012-2014 (Males or Females, as appropriate) with age ratings varying by the type of pension as shown in Table 87.

Table 87 Mortality Age Ratings

Type of Pension	Males	Females
Age Retirement	- 2 years	- 2 years
Ill-Health Retirement	+ 4 years	+ 4 years
Spouse	- 2 years	- 2 years

Mortality improvement has been incorporated in the value of pensions consistent with the last 25 years of population mortality experience in the Australian Life Tables 2010-2012, as shown in Table 88.

It has also been assumed that males are three years older than their spouses and that all pensioners are married. Regarding the option to select or commute pension benefits, the following has been assumed:

- Standard Defined Benefit Category – 50% of total and permanent disablement exits will take the pension;
- State Categories – 75% of age retirees, 75% of ill-health retirees and 50% of pensioner spouses will take the pension;
- Police Categories – 50% of age retirees, ill-health retirees and pensioner spouses will take the pension;
- Parliamentary Category – 90% of eligible members and 100% of eligible spouses will take the pension;

Table 88 Mortality Improvement Rates

	Annual Percentage Improvement in Mortality	
Age	Males	Females
20	3.68	2.52
25	2.91	2.36
30	1.77	1.70
35	1.09	1.11
40	1.18	1.21
45	1.72	1.64
50	2.28	1.98
55	2.73	2.26
60	3.04	2.46
65	3.19	2.56
70	3.14	2.55
75	2.86	2.38
80	2.29	2.06
85	1.66	1.52
90	0.89	0.83
95	0.00	0.20

C.3 Expenses

It has been assumed that pension administration expenses will equate to 2.75% of pension payments, non-pension administration expenses will equate to 2.75% of benefit payments and income protection administration expenses will be 11.00% of income protection payments.

C.4 Income Protection Benefit

The income protection benefit is expected to cost 0.45% of salaries for Standard Males and 0.75% of salaries for Standard Females in the Standard Defined Benefit Category. The income protection benefit is assumed to cost 1.30% of salaries for members of the State Category. There is no income protection benefit for Police Category members nor Police members of the Standard Defined Benefit Category.

C.5 Child and Orphan Benefits

Child and orphan benefits have been allowed for by increasing the costs of lump sum death benefits by 4%.

C.6 Member Contribution Rates

It was assumed that average member contribution rates for the active members at the investigation date would be maintained in the future.

C.7 Superannuation Guarantee

It was assumed that additional payments resulting from the application of the minimum requisite benefit test specified in the Superannuation Guarantee Certificate would be approximately 0.10% of Standard Defined Benefit Category benefit payments.

C.8 Service and Decrement Tables

Table 89 Service Table – Standard Male Members

		Number leaving within one year of attaining age x as a result of					
Age x	Number Attaining Age x	PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation	Salary Scale	Family Law/ TtR Rate
16	100,000	0	12	0	2,550	100	0.0000
17	97,438	0	11	0	3,264	112	0.0000
18	94,163	0	11	0	3,813	128	0.0000
19	90,338	0	11	0	4,200	150	0.0000
20	86,127	0	10	1	4,435	185	0.0000
21	81,681	0	10	1	4,615	221	0.0000
22	77,056	52	9	2	4,737	256	0.0000
23	72,257	145	8	1	4,655	284	0.0000
24	67,447	212	8	2	4,612	306	0.0000
25	62,613	260	7	2	4,467	323	0.0000
26	57,878	289	7	3	4,214	341	0.0001
27	53,366	304	7	4	3,964	358	0.0001
28	49,088	308	7	4	3,571	374	0.0001
29	45,197	306	7	5	3,130	389	0.0001
30	41,750	298	7	6	2,724	403	0.0002
31	38,716	288	7	6	2,371	415	0.0002
32	36,043	276	7	7	2,064	425	0.0003
33	33,690	263	7	8	1,714	436	0.0003
34	31,698	251	7	9	1,499	445	0.0004
35	29,932	239	7	9	1,332	455	0.0005
36	28,344	227	7	10	1,185	465	0.0006
37	26,914	216	8	11	1,041	474	0.0007
38	25,638	207	8	12	934	484	0.0007
39	24,477	198	8	13	837	493	0.0008
40	23,420	191	8	14	759	502	0.0009
41	22,447	186	9	15	697	511	0.0010
42	21,541	182	9	16	630	520	0.0010
43	20,703	180	10	17	568	528	0.0011
44	19,928	179	10	18	529	536	0.0011
45	19,192	180	10	19	480	544	0.0011
46	18,502	183	11	20	448	552	0.0011
47	17,839	188	11	21	417	558	0.0011
48	17,201	195	12	22	390	565	0.0010
49	16,583	203	13	23	365	571	0.0010
50	15,979	212	13	24	343	576	0.0010
51	15,386	224	14	25	324	581	0.0009
52	14,800	237	14	25	306	586	0.0009
53	14,218	251	15	26	290	590	0.0009
54	13,637	266	15	27	275	593	0.0008
55	13,054	1,303	15	26	0	595	0.0008
56	11,709	1,169	15	25	0	597	0.0100
57	10,501	1,048	14	24	0	599	0.0100
58	9,414	940	14	22	0	600	0.0090
59	8,438	842	14	21	0	600	0.0080
60	7,561	1,284	13	0	0	600	0.0075
61	6,264	939	12	0	0	600	0.0200
62	5,314	849	11	0	0	600	0.0200
63	4,454	756	10	0	0	600	0.0140
64	3,688	995	8	0	0	600	0.0150
65	2,686	912	6	0	0	600	0.0150
66	1,768	529	4	0	0	600	0.0200
67	1,234	345	3	0	0	600	0.0250
68	885	265	3	0	0	600	0.0250
69	618	185	2	0	0	600	0.0250
70	431	431	0	0	0	600	0.0250

Table 90 Service Table – Standard Female Members

		Number leaving within one year of attaining age x as a result of					
Age x	Number Attaining Age x	PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation	Salary Scale	Family Law/ TtR Rate
16	100,000	0	2	0	2,450	100	0.0000
17	97,548	0	2	0	3,073	113	0.0000
18	94,473	0	2	0	3,637	127	0.0000
19	90,834	0	2	1	4,133	142	0.0000
20	86,699	0	3	1	4,465	158	0.0000
21	82,230	0	2	2	4,646	186	0.0000
22	77,581	0	2	2	4,849	207	0.0000
23	72,727	62	2	3	4,907	226	0.0000
24	67,754	111	3	3	4,908	240	0.0000
25	62,729	146	2	4	4,793	252	0.0000
26	57,785	168	2	4	4,587	263	0.0001
27	53,023	181	3	5	4,260	275	0.0001
28	48,574	186	2	6	3,757	285	0.0001
29	44,624	186	2	6	3,228	294	0.0001
30	41,202	186	2	7	2,651	302	0.0002
31	38,355	184	2	8	2,238	309	0.0002
32	35,923	180	2	9	1,917	315	0.0003
33	33,816	175	3	10	1,568	321	0.0003
34	32,060	170	2	11	1,371	326	0.0004
35	30,506	164	3	12	1,250	330	0.0005
36	29,078	158	3	13	1,139	334	0.0006
37	27,765	152	3	14	1,038	338	0.0007
38	26,559	146	3	15	945	342	0.0007
39	25,450	141	3	16	871	346	0.0008
40	24,420	135	3	17	803	349	0.0009
41	23,461	131	3	18	740	353	0.0010
42	22,569	127	4	19	682	356	0.0010
43	21,737	125	4	20	656	360	0.0011
44	20,933	122	4	21	623	363	0.0011
45	20,163	121	4	22	591	366	0.0011
46	19,426	121	4	23	534	370	0.0011
47	18,743	122	4	24	515	373	0.0011
48	18,078	124	5	25	481	376	0.0010
49	17,443	127	5	25	464	379	0.0010
50	16,822	132	5	26	432	381	0.0010
51	16,227	137	5	27	416	384	0.0009
52	15,642	143	6	28	387	386	0.0009
53	15,079	150	6	28	373	388	0.0009
54	14,522	158	6	29	359	390	0.0008
55	13,970	1,535	6	28	0	392	0.0008
56	12,400	1,114	6	27	0	394	0.0100
57	11,253	1,011	6	25	0	396	0.0100
58	10,210	917	6	24	0	397	0.0090
59	9,262	832	6	23	0	399	0.0080
60	8,401	1,260	6	0	0	400	0.0075
61	7,135	998	6	0	0	401	0.0200
62	6,130	858	6	0	0	401	0.0200
63	5,267	948	5	0	0	401	0.0140
64	4,314	949	5	0	0	401	0.0150
65	3,361	940	4	0	0	401	0.0150
66	2,417	604	3	0	0	401	0.0200
67	1,810	470	3	0	0	401	0.0250
68	1,337	347	2	0	0	401	0.0250
69	987	256	2	0	0	401	0.0250
70	729	729	0	0	0	401	0.0250

Table 91 Service Table – Police Members

		Number leaving within one year of attaining age x as a result of					
Age x	Number Attaining Age x	PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation	Salary Scale	Family Law/ TtR Rate
16	100,000	0	0	44	400	100	0.0000
17	99,555	0	0	44	408	106	0.0000
18	99,103	0	0	44	425	111	0.0000
19	98,631	0	0	44	443	117	0.0000
20	98,144	0	0	52	481	123	0.0000
21	97,610	0	0	52	512	129	0.0000
22	97,045	0	0	62	534	135	0.0000
23	96,450	0	0	60	607	140	0.0000
24	95,783	0	0	70	717	146	0.0000
25	94,996	0	0	68	878	152	0.0000
26	94,050	0	0	75	1,104	157	0.0001
27	92,869	73	0	75	1,323	162	0.0001
28	91,399	118	4	81	1,553	168	0.0001
29	89,643	145	6	87	1,735	173	0.0001
30	87,669	166	8	93	1,881	178	0.0002
31	85,521	184	10	106	1,976	183	0.0002
32	83,245	195	12	118	2,015	187	0.0003
33	80,903	205	14	130	1,982	192	0.0003
34	78,573	209	17	139	1,947	196	0.0004
35	76,260	211	19	157	1,876	200	0.0005
36	73,998	211	21	166	1,713	204	0.0006
37	71,886	207	23	174	1,591	208	0.0007
38	69,891	203	27	182	1,481	212	0.0007
39	68,000	195	29	191	1,392	215	0.0008
40	66,192	188	31	201	1,319	218	0.0009
41	64,451	180	33	213	1,245	221	0.0010
42	62,779	170	37	226	1,164	224	0.0010
43	61,183	162	39	240	1,083	227	0.0011
44	59,660	157	41	253	990	230	0.0011
45	58,217	153	43	269	891	232	0.0011
46	56,864	155	44	284	812	234	0.0011
47	55,568	164	48	300	731	236	0.0011
48	54,325	184	50	317	657	238	0.0010
49	53,116	217	52	335	601	240	0.0010
50	51,910	259	54	352	553	242	0.0010
51	50,691	354	56	369	489	243	0.0009
52	49,421	476	58	387	425	245	0.0009
53	48,075	632	60	402	371	246	0.0009
54	46,609	828	62	416	338	247	0.0008
55	44,966	6,708	60	400	0	249	0.0008
56	37,798	4,132	54	367	0	250	0.0100
57	33,244	4,295	48	340	0	251	0.0100
58	28,560	3,688	44	311	0	251	0.0090
59	24,517	4,869	39	273	0	252	0.0080
60	19,337	19,337	0	0	0	253	0.0075

Table 92 Decrement Table – DRB Members

	Rate of leaving as a result of		
Age	Death	TPD	Transfer to Accumulation
21	0.0001	0.0000	0.0150
22	0.0001	0.0000	0.0150
23	0.0001	0.0000	0.0150
24	0.0002	0.0000	0.0150
25	0.0002	0.0000	0.0150
26	0.0002	0.0000	0.0150
27	0.0002	0.0000	0.0150
28	0.0003	0.0000	0.0150
29	0.0003	0.0001	0.0150
30	0.0003	0.0001	0.0150
31	0.0003	0.0001	0.0150
32	0.0003	0.0001	0.0150
33	0.0003	0.0001	0.0150
34	0.0003	0.0002	0.0150
35	0.0004	0.0002	0.0150
36	0.0004	0.0002	0.0150
37	0.0004	0.0002	0.0150
38	0.0004	0.0003	0.0150
39	0.0005	0.0003	0.0150
40	0.0005	0.0004	0.0150
41	0.0005	0.0004	0.0150
42	0.0005	0.0005	0.0150
43	0.0006	0.0006	0.0150
44	0.0006	0.0007	0.0150
45	0.0007	0.0008	0.0150
46	0.0007	0.0009	0.0150
47	0.0008	0.0010	0.0150
48	0.0009	0.0012	0.0150
49	0.0009	0.0014	0.0150
50	0.0010	0.0016	0.0150
51	0.0011	0.0018	0.0150
52	0.0013	0.0020	0.0150
53	0.0014	0.0023	0.0150
54	0.0016	0.0026	0.0150

Appendix D Pension factors for funding purposes

As noted in Section 6.5, as new pensions emerge for the defined benefit categories, they are funded by a transfer from the Employer Fund equal to 95% of the present value of the pension liability. This liability is in turn calculated as the annual value of the pension multiplied by a pension factor intended to approximate the value of $1 per annum payable for the life of the pensioner and any subsequent reversionary spouse.

These pension factors are shown in the following tables, depending on the method of indexation applicable to the pension, the pension type (age, ill-health, spouse) and the age last birthday of the member at retirement or death. For members aged over 100, the age 100 factor should be used.

Table 93 Pension Factors to Determine Value of New Pensions for Funding Purposes (to age 60)

	CPI Indexed			Salary Indexed		
Age Last Birthday	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse
16	25.719	25.532	25.355	32.654	32.293	32.014
17	25.653	25.459	25.275	32.520	32.147	31.858
18	25.586	25.384	25.192	32.381	31.997	31.698
19	25.516	25.305	25.106	32.239	31.842	31.535
20	25.443	25.224	25.019	32.093	31.682	31.369
21	25.368	25.139	24.929	31.943	31.517	31.198
22	25.291	25.051	24.836	31.789	31.348	31.024
23	25.210	24.959	24.740	31.631	31.174	30.845
24	25.126	24.863	24.640	31.468	30.994	30.661
25	25.039	24.763	24.536	31.301	30.809	30.472
26	24.948	24.659	24.428	31.129	30.619	30.277
27	24.854	24.551	24.316	30.951	30.422	30.076
28	24.756	24.440	24.199	30.768	30.220	29.869
29	24.654	24.323	24.078	30.580	30.013	29.657
30	24.547	24.201	23.951	30.387	29.799	29.438
31	24.437	24.075	23.820	30.187	29.578	29.212
32	24.322	23.944	23.683	29.982	29.351	28.980
33	24.202	23.807	23.541	29.770	29.117	28.741
34	24.078	23.665	23.394	29.552	28.877	28.495
35	23.949	23.518	23.240	29.328	28.630	28.242
36	23.814	23.364	23.081	29.097	28.375	27.981
37	23.674	23.205	22.915	28.859	28.113	27.713
38	23.529	23.039	22.742	28.615	27.843	27.437
39	23.378	22.867	22.564	28.364	27.565	27.154
40	23.221	22.687	22.379	28.105	27.279	26.863
41	23.057	22.501	22.187	27.838	26.985	26.564
42	22.888	22.307	21.988	27.565	26.682	26.257
43	22.712	22.106	21.782	27.283	26.371	25.942
44	22.529	21.897	21.567	26.993	26.052	25.618
45	22.339	21.681	21.345	26.695	25.724	25.285
46	22.141	21.457	21.114	26.388	25.387	24.942
47	21.936	21.224	20.875	26.073	25.041	24.591
48	21.722	20.983	20.627	25.750	24.686	24.231
49	21.501	20.734	20.372	25.417	24.322	23.863
50	21.273	20.475	20.108	25.076	23.948	23.486
51	21.036	20.208	19.836	24.726	23.566	23.101
52	20.790	19.931	19.556	24.367	23.173	22.707
53	20.536	19.645	19.267	23.999	22.771	22.305
54	20.274	19.348	18.970	23.623	22.359	21.895
55	20.002	19.042	18.663	23.236	21.937	21.476
56	19.721	18.726	18.348	22.840	21.505	21.048
57	19.430	18.399	18.024	22.435	21.063	20.613
58	19.130	18.063	17.691	22.020	20.612	20.169
59	18.820	17.716	17.348	21.595	20.152	19.716
60	18.499	17.360	16.996	21.161	19.682	19.254

Table 94 Pension Factors to Determine Value of New Pensions for Funding Purposes (over age 60)

	CPI Indexed			Salary Indexed		
Age Last Birthday	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse
61	18.169	16.992	16.634	20.716	19.203	18.784
62	17.828	16.614	16.262	20.263	18.715	18.306
63	17.477	16.225	15.882	19.800	18.218	17.821
64	17.116	15.826	15.494	19.328	17.711	17.329
65	16.744	15.418	15.098	18.847	17.197	16.832
66	16.363	15.000	14.694	18.357	16.675	16.328
67	15.971	14.572	14.281	17.858	16.146	15.817
68	15.570	14.137	13.860	17.351	15.612	15.301
69	15.158	13.694	13.431	16.836	15.073	14.779
70	14.736	13.243	12.994	16.313	14.528	14.252
71	14.305	12.786	12.552	15.783	13.981	13.722
72	13.866	12.322	12.105	15.248	13.430	13.190
73	13.419	11.853	11.653	14.707	12.877	12.657
74	12.965	11.380	11.197	14.162	12.323	12.123
75	12.504	10.904	10.740	13.613	11.770	11.591
76	12.038	10.427	10.280	13.062	11.219	11.061
77	11.567	9.950	9.821	12.510	10.672	10.533
78	11.092	9.476	9.362	11.957	10.132	10.010
79	10.614	9.006	8.904	11.405	9.602	9.490
80	10.135	8.543	8.447	10.856	9.081	8.977
81	9.655	8.089	7.994	10.310	8.573	8.471
82	9.178	7.644	7.547	9.770	8.079	7.974
83	8.704	7.210	7.109	9.238	7.600	7.490
84	8.237	6.790	6.682	8.717	7.137	7.021
85	7.780	6.383	6.269	8.209	6.693	6.569
86	7.333	5.994	5.870	7.716	6.270	6.136
87	6.900	5.625	5.488	7.240	5.868	5.723
88	6.481	5.275	5.123	6.783	5.492	5.329
89	6.079	4.948	4.777	6.347	5.140	4.958
90	5.696	4.645	4.449	5.933	4.815	4.608
91	5.333	4.367	4.142	5.542	4.518	4.282
92	4.992	4.114	3.857	5.177	4.249	3.980
93	4.675	3.883	3.594	4.839	4.004	3.702
94	4.383	3.672	3.355	4.528	3.780	3.450
95	4.116	3.477	3.138	4.244	3.573	3.222
96	3.873	3.295	2.945	3.987	3.381	3.020
97	3.655	3.125	2.777	3.757	3.203	2.844
98	3.458	2.965	2.632	3.551	3.036	2.693
99	3.281	2.817	2.505	3.365	2.880	2.560
100	3.119	2.680	2.389	3.195	2.738	2.439

Appendix E Data integrity checks and adjustments

This Appendix lists the checks undertaken on the membership data provided by QSuper as well as any adjustments that have been made in order to provide the best assessment of the scheme's liabilities.

The following data files were supplied in respect of each Category of membership within QSuper.

Table 95 List of Data Sources

Name of File	Date	Category	Description
Contributors			
Defined Benefit Actives Data Phase 2 30062015.txt	29/10/2015	Defined Benefit	Membership details of active members at 30 June 2015
Defined Benefit Salary Reduction Phase 2 30062015.txt	29/10/2015	Defined Benefit	Details of members who had salary reduction benefits at 30 June 2015
DB Exits Phase 2 30062015.txt	3/11/2015	Defined Benefit	Exits in financial year 2014-2015
Defined Benefit Exits Actuary Phase 2 30062014.txt	3/11/2014	Defined Benefit	Exits in financial year 2013-2014
Police Actives Actuary Phase 2 30062015.txt	15/10/2015	Police	Membership details of active members at 30 June 2015
Police Exits Actuary Phase 2 30062015.txt	15/10/2015	Police	Exits in financial year 2014-2015
Police Exits Actuary Phase 2 30062014.txt	31/10/2014	Police	Exits in financial year 2013-2014
State Actives Actuary Phase 2 30062015.txt	15/10/2015	State	Membership details of active members at 30 June 2015
State Exits Actuary Phase 2 30062015.txt	15/10/2015	State	Exits in financial year 2014-2015
State Exits Actuary Phase 2 30062014.txt	31/10/2014	State	Exits in financial year 2013-2014
Actuary data - Appendix 5 - Active Members from 30-6-15 Final.xls	15/07/2015	Parliamentary	Membership details of active members at 30 June 2015
Actuary Data - Appendix 24 - Exited Members 30-6-2015 Final.xls	20/10/2015	Parliamentary	Exits in financial year 2014-2015
Actuary Data - Appendix 24 - Exited Members.xls	15/09/2014	Parliamentary	Exits in financial year 2013-2014
Accumulation Members Phase 2 30062015.txt	9/11/2015	Accumulation	Membership details of accumulation members at 30 June 2015
SAACQALL20142015_201510121048.txt	20/10/2015	Income Account	Membership details of income account based members at 30 June 2015
Pensioners			
DB Final.txt	16/07/2015	Defined Benefit	Pensions in payment at 30 June 2015 and pensioner movements in 2014-15 financial year
Actuary Data - Appendix 14 - Pensioners Adjustments 30-6-15 Final.xlsx	13/07/2015	Parliamentary	Pensions in payment at 30 June 2015 and pensioner movements in 2014-15 financial year
PO Final.txt	17/07/2015	Police	Pensions in payment at 30 June 2015 and pensioner movements in 2014-15 financial year
ST Final.txt	17/07/2015	State	Pensions in payment at 30 June 2015 and pensioner movements in 2014-15 financial year
SAACPEFI20142015_201506290815.txt	3/07/2015	Fire	Pensions in payment at 30 June 2015 and pensioner movements in 2014-15 financial year
POLICE PE PO extract Phase 1 2014.txt	22/07/2014	Police	Pensions in payment at 30 June 2014 and pensioner movements in 2013-14 financial year
STATE PE ST Phase 1 extract 2014.txt	25/07/2014	State	Pensions in payment at 30 June 2014 and pensioner movements in 2013-14 financial year
PEFI 2013-2014 Phase 1	3/07/2014	Fire	Pensions in payment at 30 June 2014 and pensioner movements in 2013-14 financial year
Actuary Data - Appendix 14 - Pensioners - Final 2014.xlsx	9/07/2014	Parliamentary	Pensions in payment at 30 June 2014 and pensioner movements in 2013-14 financial year
Commuters 2015.xls	3/08/2015	State & Police	Pensions in payment at 30 June 2015 and pensioner movements in 2014-15 financial year
Deferred Members			
SAACQDRB20142015_201510121048.txt	20/10/2015	Defined Benefit	Membership details at 30 June 2015
SAEXQDRB20142015_201510121048.txt	12/10/2015	Defined Benefit	Exits in financial year 2014-2015
Deferred Retirement Exits Actuary Phase 2 30062014.txt	29/09/2014	Defined Benefit	Exits in financial year 2013-2014
Preserved Members			
Actuary Data - Appendix 8 - Preserved Members - 30-06-2015 Final.xls	2/07/2015	Parliamentary	Membership details at 30 June 2015
State Preserved Actuary Phase 2 30062015.txt	15/10/2015	State	Membership details at 30 June 2015
Police Preserved Actuary Phase 2 30062015.txt	15/10/2015	Police	Membership details at 30 June 2015
Income Protection Claims			
qryActuaryXtr_Apx26.txt	20/08/2015	Defined Benefit & State	Static claims data for Income Protection claims
qryActuaryXtr_Apx27_2009.txt	20/08/2015	Defined Benefit & State	Payment data for Income Protection claims
qryActuaryXtr_Apx27_2of2_2015.txt	20/08/2015	Defined Benefit & State	Payment data for Income Protection claims
qryActuaryXtr_Apx28Finalised.txt	20/08/2015	Defined Benefit & State	Finalised recoveries data in respect of Income Protection claims
qryActuaryXtr_Apx28NotFinalised.txt	20/08/2015	Defined Benefit & State	Unfinalised recoveries data in respect of Income Protection claims
Administration Expenses			
DB Admin Cost - Print v3.xlsx	1/03/2016		Administration expense data for Defined Benefit for the period 1 July 2010 to 30 June 2015
DB Financial Planning Cost - Print v3.xlsx	1/03/2016		Financial planning expense data for Defined Benefit for the period 1 July 2010 to 30 June 2015
DB Insurance Fee - Print v3.xlsx	1/03/2016		Insurance expense data for Defined Benefit for the period 1 July 2010 to 30 June 2015
Assets			
QSuper - Certified Financial Statements.docx.pdf	15/01/2016		Audited financial statements as at 30 June 2015
QTC 3A Account - Transaction Detail by Product_1251162_1.xlsx	30/07/2015		Consolidated fund assets as at 30 June 2015
ALM Spreadsheet 2010-11 (Final 07092011).xls	7/09/2011		Defined Benefit/Accumulation asset split for financial year 2010-11
Qld Govt ALM - QSL FY 11-12 (Final).xls	23/08/2012		Defined Benefit/Accumulation asset split for financial year 2011-12
FINAL - Qld Govt ALM - QSL FY 12 - 13 YTD V2 dated 080812.xlsx	8/08/2013		Defined Benefit/Accumulation asset split for financial year 2012-13
Qld Govt ALM - Jun14 QTR after tax.xlsx	7/08/2014		Defined Benefit/Accumulation asset split for financial year 2013-14
Qld Govt ALM - June15 QTR - v3.xlsx	5/02/2016		Defined Benefit/Accumulation asset split for financial year 2014-15

A number of checks were performed on the data to ensure that it was of sufficient quality to be relied upon. These checks are summarised below by Category of membership.

Deferred Members Actives at 30 June 2015

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Gender
- Date Commenced after Valuation Date
- Missing Date Commenced, Date of Birth
- AWOTE Benefit less than zero
- Low (15) or High (55) Age at 30 June 2015

Deferred Members - Exits in period 1 July 2013 to 30 June 2015

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Exit Type
- Missing Date Commenced, Date of Birth, Date of Exit
- Date Of Exit outside period 1 July 2013 to 30 June 2015
- Date of Exit earlier than Date Commenced
- Low (15) or High (55) Age at Date Of Exit

Reconciliation of new Deferred members, exits and actives at the end of the period with the corresponding data at the beginning of the period.

Pensioners - DB, State, Police, & Parliamentary

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Pension Type, Gender, Commencement Code or Termination Code
- Missing Date Of Birth, Date Commenced
- Missing or Zero Pension or Reversion Amount
- Date Terminated outside period 1 July 2013 to 30 June 2015
- Commencement Code but no Date Commenced in period
- Termination Code but no Termination Date, and vice versa
- Date Terminated before Date Commenced
- Compare pension amount at start indexed with pension increases with actual pension amount at end
- Low ($20per f/n) or High ($3k per f/n) Pension Amount or Reversion Amount
- Low (16 Child, 55 Pensioner) or High (25 Child, 100

	Pensioner) Pension Age
	Reconciliation of new pensioners, exits and pensioners in payment at the end of the year with the corresponding pensioner data at the beginning of the year.
Preserved Members - State, Police Actives at 30 June 2015	Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly: • Invalid Gender • Missing Date Of Birth • Missing, Zero or Negative Preserved Balance at 30 June 2015
Standard Defined Benefit Category Members - Actives at 30 June 2015	Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly: • Invalid Gender, Previous Scheme Indicator, TTR Indicator, FL Indicator • Missing Date Of Birth, Date Joined DB Plan • Low (15) or High (70) Age at 30 June 2015 • Missing Date Joined Previous Scheme if Previous Scheme indicator was not blank • Date Joined Previous Scheme later than Date Joined DB Plan • Date Joined Previous Scheme later than Police Closure Date if Previous Scheme Indicator equal to P • Date Joined Previous Scheme later than State Closure Date if Previous Scheme Indicator equal to S • Date Joined DB Plan later than DB Closure Date • Missing or Zero 1 July 2015, 2014 & 2013 Review Date Salary and OTE Salary • Low ($0) or High ($1m) 1 July 2015, 2014 & 2013 Review Date Salary and OTE Salary • High (100%) DB Salary Increase in 2013-2014 and 2014-2015 financial year • Missing or High (9.45 DB Standard, 11 DB Police, 2.0 ATM) Accrued Multiple & ATM at 30 June 2015 • Missing ATM where Previous Scheme Indicator is S or P • Zero, Low (2% DB Standard, 3% DB Police) or High (8% DB Standard, 9% DB Police) Member Contribution Rate • Missing or Zero FTE Ratio

- Missing or Zero Career FTE Ratio
- FTE Ratio or Career FTE Ratio greater than 1.0
- Missing, Zero or High Service (1.1 times Service) For Prospective Benefit
- Missing or Zero Member Contribution Balance at 30 June 2015
- High ($1.5m) Voluntary Contribution Balance at 30 June 2015
- Missing or Zero TTR Multiple if TTR Indicator = Y
- Missing or Zero FL Multiple if FL Indicator = Y
- Missing Date of TTR if TTR Indicator = Y
- Missing Date of FL if FL Indicator = Y
- TTR Multiple greater than Accrued Multiple at TTR Date if TTR Indicator = Y
- FL Multiple greater than Accrued Multiple at FL Date if FL Indicator = Y

Reconciliation of exits and actives at the end of the year with the corresponding actives data at the beginning of the year.

Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

Adjustments made to the data include:

- Duplicate membership records due to secondments or multiple part-time memberships were combined to a single record for each life
- Removal of membership records in relation to an agency redundancy program that were incorrectly included in the actives data
- Minor corrections were advised by QSuper in respect of individual membership records in respect of the following fields:
- 1 July 2015 Review Date Salary
- OTE Salary
- ATM
- Accrued Multiple
- 1 July 2014 Review Date Salary
- Member Contribution Rate
- FL & TTR Multiple

- Date Joined DB Plan
- Date Joined Previous Scheme
- If missing or zero Member Contribution Rate, assume member is on Leave Without Pay
- Where FTE Ratio is less than zero, set to be equal to Career FTE Ratio if Career FTE Ratio reasonable, otherwise Impute an average equal to the non-zero average FTE Ratio
- Where Career FTE Ratio is less than zero, set to be equal to FTE Ratio if FTE Ratio reasonable, otherwise Impute an average equal to the non-zero average Career FTE Ratio
- Imputed the maximum Member Contribution Rate if Member Contribution Rate was greater than the maximum allowable (48 records adjusted)
- Imputed the standard Member Contribution Rate if Member Contribution Rate was less than the minimum allowable (46 records adjusted)
- If Missing Service for Prospective Benefit, derive from the Date Joined field (487 records adjusted)
- If Low or Missing Salary, use the previous years' Salary, otherwise impute an average Salary (90 records adjusted)
- If Low OTE Salary, use the 1 July Review Date Salary (3 records adjusted)
- If High Salary Growth in year, impute Salary at start of year equal to Salary at start of previous year if Salary at start of year is greater than Salary at end of year (14 records adjusted)

Standard Defined Benefit Category Members - Exits in period

1 July 2013 to

30 June 2015

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Previous Scheme Indicator, Gender, Exit Type, TPD Benefit Type
- Date Joined DB Plan later than Valuation Date
- Missing Date of Exit or Date of Exit later than Valuation Date
- Date Of Exit outside period 1 July 2013 to 30 June 2015
- Date of Exit earlier than Date Joined
- Low (15) or High (70) Age at Date Of Exit
- Missing Date Joined Previous Scheme if Previous Scheme indicator is not blank

- Date Joined Previous Scheme later than Date Joined DB Plan
- Date Joined Previous Scheme later than Police Closure Date if Previous Scheme Indicator equal to P
- Date Joined Previous Scheme later than State Closure Date if Previous Scheme Indicator equal to S
- Date Joined DB Plan later than DB Closure Date
- Missing or Zero 1 July 2014 & 2013 Review Date Salary
- Low ($5k) or High ($1m) 1 July 2014 & 2013 Review Date Salary
- High (100%) DB Salary Increase in financial year
- High ($1.5m), Missing, Zero or Negative amounts transferred out of the DB sub-plan to either Deferred Retirement, Accumulation, Allocated Pension sub-plans or transferred out of the Fund.
- High ($1.5m) or Low ($0) Standard QSuper DB Benefit
- Missing or Zero Member Contribution Balance at Date of Exit
- High ($1.5m), Missing or Zero Voluntary Contribution Balance at Date of Exit

Reconciliation of exits in the period and the actives at the end of the period with the corresponding actives data at the beginning of the period.

Police Category Members - Actives at 30 June 2015

- Low (18) or High (60) Age at 30 June 2015
- Date Joined Fund after Police Plan Closure Date
- Low (15) Age at Date Joined Fund
- Invalid Gender, Section 24A Indicator
- Missing Section 24A Rate if Section 24A Indicator = Y
- Missing Additional Contribution Rate if member has Additional Service years
- Low ($10k) or High ($130k) Salary at 30 June 2015
- Low ($0) OTE Salary at 30 September 2014
- Low ($500) Accumulation Balance at 30 June 2015
- High ($90k) Annual Pension Amount at 30 June 2015
- High ($900k) Lump Sum Payable on Retirement at 30 June 2015
- Missing or Zero Vested Benefit at 30 June 2015
- Retirement Benefit provided but member is below Retirement Age

- Retirement Benefit not provided but member is above Retirement Age
- Resignation Benefit provided but member is above Retirement Age
- Resignation Benefit not provided but member is below Retirement Age

Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

State Category Members - Actives at 30 June 2015

- Low (16) or High (65) Age at 30 June 2015
- Date Joined Fund after State Plan Closure Date
- Low (15) Age at Date Joined Fund
- Invalid Gender, Section 24A Indicator
- Low ($10k) or High ($250k) 30 June 2015 Review Date Salary
- Low ($0) OTE Salary at 30 September 2014
- Low ($500) Accumulation Balance at 30 June 2015
- Low ($0) Member Contribution Balance at 30 June 2015
- High Portability Service (15), Reduced Service (12) or Additional Service (25) at 30 June 2015
- Missing Additional Contribution Rate if member has Additional Service years
- High ($100k) Annual Pension Amount or Lump Sum Payable on Retirement at 30 June 2015
- Missing or Zero Vested Benefit at 30 June 2015
- Retirement Benefit provided but member is below Retirement Age
- Retirement Benefit not provided but member is above Retirement Age
- Resignation Benefit provided but member is above Retirement Age
- Resignation Benefit not provided but member is below Retirement Age

Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

State & Police Category Members - Exits in period 1 July 2013 to 30 June 2015

- Invalid Gender, Benefit Type, Exit Type
- Missing Date of Exit
- Date Joined Fund, Date of Exit later than Valuation Date
- Date Of Exit outside period 1 July 2013 to 30 June 2015
- Date of Exit earlier than Date Joined
- Low (15) or High (60 Police, 65 State) Age at Date of Exit
- Missing, Zero, Low ($5k) or High ($1m) salary at Date of Exit
- Low ($0) or High ($1.5m) Preserved Benefit at Date of Exit
- Accumulated Member Balance is greater than Preserved Benefit at Date of Exit

Reconciliation of exits in the period and the actives at the end of the period with the corresponding actives data at the beginning of the period.

Parliamentary Category Members - Actives at 30 June 2015

- Low (18) or High (70) Age at 30 June 2015
- Low (18) Age at Election Date
- Missing Date Of Birth, Date of Entry
- Election Date after Valuation Date
- Invalid Member Category
- Low (<$Backbencher) or High Own Salary ($300k) at 30 June 2015
- Low ($1m) or High ($3m) Accumulated Own Salary at 30 June 2015
- Low ($1m) or High ($3m) Accumulated Backbencher Salary at 30 June 2015
- Total Accumulated Own Salary is less than Total Accumulated Backbencher Salary as at 30 June 2015
- Total Member Contributions at 30 June 2015 not equal to Member Contribution Rate times Total Own Salary

Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

Parliamentary Category Members - Exits in period 1 July 2013 to 30 June 2015

- Low (18) or High (70) Age at Date of Exit
- Invalid Member Category, Benefit Type, Exit Reason
- Missing Date Of Birth, Date of Entry, Date of Exit
- Low (<$Backbencher) or High Own Salary ($300k) at Date Of Exit
- Missing Surcharge Debt Account, Surcharge Contribution Account (if applicable) and Surcharge Cap (if applicable) at Date Of Exit
- Missing Emerging Pension at Date Of Exit
- Missing Fortnightly Pension Benefit, net of Surcharge at Date of Exit
- If commuted, Missing Commuted Amount at Date of Exit
- If commuted, Missing Amount of Fortnightly Pension commuted at Date of Exit
- Missing Accumulated Member Contributions at Date of Exit

Reconciliation of exits in the period and the actives at the end of the period with the corresponding actives data at the beginning of the period.

Income Protection Claims - Static Claims Data for Defined Benefit & State Category

- Invalid Gender, Plan Type, Data Source Field
- Missing or Zero Salary at Commencement of Claim
- Missing Date of Birth, Date Commenced, Date of Event, Date Notified, Date Joined, Date Ceased
- Low (15) or High (65) Age at Commencement of Claim
- Low (15) or High (65) Age at Cessation of Claim
- Date of Cessation earlier than Date Commenced
- Date Commenced earlier than Date of Event
- Low ($5k) or High Salary ($1m) at Commencement of Claim
- IP claims with Long Duration

Adjustments made to the data include:

- Duplicate claim records were combined to a single record for each incident

Income Protection Claims - Gross

- Invalid Gender, Pay Type, Plan ID, Data Source Field
- Missing or Zero Gross Payment Amount

Payment and Recoveries Data for Defined Benefit & State Category

- Missing Recovery Amount
- Missing Date of Birth, Weekly Payment Start Date, Weekly Payment End Date
- Low (15) or High (65) Age at Start of Payment Week

Adjustments made to the data include:

- Removal of payment records that had both no gross payment amount or recovery amount paid

Aggregate payments data for each payment year were compared to payments data from QSuper Fund Finance branch.

Appendix F Letter Requesting Valuation

Queensland Government

Queensland Treasury

Our Ref: 00552-2016

Mr Wayne Cannon
State Actuary
Queensland Treasury
Level 8, 100 George Street
BRISBANE QLD 4000

Dear Mr Cannon

Actuarial Review of State Public Sector Superannuation Scheme (QSuper)

I refer to my letter to you dated 17 December 2015 acknowledging receipt of your interim actuarial review of QSuper as at 30 June 2015, in accordance with the statements of the Treasurer during the 2015-16 Budget session.

I note that the Interim Review provided an update of the funding position but did not consider any recommendations for changes where appropriate, with the recommended contribution rates and any other matters to be considered at the next comprehensive actuarial review, scheduled for 30 June 2016. I understand that, due to the compression of the time schedules for actuarial reviews of regulated superannuation funds prescribed by APRA, your Office is already well advanced on the analysis of decrement and other key assumptions for that review.

In view of the very strong funding position identified in the Interim Review, I request that you bring forward the next comprehensive actuarial review to 30 June 2015, with projections until 30 June 2020. This will enable the most comprehensive and up to date picture of the funding position of the scheme to be provided to the Government as part of deliberations for the 2016-17 Budget. In order to meet the required timeframes, I request that your report be completed by 31 March 2016.

Again I stress the Government's commitment to the fiscal principle of full funding of the Scheme in accordance with your advice.

I thank you and your staff for undertaking this review within such a tight deadline.

Yours sincerely

Jim Murphy
Under Treasurer
22/2/16

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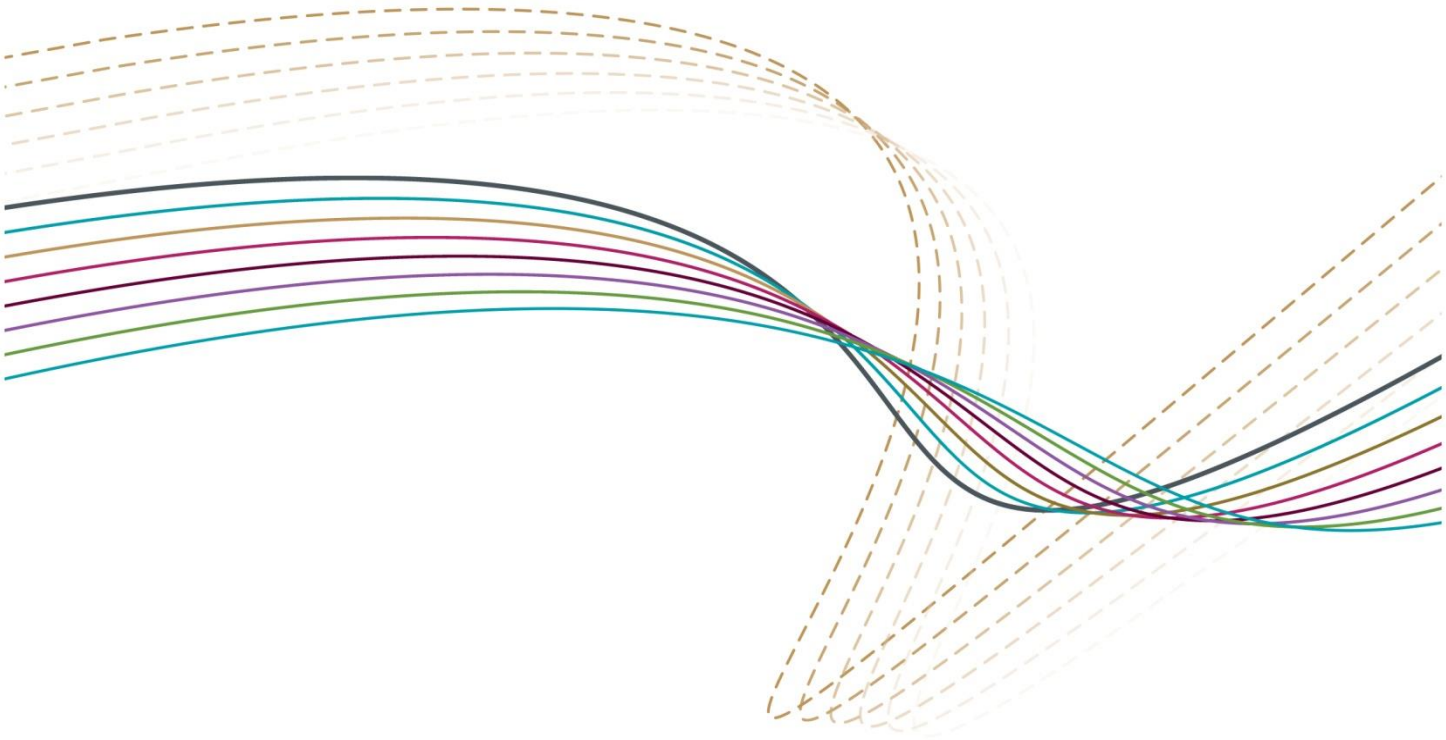

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Queensland Government