



Ohio Police & Fire

Pension Fund

Investigation of Demographic and Economic Experience

Five-Year Period from January 1, 2012 – December 31,
2016

October 2017

October 2017

Board of Trustees
Ohio Police & Fire Pension Fund
140 East Town Street
Columbus, Ohio 43215

Members of the Board:

This report presents the results of the actuarial review of the demographic and economic experience of the active members, retirees, beneficiaries and survivors covered under the Ohio Police & Fire Pension Fund (“Fund”) for the five-year period January 1, 2012 to December 31, 2016. The results of this report are contained in our August 23, 2017 and September 26, 2017 presentations to the Board of Trustees. The Board adopted these recommendations at the October 25th Board meeting.

This experience review was prepared in accordance with Section 742.14(C) of the Ohio Revised Code, which requires the actuary for the Fund to make an actuarial investigation into the mortality, service and compensation experience of the members and beneficiaries covered under the Fund at least once in each five-year period.

The attached report describes the actuarial process employed and identifies the significant results of the study.

Summary of Recommendations

The results of the experience review show that for many of the assumptions the actual experience of the Fund has deviated from expected based on the current assumption set. In particular, we have recommended and the Board has adopted the following changes to the actuarial assumptions:

- Make minor adjustments to the withdrawal rates (for termination reasons other than retirement, disability or death)
- Increase the retirement rates, reflecting a trend toward earlier retirement
- Decrease the disability retirement rates to reflect post-2013 experience
- Update the mortality rates to reflect recent mortality tables and improvement scales developed by the Society of Actuaries. The new rates are based on the RP-2014 tables projected with Conduent Modified MP-2016 improvement scale, with varying age adjustments for police and fire, service and disability retirements, and members and beneficiaries
- Reduce the assumed average benefit percent for joint annuitants
- Reduce the DROP interest rate, CPI-based COLA rate, and assumed investment return based on economic projection
- Reduce assumed salary increases and payroll growth for lower inflation projection

A detailed analysis is included in the report. The financial impact of adopting the recommended assumptions is shown in the table below.

Financial Impact of Adopting Recommended Assumptions January 1, 2017 Valuation

Item	Unfunded Accrued Liability	Normal Rate	Funded Ratio
Current Assumptions	\$ 5,813 Mil	17.54%	70.9%
Impact of Change in Assumptions	315	(1.51)	(1.1)
Revised Assumptions	\$ 6,128 Mil	16.03%	69.8%

The Table of Contents, which immediately follows, outlines the material contained in the report. The results documented in this report are estimated based on data that may be imperfect and on assumptions about future events. Assumptions may have been made about participant data or other factors. Reasonable efforts were made in this valuation to ensure that items that were significant in the context of the actuarial liabilities or costs are treated appropriately, and not excluded or included inappropriately. We believe that the use of approximation in our calculations, if any, has not resulted in a significant difference relative to the results we would have obtained using more detailed calculations.

A range of results, different from those presented in this report could be considered reasonable. The numbers are not rounded, but this is for convenience only and should not imply precision, which is not inherent in actuarial calculations.

Future actuarial measurements may differ significantly from the current measurement presented in this report due to such factors as: plan experience different from that anticipated by the economic and demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. Due to the limited scope of this report, an analysis of the potential range of such future measurements has not been performed.

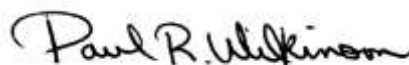
Qualified actuaries completed the valuation in accordance with accepted actuarial procedures as prescribed by the Actuarial Standards Board. The qualified actuaries are members of the American Academy of Actuaries and are experienced in performing actuarial valuations of public employee retirement systems. To the best of our knowledge, this report is complete and accurate and has been prepared in accordance with generally accepted actuarial principles and practice. The undersigned with actuarial designations is qualified to render the opinions contained in this report.

Conduent will accept no liability for any representations or warranties based on any statements or conclusions contained in the report without the prior review of Conduent.

Respectfully submitted,



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Section I – Introduction

Section 742.14(C) of the Ohio Revised Code provides that in every five-year period, the actuary of the Fund is to make an actuarial investigation of the mortality, service, and other experience of the members, retirees and beneficiaries covered under the Fund. This report presents the results of the experience review of the Fund for the five-year period January 1, 2012 through December 31, 2016.

The objectives of the investigation are to:

- Determine appropriate rates to anticipate the following events among active members:
 - withdrawal from employment;
 - mortality during active service;
 - disability retirement;
 - service retirement;
 - DROP utilization;
 - salary increases; and
 - marital status and optional form of benefit election.
- Determine appropriate rates to anticipate mortality among retirees, survivors, beneficiaries and disability retirees.
- Make recommendations regarding the adoption of refinements to the actuarial basis of the Fund, which are deemed appropriate by the actuary for adoption by the Board.

Methodology

Data is supplied annually to the actuary by the Fund for purposes of the actuarial valuation report. This data includes demographic characteristics of the current and past membership, including any changes in the members' status or relationship with the Fund. The data also includes a salary history for active members. These demographic changes and salary history are the basis for the experience review.

Tabulations were compiled which show the distribution by age of the number of members who were **exposed** during the five-year period to the events of termination from employment, retirement, death and disability. A member is considered exposed to an event if the member meets the age and service requirements for that event. The assumed rates of occurrence for each event, which are currently used in the annual actuarial valuations, were then applied to the number of members exposed to determine the number of members **expected to** separate from service for each category.

The **actual** number of members who separated from service due to termination from employment, retirement, death or disability was then compared to the expected number. The results were then expressed as a ratio of actual experience over expected experience. In some instances, a high ratio is favorable for the financial experience of the Fund and, in others, a high ratio is unfavorable.

The expected and actual salaries as of the end of each year were also compared to actual salaries as of the end of each previous year. The comparisons show an average annual total increase in both expected and actual salaries for the five-year period.

The results of the experience review are the basis for the actuary's recommendation of assumption changes. In recommending assumptions the actuary must also take into account special plan benefits and past economic factors. In addition to comparing actual to expected experience and adjusting the results for special plan benefits and economic conditions, the actuary must consider future expectations of experience due to future plan changes or changes in the economy.

Section I – Introduction (continued)

To summarize, the actuary's recommendation of assumptions is based on the following:

- comparison of actual to expected experience,
- adjustment for special plan benefits and past economic conditions, and
- adjustment for future plan changes and economic conditions.

Generally, actuarial assumptions are selected with a slight margin for adverse experience so that the financial strength of the Fund can be maintained.

Summary of Experience Review

The summaries included in Section VI show the comparisons and results of the experience investigation for:

- the actual and expected cases of separation from active service,
- the actual and expected mortality among service and disability retirees,
- the average annual increases in salaries among active members, and
- the annual rates of return on assets.

Recommendations

Based on the results of our investigation, we recommend revisions to the rates of:

- withdrawal,
- death in active service,
- disability,
- service retirement,
- assumed average benefit percent election for J&S payment forms,
- death after retirement,
- DROP interest rate,
- CPI-based COLA,
- investment return,
- salary increases; and,
- payroll growth.

We recommend the inflation assumption underlying the interest rate, salary increase and payroll growth rate assumptions be reduced to 2.75%. Furthermore, we recommend increasing the real rate of return on assets to 5.25%, which when combined with the inflation assumption results in a decrease of the valuation interest rate to 8.00%. The payroll growth assumptions will decrease from 3.75% to 3.25%. The salary increase assumptions for all members will decrease by 0.50% to reflect the reduction in assumed inflation, while holding the underlying assumed real wage growth assumption constant.

Section I – Introduction (continued)

Financial Impact

We have determined the financial impact on the Fund of adopting the recommended set of assumptions. The calculations are based on the results of the January 1, 2017 actuarial valuation and are shown in the table below.

Financial Impact of Adopting Recommended Assumptions - January 1, 2017 Valuation

Item	Unfunded Accrued Liability	Normal Rate	Funded Ratio
Current Assumptions	\$ 5,813 Mil	17.54%	70.9%
Impact of Change in Assumptions	315	(1.51)	(1.1)
Revised Assumptions	\$ 6,128 Mil	16.03%	69.8%

Section II – Discussion of Experience Review: Demographic Assumptions for Active Members

Tables 1 through 4 included in Section VI summarize the actual and expected separations from active service due to termination (withdrawal) from employment, death, disability, and service retirement during the five-year period ended December 31, 2016. Tables 5, 6 and 7 included in Section VI summarize mortality experience for service retirees, disability retirees and beneficiaries. The tables also show the ratio of actual to expected experience. The corresponding graphs following each table show the current, actual and proposed rates. Separate summaries for police and firefighters are presented for all of these categories.

The following table summarizes the ratio of actual to expected cases of separation from active service.

Summary of Ratio of Actual to Expected Experience Demographic Assumptions

Event	Police	Firefighters
• Withdrawal from Employment	104%	97%
• Death in Active Service	100	80
• Disability Retirement	61	68
• Service Retirement	113	113

For purposes of the comparison, the ratio of the actual to expected experience is expressed as a percentage for each type of event. A percentage in excess of 100% indicates that the actual experience was greater than the expected experience, whereas a percentage of less than 100% indicates that the actual experience was less than expected.

For example, in regard to withdrawal from employment for police officers, Table 1a on Page 15 shows an entry of 104%. This means that during the five-year experience review period, the actual number of police officers who withdrew from employment was more than the expected number of withdrawals by a percentage equal to 4% (i.e., 104% minus 100%).

The comments presented below under each category discuss the results of the experience study with respect to the demographic factors, along with our recommendations for modifying the assumptions.

Rates of Withdrawal from Employment

We examined the actual experience of withdrawals for police and firefighters.

The withdrawal assumption anticipates that some active members will stop working prior to retirement. Members who withdraw prior to 15 years of service receive a refund of their member contributions. Members who withdraw with 15 or more years of service receive a deferred annuity benefit. The current withdrawal rates vary based on the age of the member and the years of service a member has. In general, as members progress in their careers, it becomes less likely that they will withdraw.

Table 1(a) shows that among police members, the ratio of actual experience to expected was 104%. Table 1(b) shows that among firefighters, the ratio was 97%. During the five-year period, the actual rate of withdrawal among all members was close to expected.

We, therefore, recommend minor adjustments to the current withdrawal rates to more closely match that observed over the five-year period.

Section II – Discussion of Experience Review: Demographic Assumptions for Active Members (continued)

Rates of Mortality Among Active Members

Tables 2(a) and 2(b) show the actual incidence of deaths among police officers and firefighters, respectively.

During the past five years, there were 117 deaths among active members compared to the 130 expected. Overall, the ratio of actual to expected experience was 90%. (For police officers, the ratio of actual to expected experience was 100%. Among firefighters, the ratio was 80%.) Therefore, we recommend adjusting the mortality table to reflect the experience by changing to the RP-2014 Total Employee Mortality Tables rolled back to 2006, and projected with the Conduent Modified 2016 Improvement Scale.

Under this assumption, the expected number of deaths would have been 125.

Disability Retirement

The disability assumption describes the expected rate of disability among active members and eligibility to receive disability benefits from the Fund. The assumption has two parts: the likelihood of becoming disabled; and, the type of disability benefit the member will receive. As members advance through their careers, it becomes more likely that they will become disabled.

Tables 3(a) and 3(b) show the summary of experience for disability retirements between police and firefighters. The five-year study shows that there were fewer disability retirements among all members than expected. For police members, the ratio of actual to expected experience was 61%. For firefighters, the ratio was 68%. This is a continuation of the decreasing trend observed in the prior quinquennial study. We recommend revising the disability rates to better match the experience during the study period.

In addition to the rates of disability among active members, the current assumptions anticipate that 23% of disabilities occur while “On Duty Permanent and Total”, 61% are “On Duty Partial”, and 16% are “Off Duty Ordinary”. During the study period, these percentages were actually 15%, 63% and 22%, respectively. During the 3-year period ending December 31, 2016, the percentages were 17%, 58% and 25% respectively. We propose changing the current assumption to the percentages observed in the 3-year period ending December 31, 2016.

Section II – Discussion of Experience Review: Demographic Assumptions for Active Members (continued)

Service Retirement

Tables 4(a) and 4(b) show the summary of experience for service retirement among police and firefighters who have meet the eligibility requirements for service retirement. We investigate the experience separately for members who are not in or in DROP when they finally retire from service.

The current retirement rates vary based on the following factors:

- The age of the member
- The type of member (police or fire)
- Years in DROP

Overall, the actual experience was more retirements than expected. Table 4(a) shows that for police members, the ratio of actual to expected experience was 113%. Table 4(b) shows that for firefighters, the ratio was 113%.

We are, therefore, recommending the assumed retirement rates for members not in DROP to be changed as shown in Page 52 of the report. We also propose that these rates be further modified based on DROP eligibility, as described in the next section and the proposed rates shown in Page 53 to Page 55 of the report.

Section II – Discussion of Experience Review: Demographic Assumptions for Active Members (continued)

DROP Experience

The DROP assumptions govern when members are expected to enter or leave the DROP program. The current assumptions anticipate that:

- 1) 90% of all members who do not retire at the earliest possible age after the valuation will enter the DROP program;
- 2) Retirement rates for DROP increase as age and years in DROP increase; and
- 3) As a result of changes in 2013 to the normal retirement age for new members and extending the minimum period in DROP without penalty from 3 years to 5 years, multiple variations of retirement rates are used depending on the rules for each member.

The DROP program was initiated in 2003; we have a full complement of history, from member entry to mandatory exit (eight years later), upon which to base our assumptions, but limited history since changes made in 2013. Based on experience data for 2012-2016, we recommend no change to the 90% assumption.

Marital Status and Optional Form of Benefit Experience

The current assumptions anticipate that 75% of active members are married, and that 33% of service retirees and 10% of disability retirees will elect a 50% joint & survivor annuity. Data of new retirees from 2012 to 2016 suggests these assumptions are still reasonable, except the average assumed joint annuity benefit should be reduced to 40%, which we recommend adopting.

The current optional annuity factors were updated in 2009 to reflect mortality improvements. The factors should be reviewed in light of the proposed changes in mortality.

DROP Account Distributions

The current assumption anticipated that the DROP account withdrawals are made in single, lump sum payment. But many retirees are deferring withdrawals, taking installments. OP&F's DROP Experience Report 4th Quarter 2016 shows about 40% of DROP account balances are for retired members, some since 2004. 2012-2016 Actuarial Experience Study data shows pattern below:

- 44% withdrawn 1st year of retirement
- 19% withdrawn 2nd year of retirement
- Remaining 37% withdrawn gradually at pace of about 4% per year

Based on the above experience data, we propose changing the DROP Account Distributions assumptions as follows:

For members who terminate DROP before the required three or five years, distribution of the account balance is assumed to be made in a lump sum payment at the end of the three or five year period. Distributions for other members are assumed to be made in a lump sum or installments at retirements in a pattern equivalent to 25 percent receiving lump sums, 30 percent receiving installments over two years, and 45 percent receiving installments over 10 years.

Section III – Discussion of Experience Review

Mortality Experience Among Retirees

Tables 5, 6 and 7 included in Section VI summarize the mortality experience among service retirements, disability retirements and beneficiaries during the five-year period ended December 31, 2016.

A summary of the results is shown in the table below:

Overall Ratios of Actual to Expected Mortality Experience Service and Disability Retirees

Death After	Police	Firefighters
Service Retirement	94%	115%
Disability Retirement	89%	92%
Beneficiaries*	110%	110%

*Combined police and firefighters

The experience study revealed the following facts concerning service and disability retirees and beneficiaries:

- Over the past five years there have been fewer deaths than expected among police service retirees at most ages and more deaths than expected among fire service retirees, mainly at older ages.
- The actual number of deaths among disability retirees was below the expected number for both police and fire members, mainly at older ages.
- The actual number of deaths among beneficiaries exceeded the expected number.

Recommendations

On the basis of actual experience among service retirees during the five-year period and in anticipation of future expected increases in life expectancy, we recommend that the mortality table for healthy retirees be updated to the RP-2014 Total Employee and Healthy Annuitant Mortality Tables rolled back to 2006, adjusted according to the rates in the following table, and projected with the Conduent Modified 2016 Improvement Scale.

Age	Police	Fire
67 or less	77%	68%
68 – 77	105%	87%
78 and up	115%	120%

For disability retirements, we recommend the RP-2014 Disabled Mortality Tables rolled back to 2006, adjusted according to the rates in the following table, and projected with the Conduent Modified 2016 Improvement Scale.

Age	Police	Fire
59 or less	35%	35%
60 – 69	60%	45%
70 – 79	75%	70%
80 and up	100%	90%

For beneficiaries, we propose updating the beneficiary mortality assumption to the RP-2014 Total Employee and Healthy Annuitant Mortality Tables rolled back to 2006, altered by multiplying rates for all ages by 120%, and projected with the Conduent Modified 2016 Improvement Scale.

Section IV – Discussion of Experience Review

Economic Factors

Tables 8 in Section VI summarize the actual results for the key economic factors affecting the operation of the Fund during the five-year period ended December 31, 2016. Table 8 shows a comparison of actual and expected salaries of active full-time members.

Rate of Inflation

The assumed rate of inflation is a component of both the investment return assumption and the salary increase assumption. The current actuarial assumption is that the inflation will be 3.25% per annum.

Actuarial Standard of Practice No. 27 (ASOP 27) entitled “Selection of Economic Assumptions for Measuring Pension Obligations,” addresses acceptable methodologies for setting the rate of inflation assumption and sets forward the following two matters for consideration:

1. Data. The actuary should review appropriate inflation data. These data may include consumer price indexes, the implicit price deflator, forecasts of inflation, and yields on government securities of various maturities.
2. The actuary may assume select and ultimate inflation rates in lieu of a single inflation rate. Select and ultimate inflation rates vary by period from the measurement date. (An example of a select and ultimate assumption is inflation of 3% for the first 5 years following the measurement date, and 4% thereafter).

Our analysis included a review of historical changes in the CPI-U, and of forecasts of inflation. Based on the GEMS Economic Scenario Generator as of 4th quarter 2016 projection of inflation, the comparable inflation rate, between 15 and 20 years of 2.72% and 2.86%, is 2.82%.

As a result, we recommend reducing the long-term inflation assumption for the actuarial valuation from 3.25% per annum to 2.75% per annum.

Rates of Investment Return

ASOP 27 also addresses acceptable methodologies for setting the interest rate assumption. One of the acceptable methodologies described in ASOP 27 is the “Building-Block Method.”

Under the Building-Block Method, (i) a best-estimate range of expected future return is developed for each asset class, (ii) an average, weighted real-return range reflecting the plan’s expected asset class mix is developed, and (iii) the best-estimate real-return range is combined with the best-estimate range of expected inflation. Stochastic simulation models that take into account correlations among returns of different asset classes and inflation are frequently used to obtain the final result.

Section IV – Discussion of Experience Review

Economic Factors

Sources of Investment Data

ASOP 27 encourages the actuary to review appropriate investment data, including

1. current yields to maturity of fixed income securities such as government securities and corporate bonds;
2. forecasts of inflation and of total returns for each asset class;
3. historical investment data, including real risk-free returns, the inflation component of the return, and the real return or risk premium for each asset class;
4. historical plan performance; and
5. historical data showing standard deviations, correlations, and other statistical measures related to historical returns of each asset class and to inflation.

Other Factors to be Considered

ASOP 27 also advises the actuary to take into account the following factors.

1. investment policy
2. reinvestment risk
3. investment volatility
4. investment manager performance
5. investment expenses
6. cash flow timing
7. benefit volatility
8. other issues unique to the plan

The current interest rate assumption is 8.25%, which includes an inflation component of 3.25%.

The Fund’s current target asset allocation is shown below:

Asset Class	OP&F Target Allocation
US Large Cap	16.00%
MSCI EAFE	16.00
Private Equity	8.00
US High Yield	7.00
Bank Loans	5.00
Aggregate Bonds	23.00
Commodities	8.00
US TIPS	17.00
NCREIF	12.00
Infrastructure	8.00
Cash	-20.00
Total weighted by allocation	100.00%

Section IV – Discussion of Experience Review Economic Factors

Based on the Fund's current asset allocation policy we have estimated nominal and real returns net of investment expenses over 1, 5, 10, 15, 20, 25 and 30 year periods as follows:

	1-Year	5-Year	10-Year	15-Year	20-Year	25-Year	30-Year
Nominal							
Expected Return (Arithmetic)	5.83%	6.77%	7.64%	8.35%	8.79%	9.13%	9.37%
Expected Return (Geometric)	5.83%	6.33%	7.12%	7.81%	8.23%	8.56%	8.80%
Standard Deviation (Arithmetic)	10.07%	10.71%	10.87%	10.96%	11.01%	11.15%	11.17%
Geometric							
75th Percentile	12.41%	10.01%	9.88%	10.16%	10.35%	10.40%	10.44%
60th Percentile	8.45%	7.70%	8.23%	8.73%	9.02%	9.29%	9.43%
50th Percentile	5.75%	6.58%	7.10%	7.92%	8.27%	8.54%	8.80%
40th Percentile	3.74%	5.32%	6.07%	6.96%	7.52%	7.77%	8.05%
25th Percentile	-0.44%	3.20%	4.53%	5.61%	6.12%	6.44%	6.95%
Inflation							
Expected Inflation (Arithmetic)	2.26%	2.28%	2.50%	2.74%	2.88%	3.03%	3.14%
Expected Inflation (Geometric)	2.26%	2.27%	2.49%	2.72%	2.86%	3.00%	3.12%

Based on investment expense information in the 3 year period ending 2016 in table below, our forecast in the above exhibit assumed investment expense is 0.35%.

\$ in Million

Year	2016	2015	2014
Asset at beginning of the year	12,924	13,453	13,166
Investment expense	44	44	46
Investment expense percentage	0.34%	0.33%	0.35%

We recommend emphasis on an investment period of the next 15 to 20 years as follows:

- Matching the nominal, geometric rates at 50th percentile (5.75% to 8.80%) to projected pension payments produces a single weighted average rate of return of 8.17%
- This rate lies between the 15 and 20 year rates of 7.92% and 8.27%
- The comparable inflation rate, between 15 and 20 years of 2.72% and 2.86%, is 2.82%
- The underlying real rate of return would be 5.35%

The current assumption of 8.25% is projected to have less than a 50% likelihood of occurring over the next 15 to 20 years.

As a point of comparison, we have reviewed the actuarial interest rate assumption used by other public pension systems. The most recent Public Fund Survey shows an average investment return assumption of 7.50%.

GEMS projection at 50 percentile and just under 20 year average period:

- Supports 5.35% real return, net of investment fees
- Inflation of 2.82%
- Total 8.17%

We believe that the current investment climate supports a change of the assumed rate of return from 8.25% per annum to 8.00% per annum, which includes an inflation component of 2.75%.

Section IV – Discussion of Experience Review

Economic Factors (continued)

Rates of Salary Increase

Salary is a factor in determining the majority of the benefits provided by the Fund, and an assumption for how an individual member's salary will change over the long term is necessary for a proper valuation. Generally, the components of the salary increase assumption are inflation, real wage growth (productivity), and merit or seniority growth. The current rates of salary increase used in the valuation are rates that vary by a member's years of service, as follows:

Years of Service	Salary Increase Rate
0	11.00%
1	9.50
2	8.50
3	6.50
4	5.00
5 or more	4.25

The growth in average annual salary over the five-year experience period is presented in Table 8 in Section VI. The average annual salary increase over that period has been 4.0% for police and 4.0% for fire, compared to an effective assumed average of 4.9% and 4.8%, respectively.

The salary increase assumption should be selected with an eye on past experience and with considerable emphasis placed on judgment concerning future expectations. The salary increase assumption should be consistent with the interest rate assumption as both assumptions are based on a long-term inflation assumption.

We recommend reducing the rates of salary increase for all active police and fire members by 0.50% to reflect the reduction in the inflation assumption, but no changes to productivity and career scale.

Payroll Growth

The current payroll growth assumption is 3.75%, consisting of inflation of 3.25% and real wage growth of 0.50%. We recommend reducing the payroll growth assumption from 3.75% to 3.25%, consisting of inflation of 2.75% and real wage growth of 0.50%.

DROP Interest Crediting Rate

The Current valuation assumption is 4.5% per year. GEMS cumulative arithmetic averages of 10-year Treasury rate limited to 5% ceiling and 0% floor is 3.62% over 10 years, 4.02% over 20 years, 4.19% over 30 years. We recommend reducing the DROP Interest Crediting Rate assumption from 4.50% to 4.00%.

CPI-Based COLA

The Current valuation assumption is 2.6% per year. GEMS cumulative arithmetic averages of inflation limited to 3% ceiling and 0% floor, is 1.87% for first 10 years, 2.18% for next 20 years. We recommend reducing the CPI-Based COLA assumption from 2.60% to 2.20%.

Section V – Actuarial Cost Method and Asset Valuation Method

Actuarial Cost Method

The cost method is Entry Age Normal. This is a projected benefit method with level percentage entry age normal cost and open-end unfunded accrued liability. Gains and losses are reflected in the accrued liability. This method is required by statute.

Asset Valuation Method

The asset valuation method is used to determine the actuarial value of assets and to measure the financial status of the Fund.

The asset valuation method is a four-year moving market average value of assets that spreads the difference between the actual investment income and the expected income on the market value (based on the valuation interest rate) over a period of four years. The actuarial value shall not be less than 80% or more than 120% of market value.

The use of an actuarial value of assets which smooths investment gains and losses over a four-year period has the advantage of producing relatively stable changes in the value of assets over time. Thus, provided that the actuarial value remains within a reasonable corridor range of the market value of assets, the four-year smoothing period is an acceptable method of valuing assets for actuarial purposes.

A five-year history of the actuarial and market value of assets is shown below:

2012 – 2016 Summary of Asset Values (\$ in millions)

Fiscal Year Ending	Actuarial Value of Assets	Market Value of Assets	Ratio of Actuarial Value to Market Value
2016	\$ 14,163	\$ 13,682	103.5%
2015	13,653	12,924	105.6
2014	13,029	13,453	96.8
2013	11,063	11,921	92.8
2012	10,278	10,603	96.9

We recommend no change to the asset valuation method.

**Section VI - Comparison between Actual and Expected
Experience
during Five-Year Period from
January 1, 2012 through December 31, 2016**

Table 1(a) – Summary of Experience for Withdrawal from Employment before Retirement

Police – 2012 - 2016

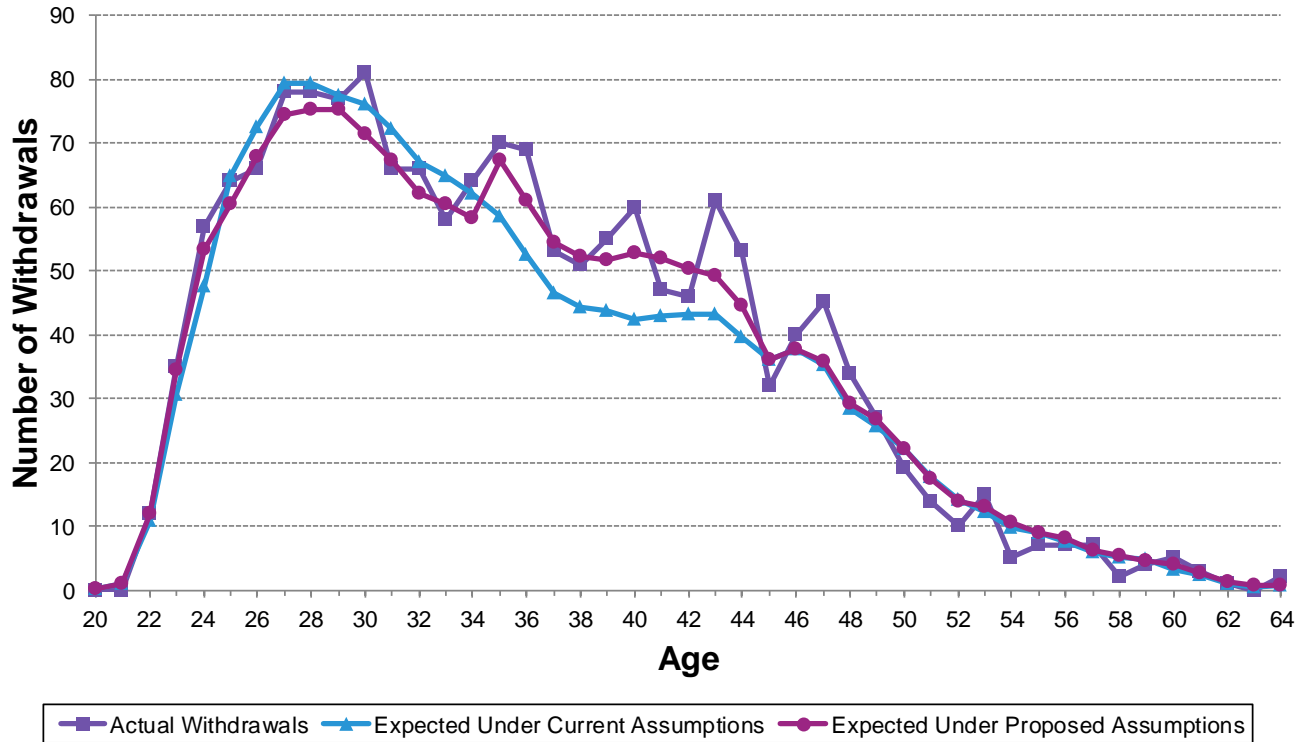
Age	Number of Withdrawals			Ratio of Actual to Expected Experience	Age	Number of Withdrawals			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
20	0	0.18	2	0%	43	60	43.08	3,353	139%
21	0	0.88	10	0%	44	51	39.75	3,357	128%
22	12	10.75	117	112%	45	30	36.18	3,334	83%
23	35	30.53	339	115%	46	39	37.72	3,197	103%
24	54	47.46	572	114%	47	45	35.20	2,713	128%
25	63	64.87	856	97%	48	33	28.33	1,911	116%
26	65	72.54	1,076	90%	49	25	25.67	1,514	97%
27	76	79.26	1,318	96%	50	18	22.17	1,158	81%
28	77	79.30	1,483	97%	51	14	17.80	944	79%
29	75	77.49	1,594	97%	52	10	14.03	703	71%
30	78	76.08	1,714	103%	53	15	12.12	536	124%
31	61	72.23	1,799	84%	54	5	9.76	416	51%
32	65	66.93	1,829	97%	55	7	9.01	374	78%
33	56	64.89	1,850	86%	56	7	7.65	308	92%
34	64	62.02	1,900	103%	57	7	5.87	237	119%
35	66	58.61	2,004	113%	58	2	5.14	187	39%
36	66	52.55	2,016	126%	59	4	4.74	159	84%
37	52	46.54	2,097	112%	60	5	3.28	131	152%
38	51	44.29	2,195	115%	61	3	2.30	68	130%
39	53	43.81	2,398	121%	62	1	1.07	17	94%
40	57	42.37	2,603	135%	63	0	0.52	10	0%
41	44	43.02	2,908	102%	64	2	0.66	12	305%
42	45	43.08	3,144	104%	65+	3	1.20	24	251%
					Total	1,601	1,542.89	60,488	104%

Table 1(b) – Summary of Experience for Withdrawal from Employment before Retirement

Firefighters – 2012 - 2016

Age	Number of Withdrawals			Ratio of Actual to Expected Experience	Age	Number of Withdrawals			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
20	2	0.39	11	519%	43	17	16.45	2,427	103%
21	1	1.38	42	72%	44	14	15.63	2,452	90%
22	3	3.91	127	77%	45	16	14.65	2,445	109%
23	3	6.44	232	47%	46	13	14.55	2,354	89%
24	6	9.28	383	65%	47	17	13.80	2,082	123%
25	9	12.01	555	75%	48	15	11.66	1,676	129%
26	16	15.82	763	101%	49	18	10.97	1,474	164%
27	28	19.58	988	143%	50	12	10.01	1,261	120%
28	15	20.99	1,123	71%	51	10	10.18	1,132	98%
29	15	23.53	1,297	64%	52	7	8.49	900	82%
30	26	25.08	1,445	104%	53	8	7.52	723	106%
31	23	25.07	1,502	92%	54	2	6.55	581	31%
32	19	25.61	1,581	74%	55	9	5.90	489	153%
33	18	25.82	1,683	70%	56	0	4.47	368	0%
34	18	26.03	1,769	69%	57	9	3.62	298	248%
35	18	24.81	1,800	73%	58	5	2.85	229	176%
36	22	23.63	1,886	93%	59	2	2.34	185	86%
37	18	21.62	1,931	83%	60	3	1.78	137	168%
38	22	19.33	1,926	114%	61	0	0.92	65	0%
39	18	17.94	1,991	100%	62	2	0.31	15	637%
40	29	17.86	2,119	162%	63	1	0.17	9	602%
41	17	17.44	2,236	97%	64	1	0.14	6	725%
42	20	16.94	2,349	118%	65+	2	0.49	28	412%
Total						549	563.95	51,077	97%

Police Withdrawal



Firefighters Withdrawal

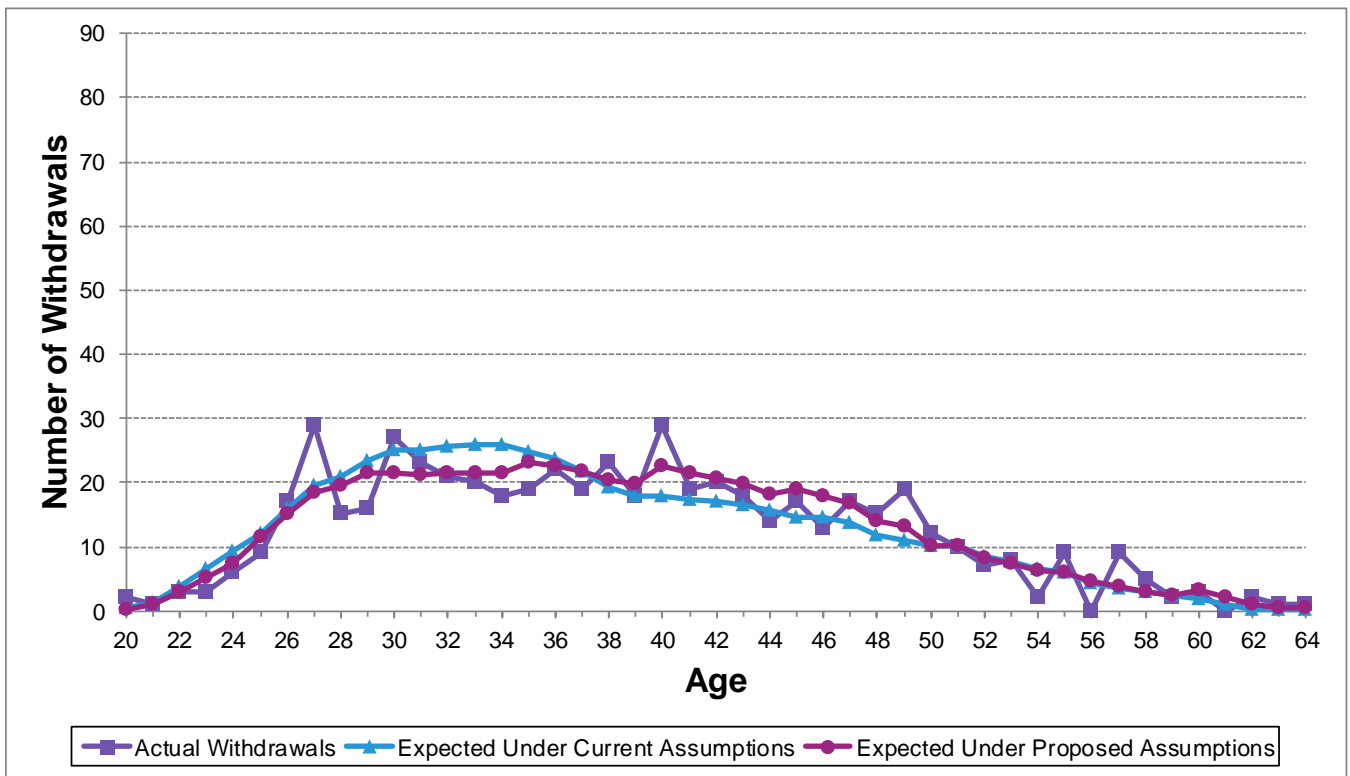


Table 2(a) – Summary of Experience for Death while in Active Service

Police – 2012 - 2016

Age	Number of Deaths			Ratio of Actual to Expected Experience	Age	Number of Deaths			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
20	0	0.00	2	0%	43	4	2.76	3,353	145%
21	0	0.00	10	0%	44	3	2.93	3,357	102%
22	0	0.03	117	0%	45	4	3.07	3,334	130%
23	0	0.09	339	0%	46	1	3.10	3,197	32%
24	0	0.16	572	0%	47	2	3.15	3,071	64%
25	1	0.26	856	388%	48	2	3.09	2,841	65%
26	0	0.35	1,076	0%	49	2	3.03	2,618	66%
27	0	0.44	1,318	0%	50	3	2.93	2,357	103%
28	0	0.51	1,483	0%	51	1	2.84	2,128	35%
29	0	0.56	1,594	0%	52	4	2.67	1,872	150%
30	0	0.60	1,714	0%	53	4	2.57	1,676	156%
31	1	0.63	1,799	158%	54	3	2.50	1,514	120%
32	0	0.65	1,829	0%	55	1	2.48	1,388	40%
33	0	0.66	1,850	0%	56	4	2.04	1,189	196%
34	1	0.70	1,900	143%	57	1	1.84	902	54%
35	2	0.78	2,004	258%	58	2	1.61	714	125%
36	0	0.84	2,016	0%	59	3	1.45	584	207%
37	2	0.98	2,097	203%	60	0	1.24	459	0%
38	0	1.16	2,195	0%	61	2	1.16	370	173%
39	4	1.41	2,398	284%	62	2	0.97	271	207%
40	2	1.69	2,603	119%	63	1	0.86	216	116%
41	0	2.07	2,908	0%	64	2	0.61	136	328%
42	1	2.42	3,144	41%	65+	2	1.40	251	143%
					Total	67	67.26	73,623	100%

Table 2(b) – Summary of Experience for Death while in Active Service

Firefighters – 2012 – 2016

Age	Number of Deaths			Ratio of Actual to Expected Experience	Age	Number of Deaths			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
20	0	0.00	11	0%	43	2	2.06	2,427	97%
21	0	0.01	42	0%	44	1	2.20	2,452	45%
22	0	0.03	127	0%	45	1	2.32	2,445	43%
23	0	0.06	232	0%	46	4	2.35	2,354	171%
24	0	0.11	383	0%	47	2	2.46	2,339	81%
25	0	0.17	555	0%	48	4	2.65	2,375	151%
26	0	0.25	763	0%	49	1	2.73	2,305	37%
27	0	0.34	988	0%	50	4	2.81	2,212	143%
28	0	0.39	1,123	0%	51	4	3.02	2,218	133%
29	1	0.46	1,297	216%	52	2	2.96	2,043	68%
30	0	0.52	1,445	0%	53	1	2.95	1,892	34%
31	2	0.54	1,502	369%	54	3	2.88	1,723	104%
32	2	0.57	1,581	348%	55	1	2.88	1,598	35%
33	0	0.62	1,683	0%	56	3	2.38	1,336	126%
34	0	0.67	1,769	0%	57	1	2.22	1,049	45%
35	1	0.71	1,800	140%	58	1	1.86	816	54%
36	0	0.80	1,886	0%	59	1	1.67	657	60%
37	0	0.93	1,931	0%	60	3	1.40	499	215%
38	0	1.04	1,926	0%	61	0	1.14	375	0%
39	1	1.20	1,991	83%	62	0	0.96	272	0%
40	0	1.41	2,119	0%	63	1	0.69	177	145%
41	0	1.64	2,236	0%	64	0	0.56	126	0%
42	2	1.87	2,349	107%	65+	1	1.11	197	0%
					Total	50	62.63	63,628	80%

Active Mortality

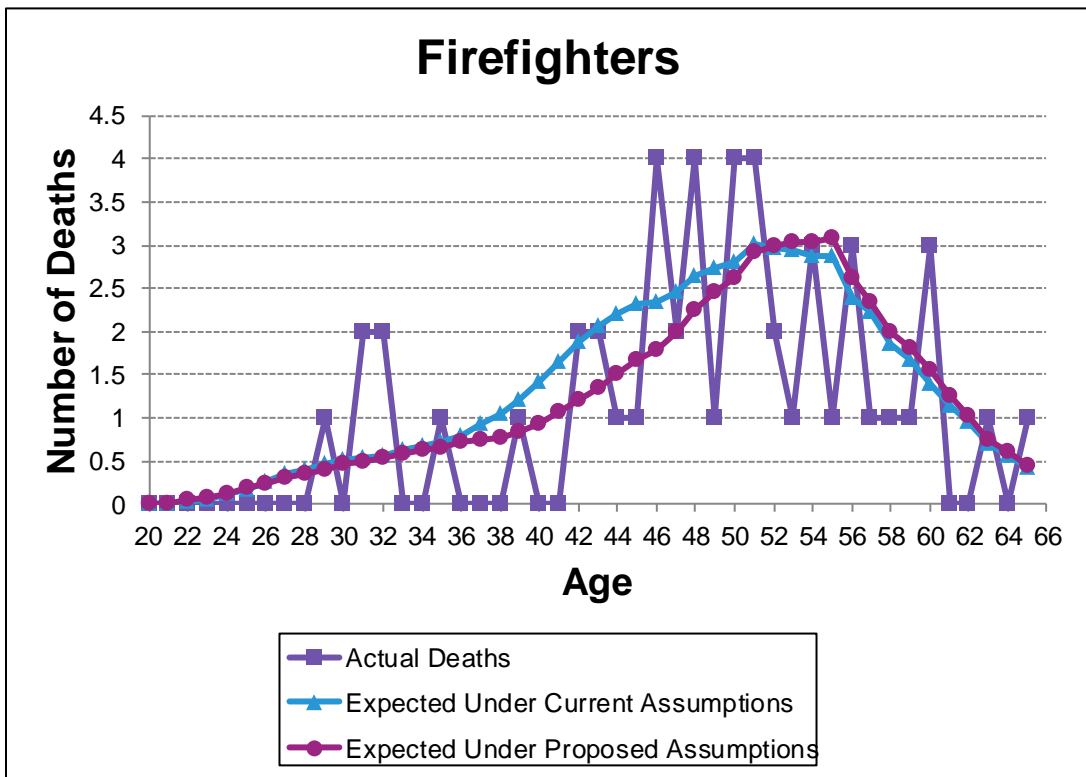
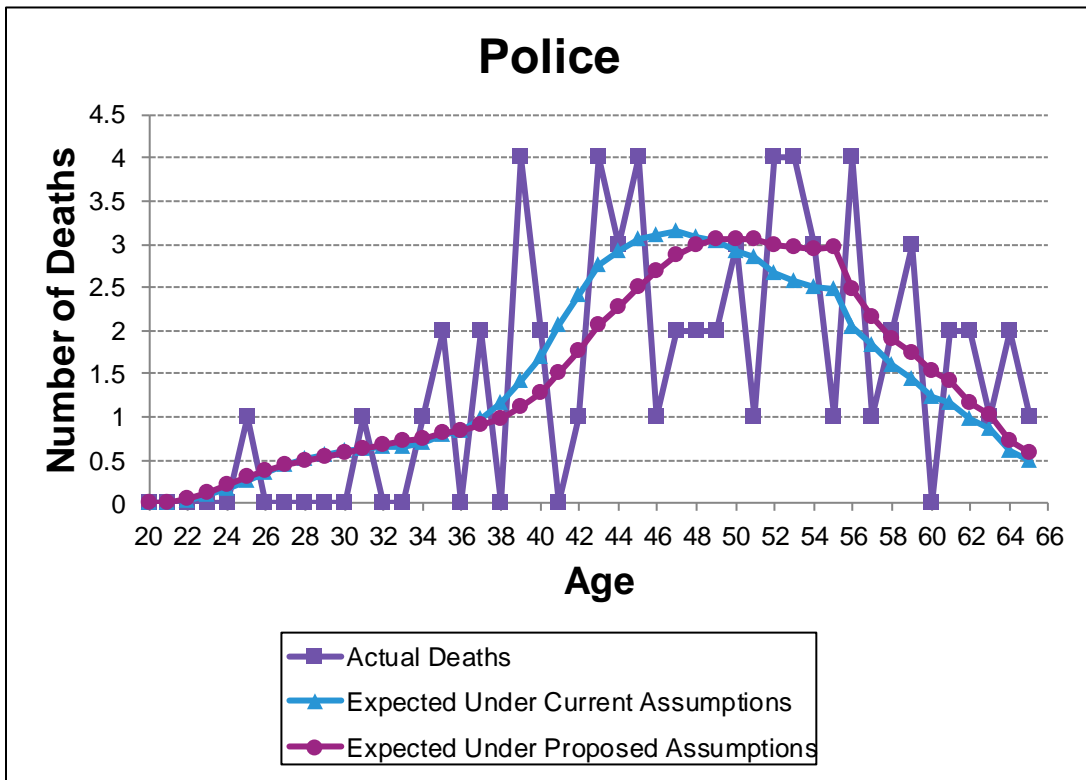


Table 3(a) – Summary of Experience for Disability during Active Service

Police – 2012 - 2016

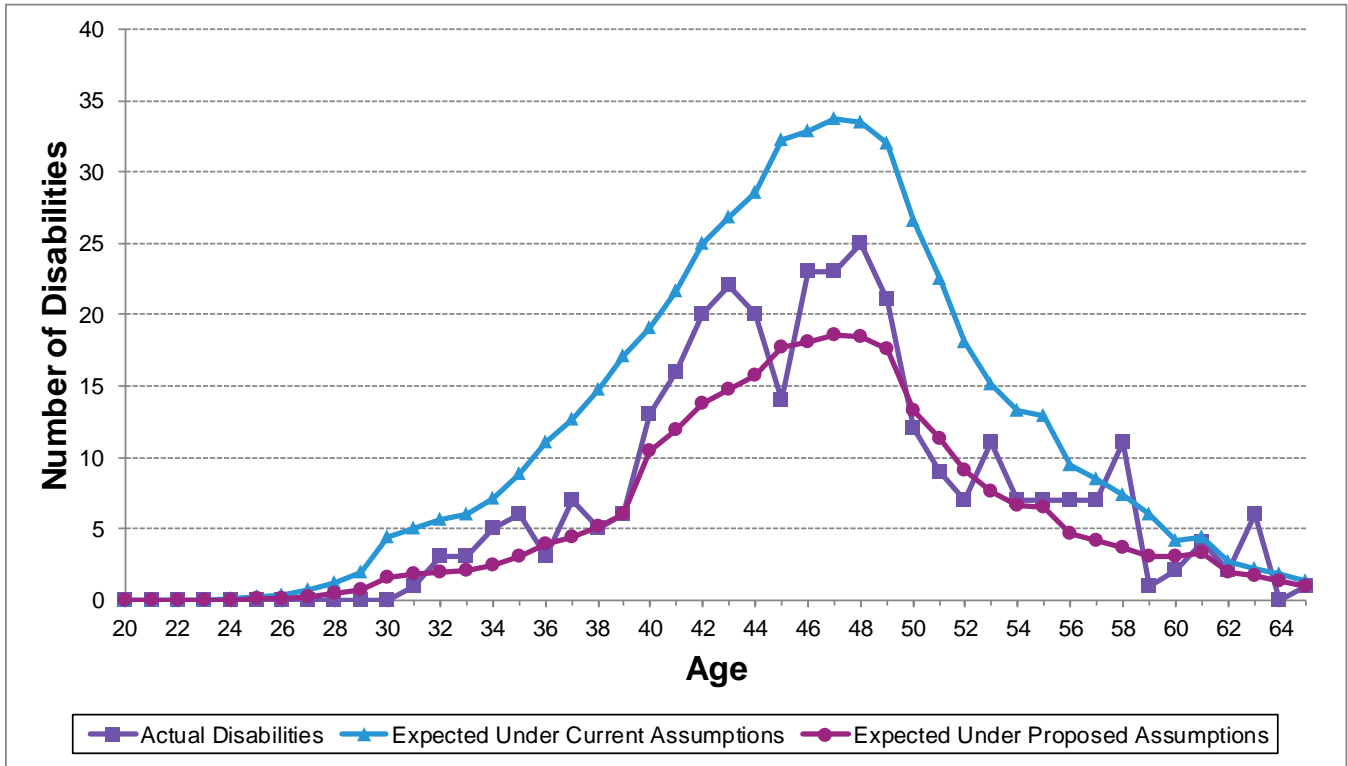
Age	Number of Disabilities			Ratio of Actual to Expected Experience	Age	Number of Disabilities			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
20	0	0.00	2	0%	43	22	26.78	3,353	82%
21	0	0.00	10	0%	44	20	28.58	3,357	70%
22	0	0.00	117	0%	45	14	32.30	3,334	43%
23	0	0.02	339	0%	46	23	32.81	3,197	70%
24	0	0.07	572	0%	47	23	33.72	3,071	68%
25	0	0.17	856	0%	48	25	33.46	2,841	75%
26	0	0.34	1,076	0%	49	21	32.03	2,618	66%
27	0	0.73	1,318	0%	50	12	26.53	2,357	45%
28	0	1.25	1,483	0%	51	9	22.47	2,128	40%
29	0	1.99	1,594	0%	52	7	18.13	1,872	39%
30	0	4.37	1,714	0%	53	11	15.14	1,676	73%
31	1	5.02	1,799	20%	54	7	13.22	1,514	53%
32	3	5.59	1,829	54%	55	7	12.95	1,388	54%
33	3	5.99	1,850	50%	56	7	9.40	1,189	75%
34	5	7.06	1,900	71%	57	7	8.41	902	83%
35	6	8.80	2,004	68%	58	11	7.30	714	151%
36	3	11.01	2,016	27%	59	1	6.00	584	17%
37	7	12.68	2,097	55%	60	2	4.12	459	49%
38	5	14.79	2,195	34%	61	4	4.36	370	92%
39	6	17.12	2,398	35%	62	2	2.65	271	76%
40	13	19.05	2,603	68%	63	6	2.18	216	276%
41	16	21.67	2,908	74%	64	0	1.82	136	0%
42	20	24.93	3,144	80%	65+	3	3.12	251	96%
					Total	332	540.12	73,623	61%

Table 3(b) – Summary of Experience for Disability during Active Service (continued)

Firefighters – 2012 – 2016

Age	Number of Disabilities			Ratio of Actual to Expected Experience	Age	Number of Disabilities			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
20	0	0.00	11	0%	43	10	16.16	2,427	62%
21	0	0.00	42	0%	44	13	16.05	2,452	81%
22	0	0.01	127	0%	45	10	18.83	2,445	53%
23	0	0.01	232	0%	46	14	18.21	2,354	77%
24	0	0.03	383	0%	47	9	20.50	2,339	44%
25	0	0.08	555	0%	48	19	19.64	2,375	97%
26	0	0.27	763	0%	49	21	20.39	2,305	103%
27	0	0.48	988	0%	50	10	19.71	2,212	51%
28	0	0.71	1,123	0%	51	14	20.51	2,218	68%
29	1	1.02	1,297	98%	52	23	19.19	2,043	120%
30	1	0.90	1,445	111%	53	18	21.26	1,892	85%
31	1	1.74	1,502	58%	54	8	21.65	1,723	37%
32	1	2.26	1,581	44%	55	7	21.58	1,598	32%
33	0	3.21	1,683	0%	56	18	18.21	1,336	99%
34	3	4.23	1,769	71%	57	8	15.52	1,049	52%
35	2	4.69	1,800	43%	58	7	10.98	816	64%
36	3	5.46	1,886	55%	59	10	8.24	657	121%
37	3	6.12	1,931	49%	60	6	6.33	499	95%
38	1	6.59	1,926	15%	61	9	4.41	375	204%
39	5	8.19	1,991	61%	62	4	3.36	272	119%
40	2	9.62	2,119	21%	63	0	2.98	177	0%
41	8	11.80	2,236	68%	64	2	3.60	126	56%
42	5	13.29	2,349	38%	65+	6	5.34	197	112%
					Total	282	413.37	63,628	68%

Police Disabilities



Firefighters Disabilities

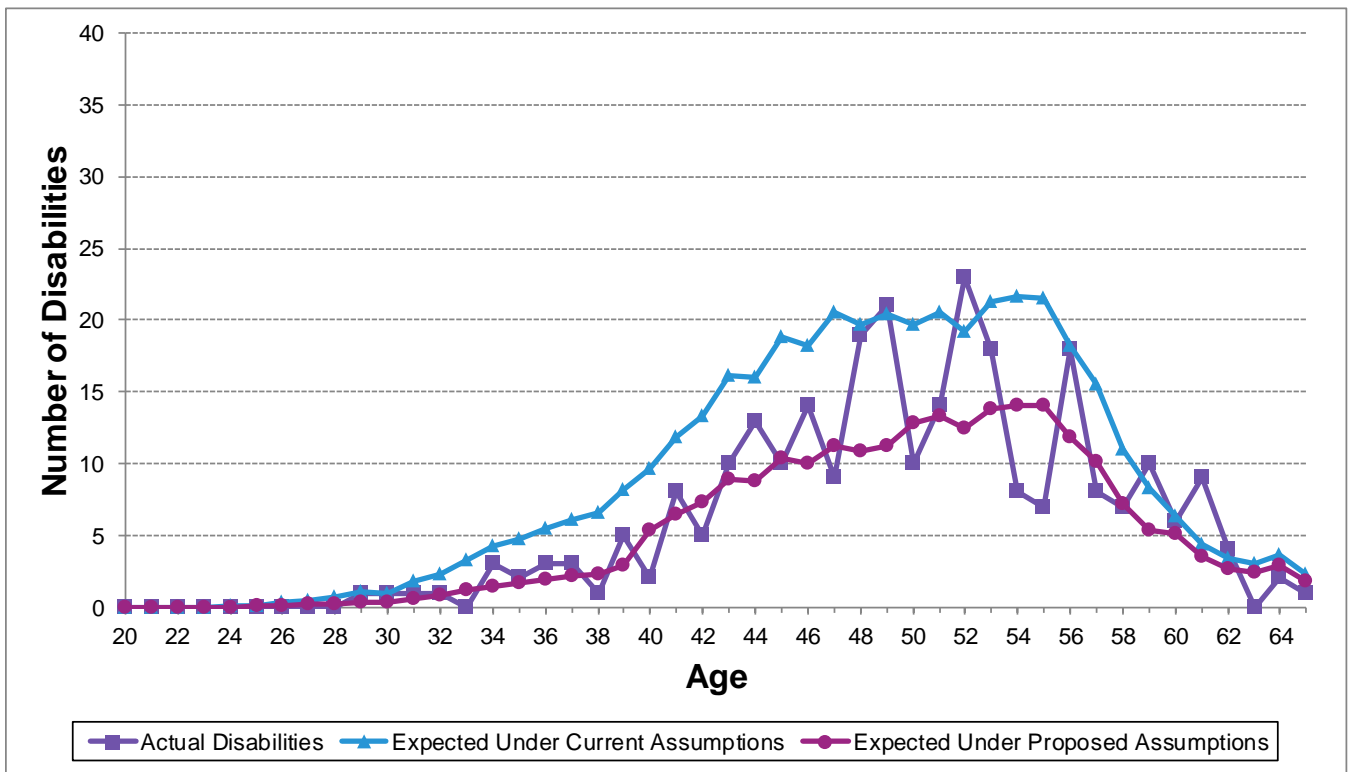


Table 4(a) – Summary of Experience for Service Retirement

Police – 2012 - 2016

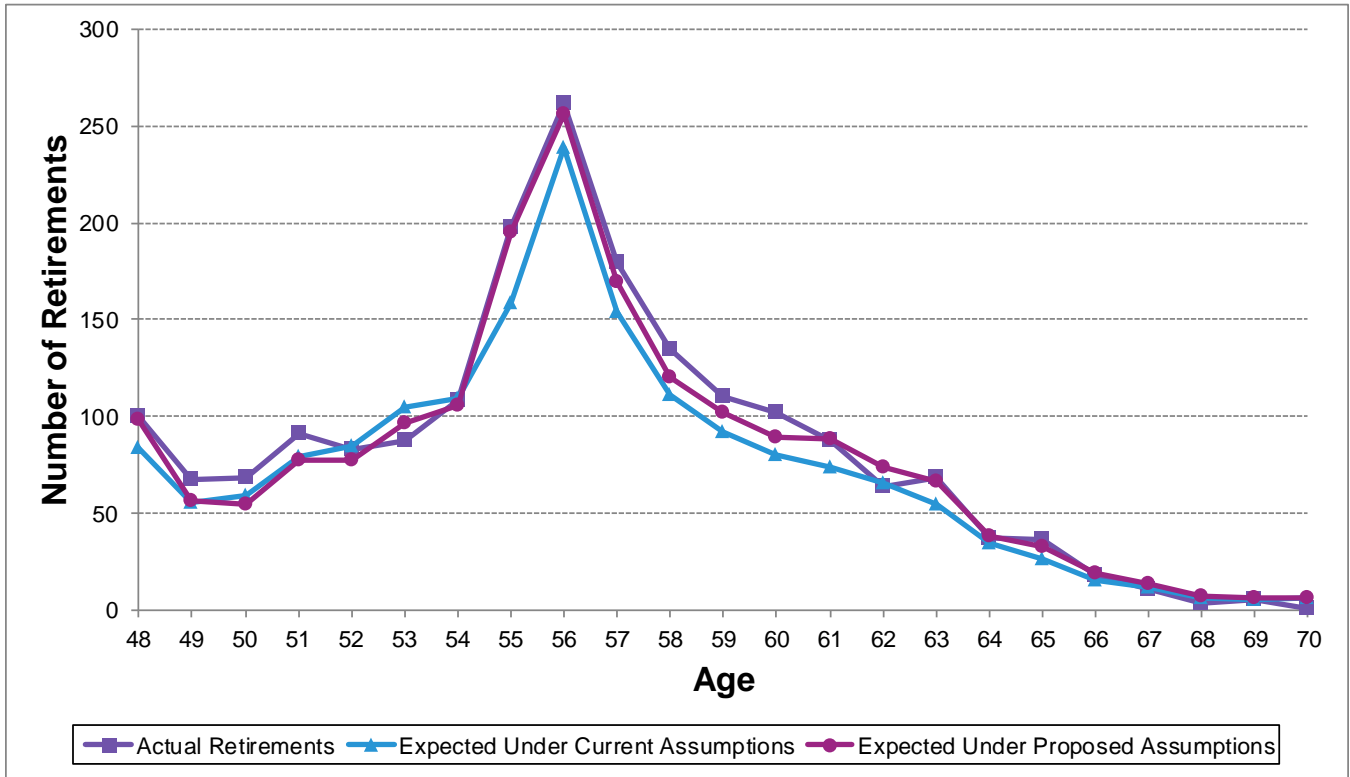
Age	Number of Retirements			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed	
under 48	23	0.00	358	0%
48	100	83.70	930	119%
49	67	55.20	1,104	121%
50	68	58.97	1,199	115%
51	91	78.82	1,184	115%
52	83	84.52	1,169	98%
53	87	105.15	1,140	83%
54	108	108.94	1,098	99%
55	198	158.72	1,014	125%
56	261	238.99	881	109%
57	180	154.19	665	117%
58	135	110.84	527	122%
59	109	92.16	425	118%
60	102	80.22	328	127%
61	87	73.74	302	118%
62	64	65.65	254	97%
63	67	54.29	206	123%
64	37	34.02	124	109%
65+	79	85.03	227	93%
Total	1,946	1,723.15	13,135	113%

Table 4(a) – Summary of Experience for Service Retirement (continued)

Firefighters – 2012 - 2016

Age	Number of Retirements			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed	
under 48	7	0.00	257	0%
48	49	22.22	699	221%
49	41	31.24	831	131%
50	44	33.97	951	130%
51	61	61.99	1,086	98%
52	71	79.63	1,143	89%
53	100	92.18	1,169	109%
54	101	103.11	1,142	98%
55	191	144.83	1,109	132%
56	259	214.45	968	121%
57	165	135.63	751	122%
58	141	132.17	587	107%
59	111	101.53	472	109%
60	99	81.73	362	121%
61	79	75.16	310	105%
62	73	63.34	257	115%
63	43	53.27	168	81%
64	36	37.31	120	97%
65	47	57.74	169	81%
Total	1,718	1,521.50	12,551	113%

Police Retirements



Firefighters Retirements

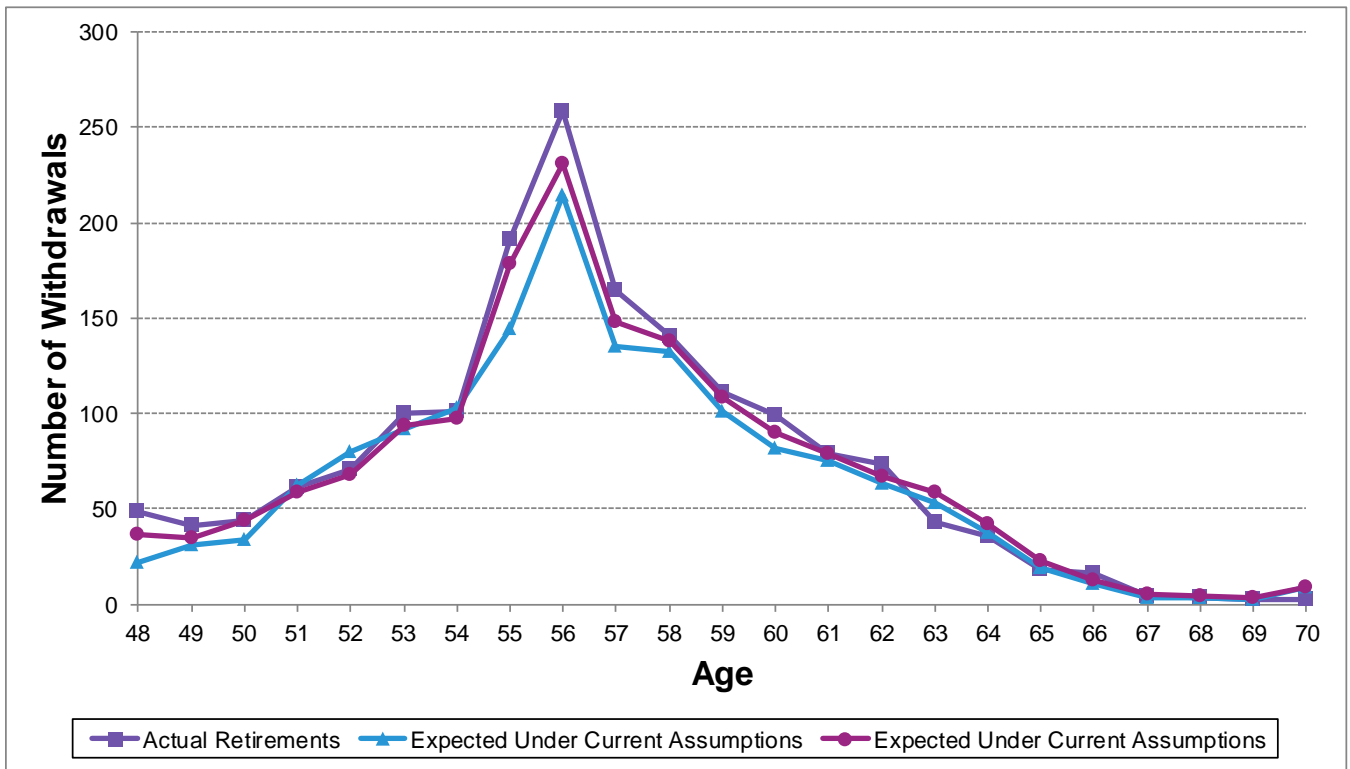


Table 5(a) – Summary of Mortality Experience among Retirees Service Retirement

Police – 2012 - 2016

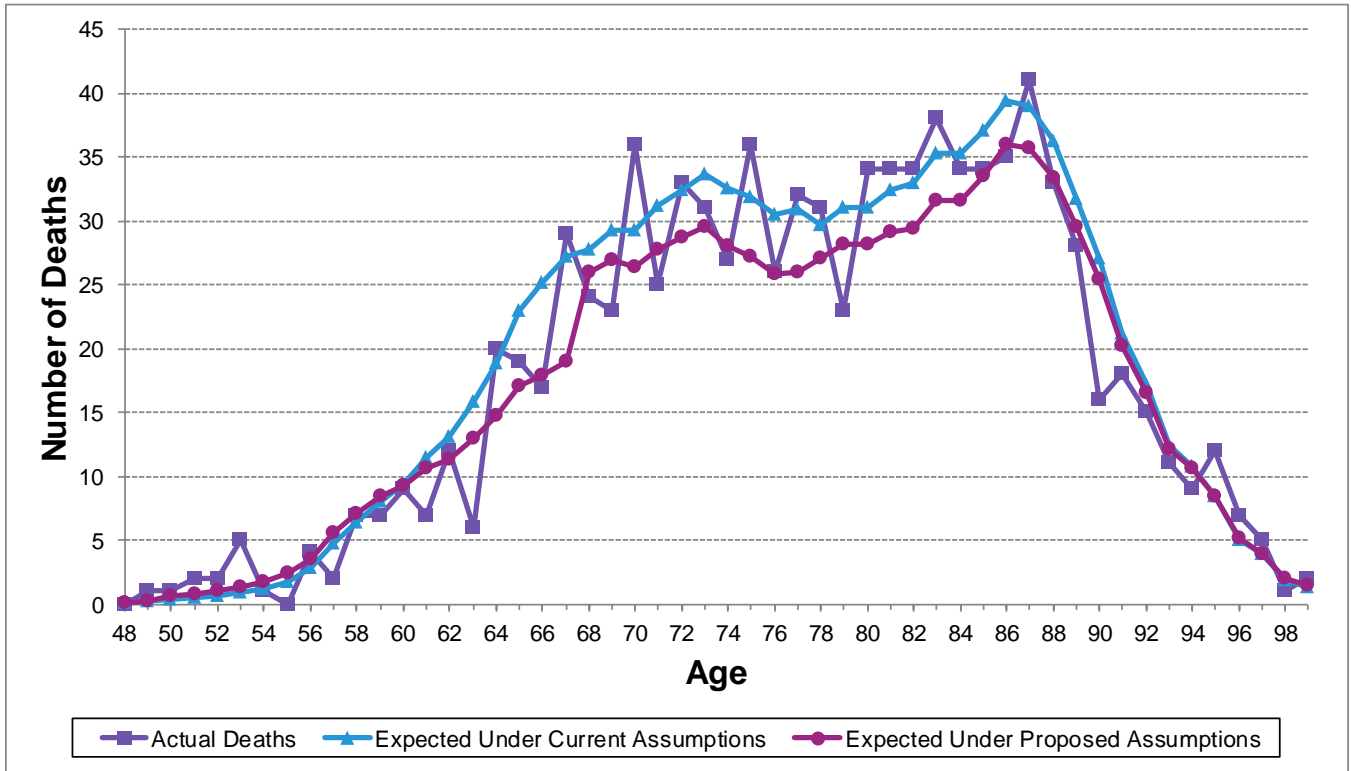
Age	Number of Deaths			Ratio of Actual to Expected Experience	Age	Number of Deaths			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
48	0	0.07	39	0%	75	36	31.93	909	113%
49	1	0.26	145	386%	76	26	30.49	779	85%
50	1	0.36	190	277%	77	32	30.97	707	103%
51	2	0.51	234	395%	78	31	29.66	607	105%
52	2	0.67	287	297%	79	23	31.03	570	74%
53	5	0.87	340	574%	80	34	31.10	511	109%
54	1	1.16	414	86%	81	34	32.36	473	105%
55	-	1.75	542	0%	82	34	32.90	428	103%
56	4	2.83	752	141%	83	38	35.23	412	108%
57	2	4.80	1,133	42%	84	34	35.24	367	96%
58	6	6.46	1,353	93%	85	34	37.04	347	92%
59	7	8.00	1,482	88%	86	35	39.46	333	89%
60	9	9.44	1,541	95%	87	41	38.95	295	105%
61	7	11.43	1,630	61%	88	33	36.26	247	91%
62	12	13.08	1,629	92%	89	28	31.78	196	88%
63	6	15.83	1,713	38%	90	16	27.10	151	59%
64	20	18.82	1,805	106%	91	18	21.20	109	85%
65	19	22.91	1,941	83%	92	15	17.15	81	87%
66	17	25.10	1,874	68%	93	11	12.36	54	89%
67	29	27.23	1,825	106%	94	9	10.80	44	83%
68	24	27.77	1,682	86%	95	12	8.47	32	142%
69	23	29.31	1,599	78%	96	7	5.06	18	138%
70	36	29.29	1,427	123%	97	5	3.86	13	129%
71	25	31.14	1,372	80%	98	1	1.88	6	53%
72	33	32.45	1,288	102%	99	2	1.31	4	152%
73	31	33.72	1,204	92%	100+	2	1.04	3	192%
74	27	32.49	1,039	83%					
Total					Total	940	1,002.41	38,176	94%

Table 5(b) – Summary of Mortality Experience among Retirees Service Retirement (continued)

Firefighters – 2012 - 2016

Age	Number of Deaths			Ratio of Actual to Expected Experience	Age	Number of Deaths			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
48	0	0.02	14	0%	75	32	21.00	743	152%
49	0	0.10	66	0%	76	22	21.39	678	103%
50	0	0.16	98	0%	77	25	22.49	635	111%
51	0	0.24	133	0%	78	31	23.87	601	130%
52	2	0.37	195	536%	79	31	24.32	548	127%
53	2	0.54	245	372%	80	30	26.06	526	115%
54	2	0.78	324	258%	81	35	29.32	529	119%
55	2	1.07	405	188%	82	37	31.39	507	118%
56	4	1.69	580	236%	83	38	33.13	478	115%
57	6	2.70	813	222%	84	31	36.94	475	84%
58	3	3.62	936	83%	85	45	42.82	494	105%
59	9	4.48	1,037	201%	86	56	42.80	444	131%
60	8	5.41	1,114	148%	87	59	40.08	373	147%
61	6	6.43	1,168	93%	88	40	35.89	300	111%
62	6	7.50	1,201	80%	89	46	32.57	246	141%
63	6	8.67	1,215	69%	90	37	24.48	166	151%
64	8	9.95	1,222	80%	91	27	18.27	112	148%
65	12	11.90	1,275	101%	92	24	12.82	71	187%
66	11	12.49	1,184	88%	93	11	10.23	52	108%
67	12	13.25	1,114	91%	94	9	8.32	39	108%
68	14	14.42	1,077	97%	95	7	6.47	28	108%
69	12	16.08	1,075	75%	96	4	4.47	18	89%
70	11	16.06	968	69%	97	3	3.44	13	87%
71	16	17.70	964	90%	98	3	1.98	7	152%
72	16	19.80	963	81%	99	4	1.19	4	335%
73	21	20.52	903	102%	100+	1	1.46	4	69%
74	16	20.34	805	79%					
					Total	893	773.50	29,186	115%

Police Retiree Mortality



Firefighters Retiree Mortality

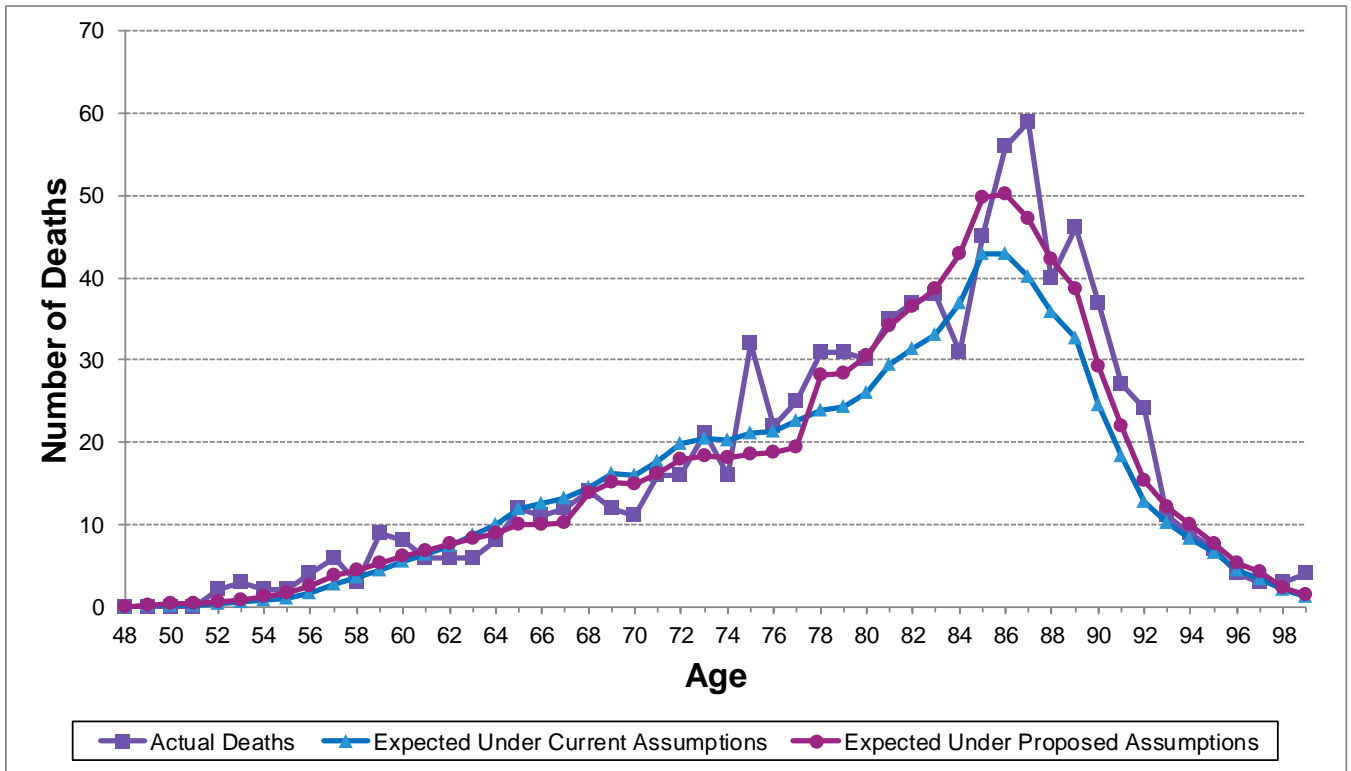


Table 6(a) – Summary of Mortality Experience among Retirees Disability Retirement (continued)

Police – 2012 - 2016

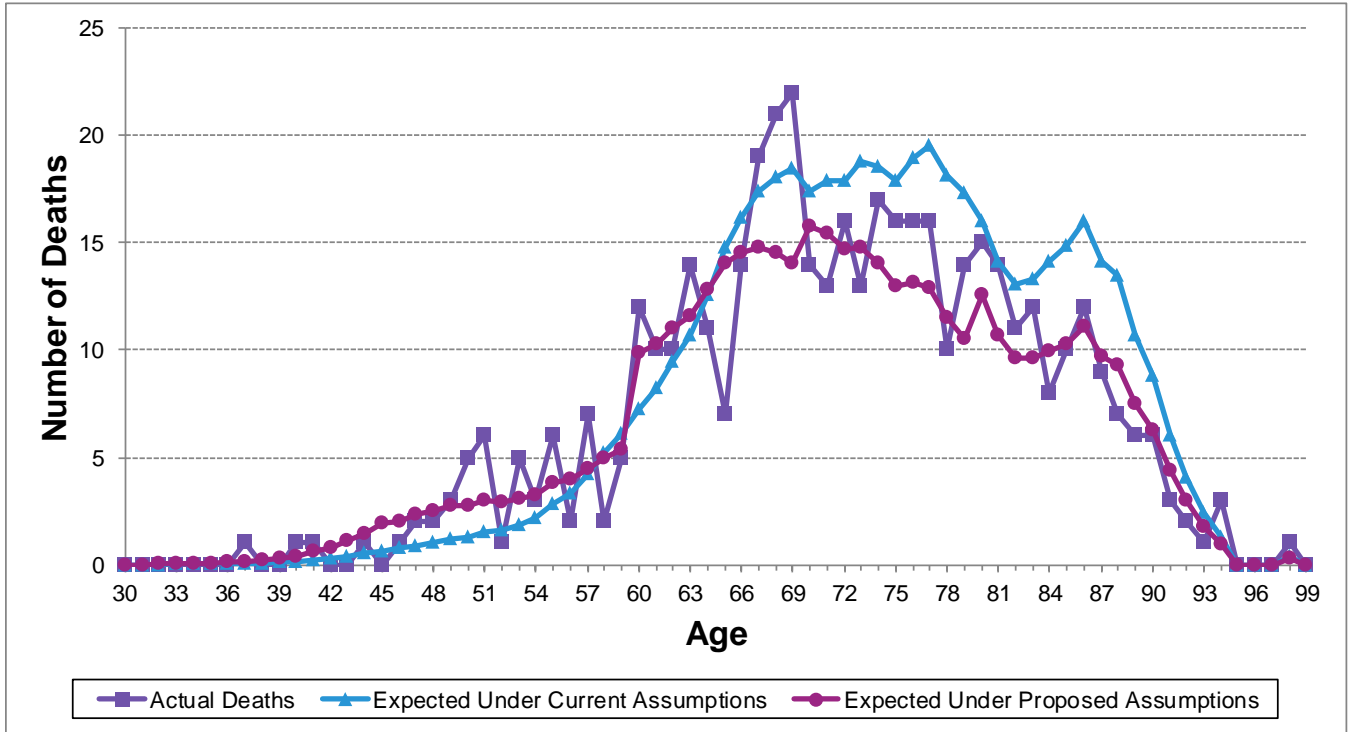
Age	Number of Deaths			Ratio of Actual to Expected Experience	Age	Number of Deaths			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
30	0	0.00	3	0%	66	14	16.18	715	87%
31	0	0.00	6	0%	67	19	17.43	693	109%
32	0	0.01	10	0%	68	21	18.05	647	116%
33	0	0.02	19	0%	69	22	18.45	591	119%
34	0	0.02	22	0%	70	14	17.39	499	80%
35	0	0.03	30	0%	71	13	17.87	461	73%
36	0	0.04	42	0%	72	16	17.86	413	90%
37	1	0.06	53	1716%	73	13	18.77	391	69%
38	0	0.08	73	0%	74	17	18.55	348	92%
39	0	0.11	85	0%	75	16	17.92	300	89%
40	1	0.14	106	700%	76	16	18.97	284	84%
41	1	0.23	159	435%	77	16	19.53	260	82%
42	0	0.30	193	0%	78	10	18.16	216	55%
43	0	0.41	246	0%	79	14	17.31	184	81%
44	1	0.51	288	194%	80	15	16.03	153	94%
45	0	0.65	340	0%	81	14	14.13	121	99%
46	1	0.76	351	131%	82	11	13.04	100	84%
47	2	0.91	389	219%	83	12	13.32	92	90%
48	2	1.02	401	195%	84	8	14.16	88	56%
49	3	1.19	428	252%	85	10	14.88	84	67%
50	5	1.30	416	385%	86	12	16.02	83	75%
51	6	1.54	425	390%	87	9	14.10	67	64%
52	1	1.61	396	62%	88	7	13.44	59	52%
53	5	1.86	407	268%	89	6	10.69	44	56%
54	3	2.20	424	137%	90	6	8.82	34	68%
55	6	2.86	484	209%	91	3	6.03	22	50%
56	2	3.36	499	60%	92	2	4.04	14	49%
57	7	4.20	543	167%	93	1	2.39	8	42%
58	2	5.25	589	38%	94	3	1.30	4	231%
59	5	6.15	613	81%	95	0	0.00	0	0%
60	12	7.26	636	165%	96	0	0.00	0	0%
61	10	8.23	633	122%	97	0	0.00	0	0%
62	10	9.44	651	106%	98	1	0.38	1	262%
63	14	10.66	657	131%	99	0	0.00	0	0%
64	11	12.54	694	88%	100+	0	0.00	0	0%
65	6	14.82	728	40%					
					Total	458	515.00	19,017	89%

Table 6(b) – Summary of Mortality Experience among Retirees Disability Retirement (continued)

Firefighters – 2012 - 2016

Age	Number of Deaths			Ratio of Actual to Expected Experience	Age	Number of Deaths			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
30	1	0.00	5	35125%	66	8	9.14	494	88%
31	0	0.00	6	0%	67	8	9.80	473	82%
32	0	0.00	6	0%	68	15	9.88	433	152%
33	0	0.01	8	0%	69	5	10.83	427	46%
34	0	0.01	13	0%	70	6	10.50	372	57%
35	0	0.01	14	0%	71	16	11.23	357	143%
36	0	0.02	17	0%	72	6	12.10	345	50%
37	0	0.02	24	0%	73	10	13.27	340	75%
38	0	0.04	34	0%	74	11	13.43	309	82%
39	1	0.04	33	2654%	75	9	13.63	281	66%
40	0	0.06	45	0%	76	18	13.95	259	129%
41	0	0.07	55	0%	77	12	13.04	217	92%
42	0	0.11	75	0%	78	15	12.25	181	123%
43	0	0.13	87	0%	79	11	11.40	150	97%
44	1	0.17	107	589%	80	9	10.46	123	86%
45	2	0.22	128	919%	81	11	10.00	105	110%
46	3	0.25	140	1182%	82	4	9.14	86	44%
47	0	0.32	163	0%	83	6	9.67	82	62%
48	1	0.39	176	257%	84	11	11.45	87	96%
49	0	0.48	201	0%	85	10	12.38	85	81%
50	1	0.58	221	174%	86	8	12.89	80	62%
51	4	0.67	237	595%	87	10	14.24	80	70%
52	1	0.78	243	128%	88	9	12.24	63	74%
53	2	1.00	268	200%	89	4	9.06	43	44%
54	2	1.25	298	160%	90	8	7.08	31	113%
55	8	1.61	341	495%	91	4	4.42	18	91%
56	3	1.90	353	158%	92	4	2.37	9	169%
57	3	2.32	379	130%	93	0	1.40	5	0%
58	0	2.87	411	0%	94	0	1.18	4	0%
59	2	3.44	429	58%	95	2	1.56	5	128%
60	5	4.07	443	123%	96	2	0.98	3	203%
61	7	4.82	463	145%	97	0	0.34	1	0%
62	7	5.45	464	129%	98	1	0.36	1	280%
63	8	6.49	486	123%	99	0	0.00	0	0%
64	5	6.97	467	72%	100+	0	0.00	0	0%
65	4	8.39	504	48%					
					Total	324	350.61	12,898	92%

Police Disability Retirement Mortality



Firefighters Disability Retirement Mortality

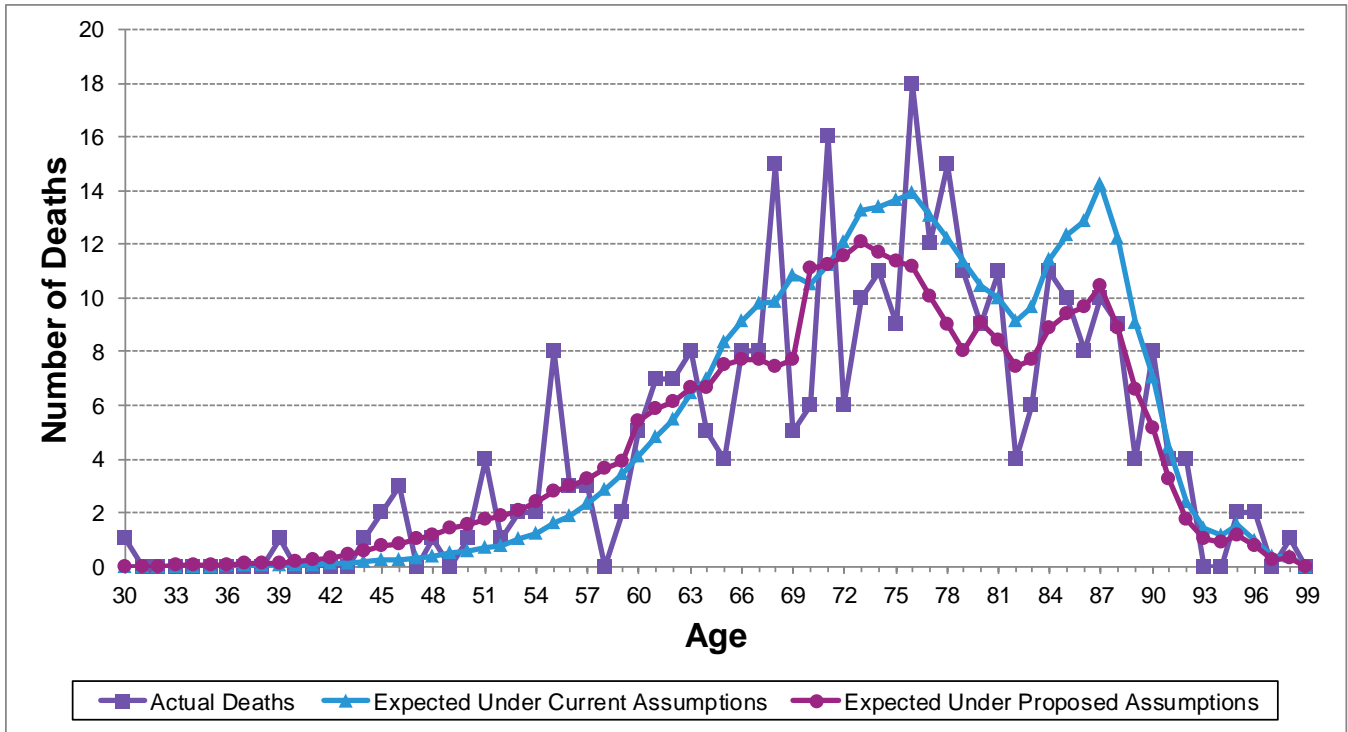


Table 7 – Summary of Mortality Experience among Beneficiaries

Police and Firefighters – 2012 - 2016

Age	Number of Deaths			Ratio of Actual to Expected Experience	Age	Number of Deaths			Ratio of Actual to Expected Experience
	Actual	Expected	Exposed			Actual	Expected	Exposed	
15	0	0.16	798	0%	58	4	1.53	398	261%
16	0	0.03	146	0%	59	4	1.88	432	213%
17	1	0.04	160	2733%	60	5	2.55	515	196%
18	0	0.04	171	0%	61	3	3.10	546	97%
19	0	0.04	148	0%	62	6	3.91	601	153%
20	0	0.03	126	0%	63	7	5.23	698	134%
21	0	0.03	127	0%	64	7	6.36	754	110%
22	0	0.03	114	0%	65	14	7.38	776	190%
23	1	0.02	66	5564%	66	9	8.66	808	104%
24	0	0.01	47	0%	67	14	10.17	856	138%
25	0	0.01	53	0%	68	13	11.19	853	116%
26	0	0.01	46	0%	69	13	12.60	868	103%
27	0	0.01	27	0%	70	16	14.64	895	109%
28	0	0.01	20	0%	71	18	17.81	986	101%
29	0	0.0	14	0%	72	36	21.05	1,048	171%
30	0	0.00	9	0%	73	22	23.13	1,042	95%
31	0	0.00	9	0%	74	36	25.59	1,041	141%
32	0	0.01	15	0%	75	21	27.79	1,029	76%
33	0	0.01	15	0%	76	28	32.37	1,087	86%
34	0	0.01	15	0%	77	41	36.57	1,110	112%
35	0	0.01	17	0%	78	53	41.75	1,149	127%
36	0	0.01	19	0%	79	45	46.99	1,171	96%
37	0	0.01	21	0%	80	65	53.69	1,211	121%
38	0	0.02	36	0%	81	70	60.14	1,224	116%
39	0	0.03	47	0%	82	85	68.98	1,268	123%
40	2	0.04	59	4743%	83	74	74.79	1,238	99%
41	0	0.05	66	0%	84	97	84.23	1,253	115%
42	0	0.06	71	0%	85	96	96.70	1,286	99%
43	1	0.07	70	1531%	86	79	103.82	1,232	76%
44	0	0.10	100	0%	87	125	110.07	1,165	114%
45	0	0.12	107	0%	88	109	108.89	1,035	100%
46	3	0.15	123	2062%	89	94	99.71	850	94%
47	0	0.18	140	0%	90	97	92.27	712	105%
48	0	0.24	176	0%	91	92	81.97	575	112%
49	2	0.28	191	724%	92	71	67.72	436	105%
50	3	0.30	193	996%	93	64	55.07	326	116%
51	0	0.36	207	0%	94	46	45.66	252	101%
52	1	0.41	215	242%	95	35	38.57	200	91%
53	0	0.53	249	0%	96	46	31.10	153	148%
54	5	0.65	275	774%	97	29	20.35	95	143%
55	3	0.87	327	345%	98	18	15.82	71	114%
56	0	1.11	365	0%	99	15	13.35	58	112%
57	4	1.33	387	301%	100+	28	18.19	80	154%
Total						1,876	1,710.76	38,970	110%

Beneficiary Mortality

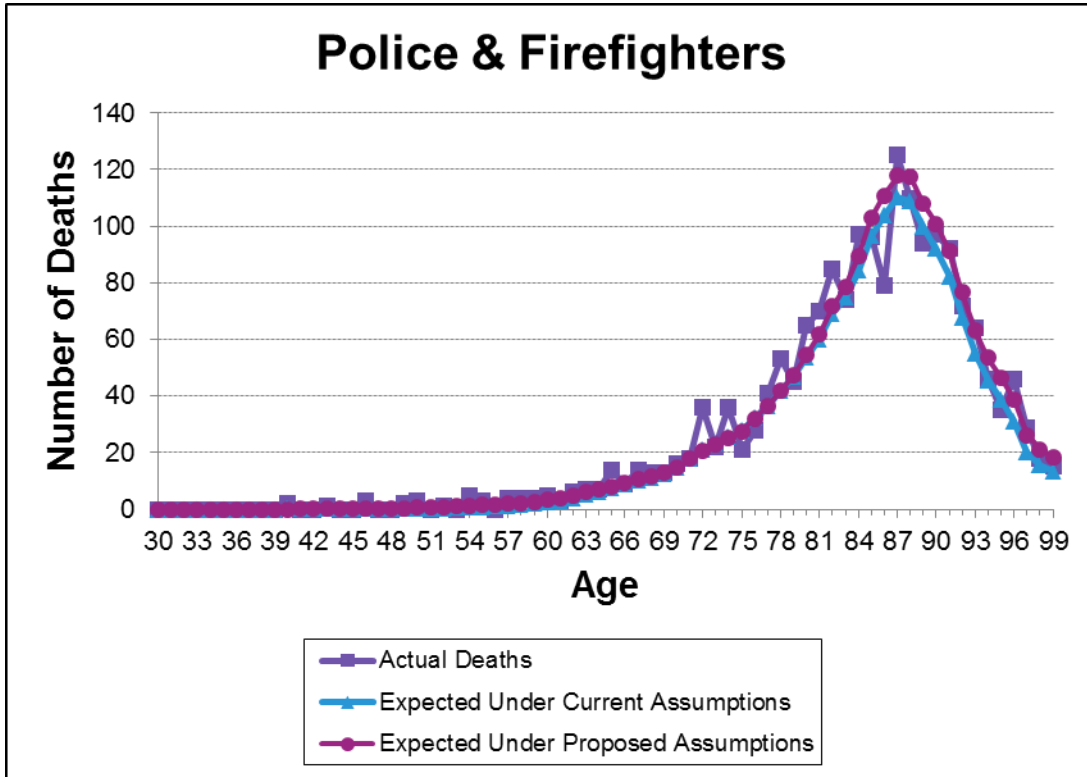


Table 8(a) – Salary Increase Rates of Active Members

Police – 2012 – 2016

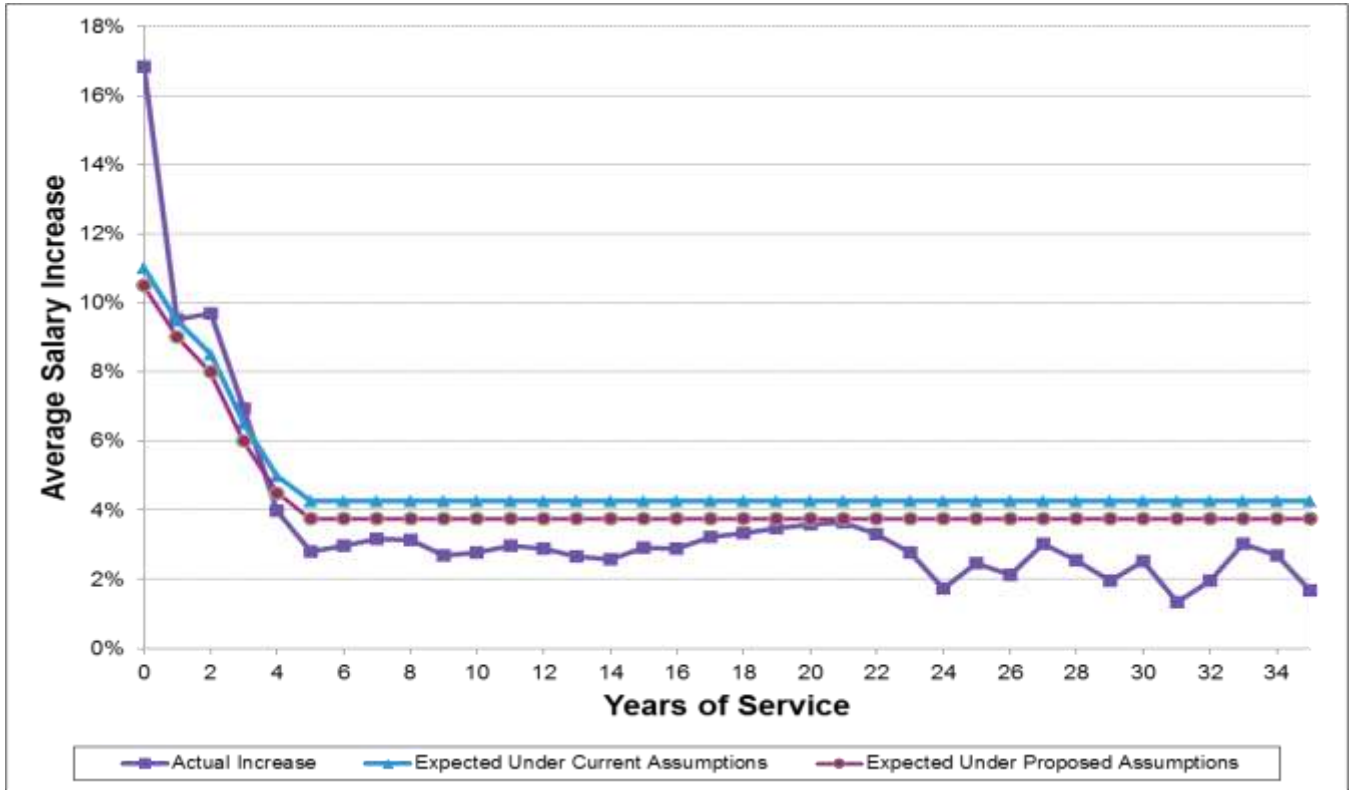
Years of Service	Actual Increase						Expected Increase
	2012	2013	2014	2015	2016	Total	
0	19.4 %	15.7 %	13.9 %	21.1 %	15.4 %	16.8 %	11.0 %
1	13.2	9.5	8.4	8.5	9.9	9.5	9.5
2	9.5	7.7	10.4	9.2	10.6	9.7	8.5
3	6.1	5.3	8.8	8.7	6.7	6.9	6.5
4	3.2	2.9	3.5	3.8	7.4	4.0	5.0
5	1.9	2.4	1.9	3.0	6.9	2.8	4.3
6	1.9	2.5	2.3	3.0	5.6	3.0	4.3
7	1.8	2.8	2.6	2.8	5.0	3.2	4.3
8	1.6	2.3	2.5	3.2	5.4	3.1	4.3
9	2.2	1.5	1.8	2.8	5.2	2.7	4.3
10	2.0	1.4	2.0	2.8	6.6	2.8	4.3
11	2.3	1.6	2.3	3.1	6.2	3.0	4.3
12	2.0	2.3	3.0	2.8	4.8	2.9	4.3
13	2.0	1.0	2.9	3.3	4.4	2.7	4.3
14	2.2	1.7	2.0	2.1	5.0	2.6	4.3
15	1.9	2.0	2.4	3.1	5.7	2.9	4.3
16	2.6	2.1	2.5	2.8	4.8	2.9	4.3
17	2.6	2.1	2.7	3.3	5.2	3.2	4.3
18	2.2	2.1	3.3	2.8	5.7	3.3	4.3
19	2.3	2.4	3.3	2.7	6.0	3.5	4.3
20	3.5	2.1	3.0	3.4	5.7	3.6	4.3
21	2.9	2.1	3.4	3.4	6.1	3.6	4.3
22	2.3	2.3	3.0	3.6	5.3	3.3	4.3
23	2.2	2.1	1.9	2.4	5.2	2.8	4.3
24	1.3	0.1	1.6	1.5	4.0	1.7	4.3
25	1.7	0.6	2.2	1.9	5.0	2.4	4.3
26	1.9	0.5	1.7	1.7	4.5	2.1	4.3
27	1.3	0.9	2.2	2.7	6.2	3.0	4.3
28	1.8	0.7	1.9	2.8	5.0	2.6	4.3
29	1.8	0.0	2.0	1.8	3.7	2.0	4.3
30	1.1	0.6	2.4	2.9	5.0	2.5	4.3
31	0.0	0.3	2.0	1.8	2.9	1.3	4.3
32	0.1	0.6	3.0	1.9	5.5	1.9	4.3
33	1.9	1.7	4.3	0.7	6.4	3.0	4.3
34	2.9	0.5	3.8	3.6	3.2	2.7	4.3
35	1.0	2.1	1.0	1.3	3.3	1.7	4.3
36+	(1.2)	0.1	0.9	1.2	3.9	1.1	4.3
Total	3.1 %	2.7 %	3.5 %	4.2 %	6.3 %	4.0 %	4.9 %

Table 8(b) – Salary Increase Rates of Active Members (continued)

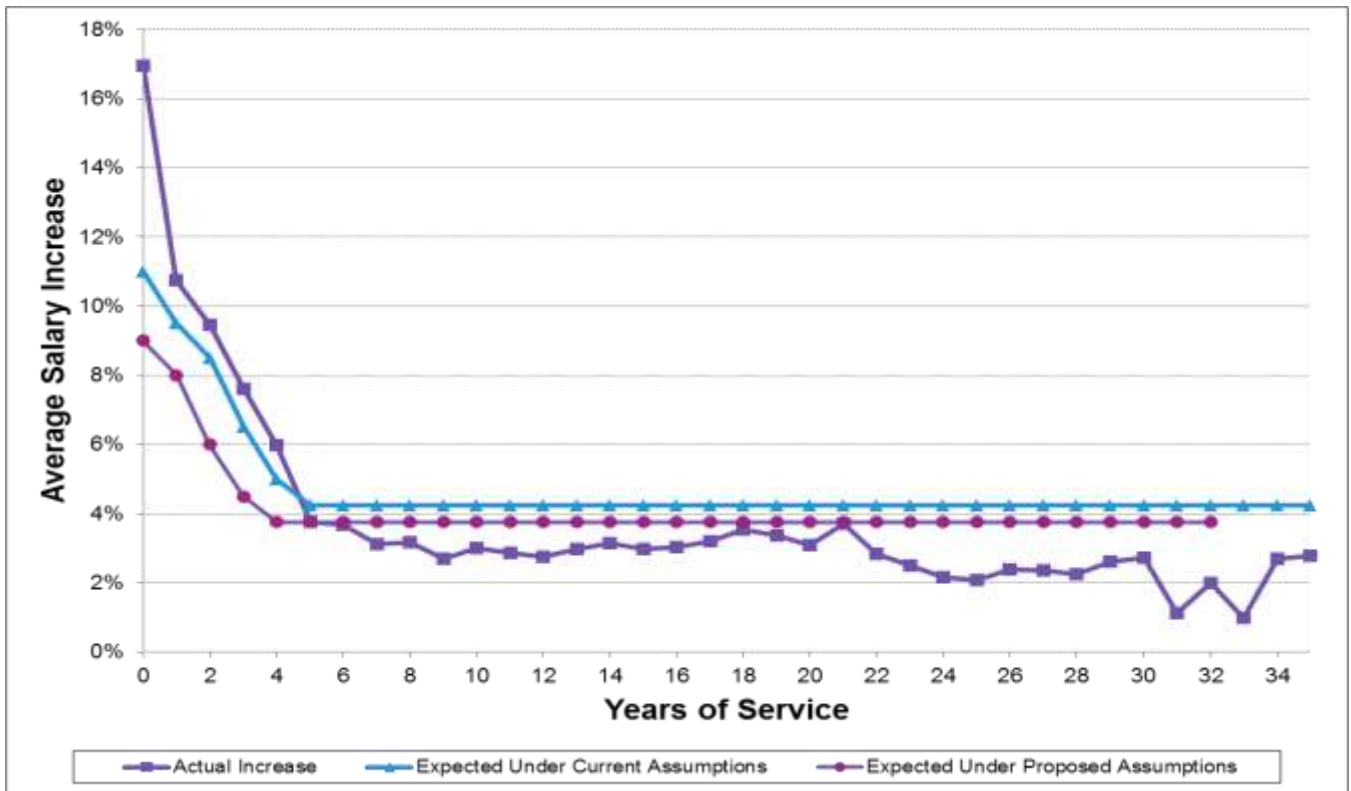
Firefighters – 2012 – 2016

Years of Service	Actual Increase						Expected Increase
	2012	2013	2014	2015	2016	Total	
0	12.4 %	16.5 %	17.7 %	19.1 %	18.1 %	17.0 %	11.0 %
1	11.5	9.5	10.7	9.9	11.9	10.7	9.5
2	7.2	8.4	10.0	9.9	10.7	9.4	8.5
3	5.5	5.3	6.9	9.7	10.3	7.6	6.5
4	3.2	4.9	4.9	8.4	8.7	6.0	5.0
5	2.8	2.6	2.7	4.5	6.9	3.8	4.3
6	3.0	1.9	3.7	3.8	5.8	3.7	4.3
7	1.9	1.0	2.5	3.8	5.7	3.1	4.3
8	2.2	2.4	2.7	2.4	5.9	3.2	4.3
9	1.6	1.5	2.7	3.3	5.0	2.7	4.3
10	2.0	2.4	2.1	3.7	6.3	3.0	4.3
11	1.1	2.1	3.6	3.5	5.2	2.9	4.3
12	1.2	2.2	2.2	3.3	5.5	2.8	4.3
13	1.5	2.2	2.7	4.0	5.0	3.0	4.3
14	2.2	2.3	2.4	3.1	5.4	3.2	4.3
15	1.5	1.9	2.5	3.2	5.7	3.0	4.3
16	1.3	2.1	1.9	3.3	6.6	3.0	4.3
17	1.7	2.4	2.2	3.6	5.2	3.2	4.3
18	1.2	2.2	2.9	4.6	6.1	3.5	4.3
19	1.9	2.0	2.3	3.6	6.1	3.4	4.3
20	1.1	3.0	2.2	3.4	5.8	3.1	4.3
21	2.1	2.2	2.6	5.9	5.6	3.7	4.3
22	1.7	1.9	2.8	3.3	4.4	2.8	4.3
23	1.4	1.5	1.6	2.6	5.4	2.5	4.3
24	1.1	1.1	1.0	3.5	4.3	2.2	4.3
25	1.0	0.5	1.3	2.6	4.3	2.1	4.3
26	0.8	1.4	1.2	2.2	5.5	2.4	4.3
27	(0.1)	1.7	1.3	2.9	5.4	2.4	4.3
28	0.5	0.6	1.6	1.9	5.5	2.3	4.3
29	1.6	1.6	1.2	1.8	6.0	2.6	4.3
30	0.4	1.3	1.6	4.0	6.4	2.7	4.3
31	0.9	0.7	0.5	1.4	2.3	1.1	4.3
32	1.5	2.2	0.6	2.0	5.1	2.0	4.3
33	0.2	(1.8)	0.8	2.3	2.9	1.0	4.3
34	1.0	3.6	1.9	0.7	4.9	2.7	4.3
35	3.4	(1.0)	2.4	1.7	6.0	2.8	4.3
36+	(1.6)	1.7	1.0	1.3	4.1	1.5	4.3
Total	2.3 %	2.8 %	3.3 %	4.7 %	6.5 %	4.0 %	4.8 %

Police Salary Increase



Firefighters Salary Increase



Appendix A - Summary of Current and Proposed Assumptions

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates

Police - Current

Age	Years of Service										
	0	1	2	3	4	5	6	7	8	9	Over 9
20	0.08900	0.08300	0.06000	0.05500	0.03860	0.02800	0.02600	0.02400	0.02200	0.01800	0.01500
21	0.09164	0.07855	0.05387	0.05260	0.03868	0.02668	0.02491	0.02314	0.02113	0.01800	0.01500
22	0.09436	0.07433	0.04836	0.05030	0.03876	0.02543	0.02387	0.02231	0.02030	0.01800	0.01500
23	0.09715	0.07035	0.04342	0.04811	0.03884	0.02423	0.02287	0.02151	0.01950	0.01800	0.01500
24	0.10003	0.06657	0.03898	0.04601	0.03892	0.02309	0.02192	0.02074	0.01874	0.01800	0.01500
25	0.10300	0.06300	0.03500	0.04400	0.03900	0.02200	0.02100	0.02000	0.01800	0.01800	0.01500
26	0.10320	0.06197	0.03664	0.04203	0.03749	0.02341	0.02240	0.02091	0.01874	0.01800	0.01500
27	0.10340	0.06095	0.03835	0.04015	0.03603	0.02491	0.02389	0.02187	0.01950	0.01800	0.01500
28	0.10360	0.05995	0.04015	0.03835	0.03464	0.02650	0.02549	0.02287	0.02030	0.01800	0.01500
29	0.10380	0.05897	0.04203	0.03664	0.03329	0.02820	0.02719	0.02391	0.02113	0.01800	0.01500
30	0.10400	0.05800	0.04400	0.03500	0.03200	0.03000	0.02900	0.02500	0.02200	0.01800	0.01500
31	0.10875	0.05696	0.04128	0.03558	0.03258	0.03076	0.02958	0.02610	0.02257	0.01780	0.01458
32	0.11371	0.05595	0.03874	0.03617	0.03317	0.03154	0.03016	0.02725	0.02315	0.01759	0.01417
33	0.11890	0.05495	0.03635	0.03677	0.03377	0.03234	0.03076	0.02844	0.02375	0.01739	0.01377
34	0.12433	0.05396	0.03410	0.03738	0.03438	0.03316	0.03138	0.02969	0.02437	0.01720	0.01338
35	0.13000	0.05300	0.03200	0.03800	0.03500	0.03400	0.03200	0.03100	0.02500	0.01700	0.01300
36	0.13194	0.05433	0.03441	0.03931	0.03613	0.03495	0.03220	0.03120	0.02341	0.01658	0.01208
37	0.13391	0.05570	0.03700	0.04066	0.03729	0.03592	0.03240	0.03140	0.02192	0.01617	0.01122
38	0.13591	0.05710	0.03978	0.04206	0.03849	0.03692	0.03260	0.03160	0.02053	0.01577	0.01043
39	0.13794	0.05853	0.04278	0.04350	0.03972	0.03794	0.03280	0.03180	0.01922	0.01538	0.00969
40	0.14000	0.06000	0.04600	0.04500	0.04100	0.03900	0.03300	0.03200	0.01800	0.01500	0.00900
41	0.14379	0.06059	0.04867	0.04751	0.04300	0.03977	0.03339	0.03258	0.01856	0.01435	0.00879
42	0.14768	0.06118	0.05150	0.05015	0.04509	0.04055	0.03379	0.03317	0.01914	0.01372	0.00859
43	0.15168	0.06178	0.05449	0.05294	0.04728	0.04135	0.03419	0.03377	0.01974	0.01312	0.00839
44	0.15578	0.06239	0.05765	0.05589	0.04959	0.04217	0.03459	0.03438	0.02036	0.01255	0.00819
45	0.16000	0.06300	0.06100	0.05900	0.05200	0.04300	0.03500	0.03500	0.02100	0.01200	0.00800
46	0.16381	0.06657	0.06456	0.06190	0.05437	0.04484	0.03613	0.03595	0.02377	0.01451	0.00907
47	0.16772	0.07035	0.06833	0.06494	0.05685	0.04675	0.03729	0.03692	0.02690	0.01754	0.01029
48	0.17172	0.07433	0.07231	0.06814	0.05945	0.04875	0.03849	0.03792	0.03045	0.02121	0.01167
49	0.17581	0.07855	0.07653	0.07149	0.06216	0.05083	0.03972	0.03895	0.03446	0.02564	0.01323
50	0.18000	0.08300	0.08100	0.07500	0.06500	0.05300	0.04100	0.04000	0.03900	0.03100	0.01500

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates (continued)

Police – Current (continued)

Age	Years of Service										
	0	1	2	3	4	5	6	7	8	9	Over 9
51	0.18383	0.08935	0.08449	0.07846	0.06776	0.05521	0.04300	0.04199	0.04082	0.03340	0.01538
52	0.18775	0.09619	0.08812	0.08209	0.07063	0.05751	0.04509	0.04408	0.04273	0.03598	0.01577
53	0.19175	0.10355	0.09192	0.08588	0.07362	0.05990	0.04728	0.04628	0.04472	0.03877	0.01617
54	0.19583	0.11147	0.09587	0.08985	0.07675	0.06240	0.04959	0.04858	0.04681	0.04177	0.01658
55	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
56	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
57	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
58	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
59	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
60	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
61	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
62	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
63	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700
64	0.20000	0.12000	0.10000	0.09400	0.08000	0.06500	0.05200	0.05100	0.04900	0.04500	0.01700

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates (continued)

Police – Proposed

Age	Years of Service															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
20	0.10012	0.08836	0.05440	0.05412	0.04378	0.02592	0.02639	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
21	0.10309	0.08836	0.05440	0.05412	0.04378	0.02592	0.02639	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
22	0.10615	0.08361	0.05440	0.05412	0.04378	0.02592	0.02639	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
23	0.10929	0.07914	0.04884	0.05412	0.04378	0.02592	0.02639	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
24	0.11253	0.07489	0.04385	0.05176	0.04378	0.02592	0.02639	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
25	0.09618	0.05883	0.03268	0.04109	0.03642	0.02592	0.02639	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
26	0.09637	0.05787	0.03422	0.03925	0.03501	0.02758	0.02639	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
27	0.09656	0.05692	0.03581	0.03749	0.03365	0.02935	0.02815	0.02577	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
28	0.09674	0.05598	0.03749	0.03581	0.03235	0.03122	0.03003	0.02695	0.02392	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
29	0.09693	0.05507	0.03925	0.03422	0.03109	0.03323	0.03204	0.02817	0.02490	0.02121	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
30	0.09940	0.05544	0.04206	0.03345	0.03059	0.02653	0.02564	0.02211	0.01945	0.01592	0.01557	0.01490	0.01408	0.01314	0.01206	0.01170
31	0.10394	0.05444	0.03946	0.03401	0.03114	0.02720	0.02616	0.02308	0.01996	0.01574	0.01532	0.01490	0.01408	0.01314	0.01206	0.01170
32	0.10868	0.05348	0.03703	0.03457	0.03170	0.02789	0.02667	0.02410	0.02047	0.01555	0.01506	0.01457	0.01408	0.01314	0.01206	0.01170
33	0.11364	0.05252	0.03474	0.03514	0.03228	0.02860	0.02720	0.02515	0.02100	0.01538	0.01482	0.01426	0.01370	0.01314	0.01206	0.01170
34	0.11883	0.05158	0.03259	0.03573	0.03286	0.02932	0.02775	0.02625	0.02155	0.01521	0.01458	0.01395	0.01332	0.01269	0.01206	0.01170
35	0.15927	0.06493	0.03921	0.04656	0.04288	0.03488	0.03282	0.03180	0.02564	0.01744	0.01662	0.01580	0.01498	0.01416	0.01334	0.01170
36	0.16165	0.06656	0.04216	0.04816	0.04427	0.03585	0.03303	0.03200	0.02401	0.01701	0.01631	0.01561	0.01491	0.01421	0.01351	0.01087
37	0.16406	0.06824	0.04533	0.04981	0.04569	0.03685	0.03324	0.03221	0.02249	0.01659	0.01600	0.01541	0.01482	0.01423	0.01364	0.01010
38	0.16651	0.06996	0.04874	0.05153	0.04716	0.03787	0.03344	0.03241	0.02106	0.01618	0.01569	0.01520	0.01471	0.01422	0.01373	0.00938
39	0.16900	0.07171	0.05241	0.05329	0.04866	0.03892	0.03365	0.03262	0.01972	0.01578	0.01539	0.01500	0.01461	0.01422	0.01383	0.00872
40	0.17854	0.07652	0.05866	0.05739	0.05229	0.04216	0.03567	0.03459	0.01946	0.01621	0.01588	0.01555	0.01522	0.01489	0.01456	0.00912

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates (continued)

Police – Proposed (continued)

Age	Years of Service															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
41	0.18337	0.07727	0.06207	0.06059	0.05484	0.04299	0.03609	0.03522	0.02006	0.01551	0.01505	0.01459	0.01413	0.01367	0.01321	0.00891
42	0.18833	0.07802	0.06568	0.06396	0.05750	0.04383	0.03652	0.03585	0.02069	0.01483	0.01424	0.01365	0.01306	0.01247	0.01188	0.00871
43	0.19344	0.07879	0.06949	0.06751	0.06030	0.04470	0.03696	0.03650	0.02134	0.01418	0.01346	0.01274	0.01202	0.01130	0.01058	0.00851
44	0.19866	0.07957	0.07352	0.07128	0.06324	0.04558	0.03739	0.03716	0.02201	0.01357	0.01273	0.01189	0.01105	0.01021	0.00937	0.00830
45	0.15217	0.05992	0.05802	0.05611	0.04946	0.04220	0.03435	0.03435	0.02061	0.01178	0.01090	0.01002	0.00914	0.00826	0.00738	0.00791
46	0.15579	0.06331	0.06140	0.05887	0.05171	0.04401	0.03546	0.03528	0.02333	0.01424	0.01333	0.01242	0.01151	0.01060	0.00969	0.00896
47	0.15951	0.06691	0.06499	0.06176	0.05407	0.04588	0.03660	0.03624	0.02640	0.01722	0.01630	0.01538	0.01446	0.01354	0.01262	0.01017
48	0.16332	0.07069	0.06877	0.06481	0.05654	0.04785	0.03778	0.03722	0.02989	0.02082	0.01991	0.01900	0.01809	0.01718	0.01627	0.01153
49	0.16721	0.07471	0.07279	0.06799	0.05912	0.04989	0.03898	0.03823	0.03382	0.02517	0.02430	0.02343	0.02256	0.02169	0.02082	0.01308
50	0.22003	0.10146	0.09901	0.09168	0.07945	0.07568	0.05855	0.05712	0.05569	0.04427	0.04313	0.04199	0.04085	0.03971	0.03857	0.00912
51	0.22471	0.10922	0.10328	0.09591	0.08283	0.07884	0.06140	0.05996	0.05829	0.04769	0.04663	0.04557	0.04451	0.04345	0.04239	0.00936
52	0.22950	0.11758	0.10772	0.10034	0.08634	0.08212	0.06439	0.06294	0.06102	0.05138	0.05042	0.04946	0.04850	0.04754	0.04658	0.00959
53	0.23439	0.12658	0.11236	0.10498	0.08999	0.08553	0.06751	0.06608	0.06386	0.05536	0.05451	0.05366	0.05281	0.05196	0.05111	0.00984
54	0.23938	0.13626	0.11719	0.10983	0.09382	0.08910	0.07081	0.06937	0.06684	0.05964	0.05892	0.05820	0.05748	0.05676	0.05604	0.01009
55	0.18678	0.11207	0.09339	0.08779	0.07471	0.08790	0.07032	0.06897	0.06626	0.06085	0.06031	0.05977	0.05923	0.05869	0.05815	0.01103
56	0.18678	0.11207	0.09339	0.08779	0.07471	0.08790	0.07032	0.06897	0.06626	0.06085	0.06031	0.05977	0.05923	0.05869	0.05815	0.01103
57	0.18678	0.11207	0.09339	0.08779	0.07471	0.08790	0.07032	0.06897	0.06626	0.06085	0.06031	0.05977	0.05923	0.05869	0.05815	0.01103
58	0.18678	0.11207	0.09339	0.08779	0.07471	0.08790	0.07032	0.06897	0.06626	0.06085	0.06031	0.05977	0.05923	0.05869	0.05815	0.01103
59	0.18678	0.11207	0.09339	0.08779	0.07471	0.08790	0.07032	0.06897	0.06626	0.06085	0.06031	0.05977	0.05923	0.05869	0.05815	0.01103
60	0.19231	0.11538	0.09615	0.09038	0.07692	0.06500	0.05200	0.05100	0.04900	0.04500	0.04460	0.04420	0.04380	0.04340	0.04300	0.01961
61	0.19231	0.11538	0.09615	0.09038	0.07692	0.06500	0.05200	0.05100	0.04900	0.04500	0.04460	0.04420	0.04380	0.04340	0.04300	0.01961
62	0.19231	0.11538	0.09615	0.09038	0.07692	0.06500	0.05200	0.05100	0.04900	0.04500	0.04460	0.04420	0.04380	0.04340	0.04300	0.01961
63	0.19231	0.11538	0.09615	0.09038	0.07692	0.06500	0.05200	0.05100	0.04900	0.04500	0.04460	0.04420	0.04380	0.04340	0.04300	0.01961
64	0.19231	0.11538	0.09615	0.09038	0.07692	0.06500	0.05200	0.05100	0.04900	0.04500	0.04460	0.04420	0.04380	0.04340	0.04300	0.01961

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates (continued)

Firefighters - Current

Age	Years of Service										
	0	1	2	3	4	5	6	7	8	9	Over 9
20	0.03500	0.03500	0.02500	0.02000	0.01500	0.01300	0.01200	0.01000	0.00900	0.00900	0.00800
21	0.03347	0.03190	0.02287	0.01888	0.01435	0.01257	0.01157	0.01000	0.00900	0.00900	0.00800
22	0.03201	0.02907	0.02091	0.01783	0.01372	0.01216	0.01116	0.01000	0.00900	0.00900	0.00800
23	0.03061	0.02649	0.01913	0.01683	0.01312	0.01176	0.01076	0.01000	0.00900	0.00900	0.00800
24	0.02928	0.02414	0.01749	0.01589	0.01255	0.01137	0.01037	0.01000	0.00900	0.00900	0.00800
25	0.02800	0.02200	0.01600	0.01500	0.01200	0.01100	0.01000	0.01000	0.00900	0.00900	0.00800
26	0.02976	0.02064	0.01638	0.01538	0.01271	0.01137	0.01037	0.01019	0.00919	0.00919	0.00819
27	0.03164	0.01937	0.01677	0.01577	0.01346	0.01176	0.01076	0.01039	0.00939	0.00939	0.00839
28	0.03363	0.01817	0.01717	0.01617	0.01426	0.01216	0.01116	0.01059	0.00959	0.00959	0.00859
29	0.03575	0.01705	0.01758	0.01658	0.01511	0.01257	0.01157	0.01079	0.00979	0.00979	0.00879
30	0.03800	0.01600	0.01800	0.01700	0.01600	0.01300	0.01200	0.01100	0.01000	0.01000	0.00900
31	0.03877	0.01860	0.01856	0.01756	0.01656	0.01319	0.01219	0.01128	0.01019	0.00979	0.00879
32	0.03955	0.02163	0.01914	0.01814	0.01714	0.01339	0.01239	0.01158	0.01039	0.00959	0.00859
33	0.04035	0.02515	0.01974	0.01874	0.01774	0.01359	0.01259	0.01188	0.01059	0.00939	0.00839
34	0.04117	0.02924	0.02036	0.01936	0.01836	0.01379	0.01279	0.01218	0.01079	0.00919	0.00819
35	0.04200	0.03400	0.02100	0.02000	0.01900	0.01400	0.01300	0.01250	0.01100	0.00900	0.00800
36	0.04258	0.03439	0.02120	0.02020	0.01920	0.01419	0.01319	0.01260	0.01119	0.00919	0.00755
37	0.04318	0.03479	0.02139	0.02039	0.01939	0.01439	0.01339	0.01270	0.01139	0.00939	0.00713
38	0.04378	0.03519	0.02159	0.02059	0.01959	0.01459	0.01359	0.01280	0.01159	0.00959	0.00673
39	0.04438	0.03559	0.02180	0.02080	0.01980	0.01479	0.01379	0.01290	0.01179	0.00979	0.00636
40	0.04500	0.03600	0.02200	0.02100	0.02000	0.01500	0.01400	0.01300	0.01200	0.01000	0.00600
41	0.04520	0.03639	0.02292	0.02192	0.02091	0.01573	0.01438	0.01319	0.01219	0.01019	0.00579
42	0.04540	0.03679	0.02388	0.02287	0.02187	0.01649	0.01477	0.01339	0.01239	0.01039	0.00558
43	0.04560	0.03719	0.02488	0.02387	0.02287	0.01729	0.01517	0.01359	0.01259	0.01059	0.00538
44	0.04580	0.03759	0.02592	0.02491	0.02391	0.01812	0.01558	0.01379	0.01279	0.01079	0.00519
45	0.04600	0.03800	0.02700	0.02600	0.02500	0.01900	0.01600	0.01400	0.01300	0.01100	0.00500
46	0.04867	0.03913	0.02921	0.02805	0.02674	0.02038	0.01735	0.01532	0.01431	0.01170	0.00535
47	0.05150	0.04030	0.03160	0.03026	0.02860	0.02187	0.01882	0.01677	0.01575	0.01245	0.00572
48	0.05449	0.04149	0.03418	0.03265	0.03059	0.02346	0.02041	0.01836	0.01733	0.01325	0.00612
49	0.05765	0.04273	0.03698	0.03522	0.03272	0.02517	0.02213	0.02010	0.01908	0.01410	0.00654
50	0.06100	0.04400	0.04000	0.03800	0.03500	0.02700	0.02400	0.02200	0.02100	0.01500	0.00700

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates (continued)

Firefighters – Current (continued)

Age	Years of Service										
	0	1	2	3	4	5	6	7	8	9	Over 9
51	0.06100	0.04514	0.04183	0.04014	0.03595	0.02844	0.02400	0.02200	0.02080	0.01500	0.00766
52	0.06100	0.04631	0.04373	0.04241	0.03692	0.02995	0.02400	0.02200	0.02059	0.01500	0.00839
53	0.06100	0.04751	0.04573	0.04480	0.03792	0.03155	0.02400	0.02200	0.02039	0.01500	0.00918
54	0.06100	0.04874	0.04782	0.04733	0.03895	0.03323	0.02400	0.02200	0.02020	0.01500	0.01005
55	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
56	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
57	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
58	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
59	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
60	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
61	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
62	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
63	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100
64	0.06100	0.05000	0.05000	0.05000	0.04000	0.03500	0.02400	0.02200	0.02000	0.01500	0.01100

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates (continued)

Firefighters – Proposed

Age	Years of Service															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
20	0.02755	0.02511	0.01646	0.01325	0.00988	0.00825	0.00777	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
21	0.02634	0.02511	0.01646	0.01325	0.00988	0.00825	0.00777	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
22	0.02519	0.02288	0.01646	0.01325	0.00988	0.00825	0.00777	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
23	0.02409	0.02085	0.01506	0.01325	0.00988	0.00825	0.00777	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
24	0.02304	0.01900	0.01377	0.01251	0.00988	0.00825	0.00777	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
25	0.02685	0.02110	0.01534	0.01439	0.01151	0.00825	0.00777	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
26	0.02854	0.01979	0.01571	0.01475	0.01219	0.00852	0.00777	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
27	0.03034	0.01858	0.01608	0.01512	0.01291	0.00882	0.00807	0.00779	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
28	0.03225	0.01743	0.01647	0.01551	0.01368	0.00912	0.00837	0.00794	0.00719	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
29	0.03429	0.01635	0.01686	0.01590	0.01449	0.00942	0.00867	0.00809	0.00734	0.00734	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
30	0.03456	0.01455	0.01637	0.01546	0.01455	0.00944	0.00872	0.00799	0.00727	0.00727	0.00727	0.00705	0.00679	0.00646	0.00608	0.00903
31	0.03526	0.01692	0.01688	0.01597	0.01506	0.00958	0.00886	0.00820	0.00740	0.00711	0.00708	0.00705	0.00679	0.00646	0.00608	0.00903
32	0.03597	0.01967	0.01741	0.01650	0.01559	0.00973	0.00900	0.00841	0.00755	0.00697	0.00691	0.00685	0.00679	0.00646	0.00608	0.00903
33	0.03670	0.02287	0.01795	0.01704	0.01613	0.00987	0.00915	0.00863	0.00769	0.00682	0.00673	0.00664	0.00655	0.00646	0.00608	0.00903
34	0.03744	0.02659	0.01852	0.01761	0.01670	0.01002	0.00929	0.00885	0.00784	0.00668	0.00656	0.00644	0.00632	0.00620	0.00608	0.00903
35	0.03658	0.02961	0.01829	0.01742	0.01655	0.01330	0.01235	0.01187	0.01045	0.00855	0.00836	0.00817	0.00798	0.00779	0.00760	0.00903
36	0.03708	0.02995	0.01846	0.01759	0.01672	0.01348	0.01253	0.01197	0.01063	0.00873	0.00854	0.00835	0.00816	0.00797	0.00778	0.00853
37	0.03760	0.03030	0.01863	0.01776	0.01689	0.01367	0.01272	0.01206	0.01082	0.00892	0.00873	0.00854	0.00835	0.00816	0.00797	0.00805
38	0.03813	0.03065	0.01880	0.01793	0.01706	0.01386	0.01291	0.01216	0.01101	0.00911	0.00892	0.00873	0.00854	0.00835	0.00816	0.00760
39	0.03865	0.03099	0.01898	0.01811	0.01724	0.01405	0.01310	0.01225	0.01120	0.00930	0.00911	0.00892	0.00873	0.00854	0.00835	0.00718
40	0.06220	0.04976	0.03041	0.02903	0.02765	0.01643	0.01533	0.01424	0.01314	0.01095	0.01073	0.01051	0.01029	0.01007	0.00985	0.00473

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Withdrawal Rates (continued)

Firefighters – Proposed

Age	Years of Service															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
41	0.06248	0.05030	0.03168	0.03030	0.02890	0.01723	0.01575	0.01445	0.01335	0.01116	0.01094	0.01072	0.01050	0.01028	0.01006	0.00457
42	0.06276	0.05085	0.03301	0.03161	0.03023	0.01806	0.01618	0.01467	0.01357	0.01138	0.01116	0.01094	0.01072	0.01050	0.01028	0.00440
43	0.06303	0.05141	0.03439	0.03300	0.03161	0.01894	0.01662	0.01489	0.01379	0.01160	0.01138	0.01116	0.01094	0.01072	0.01050	0.00424
44	0.06331	0.05196	0.03583	0.03443	0.03305	0.01985	0.01706	0.01510	0.01401	0.01182	0.01160	0.01138	0.01116	0.01094	0.01072	0.00409
45	0.08484	0.07009	0.04980	0.04795	0.04611	0.02045	0.01722	0.01507	0.01399	0.01184	0.01162	0.01140	0.01118	0.01096	0.01074	0.00495
46	0.08976	0.07217	0.05387	0.05173	0.04932	0.02193	0.01867	0.01649	0.01540	0.01259	0.01231	0.01203	0.01175	0.01147	0.01119	0.00529
47	0.09498	0.07433	0.05828	0.05581	0.05275	0.02353	0.02025	0.01805	0.01695	0.01340	0.01304	0.01268	0.01232	0.01196	0.01160	0.00566
48	0.10050	0.07652	0.06304	0.06022	0.05642	0.02524	0.02196	0.01976	0.01865	0.01426	0.01382	0.01338	0.01294	0.01250	0.01206	0.00605
49	0.10633	0.07881	0.06820	0.06496	0.06035	0.02708	0.02381	0.02163	0.02053	0.01517	0.01463	0.01409	0.01355	0.01301	0.01247	0.00647
50	0.06926	0.04996	0.04542	0.04315	0.03974	0.02908	0.02584	0.02369	0.02261	0.01615	0.01550	0.01485	0.01420	0.01355	0.01290	0.00594
51	0.06926	0.05126	0.04750	0.04558	0.04082	0.03063	0.02584	0.02369	0.02240	0.01615	0.01552	0.01489	0.01426	0.01363	0.01300	0.00650
52	0.06926	0.05258	0.04965	0.04816	0.04192	0.03225	0.02584	0.02369	0.02217	0.01615	0.01555	0.01495	0.01435	0.01375	0.01315	0.00712
53	0.06926	0.05395	0.05193	0.05087	0.04306	0.03398	0.02584	0.02369	0.02196	0.01615	0.01557	0.01499	0.01441	0.01383	0.01325	0.00779
54	0.06926	0.05534	0.05430	0.05374	0.04423	0.03578	0.02584	0.02369	0.02175	0.01615	0.01559	0.01503	0.01447	0.01391	0.01335	0.00853
55	0.08734	0.07159	0.07159	0.07159	0.05728	0.05332	0.03656	0.03352	0.03047	0.02285	0.02209	0.02133	0.02057	0.01981	0.01905	0.00916
56	0.08734	0.07159	0.07159	0.07159	0.05728	0.05332	0.03656	0.03352	0.03047	0.02285	0.02209	0.02133	0.02057	0.01981	0.01905	0.00916
57	0.08734	0.07159	0.07159	0.07159	0.05728	0.05332	0.03656	0.03352	0.03047	0.02285	0.02209	0.02133	0.02057	0.01981	0.01905	0.00916
58	0.08734	0.07159	0.07159	0.07159	0.05728	0.05332	0.03656	0.03352	0.03047	0.02285	0.02209	0.02133	0.02057	0.01981	0.01905	0.00916
59	0.08734	0.07159	0.07159	0.07159	0.05728	0.05332	0.03656	0.03352	0.03047	0.02285	0.02209	0.02133	0.02057	0.01981	0.01905	0.00916
60	0.19110	0.15664	0.15664	0.15664	0.12531	0.11940	0.08187	0.07505	0.06823	0.05117	0.04946	0.04775	0.04604	0.04433	0.04262	0.01207
61	0.19110	0.15664	0.15664	0.15664	0.12531	0.11940	0.08187	0.07505	0.06823	0.05117	0.04946	0.04775	0.04604	0.04433	0.04262	0.01207
62	0.19110	0.15664	0.15664	0.15664	0.12531	0.11940	0.08187	0.07505	0.06823	0.05117	0.04946	0.04775	0.04604	0.04433	0.04262	0.01207
63	0.19110	0.15664	0.15664	0.15664	0.12531	0.11940	0.08187	0.07505	0.06823	0.05117	0.04946	0.04775	0.04604	0.04433	0.04262	0.01207
64	0.19110	0.15664	0.15664	0.15664	0.12531	0.11940	0.08187	0.07505	0.06823	0.05117	0.04946	0.04775	0.04604	0.04433	0.04262	0.01207

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Disability Rates

Age	Police			Firefighters		
	Current	Proposed		Current	Proposed	
		Hired Before July 2, 2013	Hired After July 1, 2013		Hired Before July 2, 2013	Hired After July 1, 2013
20	0.00002	0.00001	0.00001	0.00004	0.00001	0.00001
21	0.00002	0.00001	0.00001	0.00004	0.00001	0.00001
22	0.00002	0.00001	0.00001	0.00004	0.00001	0.00001
23	0.00005	0.00002	0.00002	0.00004	0.00001	0.00001
24	0.00012	0.00004	0.00004	0.00008	0.00003	0.00003
25	0.00020	0.00007	0.00007	0.00015	0.00005	0.00005
26	0.00032	0.00011	0.00011	0.00036	0.00013	0.00013
27	0.00055	0.00019	0.00019	0.00049	0.00017	0.00017
28	0.00084	0.00030	0.00030	0.00063	0.00022	0.00022
29	0.00125	0.00044	0.00044	0.00079	0.00027	0.00027
30	0.00255	0.00089	0.00089	0.00063	0.00022	0.00022
31	0.00279	0.00098	0.00098	0.00116	0.00040	0.00040
32	0.00306	0.00107	0.00107	0.00143	0.00050	0.00050
33	0.00324	0.00113	0.00113	0.00191	0.00067	0.00067
34	0.00372	0.00130	0.00130	0.00239	0.00084	0.00084
35	0.00439	0.00154	0.00154	0.00261	0.00091	0.00091
36	0.00546	0.00191	0.00191	0.00290	0.00101	0.00101
37	0.00605	0.00212	0.00212	0.00317	0.00111	0.00111
38	0.00674	0.00236	0.00236	0.00342	0.00120	0.00120
39	0.00714	0.00250	0.00250	0.00412	0.00144	0.00144
40	0.00732	0.00403	0.00403	0.00454	0.00204	0.00204
41	0.00745	0.00410	0.00410	0.00528	0.00237	0.00237
42	0.00793	0.00436	0.00436	0.00566	0.00255	0.00255
43	0.00799	0.00439	0.00439	0.00666	0.00300	0.00300
44	0.00851	0.00468	0.00468	0.00655	0.00295	0.00295
45	0.00969	0.00533	0.00533	0.00770	0.00347	0.00347
46	0.01026	0.00564	0.00564	0.00774	0.00348	0.00348
47	0.01098	0.00604	0.00604	0.00877	0.00394	0.00394
48	0.01178	0.00824	0.00633	0.00827	0.01034	0.00421
49	0.01224	0.00856	0.00662	0.00885	0.01106	0.00448
50	0.01126	0.01351	0.00691	0.00891	0.01337	0.00475

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Disability Rates (continued)

Age	Police			Firefighters		
	Current	Proposed		Current	Proposed	
		Hired Before July 2, 2013	Hired After July 1, 2013		Hired Before July 2, 2013	Hired After July 1, 2013
51	0.01056	0.01267	0.00720	0.00925	0.01387	0.00502
52	0.00969	0.01162	0.01162	0.00939	0.01409	0.01409
53	0.00903	0.01084	0.01084	0.01124	0.01686	0.01686
54	0.00873	0.01048	0.01048	0.01257	0.01885	0.01885
55	0.00933	0.01119	0.01119	0.01350	0.02025	0.02025
56	0.00883	0.01059	0.01059	0.01489	0.02233	0.02233
57	0.01006	0.01207	0.01207	0.01559	0.02339	0.02339
58	0.01096	0.01316	0.01316	0.01442	0.02163	0.02163
59	0.01094	0.01313	0.01313	0.01320	0.01981	0.01981
60	0.00966	0.02078	0.02078	0.01331	0.03060	0.03060
61	0.01246	0.02680	0.02680	0.01288	0.02963	0.02963
62	0.01048	0.02252	0.02252	0.01348	0.03101	0.03101
63	0.01083	0.02329	0.02329	0.01872	0.04305	0.04305
64	0.01441	0.03099	0.03099	0.03126	0.07190	0.07190

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Service Retirement Rates

Current

The following rates of retirement apply to members not in DROP.

Age	Police	Firefighters
48	10%	10%
49-52	5	5
53-54	11	5
55-57	11	10
58-59	5	13
60	15	20
61	25	20
62	25	50
63	25	20
64	25	25
65-69	35	25
70	100	100

The following rates of retirement apply to members in DROP on or before July 1, 2013:

Police

Age	Years in DROP								
	0	1	2	3	4	5	6	7	8
48	5%								
49	5	5%							
50	4	5	5%						
51	4	5	5	10%					
52	4	5	5	10	10%				
53	4	5	5	10	10	12%			
54	4	5	5	10	10	12	14%		
55	5	5	5	15	15	12	17	30%	
56	5	5	5	15	15	12	17	30	100%
57	5	5	5	15	15	12	17	30	100
58	5	5	5	15	15	12	17	30	100
59	16	5	5	15	16	15	18	32	100
60	16	5	5	15	16	15	18	32	100
61	16	5	5	15	16	15	18	32	100
62	16	5	5	15	16	15	18	32	100
63	16	5	5	15	16	15	18	32	100
64	19	5	5	17	17	16	19	35	100
65-69	19	5	5	17	17	16	19	35	100
70	100	100	100	100	100	100	100	100	100

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Service Retirement Rates (continued)

Current (continued)

Firefighters

Age	Years in DROP								
	0	1	2	3	4	5	6	7	8
48	2%								
49	4	3%							
50	4	3	3%						
51	4	3	3	10%					
52	4	3	3	10	12%				
53	4	3	3	10	12	13%			
54	4	3	3	10	12	13	15%		
55	5	3	3	12	12	13	17	27%	
56	5	3	3	12	12	13	17	27	100%
57	5	3	3	12	12	13	17	27	100
58	5	3	3	17	16	15	20	35	100
59	6	3	3	17	16	15	20	35	100
60	6	3	3	17	16	15	20	35	100
61	6	3	3	17	16	15	20	35	100
62	6	3	3	17	16	15	20	35	100
63	30	3	3	20	20	20	20	40	100
64	30	3	3	20	20	20	20	40	100
65-69	30	3	3	20	20	20	20	40	100
70	100	100	100	100	100	100	100	100	100

The same rates apply for members entering DROP after July 1, 2013, except the rates for years three and four are replaced with the rates for year two.

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Service Retirement Rates (continued)

Proposed

The following rates of retirement apply to members who have not elected to be in DROP:

Age	Police	Firefighters
48	0%	0%
49-50	5%	4%
51	6%	4%
52	6%	6%
53	10%	6%
54	10%	7%
55-57	11%	11%
58	5%	16%
59	10%	16%
60	18%	20%
61	19%	20%
62	25%	50%
63	25%	20%
64	25%	25%
65-69	35%	25%
70	100%	100%

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Service Retirement Rates (continued)

Proposed (continued)

The following rates of retirement apply to members in DROP on or before July 1, 2013:

Police

Age	Years in DROP								
	0	1	2	3	4	5	6	7	8
48	5%	0%	0%	0%	0%	0%	0%	0%	0%
49	4%	4%	0%	0%	0%	0%	0%	0%	0%
50	4%	4%	4%	0%	0%	0%	0%	0%	0%
51	4%	4%	4%	10%	0%	0%	0%	0%	0%
52	3%	4%	4%	9%	9%	0%	0%	0%	0%
53	3%	4%	4%	9%	8%	12%	0%	0%	0%
54	4%	5%	5%	10%	9%	13%	13%	0%	0%
55	5%	5%	5%	16%	16%	14%	18%	44%	0%
56	5%	5%	5%	15%	15%	13%	17%	41%	100%
57	5%	5%	5%	16%	15%	14%	17%	43%	100%
58	5%	5%	5%	16%	15%	14%	17%	42%	100%
59	15%	5%	5%	15%	16%	16%	18%	44%	100%
60	17%	5%	5%	16%	17%	18%	19%	47%	100%
61	17%	5%	5%	17%	18%	18%	20%	48%	100%
62	16%	5%	5%	16%	17%	17%	19%	46%	100%
63	18%	6%	6%	18%	19%	19%	21%	50%	100%
64	19%	5%	5%	17%	17%	18%	19%	49%	100%
65	24%	6%	6%	23%	22%	22%	25%	59%	100%
66	24%	5%	6%	20%	19%	22%	22%	54%	100%
67	24%	5%	5%	20%	19%	22%	22%	53%	100%
68	24%	5%	5%	15%	19%	22%	22%	53%	100%
69	24%	5%	5%	20%	19%	22%	22%	47%	100%
70	100%	100%	100%	100%	100%	100%	100%	100%	100%

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Service Retirement Rates (continued)

Proposed (continued)

Firefighters

Age	Years in DROP								
	0	1	2	3	4	5	6	7	8
48	2%								
49	4%	3%							
50	5%	4%	4%						
51	3%	3%	3%	9%					
52	3%	3%	3%	8%	9%				
53	4%	3%	4%	10%	11%	13%			
54	4%	3%	3%	9%	11%	13%	13%		
55	6%	4%	4%	13%	13%	15%	17%	38%	
56	5%	3%	4%	13%	12%	14%	17%	37%	100%
57	5%	3%	4%	13%	12%	14%	17%	37%	100%
58	5%	3%	4%	17%	15%	15%	18%	46%	100%
59	6%	3%	4%	17%	15%	16%	19%	46%	100%
60	6%	3%	4%	18%	16%	16%	19%	48%	100%
61	6%	3%	4%	17%	15%	15%	18%	45%	100%
62	6%	3%	4%	17%	15%	16%	18%	46%	100%
63	29%	3%	4%	20%	18%	20%	18%	52%	100%
64	32%	3%	4%	21%	20%	22%	19%	55%	100%
65	33%	4%	4%	22%	21%	23%	20%	57%	100%
66	38%	4%	5%	26%	24%	23%	24%	64%	100%
67	38%	4%	5%	26%	24%	23%	24%	65%	100%
68	38%	4%	5%	26%	24%	23%	24%	65%	100%
69	38%	4%	5%	20%	25%	23%	24%	65%	100%
70	100%	100%	100%	100%	100%	100%	100%	100%	100%

The same rates apply for members entering DROP after July 1, 2013, except the rates for years three and four are replaced with the rates for year two.

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Service Retirement Rates (continued)

Proposed (continued)

The following rates of retirement apply to members who are not yet in DROP but may become eligible in the future:

Police

Age	Years Eligible for DROP										
	0	1	2	3	4	5	6	7	8	9+	
47	6%										
48	12%										
49	7%	5%									
50	6%	5%	5%								
51	6%	5%	5%	5%							
52	6%	5%	5%	5%	5%						
53	11%	5%	5%	5%	5%	12%					
54	10%	5%	5%	5%	5%	13%	13%				
55	12%	6%	6%	6%	6%	14%	18%	43%			
56	12%	6%	5%	5%	5%	13%	17%	41%	96%		
57	13%	6%	5%	5%	5%	14%	17%	43%	94%	100%	
58	7%	5%	5%	5%	5%	13%	17%	43%	98%	100%	
59	10%	5%	5%	5%	5%	17%	18%	45%	97%	100%	
60	20%	8%	6%	6%	6%	18%	20%	48%	98%	100%	
61	32%	6%	5%	5%	5%	18%	19%	46%	93%	100%	
62	29%	9%	5%	5%	5%	16%	17%	42%	92%	100%	
63	33%	5%	7%	7%	7%	18%	19%	46%	95%	100%	
64	31%	11%	7%	7%	7%	18%	19%	49%	93%	100%	
65	47%	13%	6%	6%	6%	20%	22%	54%	100%	100%	
66	47%	13%	5%	5%	5%	20%	20%	50%	100%	100%	
67	47%	13%	18%	18%	18%	20%	20%	46%	100%	100%	
68	47%	13%	18%	18%	18%	20%	20%	46%	100%	100%	
69	47%	13%	18%	18%	18%	20%	20%	46%	100%	100%	
70	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Appendix A - Summary of Current and Proposed Assumptions (continued)

Active Service Retirement Rates (continued)

Proposed (continued)

Fire

Age	Years Eligible for DROP									
	0	1	2	3	4	5	6	7	8	9+
47	3%									
48	6%									
49	6%	4%								
50	6%	4%	4%							
51	5%	3%	4%	4%						
52	5%	3%	3%	3%	3%					
53	5%	4%	4%	4%	4%	13%				
54	5%	3%	4%	4%	4%	13%	13%			
55	8%	5%	5%	5%	5%	15%	18%	38%		
56	8%	5%	4%	4%	4%	14%	17%	38%	95%	
57	8%	4%	5%	5%	5%	15%	17%	38%	98%	100%
58	8%	5%	4%	4%	4%	16%	19%	46%	97%	100%
59	9%	5%	5%	5%	5%	16%	19%	46%	97%	100%
60	10%	5%	7%	7%	7%	17%	20%	49%	86%	100%
61	11%	5%	4%	4%	4%	16%	19%	45%	93%	100%
62	15%	7%	12%	12%	12%	16%	20%	49%	95%	100%
63	33%	7%	4%	4%	4%	19%	16%	48%	100%	100%
64	37%	7%	3%	3%	3%	20%	18%	49%	100%	100%
65	37%	7%	8%	8%	8%	20%	18%	51%	100%	100%
66	37%	7%	4%	4%	4%	23%	23%	61%	100%	100%
67	37%	7%	4%	4%	4%	23%	23%	53%	100%	100%
68	37%	7%	4%	4%	4%	23%	23%	53%	100%	100%
69	37%	7%	4%	4%	4%	23%	23%	47%	100%	100%
70	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Mortality

Current

Rates of death are based on the RP2000 Combined Table (sex distinct), age-adjusted as follows. For active members, set back six years. For disability retirements, set forward five years for police and three years for firefighters. For service retirements, set back zero years for police and two years for firefighters. For beneficiaries, set back zero years. The rates are applied on a fully generational basis, with a base year of 2009, using mortality improvement Scale AA.

Proposed

For active members and healthy service retirees, the RP-2014 Total Employee and Healthy Annuitant Mortality Tables rolled back to 2006, adjusted according to the rates in the following table, and projected with the Conduent Modified 2016 Improvement Scale.

Age	Police	Fire
67 or less	77%	68%
68 – 77	105%	87%
78 and up	115%	120%

For disability retirements, we recommend the RP-2014 Disabled Mortality Tables rolled back to 2006, adjusted according to the rates in the following table, and projected with the Conduent Modified 2016 Improvement Scale.

Age	Police	Fire
59 or less	35%	35%
60 – 69	60%	45%
70 – 79	75%	70%
80 and up	100%	90%

For beneficiaries, we propose updating the beneficiary mortality assumption to the RP-2014 Total Employee and Healthy Annuitant Mortality Tables rolled back to 2006, altered by multiplying rates for all ages by 120%, and projected with the Conduent Modified 2016 Improvement Scale.