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CONSULTING ACTUARIES

27 June 2018

Actuarial Report as at 30 June 2017

Police Superannuation Scheme

Contents

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Executive Summary

1.1. We have prepared this report at the request of the Minister, to satisfy the requirements of Section 15 of the Police Superannuation Act, 1990. This Section of the Act requires an Actuary to provide a report to the Minister:

(a) on the cost of the Police Superannuation Scheme to the State Government at the time of the report and in the foreseeable future, and

(b) estimating the proportion of future benefits under this Act that can be met from the Fund.

1.2. This report continues the series of reports that have been prepared to address these issues in the past. These reports have been prepared on a regular basis, generally every three years, and have provided information about the funding and cost of the superannuation scheme which is used for members of the police force in South Australia.

1.3. The previous report was prepared by Geoffrey Keen and Bruce Watson of Brett & Watson Pty Ltd as at 30 June 2014, with that report dated 26 June 2015.

1.4. The Police Superannuation Board in its annual report for 2014-15 advised that the recommendations of the previous report were adopted. That is, the employer contribution rate of 20.5% was maintained and the share of benefits met from the Fund was increased from 19.0% to 22.0%.

1.5. We have prepared this report with the assistance of Mr John Barrett, Actuarial Officer, Department of Treasury and Finance. We have used computer analyses prepared by Mr Barrett, which derive their information from the administration computer system that is

used by the Police Superannuation Board. We have been grateful for the assistance provided in this exercise and for access to his extensive knowledge of the operations of the Scheme.

1.6. In this report, we have:

- provided information about the current funding status of the Scheme,
- commented on the funding proportion of benefit payments, and
- produced estimates of the future cost of the Scheme.

1.7. The major conclusions which we have made in this report are that -

(i) the funding proportion for the Scheme can be increased from 22.0% to 24.0%, and

(ii) the Government contribution for future service liabilities for the Scheme be increased from 20.5% to 22.0% of contributors' salaries.

1.8. We confirm that this Report has been prepared to comply with Professional Standard PS400 of the Institute of Actuaries of Australia, relating to the Investigation of the Financial Condition of Defined Benefit Superannuation Funds. Where requirements of the Standard are not relevant or appropriate for the Scheme, we have omitted them.

2

Legislation Affecting the Scheme

Governing Legislation

2.1. The Police Superannuation Scheme is governed by the Police Superannuation Act, 1990 ("the Act") and the Police Superannuation Regulations 2017.

2.2. Under the Act, members who joined the Scheme before 1 June 1990 are able to receive benefits in pension form. Members who joined the Scheme on or after 1 June 1990 were transferred to the Triple S Scheme effective 1 July 2008. An overview of the benefits and contributions under the current legislation is provided in Appendix A.

Amendments to Legislation

2.3. Since the time of the previous report, there has been one amendment to the Act. The amendment:

- Increases the salary loading of a contributor who holds the rank of senior sergeant or a lower rank to eleven instead of ten per cent in respect of shift work.

2.4. Under the Police Enterprise Agreement 2016, Officers of Police (from Inspector to Commander) will be entitled to a flexibility loading to their superannuation salary of eight per cent for day shift positions and eleven per cent for positions that rotate through more than one shift.

Superannuation Surcharge

2.5. The "Superannuation Surcharge" is a tax which was introduced by the Federal Government from 20 August 1996. The Surcharge was applied to this Scheme in the form of a "debt account" for affected members. That debt account is accumulated with the long term (Federal) Treasury bond rate until the person becomes eligible for a benefit entitlement under the Act, at which time the accumulated balance is required to be paid to the Australian Tax Office.

2.6. Legislation was passed which has abolished the Surcharge with effect from 30 June 2005.

3

Funding of the Scheme

Member Contributions

3.1. Scheme members who joined after their 30th birthday contribute at 6% of salary, while members who joined before their 20th birthday contribute at 5% of salary. Contribution rates decrease from the level of 6% of salary to 5% of salary for members who joined between these ages.

3.2. The average rate of member contribution for current members at 30 June 2017 was 5.1% for the Scheme. These member contributions are paid by the Treasurer into the Police Superannuation Fund. This Fund is managed and invested by Funds SA (the business name of the Superannuation Funds Management Corporation of South Australia).

3.3. The Fund is required to meet its share of administration costs and benefit payments.

Funding of Public Sector Superannuation

3.4. Since 1 July 1994, the State Government has undertaken a program that is intended to progressively fund its accumulated superannuation liabilities. This program has been set out over a 40 year period, with the intention of achieving complete funding of accumulated superannuation liabilities by the year 2034.

3.5. This program will produce a specific pool of externally invested assets, which are currently managed by Funds SA. These assets are maintained in distinct accounts for each of the State schemes that are supported by the State Government. The assets of the Police Superannuation Scheme – Employer Contribution Account are shown in the table in paragraph 4.1 below.

3.6. The payments that are being made into the investment pool are intended to meet the cost of newly accruing benefits each year, as well as to meet a portion of the existing past service liability.

3.7. During the three years to 30 June 2017, total payments of $193,800,000 were made in respect of the past service liability for members of the Police Superannuation Scheme. These contributions are paid into the Employer Account for the Scheme and are not taken into account in setting the future contribution levels or funding proportions.

Cost Sharing Proportion

3.8. The proportion of benefits met from the Fund is set by the Board under sub-section 14(3) of the Act. This is effectively the proportion of lump sum and pension benefits that must be funded out of the assets held in the Police Superannuation Fund. As mentioned in paragraph 1.1, this report must provide an estimate of the proportion.

3.9. The prescribed proportion is 100% for all resignations involving a return of the member's contribution account balance (with the balance of this benefit being fully met by the Government). For other types of entitlement, a different prescribed proportion applies.

3.10. The prescribed proportion is currently 22.0%. This means that the Government is responsible for meeting the remaining 78.0% of benefits at the time a member is paid their benefit. The Government's share of the benefit is met from the assets of the Employer Account.

Share of Administration Costs

3.11. Regulation 18, pursuant to Section 10(7)(b) of the Act, specifies that the proportion of administration costs that must be met by the Fund is 30%. The balance of the administration costs is met by the Government.

4

Assets of the Fund

Details of Assets

4.1 At 30 June 2017, the assets of the Fund and the Employer Account were invested with Funds SA in the following major asset classes:

Asset Type	Fund ($'000)	Employer Account ($'000)	Total ($'000)
Inflation Linked Investments	22,692	49,125	71,817
Property	80,441	174,142	254,583
Equities – Australian	137,893	298,518	436,411
Equities – International	139,499	301,993	441,492
Fixed Interest	-	-	-
Diversified Strategies – Growth	62,202	134,659	196,861
Diversified Strategies – Income	80,553	174,386	254,939
Cash	6,614	14,317	20,931
Total Investments	**529,894**	**1,147,140**	**1,677,034**
Other Assets and Liabilities	(214)	(547)	(761)
NET ASSETS TO PAY DEFINED BENEFITS	**529,680**	**1,146,593**	**1,676,273**

4.2. At 30 June 2017 the net assets were $529.7 million for the Fund and $1,146.6 million for the Employer Account.

4.3. The amount held in the Employer Account is intended to be used for the purpose of paying the Government's share of the benefits as they fall due.

4.4. We have used the market value of the assets of the Fund for the purposes of our projections and assessment of the funding position of the Scheme. We consider that the market value is reasonable for this purpose, and this represents a continuation of the practice from previous reports.

Returns on Investments

4.5. One of the major objectives which Funds SA has for the management of the assets of the State's defined benefit public sector superannuation schemes is the achievement of long term returns which are 4.5% per annum in excess of inflation.

4.6. The assets of the Scheme have a significant emphasis on "growth" investments, which is consistent with the objective of achieving a high real rate of return. One of the results of this emphasis on "growth" investments is that returns will be variable over different years, as Australian and international markets fluctuate over time. A review of the defined benefit investment strategy is undertaken every three years, with a view to ensuring that strategy remains appropriate to achieving the State Government's objectives. I consider that the current investment strategy with its emphasis on growth investments is appropriate given the nature of the liabilities.

4.7. Rates of return on the assets for the Scheme (money weighted), allowing for investment fees, for the last three years have been:

	2014/15	**2015/16**	**2016/17**
Investment return	10.0%	3.7%	12.4%

These rates of return were used to credit member contribution accounts in accordance with the Board's crediting rate policy. There are no reserves are held in the Scheme.

4.8. Over the three years ending 30 June 2017, the average rate of return on the assets has been 8.6% per annum. This compares with the expected return for the three years at the previous review of 7.0% per annum. Investment returns exceed expected returns by 1.6% per annum.

5

Valuation Assumptions

5.1. This actuarial investigation involves using a model to project the experience of the members of the Scheme and the balance of the Fund into the future. The model allows for demographic factors (including rates of mortality, retirement, invalidity and resignation) and economic factors (including rates of investment returns, crediting rates and inflationary increases in benefits) as well as other factors such as rates of pension commutation and preservation.

5.2. We have used a projection and funding method known as “aggregate funding”, that involves calculating the present value of all liabilities relating to present contributors, pensioners and preserved members, and comparing the prescribed proportion of this with the present value of future member contributions together with the value of the Fund’s investments.

Economic Assumptions

5.3. Assumptions are required to be made about future crediting rates, salary increases and CPI increases. These assumptions are inter-related, since it would be expected that crediting and earning rates should normally be higher than salary increases, which in turn should be higher than CPI increases.

5.4. For the purpose of this investigation, we have retained the same long-term assumptions as applied in the previous valuation as at 30 June 2014 for general salary increases, future investment returns and crediting rates and future CPI increases.

5.5. We have assumed a future general salary increase rate of 4% per annum. We have assumed that general salary increases will be 1.5% per annum in excess of CPI. We have assumed that investment returns will be 3.0% per annum in excess of general salary increases, resulting in a net investment return assumption of 7% per annum.

5.6. This "package" of assumptions produces an assumed real return of 4.5% above CPI inflation in the long term and is consistent with the objectives of Funds SA and the real return used at the previous investigation.

Promotional Salary Increases

5.7. In addition to an assumed level of general salary increases, allowance is also made for promotional salary increases throughout a member's career. A promotional salary scale is derived from prior experience. Promotional salary increases were close to the level assumed during the three year period to 30 June 2017, and so no changes were made to the existing promotional salary scale.

5.8. We also note that we expect that promotional increases will become less important over time as the membership ages.

Demographic Assumptions

5.9. The demographic assumptions that we have used in the projections and valuations were set after considering the experience of contributors and pensioners over the three year period to 30 June 2017, as well as the experience for prior periods. As the amount of experience for the Scheme is generally significant, the assumptions that are derived from the experience could be regarded as being reliable for the purpose of the calculations.

5.10. The experience observed over the three year period is summarised in Appendices C and D, while the assumptions adopted are summarised in Appendix E.

5.11. In general, we have retained the assumptions that were used in the previous valuation. In some cases, we have retained the major features of the assumptions, but used updated mortality rates, based on the rates of mortality improvement in the Australian Life Tables 2010-12.

5.12. The changes in assumptions related to:

- rates of mortality,
- rates of spouse mortality,
- rates of age and preserved age retirement,
- rates of withdrawal,
- rates of proportion married, and
- rates of commutation.

We have provided a brief discussion of the changes made to the assumptions below.

Mortality

5.13. Mortality rates in the past have been linked to percentages of the standard population mortality based on Australian Life Tables. We have retained this approach for this investigation. We have based our calculations on Australian Life Tables 2010-12, the most recent tables and we have recognised that the mortality applies at a date prior to the valuation date. As a result, we have made allowance for improvements in mortality up to 30 June 2017 where the mortality improvement factors have been set equal to the average of the 25 and 125 year factors in Appendix E of the Australian Life Tables 2010-12. During the investigation period, higher rates of mortality amongst spouses has been experienced. Spouses also experienced higher rates of mortality during the 3 year period ending 30 June 2014. As a result, we have adopted spouse mortality rates equal to 100% of the Australian Life Tables adjusted for mortality improvement.

Age Retirements

5.14. During the investigation period, lower rates of age retirement have been experienced for most ages and higher rates of preserved age retirement at age 55. As a result, we have adjusted these rates in line with the experience observed. Preserved age retirement rates have been adjusted to more closely reflect the experience by individual ages.

Proportion Married

5.15. Lower proportion of married have been assumed for males and females. At age 65 the proportion married for males has reduced from 96% to 92% and for females from 83% to 76%.

Commutations

5.16. Allowance is made for pensioners and spouses to commute the pensions to which they become entitled. It was previously assumed that 15% of age retirements, 7.5% of invalidity retirements and no eligible spouses would commute their pensions to lump sums. As a result of experience over the last three years, the rate for age retirements has been decreased to 12.5%. The other rates of commutation have remained unchanged.

Expenses

5.17. Fund administration expenses have been valued based on a cost of $190 per annum per member. It has been assumed that administration expenses increase at the same rate as general salary inflation.

Impact of Changes in Assumptions

5.18. Changes in economic assumptions are usually more significant in their impact than changes to demographic assumptions. We have provided information about the effect on the valuation results of the changes to the assumptions in Section 6.11 below.

5.19. The assumed increase in spouse mortality (see section 5.13 above) and proportion married has contributed to the surplus. The decrease in the assumed rate of commutation for age pensioners from 15% to 12.5% has reduced the surplus.

Material Risks

5.20. The main goals of the Scheme are that:

- The share of benefits that can be met from the Fund can broadly be maintained, and
- The State Government meets its objective of full funding by 2034.

Two of the main risks to achieving the above goals are:

- Investment market performance over the long term whereby investment objectives in real terms are not met, and
- Trends in mortality improvement which significantly exceed assumptions.

6

Valuation Results

Calculation of Funding Proportion

6.1. To assess the financial position of the Scheme, we have projected the future experience of current contributors and pensioners, and then discounted these benefit payments to the current date. The resulting values are the present value of projected liabilities for members of the Pension Scheme, the prescribed proportion of which must be compared with the value of the assets in the Fund and the present value of future member contributions.

6.2. We have set out below the results of the calculations using the current prescribed proportion of 22.0% of these liabilities.

1. Present Value of Prescribed Proportion of Liabilities

	$'000	$'000
Current Contributors		
Age Retirements	252,776	
Invalidity Retirements	8,999	
Spouse and Children's Benefits	22,471	
Resignations with Cash Payments	3	
Expenses	1,517	285,766
Current Pensioners		
Age Retirements	156,366	
Invalidity Retirements	25,415	
Spouses and Children	47,143	
Expenses	1,589	230,513
Total Liabilities		**516,279**

2. Present Value of Assets

	$'000	$'000
Future Member Contributions	29,894	
Fund Investments as at 30 June 2014	529,680	
Total Assets		559,574
Surplus (Deficit)		**43,295**

6.3. These results show that, if the Fund is used to meet the prescribed proportion (22.0%) of benefit costs, the Fund is expected to eventually have surplus to its obligations. The present day value of this surplus of assets over liabilities is $43,295,000. This compares to a deficit of $3,070,000 at 30 June 2014 assuming the Fund share was 22.0% at that time, or a surplus of $62,961,000 if the Fund share had remained at 19.0%.

6.4. We understand that it is preferable for administrative purposes to round the prescribed proportion to the nearest 0.5%. If the prescribed proportion is increased to 24.0% the Fund will have a small deficit of $3,357,000. We have therefore recommended that the proportion of benefits that can be met from the Fund be increased from 22.0% to 24.0%.

Projected Long Term Cost of the Scheme

6.5. We have also considered the long term cost of supporting the benefits in respect of service after 30 June 2017. (Past service liabilities are being progressively funded by the State Government, as discussed earlier in this Report).

6.6. For this purpose, we have projected the future benefit payments based only on the future service of current contributors, and then discounted the projected benefit payments to the current date. The resulting values are the present value of the future service benefit liabilities.

6.7. We have shown the results of the calculations in the following table.

Present Value of Future Service Liabilities

	$'000	**$'000**
Age Retirements	166,828	
Invalidity Retirements	4,016	
Spouse and Children's Benefits	13,541	
Resignations with Cash Payments	0	
Expenses	1,246	
Total Liabilities		**185,631**
Future Member Contributions		29,894
Liability to be Funded by Government Contributions		**155,737**
Required Government Contribution Rate		**21.7%**

6.8. This means that, if an amount equivalent to 21.7% of contributors' salaries is set aside as a provision or invested each year, the projected future service benefits would be able to be totally met by those future provisions or investments together with future member contributions, based on the projection assumptions. This is higher than the contribution rate of 21.1% determined at the 30 June 2014 actuarial investigations. We therefore recommend that the contribution rate be increased to 22.0% of salaries.

6.9. The main reason for the increase in the contribution rate is that the lower age and preserved age retirement rates are more than offset by the higher rate of preserved age retirement at age 55, lower rate of commutation on age retirement and that remaining members are three years older.

Explanation of Change in the Financial Position of the Fund

6.10. We have analysed the change in the financial position, by considering the main contributing factors. These factors relate to both experience and changes in the valuation assumptions. This analysis is set out below.

6.11. The following table sets out the major influences affecting the change in the financial position between 30 June 2014 and 30 June 2017. The starting point of this analysis is the surplus of $62,961,000 at 30 June 2014 which was based on the previous funding proportion of 19.0%. The surplus of $43,295,000 arising in this valuation results in a net change of surplus of $19,666,000.

Influence	***Impact $m***
Experience	
Change in fund proportion from 19.0% to 22.0%	(66.0)
Interest on surplus	(0.7)
Investment Returns	26.2
Salary and promotional increases	9.9
Lower pension increases	9.0
Commutation profit	(0.6)
Increase in shift loading	(1.9)
Flexibility allowance	(2.4)
Other	6.8
Total Experience	**(19.7)**
Change in Valuation Assumptions	
New spouse pensioner mortality	1.1
New age retirement rates	0.3
New proportion married	1.3
Changes to commutation assumptions	(2.5)
Total Change in Valuation Assumptions	**0.1**
Net Change in Surplus	**(19.6)**

Note that these values have been rounded to the nearer $100,000 and this may result in minor rounding differences compared to the actual change in surplus.

6.12. The major surplus items above are discussed below:

- Change in fund proportion. Reflects the increase in prescribed proportion from 19.0% to 22.0% following the surplus identified at 30 June 2014.
- Higher than expected investment returns were achieved as discussed in paragraph 4.8.

Sensitivity Analysis

6.13. We have assessed the financial position of the Scheme under alternative scenarios as part of a sensitivity analysis. The alternative scenarios are a discount rate 0.5% higher and 0.5% lower than the assumed discount rate of 7.0%, and mortality decrements 10% higher and 10% lower than the assumed mortality rates. The results are shown in the following table.

	Surplus $000	**Government Contribution Rate**	**Fund Prescribed Proportion**
Discount rate			
0.5% lower	8,264	23.6%	22.3%
Valuation assumptions	43,295	21.7%	23.9%
0.5% higher	74,826	20.0%	25.4%
Mortality decrements			
10% lower	36,207	22.0%	23.5%
Valuation assumptions	43,295	21.7%	23.9%
10% higher	49,585	21.5%	24.2%

7

Projected Cost to the State Government

7.1. We have projected the cost of the Scheme using the assumptions described in this Report, assuming that the recommended cost sharing arrangements apply in the future. We have recommended that the State Government be responsible for meeting 76.0% of the cost of benefits for members of the Scheme, relative to the current funding proportion of 78.0%.

7.2. In the following table we have set out these projected costs (expressed in current salary terms) as well as the total cost of the Scheme, including member contributions.

Year Ended 30 June	State Government Cost $ m	Total Cost (incl member contributions) $ m
2018	73.1	96.2
2019	78.3	103.1
2020	82.4	108.4
2021	85.2	112.2
2022	87.7	115.4
2023	90.2	118.8
2024	91.6	120.6
2025	92.8	122.1
2030	92.2	121.3
2035	81.1	106.7
2040	68.4	90.0
2045	54.3	71.5
2050	39.4	51.9
2055	24.6	32.4

8

Conclusions

8.1. In this Report, we have set out our comments about the funding status of the Police Superannuation Scheme.

8.2. We have recommended that:

- the funding proportion of 22.0% be increased to 24.0%, and
- the Government contribution required to fund future service liabilities be increased from 20.5% to 22.0% of contributor salaries.

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27 June 2018

Appendix A

Benefits and Contributions

Overview

A.1.1. The Police Superannuation Scheme is closed to new members.

A.1.2. This description of the Scheme is intended to provide a general understanding of the benefit entitlements of contributors to the Scheme. It is not intended to be a complete summary of the legislation.

A.1.3. There were two distinct types of benefit payable under the Scheme, those payable to:

- Pension members (Old Scheme members), being members who were accepted as contributors before 1 June 1990 and are the only members remaining in the Scheme; and

- Lump sum members (New Scheme members), being members who were accepted as contributors on or after 1 June 1990, and before the Scheme was closed to new contributors. As from 1 July 2008, all New Scheme members have been transferred to the Triple S Scheme.

A.1.4. Benefits previously payable under the Police Occupational Superannuation Scheme are now paid as an additional lump sum benefit under the Police Superannuation Scheme. The merger of the occupational scheme into the Police Superannuation Scheme was effective from 1 July 2001. This additional benefit is equivalent to 2.275% of final salary for each year of service for Old Scheme members.

A.1.5. Benefits are based on contribution points. One contribution point is awarded for each month of contribution, with proportional points awarded for part-time employees.

A.1.6. Members contribute at a constant contribution rate, based on their age at the time of entry to the Scheme. Member contribution rates are:

Age at Commencement	Old Scheme Contribution Rate
less than 20	5.0%
20	5.1%
21	5.2%
22	5.3%
23	5.4%
24	5.5%
25	5.6%
26	5.7%
27	5.8%
28	5.9%
29 and over	6.0%

A.1.7. Members who hold the rank of senior sergeant or a lower rank and who have worked on rostered shifts during the contribution period will have their salary increased by 10% for the purpose of determining contributions and benefits.

A.2 Old Scheme - Pension Benefits

Retirement Benefits

A.2.1. The retirement age is 55 for most members. A contributor who has reached this age is entitled to a pension and a lump sum.

(i) The pension is calculated as:

$$P = FS \times A \times \frac{2}{3} \times \mathrm{K} \times \left(1 + \frac{X}{600}\right)$$

FS is the contributor's actual or attributed salary;

A is the lesser of 1.0 and the numerical value obtained by dividing the number of the contributor's accrued contribution points by 360 or, if the contributor has not reached age 60, the total of 300 and the number of months by which the contributor's age exceeds 55;

X is the number of months by which the contributor's age at retirement exceeds age 60;

K is a reduction factor which varies with the contributor's age at retirement.

(ii) The lump sum is calculated as:

$$LS = Pn\left(\frac{FS \times 0.91 \times M}{480}\right)$$

FS is the contributor's actual or attributed salary;

M is the number of months of the contribution period after 31 December 1987;

Pn is the proportion of full-time employment during that part of the contribution period after 31 December 1987.

Early Retirement Benefits

A.2.2. A contributor who retires between age 50 and 55 is entitled to a lump sum benefit calculated as follows:

$$LS = 5.4545 \times A \times FS \times \left(1 + \frac{0.1667 \times X}{100}\right) + Pn\left(\frac{FS \times 0.91 \times M}{480}\right)$$

FS	is	the contributor's actual or attributed salary;
A	is	the lesser of 1.0 and the numerical value obtained by dividing the number of the contributor's accrued contribution points by 360;
X	is	the number of months by which the contributor's age at retirement exceeds age 50.
M	is	the number of months of the contribution period after 31 December 1987;
Pn	is	the proportion of full-time employment during that part of the contribution period after 31 December 1987.

Retrenchment Benefits

A.2.3. A contributor who has contributed to the Old Scheme for more than five years is entitled on retrenchment to receive a pension equal to the member's accrued pension and a lump sum.

Disability Pensions

A.2.4. A contributor who is temporarily or permanently incapacitated for work, who is not eligible for weekly workers compensation payments and who has used all available sick leave credits, is entitled to a temporary disability pension. The pension will not be paid for periods of less than one week, and may not be paid if the incapacity is expected to last less than six months. Usually the temporary disability pension will be paid for a maximum of twelve months.

The amount of the pension is calculated as follows:

$$P = A \times \frac{2}{3} \times FS$$

FS	is	the contributor's actual or attributed salary;
A	is	calculated in the same manner as for the retirement benefit at age 60 but with prospective service to age 60 being included.

While a temporary disability pension is being paid, a contributor is not required to make contributions to the Scheme.

Invalidity Benefits

A.2.5. When a contributor's employment is terminated because of invalidity, an invalidity benefit is payable. Where the incapacity is assessed as being likely to be permanent and at a level of 60% or more, the contributor is entitled to:

(i) a pension at the same level as the age 60 pension entitlement; and
(ii) a lump sum benefit.

Where the contributor's condition does not satisfy this requirement, a lump sum benefit is paid, equal to:

$$LS = 5.4545 \times A \times FS \times \left(1 + \frac{0.1667 \times X}{100}\right) + Pn \left(\frac{FS \times 0.91 \times M}{480}\right)$$

with a minimum of twice actual or attributed salary.

FS	is	the contributor's actual or attributed salary;
A	is	the lesser of 1.0 and the numerical value obtained by dividing the number of the contributor's accrued contribution points by 360;
X	is	the number of months by which the contributor's age at invalidity retirement exceeds age 50.
M	is	the number of months of the contribution period after 31 December 1987;
Pn	is	the proportion of full-time employment during that part of the contribution period after 31 December 1987.

Pensions Payable on Death of a Contributor

A.2.6. When a contributor dies, a surviving eligible spouse is entitled to a pension equal to two-thirds of the deceased contributor's notional pension, and if employed at death, a lump sum equivalent to the lump sum payable on retirement.

Children of a deceased contributor who are under the age of sixteen years, or who are undertaking full-time study and are under the age of twenty five years, are eligible for children's pensions. The rate of pension paid is dependent on the number of eligible children and on whether a spouse's pension is also payable.

Where a spouse's pension is payable, children's pensions vary from one ninth of the contributor's notional pension for one child to a maximum of one third of the contributor's notional pension divided among three or more eligible children.

Where no spouse's pension is payable, an orphan's benefit is payable varying from 45% of the decreased contributor's notional pension for one child to a maximum equal to 100% of the deceased contributor's notional pension divided among three or more eligible children. If employed at death, a lump sum equal to the greater of the balance of the contributor's contribution account and twice the contributor's final salary plus a lump sum equivalent to the lump sum payable on retirement. Otherwise a lump sum is paid equal to the balance of the contributor's contribution account.

Where no spouse or child pension is payable, a lump sum is payable equal to 7 times the actual or attributed salary reduced by the factor 'A' as used for early retirement benefit calculations plus a lump sum equivalent to the lump sum payable on retirement. If the contributor dies in the course of duty the minimum benefit is 3 times the actual or attributed salary.

Resignation Benefits

A.2.7. On resignation, contributors may elect either to receive a cash lump sum equal to a return of their contributions with interest, or to preserve their benefit until retirement at or after age 55. Preserved benefits include full vesting of the employer share of benefits.

A.2.8. If contributors elect to receive a cash lump sum, they are also entitled on retirement to a preserved lump sum consisting of a Superannuation Guarantee Minimum Requisite Benefit, and a component calculated as:

$$Pn \left(AFS \times \frac{0.91}{480} \times M \right)$$

AFS	is	the contributor's actual or attributed salary on resignation adjusted for changes in the CPI since the date of resignation;
M	is	the number of months of the contribution period from 1 January 1988 to 30 June 1992;
Pn	is	the proportion of full-time employment during that part of the contribution period from 1 January 1988 to 30 June 1992.

This preserved lump sum may also transferred to an approved fund, or paid on resignation if less than $200 in value.

A.2.9. Where contributors elect to preserve their entitlements, the form of the benefit is determined by the contributor's length of contributory membership before resignation. For contributors with ten years or more membership, the benefit is in the form of a pension and lump sum, while for contributors with less than ten years membership, the benefit is in the form of a lump sum.

A.2.10. The lump sum preserved benefit for less than ten years membership consists of:

(i) an amount equivalent to the amount standing to the credit of the contributor's contribution account; and

(ii) an employer component equal to $2\ ^1/_3$ times the balance of the contribution account; and

(iii) a lump sum calculated as:

$$LS = Pn\left(\frac{AFS \times 0.91 \times M}{480}\right)$$

AFS	is	the contributor's actual or attributed salary on resignation adjusted for changes in the CPI since the date of resignation;
M	is	the number of months of the contribution period after 31 December 1987;
Pn	is	the proportion of full-time employment during that part of the contribution period after 31 December 1987.

A.2.11. The preserved benefits for more than ten years membership consist of:

(i) a pension equal to:

$$P = 0.5181 \times A \times AFS$$

AFS	is	the contributor's actual or attributed salary at the date of resignation, adjusted for changes in CPI to the date of commencement of pension payment;
A	is	the numerical value obtained by dividing the number of the contributor's accrued contribution points by the greater of 300 and the number of months between the age at entry and 55.

and;

(ii) a lump sum equivalent to the benefit in part (iii) of A.2.10 above

Commutation

A.2.12. On commencement of an invalidity pension, up to 20% of the pension may be commuted for a lump sum, with full commutation available at age 55. Full commutation is available for retirement pensions. On attainment of age 55 in the case retrenchment pensioners, up to 50**%** of a pension entitlement may be commuted for a lump sum. The commutation basis is independent of sex or marital status, with the factor varying by age. The table below shows the amount of lump sum for each $1.00 of pension commuted.

Age	Factor
65	$9.50
64	$9.70
63	$9.90
62	$10.10
61	$10.30
60	$10.50
59	$10.70
58	$10.90
57	$11.10
56	$11.30
55 or less	$11.50

Spouses of deceased contributors may commute their full pension entitlement. Commutation rates are $11.50 at ages below 50 reducing to $8.50 at age 65 and continuing to reduce progressively at older ages.

Indexation of Pensions

A.2.13. Indexation of pension payments occur at 1 October and 1 April each year, using the rate of change in the Consumer Price Index for Adelaide for the 6 month period to the last June and December quarter respectively. All pensions which commenced to be paid under the Police Pensions Act, 1971 are indexed at 1 1/3 times the change in the CPI index. Prior to April 2002, pensions were only adjusted in October.

Appendix B

Membership Information

B.1 BACKGROUND

We have been able to use the membership data that has been extracted from the administration system used by the Police Superannuation Board for the ongoing administration of the Scheme.

We have been able to satisfy ourselves that the data is sufficiently accurate for the purpose of our calculations, and consider that any errors in the recording of member information would not have a material impact on our conclusions.

A number of checks have been performed on the member data, to ensure consistency between years and to ensure that contributor and pensioner information is consistent.

We have set out information about the membership and movement in membership over the three year period. The data has been obtained from a number of sources and it is possible that the tables below may not be totally consistent, with minor variations in numbers. These variations do not have an effect on the calculations that we have performed and are not material in this process.

B.2 CONTRIBUTOR RECORD DETAILS

The following records were obtained for contributing members:

- Identification
- Date of birth
- Date started service
- Date of joining the Scheme
- Salary
- Sex
- Exit code
- Contribution rate
- Accrued points
- Contribution account balance
- Amount of any Lump Sum payment
- Disability date

B.3 PENSIONER RECORD DETAILS

The following records were obtained for current pensioners:

- Identification
- Pension type
- Sex
- Dates of birth for member and spouse
- Date pension started and date spouse pension started
- Exit code and date of exit
- Details of children
- Commutation details
- Basic pension
- Supplementation pension

B.4 SUMMARY OF CONTRIBUTOR MOVEMENTS FOR THE THREE YEARS TO 30 JUNE 2017

	Males	Females	Total
2014 Contributors	1,127	214	1,341
Age Retirements	204	12	216
Invalidity / disability	34	1	35
Deaths	1	4	5
Resignations (with refund)	—	—	—
Resignations (preserved)	5	—	5
Total departures	**244**	**17**	**261**
2017 Contributors	**883**	**197**	**1,080**

B.5 SUMMARY OF CONTRIBUTOR DETAILS AS AT 30 JUNE 2017

	Males	Females	Total
Contributors			
Number	883	197	1,080
	$'000	$'000	$'000
Annual salaries	104,181	22,912	127,093
Contributions	4,705	1,090	5,795
Account balances	238,854	42,686	281,540
Preserved members			
Number	54	15	69
	$'000	$'000	$'000
Annual salaries	4,829	1,145	5,974

B.6 SUMMARY OF CONTRIBUTORS BY AGE GROUPS

Males

Ages	2014 No.	2014 Average Salary $	2017 No.	2017 Average Salary $
35 - 39	—	—	—	—
40 - 44	55	101,950	—	—
45 - 49	232	103,668	140	113,415
50 - 54	389	105,857	264	119,687
55 - 59	379	105,703	380	118,383
60 - 64	62	110,844	88	116,767
65 - 69	9	120,997	10	131,274
70 - 74	—	—	1	131,818
Totals	**1,126**	**105,559**	**883**	**117,985**

Females

Ages	2014 No.	2014 Average Salary $	2017 No.	2017 Average Salary $
35 - 39	—	—	—	—
40 - 44	22	99,478	—	—
45 - 49	97	101,414	63	113,122
50 - 54	76	106,205	93	117,776
55 - 59	14	108,122	37	114,275
60 - 64	5	122,518	4	150,908
Totals	**214**	**103,848**	**197**	**116,303**

B.7 SUMMARY OF PENSIONER DETAILS AS AT 30 JUNE 2017

Type of Pension	Current Act		Repealed Act		Total	
	Number	Annual Pension $'000	Number	Annual Pension $'000	Number	Annual Pension $'000
Age	1,078	54,278	72	2,739	1,150	57,017
Invalidity	132	6,267	88	3,711	220	9,978
Spouses	154	3,869	218	6,379	372	10,248
Children	28	189	—	—	28	189
Total	1,392	64,603	378	12,829	1,770	77,432

There was 1 male receiving a disability pension as at 30/6/2017

B.8 DETAILS OF PENSIONER MOVEMENT FOR THE THREE YEARS TO 30 JUNE 2017

Type	2014 In Force	New Pensioners	Exits	2017 In Force
Age	959	255	64	1,150
Invalidity	204	43	27	220
Spouse	378	54	60	372
Child	30	11	13	28
Total	**1,571**	**363**	**164**	**1,770**

Note: Disability pensions are included with invalids.

B.9 DETAILS OF AVERAGE PENSION AMOUNTS AS AT 30 JUNE 2017

Males

Ages	2014 No.	2014 Average Pension $	2017 No.	2017 Average Pension $
40 - 44	3	57,839	1	33,589
45 - 49	7	43,603	8	59,021
50 - 54	15	49,548	13	50,539
55 - 59	137	39,774	149	45,885
60 - 64	302	52,248	341	55,160
65 - 69	244	46,048	308	54,932
70 - 74	124	40,618	203	46,339
75 - 79	119	35,250	103	40,514
80 - 84	103	32,211	105	35,484
85 - 89	50	38,178	62	36,563
90 - 94	17	52,038	25	44,853
95 - 99	4	49,948	4	52,978
Totals	**1,125**	**43,758**	**1,322**	**48,891**

Excludes child and temporary disability pensions.

Females

Ages	2014 No.	2014 Average Pension $	2017 No.	2017 Average Pension $
40 - 44	2	27,277	—	—
45 - 49	11	32,610	7	33,156
50 - 54	17	24,789	17	30,066
55 - 59	27	29,298	31	34,162
60 - 64	47	31,353	41	33,874
65 - 69	43	29,135	52	34,654
70 - 74	45	25,439	42	26,841
75 - 79	68	25,645	65	27,391
80 - 84	53	25,317	62	25,207
85 - 89	64	28,511	55	29,232
90 - 94	34	32,880	40	32,523
95 - 99	4	30,228	8	29,557
Totals	**415**	**28,063**	**420**	**30,021**

Excludes child and temporary disability pensions.

Appendix C

Contributor Experience

C.1 This section only relates to Old Scheme members. The Old Scheme was closed to new entrants on 31 May 1990.

C.2 The total years of exposure during the period were as follows:

	Males	Females
Years of exposure	2,984	611

Deaths

C.3 The mortality experience was as follows, with expected deaths determined according to the assumptions used in the previous investigation.

	Males	Females
Actual deaths	1	4
Expected deaths	7	1

The mortality rates have been retained at 60% of the Australian life tables for each age. The Australian life tables used are Australian Life Tables 2010-12 adjusted for mortality improvement at the rates used in this review.

Invalidity Retirements

C.4 The invalidity experience was as shown below.

	Males	Females
Actual invalids	34	1
Expected invalids	19	3

The existing assumptions have been retained.

Resignations

C.5 A comparison of actual and expected resignations and the rates of resignation, for the three years ending 30 June 2017, are shown below.

	Males			**Females**		
Age	Actual	Expected	Rate	Actual	Expected	Rate
35 - 39	—	—	—	—	—	—
40 - 44	—	1	—	—	0	—
45 - 49	1	3	0.002	—	1	—
50 - 54	4	2	0.004	—	1	—
Total	**5**	**5**		**—**	**2**	

A new rate of resignation has been adopted equal to 0.003 for all ages.

Preservation

C.6 A summary of the numbers preserving and as a percentage of those eligible to preserve is as follows:

	Males		Females		Total	
Age	Actual	Percentage	Actual	Percentage	Actual	Percentage
40 - 44	—	—	—	—	—	—
45 - 49	1	100%	—	—	1	100%
50 - 54	4	100%	—	—	4	100%
Total	**5**	**100%**	**—**	**—**	**5**	**100%**

The existing assumptions have been retained.

Age Retirements — Current Contributors

C.7 Actual and expected age retirements for the three years to June 2017 were as follows:

	Males	Females
Actual retirements	204	12
Expected retirements	232	13

Actual age retirements were less than expected for most ages. The rates have been adjusted to reflect those changes.

Age Retirements — Preserved Contributors

C.8 Actual and expected age retirements for the three years to June 2017 were as follows:

	Males	Females
Actual retirements	38	3
Expected retirements	38	3

The rate of preserved age retirement has been increased to 95% at age 55 and lowered between age 56 and 59. All preserved members are assumed to retire at ages over 60.

Promotional Salary Increases

C.9 Promotional salary increases were 0.2% pa less than expected while total salary increases were 1.4% pa less than expected. The average annual increase in salaries over the three year period was 3.4%. Existing assumed rates of salary promotion have been retained.

Commutation

C.10 Contributors can commute up to 100% of their pensions on age retirement. Contributors can commute up to 20% on invalidity retirement before age 55. Invalid pensioners may commute up to 100% of their pension on retirement after age 55 or on attaining age 55. New spouse pensioners may also commute up to 100%.

For the three years ended 30 June 2017 the commutation experience was as follows:

	Percentage of pensioners who commuted %	Percentage of pension commuted by those who commuted %	Average Percentage of pension commuted %
Age retirements:			
Males	47%	27%	14%
Females	27%	16%	4%
Invalidity retirements:			
At start of pension	8%	10%	1%
At age 55	33%	30%	10%
Spouses	14%	64%	11%

Details of the average percentage of all new pensions commuted over each of the three years are:

	2014-15 %	**2015-16 %**	**2016-17 %**
Age Retirements	14%	15%	11%
Invalidity retirements:			
at start of pension	3%	—	—
at age 55	4%	3%	18%
Spouses	1%	27%	9%

We have decreased the commutation assumption in relation to age retirement pensions from 15% to 12.5%. The proportions for invalid and spouse pensioners have been retained at 7.5% and nil respectively.

Appendix D

Pensioner Experience

D.1 The mortality experience of pensioners during the three years to 30 June 2017 has been examined and compared with that assumed in the previous actuarial investigation.

Where appropriate the previous assumptions have been modified in light of this experience. Mortality rates have been expressed as a proportion of the underlying population mortality. For the purposes of this review we have taken the population mortality to be the Australian Life Tables 2010-12 updated by the rates of mortality improvement used in this review (referred to as adjusted ALT 2010-12).

Comments on individual aspects of the experience are detailed in the following sections of this Appendix and summaries of the rates adopted for the current investigation are set out in Appendix E.

Age Retirement Pensioners

D.2 The mortality experience was as follows, with expected deaths determined according to the assumptions used in the previous investigation.

	Males	Females
Actual deaths	56	1
Expected deaths	64	1

The proportions of the population mortality are 60% at ages below 65 and 100% from age 90. These proportions are the same as the 2014 review and increase smoothly between ages 65 and 90 and to reflect the experience.

Invalidity Pensioners

D.3 It is to be expected that invalidity pensioners will suffer higher rates of mortality than age retirement pensioners will, particularly in the first few years after retirement. The mortality experience of invalidity pensioners is summarised below:

	Males			Females		
	Year 1	Year 2	Later Years	Year 1	Year 2	Later Years
Actual deaths	1	—	16	—	—	2
Expected deaths	3	1	20	*	*	1

* *less than one expected death.*

For durations over two years, the mortality rates have been set to 120% of population mortality with minimum value of 0.015. The multiple of population mortality and the minimum value has been retained.

For early durations the mortality rate has been retained at 0.075 in year one and 0.04 in year two for both males and females.

Spouse Pensioners

D.4 The mortality experience of spouse pensioners was as follows:

	Males	Females
Actual deaths	—	57
Expected deaths	*	49

* *less than one expected death.*

As actual deaths are significantly more than expected, spouse rates of mortality, which were the same as age pensioner rates, have been set to equal population mortality.

Mortality Improvement

D.5 The mortality improvement factors have been set equal to the average of the 25 and 125 year factors in Appendix E of the Australian Life Tables 2010-12.

CPI Increases

D.6 Pensions are increased each 1 October and 1 April, according to the change in the Adelaide Consumer Price Index for the 6 months to the previous 30 June and 31 December respectively. Where the increase in CPI is negative, no adjustment to pensions is made and the pension increase for the following 6 months is based on the increase in CPI for the period since the last adjustment.

During the period, pensions were increased as follows:

Month of Increase	Current Act	Repealed Act
October 2014	1.05%	1.40%
April 2015	0.66%	0.88%
October 2015	0.57%	0.76%
April 2016	0.47%	0.63%
October 2016	0.19%	0.25%
April 2017	1.12%	1.49%

Proportion Married

D.7 The experienced proportions married were lower than expected and therefore new assumed proportions married have been adopted. At age 65 the proportion married for males has been reduced from 96% to 92% and for females from 83% to 76%.

D.8 Experienced age differences were not significantly different to the expected and therefore the assumed age differences from the previous review have been retained.

Appendix E

Demographic Assumptions

E.1 CONTRIBUTOR MORTALITY RATES

Age	Males	Females
40	0.00074	0.00042
45	0.00103	0.00064
50	0.00154	0.00096
55	0.00232	0.00141
60	0.00348	0.00214

E.2 CONTRIBUTOR INVALIDITY RETIREMENT RATES

Age	Males & Females
40	0.00251
45	0.00361
50	0.00519
55	0.00746
60	—

20% of the above rates are in respect of partial invalidity benefits.

E.3 CONTRIBUTOR RESIGNATION RATES

Age	Males & Females
40	0.00300
45	0.00300
50	0.00300

E.4 PRESERVATION PROPORTIONS

Age	Proportion
40	0.69
45	0.89
50	1.00

E.5 RATES OF RETIREMENT

Age	Current Contributors (2017)	Current Contributors (2014)	Preserved Contributors
50	0.001	0.02	—
51	0.001	0.01	—
52	0.001	0.01	—
53	0.001	0.01	—
54	0.001	0.01	—
55	0.060	0.08	0.95
56	0.060	0.06	0.90
57	0.070	0.06	0.90
58	0.090	0.10	0.90
59	0.120	0.15	0.90
60	0.450	0.45	1.00
61	0.300	0.30	1.00
62	0.300	0.30	1.00
63	0.300	0.30	1.00
64 – 69	0.250	0.30	1.00

E.6 RATES OF PROMOTIONAL SALARY INCREASES

Age	Males & Females
40	0.018
45	0.013
50	0.009
55	0.006
60	0.003

E.7 FAMILY STATISTICS — MALES

Age	Percentage Married %	Age of Husband less Age of Wife	No. of Dependent Children	Average Age of Dependent Children
40	81	3	2	10
45	90	3	2	13
50	94	3	1	15
55	94	3	—	—
60	93	3	—	—
65	92	3	—	—
70	91	3	—	—
75	88	3	—	—
80	83	3	—	—
85	74	4	—	—
90	59	4	—	—

E.8 FAMILY STATISTICS — FEMALES

Age	Percentage Married	Age of Husband less Age of Wife	No. of Dependent Children	Average Age of Dependent Children
40	77	4	2	12
45	80	3	1	14
50	81	3	1	15
55	80	3	—	—
60	78	3	—	—
65	76	3	—	—
70	73	2	—	—
75	67	2	—	—
80	57	2	—	—
85	40	2	—	—
90	19	2	—	—

E.9 PENSIONER MORTALITY RATES

	Age Retirements		Invalidity Pensioners After 2 Years		Spouse Pensioners	
Age	Females	Males	Females	Males	Females	Males
40	—	—	0.01500	0.01500	0.00070	0.00123
45	—	—	0.01500	0.01500	0.00107	0.00172
50	—	—	0.01500	0.01500	0.00161	0.00256
55	0.00141	0.00232	0.01500	0.01500	0.00235	0.00387
60	0.00214	0.00347	0.01500	0.01500	0.00356	0.00579
65	0.00330	0.00552	0.01500	0.01500	0.00550	0.00920
70	0.00597	0.00960	0.01500	0.01769	0.00917	0.01474
75	0.01161	0.01839	0.01950	0.03089	0.01625	0.02574
80	0.02388	0.03743	0.03622	0.05676	0.03018	0.04730
85	0.05474	0.07735	0.07420	0.10484	0.06183	0.08737
90	0.12291	0.15519	0.14749	0.18623	0.12291	0.15519
95	0.21548	0.24608	0.25858	0.29530	0.21548	0.24608
100	0.30234	0.31167	0.36281	0.37400	0.30234	0.31167

The mortality rate in the first year of an invalidity pension is assumed to be 7.5% and 4% in the second year.

E.10 RATES OF MORTALITY IMPROVEMENT

The table shows the annual rates of decrease of mortality rates at each age.

Age	Females %	Males %
60	1.940	2.152
70	1.917	2.102
80	1.556	1.532
90	0.687	0.632
100	0.051	0.047

E.11 COMMUTATION

Pension Type	Percentage Commuted
Age	12.5
Invalid	7.5
Spouse	—