

City of Salem Contributory Retirement System

Actuarial Valuation and Review as of
January 1, 2016



November 10, 2016

*Board of Trustees
City of Salem Contributory Retirement System
20 Central Street, Suite 110
Salem, MA 01970*

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2016. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2017 and later years and analyzes the preceding two years' experience.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the Salem. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

An actuarial valuation is a measurement at a specific date – it is not a prediction of a plan's future financial condition. We have not been retained to perform an analysis of the potential range of financial measurements, except where otherwise noted.

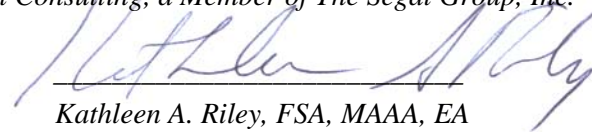
The actuarial calculations were directed under my supervision. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By:

A handwritten signature in blue ink, appearing to read 'Kathleen A. Riley', written over a horizontal line.

Kathleen A. Riley, FSA, MAAA, EA

Senior Vice President and Actuary

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SECTION 1: Valuation Summary for the City of Salem Contributory Retirement System

Purpose

This report has been prepared by Segal Consulting to present a valuation of the City of Salem Contributory Retirement System as of January 1, 2016. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of Massachusetts General Law Chapter 32;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries as of January 1, 2016;
- The assets of the System as of December 31, 2015;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

Certain disclosure information required by Governmental Accounting Standards Board Statements (GASB) Numbers 67 and 68 as of December 31, 2015 for the City of Salem Contributory Retirement System, a cost-sharing multiple-employer defined benefit pension plan, is provided in a separate report.

Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

1. The actuarial valuation report as of January 1, 2016 is based on financial information as of that date. Changes in the value of assets subsequent to that date, to the extent that they exist, are not reflected.
2. During the plan years ended December 31, 2014 and December 31, 2015, the market value rates of return were 7.20% and 0.48%, respectively. Because the actuarial value of assets gradually recognizes market value fluctuations, the actuarial rates of return for the plan years ended December 31, 2014 and December 31, 2015 were 7.98% and 6.25%, respectively. The actuarial value of assets as of December 31, 2015 was \$143.6 million, or 103.6% of the market value of assets of \$138.6 million (as reported in the Annual Statement). As of December 31, 2013, the actuarial value of assets was 97.2% of market value.

SECTION 1: Valuation Summary for the City of Salem Contributory Retirement System

3. The total unrecognized investment loss as of December 31, 2015 was \$4,977,989. This investment loss will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment gains derived from future experience. This implies that earning the assumed rate of investment return (net of expenses) on a market value basis will result in investment losses on the actuarial value of assets in the next few years. The unrecognized investment losses are not reflected in the funding schedule shown in Section 2 of this report.
4. The following actuarial assumptions and methods were changed with this valuation:
 - The investment rate of return assumption was lowered from 7.75% to 7.50%.
 - The mortality assumption for non-disabled participants was changed from the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale AA from 2010 to the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale BB2D from 2009.
 - The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward 3 years for males only projected generationally using Scale AA from 2010 to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2015.
 - The administrative expense assumption was decreased from \$350,000 to \$305,000.

Changing these assumptions resulted in a net increase in the unfunded actuarial accrued liability of \$11.8 million and a net increase in the employer normal cost of \$322,000.

5. The unfunded liability has increased from \$117.1 million as of January 1, 2014 to \$125.7 million as of January 1, 2016. The unfunded liability was expected to decrease to \$114.2 million. The increase of \$11.5 million from the expected unfunded liability is primarily due to the assumption changes described above of \$11.8 million, partially offset by a net experience gain of \$0.3 million, which is detailed in Section 2 of this report.
6. Because the fiscal 2017 appropriation has already been budgeted at \$12,527,730, the results of this valuation will first be reflected in the fiscal 2018 appropriation. The funding schedule in Chart 16 fully funds the System by June 30, 2031. The amortization payments on the 2002 ERI, the 2003 ERI and the remaining unfunded liability are 15-year increasing (4.50% per year) payments. The amortization payment on the 2010 ERI is a six-year level payment. The fiscal 2018 appropriation is \$13,172,908 or 5.15% higher than the 2017 appropriation.
7. On a market value basis, the funded ratio has decreased from 52.15% as of January 1, 2014 to 51.47% as of January 1, 2016. On an actuarial basis, the funded ratio has increased from 50.71% as of January 1, 2014 to 53.32% as of January 1, 2016.

SECTION 1: Valuation Summary for the City of Salem Contributory Retirement System

Summary of Key Valuation Results

	2016	2014
Contributions for fiscal year beginning July 1*:		
Recommended for fiscal 2017 and 2015	\$12,527,730	\$11,948,259
Recommended for fiscal 2018 and 2016	13,172,908	12,000,000
Recommended for fiscal 2019 and 2017	13,851,313	12,527,730
Funding elements for plan year beginning January 1:		
Normal cost, including administrative expenses	\$6,941,825	\$6,019,287
Market value of assets (MVA)	138,598,253	123,879,403
Actuarial value of assets (AVA)	143,576,242	120,440,960
Actuarial accrued liability	269,283,853	237,524,910
Unfunded actuarial accrued liability	125,707,611	117,083,950
Funded ratio based on market value of assets	51.47%	52.15%
Funded ratio based on actuarial value of assets	53.32%	50.71%
Demographic data for plan year beginning January 1:		
Number of retired participants and beneficiaries	573	571
Number of inactive participants entitled to a return of their employee contributions	182	207
Number of inactive participants with a vested right to a deferred or immediate benefit	24	26
Number of active participants	910	827
Total payroll**	\$43,910,174	\$38,667,679
Average payroll	48,253	46,757

* Fiscal 2015 recommended contribution includes an adjustment for timing. Fiscal 2016 and later assumes contributions are made at the beginning of the fiscal year.

** Salaries for firefighters were reduced to reflect retroactive payments received in 2015 and salaries for Police Patrolmen, Police Superiors and Police Chief were increased to reflect retroactive payments received in 2016.

SECTION 1: Valuation Summary for the City of Salem Contributory Retirement System

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by the City of Salem Contributory Retirement System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the market value of assets as of the valuation date, as provided by the City of Salem Contributory Retirement System. City of Salem Contributory Retirement System uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

SECTION 1: Valuation Summary for the City of Salem Contributory Retirement System

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the City of Salem Contributory Retirement System. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Sections of this report may include actuarial results that are not rounded, but that does not imply precision.
- If the City of Salem Contributory Retirement System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The City of Salem Contributory Retirement System should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

A. PARTICIPANT DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A and B.

A historical perspective of how the participant population has changed over the past nine valuations can be seen in this chart.

CHART 1
Participant Population: 2002 – 2015

Year Ended December 31	Active Participants	Inactive Participants	Retired Participants and Beneficiaries	Ratio of Non-Actives to Actives
2002	876	117	586	0.80
2003	839	129	607	0.88
2004	840	146	618	0.91
2005	831	170	614	0.94
2007	825	192	596	0.96
2009	827	183	594	0.94
2011	804	211	581	0.99
2013	827	233	571	0.97
2015	910	206	573	0.86

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 910 active participants with an average age of 48.6, average years of service of 12.2 years and average payroll of \$48,253. The 827 active participants in the prior valuation had an average age of 49.2, average service of 12.6 years and average payroll of \$46,757.

Among the active participants, there were none with unknown age and/or service information.

Inactive Participants

In this year's valuation, there were 24 participants with a vested right to a deferred or immediate vested benefit and 182 participants entitled to a return of their employee contributions.

These graphs show a distribution of active participants by age and by years of service.

CHART 2
Distribution of Active Participants by Age as of December 31, 2015

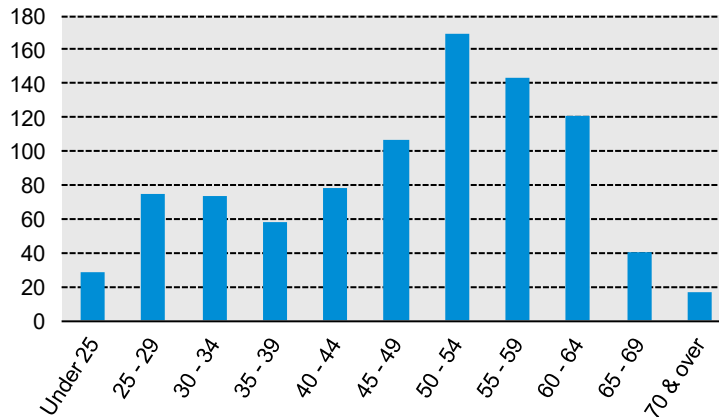
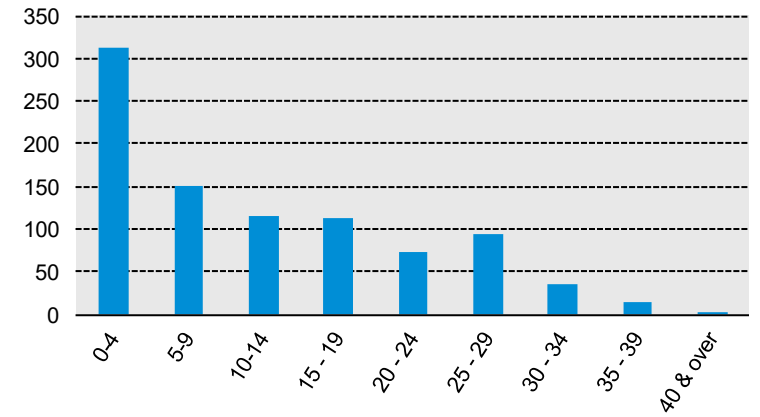


CHART 3
Distribution of Active Participants by Years of Service as of December 31, 2015



SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

Retired Participants and Beneficiaries

As of December 31, 2015, 494 retired participants and 79 beneficiaries were receiving total monthly benefits of \$1,116,818, excluding COLAs reimbursed by the Commonwealth. For comparison, in the previous valuation, there were 488 retired participants and 83 beneficiaries receiving monthly benefits of \$1,076,852, excluding COLAs reimbursed by the Commonwealth.

These graphs show a distribution of the current retired participants and beneficiaries based on their monthly amount and age, by type of pension.

- Beneficiaries
- Accidental Disability
- Ordinary Disability
- Superannuation

CHART 4
Distribution of Retired Participants and Beneficiaries by Type and by Monthly Amount as of December 31, 2015

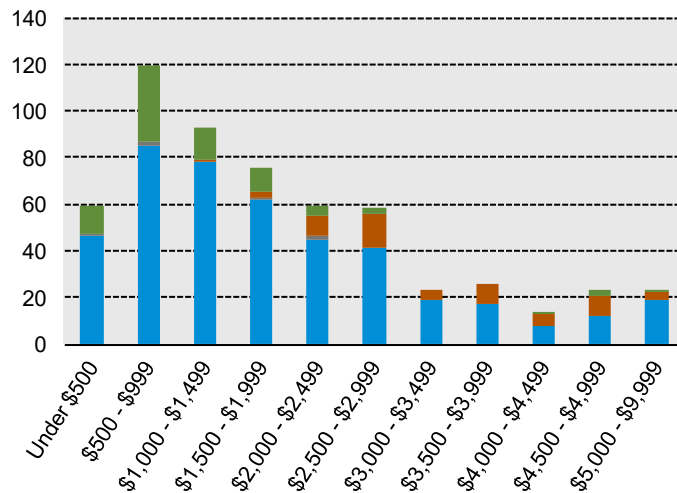
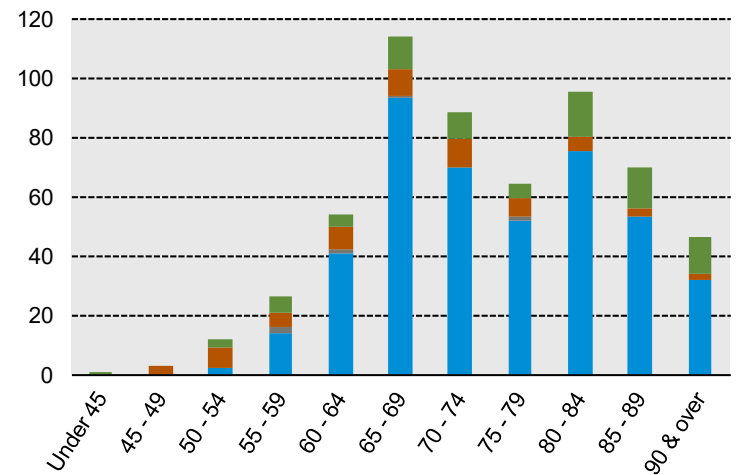


CHART 5
Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2015



SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

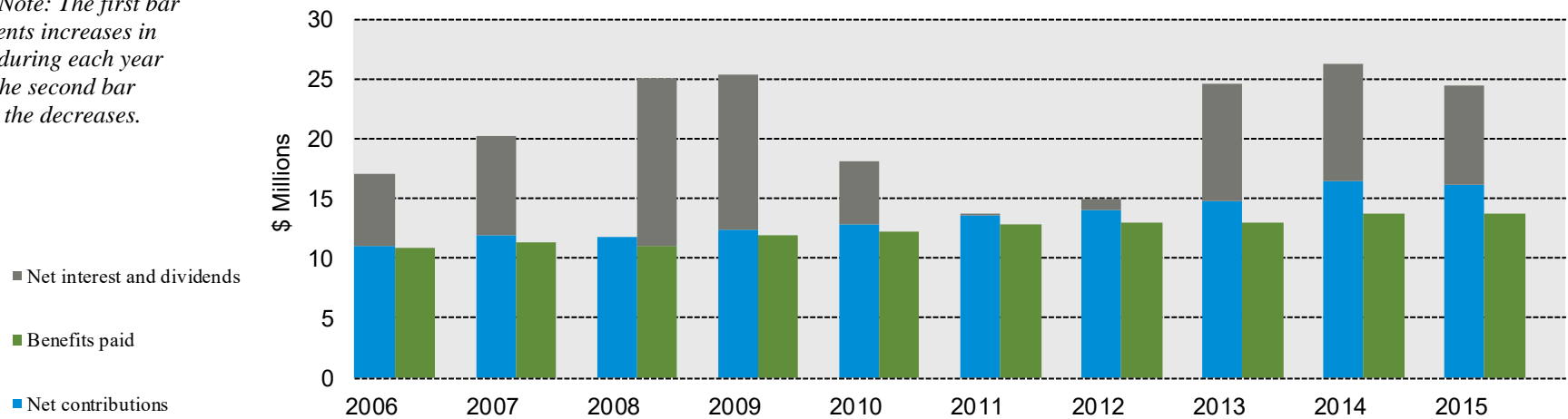
B. FINANCIAL INFORMATION

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

Retirement plan assets change as a result of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits C and D.

The chart depicts the components of changes in the actuarial value of assets over the last ten years. Note: The first bar represents increases in assets during each year while the second bar details the decreases.

CHART 6
Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 2006 – 2015



SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart shows the determination of the actuarial value of assets as of the valuation date.

CHART 7 Determination of Actuarial Value of Assets

	Year Ended		
		December 31, 2015	December 31, 2014
1. Market value of assets, December 31, 2015		\$138,598,253	\$135,650,901
2. Calculation of unrecognized return*	Original <u>Amount</u>	Unrecognized <u>Return</u>	Unrecognized <u>Return</u>
(a) Year ended December 31, 2015	-\$9,729,710	-\$7,783,768	N/A
(b) Year ended December 31, 2014	-418,046	-250,828	-\$334,437
(c) Year ended December 31, 2013	6,211,644	2,484,658	3,726,987
(d) Year ended December 31, 2012	2,859,746	571,949	1,143,898
(e) Year ended December 31, 2011	-9,010,714	<u>N/A</u>	<u>-1,802,143</u>
(f) Total unrecognized return		-4,977,989	2,734,305
3. Preliminary actuarial value: (1) - (2f)		143,576,242	132,916,596
4. Adjustment to be within 20% corridor		0	0
5. Final actuarial value of assets: (3) + (4)		<u>\$143,576,242</u>	<u>\$132,916,596</u>
6. Actuarial value as a percentage of market value: (5) ÷ (1)		103.6%	98.0%
7. Amount deferred for future recognition: (1) - (5)		-\$4,977,989	\$2,734,305

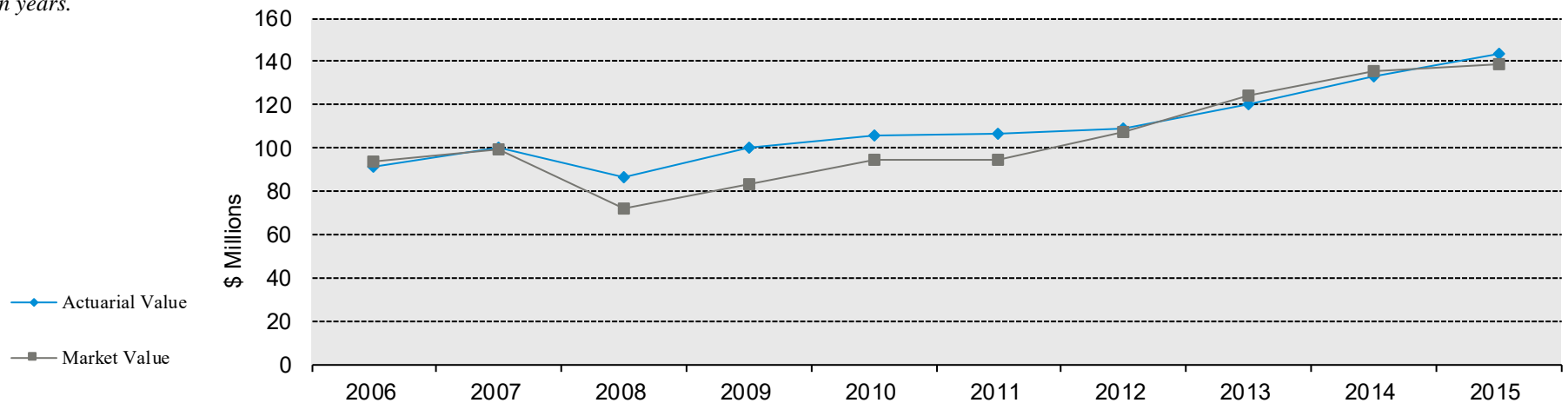
* Unrecognized return is the difference between the actual market return and the expected return on an actuarial value basis and is recognized over a five-year period.

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

Both the actuarial value and market value of assets are representations of the City of Salem Contributory Retirement System's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the City of Salem Contributory Retirement System's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

This chart shows the change in the actuarial value of assets versus the market value over the past ten years.

CHART 8
Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2006 – 2015



SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

C. ACTUARIAL EXPERIENCE

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The net experience gain over the two-year period ending December 31, 2015 is \$250,421. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience over the past two years.

CHART 9 Actuarial Experience for Two-Year Period Ended December 31, 2015

1. Net loss from investments*	-\$1,709,152
2. Net gain from administrative expenses	251,415
3. Net gain from other experience**	<u>1,708,158</u>
4. Net experience gain: (1) + (2) + (3)	\$250,421

* Details in Chart 10

** Details in Chart 13

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Salem’s investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets was 7.75% for year end December 31, 2014 and December 31, 2015. The actual rate of return on an actuarial basis for the 2015 and 2014 plan years were 6.25% and 7.98%, respectively.

Since the actual return for the year was less than the assumed return, the City of Salem Contributory Retirement System experienced an actuarial loss of \$1,709,152 (including an adjustment for interest) during the two-year period ending December 31, 2015 with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

**CHART 10
Actuarial Value Investment Experience**

	Year Ended	
	December 31, 2015	December 31, 2014
1. Actual return	\$8,372,257	\$9,726,785
2. Average value of assets	134,060,290	121,815,385
3. Actual rate of return: (1) ÷ (2)	6.25%	7.98%
4. Assumed rate of return	7.75%	7.75%
5. Expected return: (2) x (4)	\$10,389,673	\$9,440,693
6. Actuarial gain/(loss): (1) – (5)	<u>-\$2,017,416</u>	<u>\$286,092</u>

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last ten years, including five-year and ten-year averages.

Based upon this experience and future expectations, we have lowered the assumed rate of return from 7.75% to 7.50%.

CHART 11
Investment Return – Actuarial Value vs. Market Value: 2006 - 2015

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2006	\$6,050,918	7.13%	\$11,296,361	13.73%
2007	8,383,232	9.18	4,823,380	5.13
2008	-13,989,510	-13.95	-29,097,490	-28.81
2009	12,996,591	14.97	10,761,442	14.86
2010	5,296,489	5.28	10,067,766	12.03
2011	33,719	0.03	-234,863	-0.25
2012	959,266	0.89	11,446,904	12.03
2013	9,865,385	8.99	14,987,949	13.88
2014	9,726,785	7.98	9,022,647	7.20
2015	<u>8,372,257</u>	6.25	<u>659,962</u>	0.48
Total	\$47,695,132		\$43,734,058	
	Five-year average return	5.00%		6.41%
	Ten-year average return	4.57%		4.43%

Note: Each year's yield is weighted by the average asset value in that year.

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

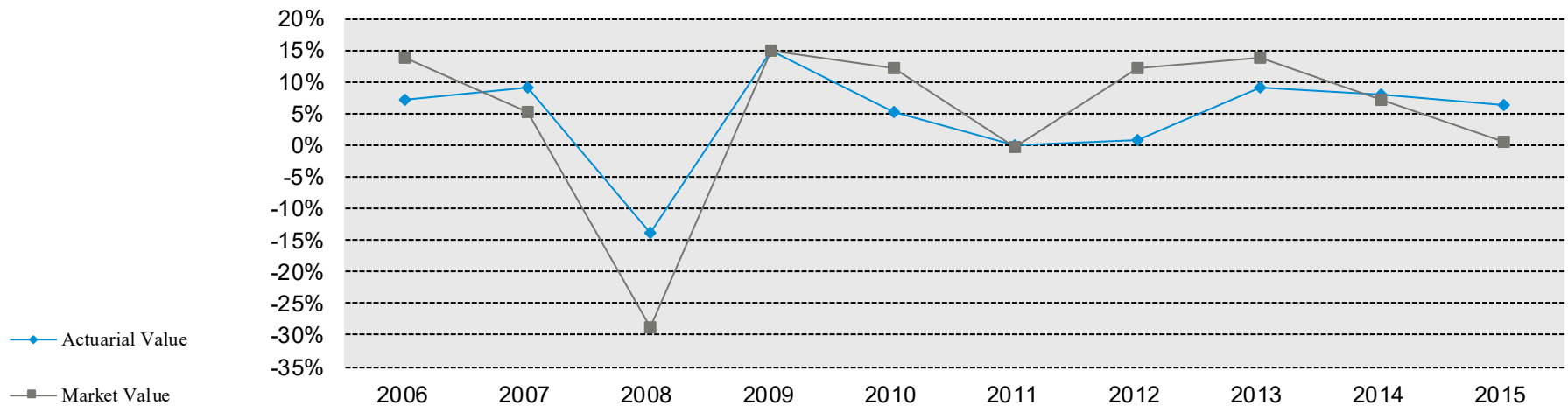
Administrative Expenses

Administrative expenses for the years ended December 31, 2014 and 2015 were \$242,295 and \$238,373, respectively, compared to the assumption of \$350,000 and \$364,000, respectively. This resulted in a gain of \$251,415 for the year. Based on budgeted expenses from the System, we have lowered the assumption from \$350,000 to \$305,000 for 2016.

This chart illustrates how this leveling effect has actually worked over the years 2006 - 2015.

CHART 12

Market and Actuarial Rates of Return for Years Ended December 31, 2006 - 2015



SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements, and
- salary increases different than assumed.

The net gain from this other experience for the two-year period ending December 31, 2015 amounted to \$1,708,158, which is 0.6% of the actuarial accrued liability.

A brief summary of the demographic gain/(loss) experience of the City of Salem Contributory Retirement System for the two-year period ending December 31, 2015 is shown in the chart below.

This valuation reflects the following changes in actuarial assumptions:

- The investment rate of return assumption was lowered from 7.75% to 7.50%.
- The mortality assumption for non-disabled participants was changed from the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale AA from 2010 to the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale BB2D from 2009.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward 3 years for males only projected generationally using Scale AA from 2010 to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2015.
- The administrative expense assumption was decreased from \$350,000 to \$305,000.

Changing these assumptions resulted in a net increase in the unfunded actuarial accrued liability of \$11.8 million and a net increase in the employer normal cost of \$322,000.

The chart shows elements of the experience gain/(loss) for the most recent years.

CHART 13

Experience Due to Changes in Demographics for Two-Year Period Ended December 31, 2015

1. Fewer deaths than expected among retired members and beneficiaries	-\$686,209
2. Salary increases less than expected for continuing actives	4,163,463
3. Loss from Essex Technical High School transfers in	-3,640,555
4. Miscellaneous experience gain (including data adjustments and other transfers)	<u>1,871,459</u>
5. Total	\$1,708,158

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

The unfunded liability was expected to decrease from \$117.1 million as of January 1, 2014 to \$114.2 million as of January 1, 2016. The actual unfunded liability as of January 1, 2016 of \$125.7 million is \$11.5 million higher than expected as detailed in Chart 14 below.

CHART 14 Development of Unfunded Actuarial Accrued Liability

	Year Ended	
	December 31, 2015	December 31, 2015
1. Unfunded actuarial accrued liability at beginning of year	\$115,377,069	\$117,083,950
2. Normal cost at beginning of year	6,260,058	6,019,287
3. Total contributions	-16,302,896	-16,682,093
4. Interest		
(a) For whole year on (1) + (2)	\$9,426,877	\$9,540,501
(b) For half year on (3)	<u>-571,287</u>	<u>-584,576</u>
(c) Total interest	<u>8,855,540</u>	<u>8,955,925</u>
5. Expected unfunded actuarial accrued liability	\$114,189,821	\$115,377,069
6. Changes due to:		
(a) Net experience gain	-\$250,421	--
(b) Assumption changes	<u>11,768,211</u>	--
(c) Total changes	<u>11,517,790</u>	--
7. Unfunded actuarial accrued liability at end of year	<u>\$125,707,611</u>	--

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

D. RECOMMENDED CONTRIBUTION

The amount of annual contribution required to fund the Plan is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability.

The recommended contribution for fiscal 2017 is equal to the City’s budgeted amount of \$12,527,730. The results of this valuation will first be reflected in the fiscal 2018 appropriation. The funding schedule in Chart 16 fully funds the System by June 30, 2031. The amortization payments on the 2002 ERI, the 2003 ERI and the remaining unfunded liability are 15-year increasing (4.50% per year) payments. The amortization payment on the 2010 ERI is a six-year level payment. The fiscal 2018 appropriation is \$13,172,908 or 5.15% higher than the 2017 appropriation.

The chart compares this valuation’s recommended contribution with the prior valuation.

**CHART 15
Recommended Contribution**

	Year Beginning January 1			
	2016		2014	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	\$6,636,825	14.48%	\$5,669,287	14.03%
2. Administrative expenses	305,000	0.67%	350,000	0.87%
3. Expected employee contributions	<u>-4,364,556</u>	<u>-9.52%</u>	<u>-3,788,003</u>	<u>-9.38%</u>
4. Employer normal cost: (1) + (2) + (3)	\$2,577,269	5.62%	\$2,231,284	5.52%
5. Actuarial accrued liability	269,283,853		237,524,910	
6. Actuarial value of assets	<u>143,576,242</u>		<u>120,440,960</u>	
7. Unfunded actuarial accrued liability: (5) - (6)	\$125,707,611		\$117,083,950	
8. Employer normal cost projected to July 1, 2016 and 2014	2,621,983	5.62%	2,310,734	5.61%
9. Projected unfunded actuarial accrued liability	130,336,425		123,692,470	
10. Payment on projected unfunded actuarial accrued liability	9,905,747	21.24%	9,637,525	23.39%
11. Total recommended contribution: (8) + (10)	<u>\$12,527,730</u>	<u>26.86%</u>	<u>\$11,948,259</u>	<u>29.00%</u>
12. Projected payroll	\$46,636,579		\$41,199,749	

Note: Fiscal 2015 recommended contribution includes an adjustment for timing. Fiscal 2017 recommended contribution assumes payment on July 1.

SECTION 2: Valuation Results for the City of Salem Contributory Retirement System

CHART 16
Funding Schedule

(1) Fiscal Year Ended June 30	(2) Employer Normal Cost	(3) Amortization of ERI Liability	(4) Amortization of Remaining Unfunded Liability	(5) Total Plan Cost: (2) + (3) + (4)	(6) Total Unfunded Actuarial Accrued Liability at Beginning of Fiscal Year	(7) Total Plan Cost % Increase
2017	\$2,621,983	\$262,825	\$9,642,922	\$12,527,730	\$130,336,425	4.40%
2018	2,724,235	273,780	10,174,893	13,172,908	129,462,979	5.15%
2019	2,830,449	285,228	10,735,635	13,851,313	127,940,378	5.15%
2020	2,940,778	297,191	11,326,687	14,564,655	125,688,478	5.15%
2021	3,055,379	309,692	11,949,664	15,314,735	122,619,446	5.15%
2022	3,174,418	322,754	12,606,272	16,103,444	118,637,098	5.15%
2023	3,298,067	317,033	13,317,671	16,932,771	113,636,177	5.15%
2024	3,426,501	331,300	14,047,008	17,804,809	107,501,584	5.15%
2025	3,559,906	346,209	14,815,642	18,721,757	100,107,522	5.15%
2026	3,698,472	361,789	15,625,666	19,685,927	91,316,597	5.15%
2027	3,842,400	378,069	16,479,284	20,699,753	80,978,827	5.15%
2028	3,991,893	395,082	17,378,815	21,765,790	68,930,585	5.15%
2029	4,147,168	412,861	18,326,699	22,886,728	54,993,440	5.15%
2030	4,308,446	431,439	19,325,510	24,065,395	38,972,922	5.15%
2031	4,475,958	450,879	20,206,291	25,133,128	20,657,170	4.44%
2032	4,649,944	0	0	4,649,944	0	-81.50%

Notes: Fiscal 2017 contribution set at budgeted amount.

Recommended contributions are assumed to be paid July 1.

Item (2) reflects 3.5% growth in payroll as well as a 0.15% adjustment to total normal cost to reflect the effects of mortality improvement due to generational mortality assumption.

Projected normal cost does not reflect the future impact of pension reform for future hires.

Item (3) reflects level dollar amortization of 2010 ERI through fiscal 2022 and increasing (4.50% per year) amortization of 2002 and 2003 ERI through fiscal 2031.

Item (4) increases 4.50% per year.

Projected unfunded actuarial accrued liability does not reflect deferred investment losses.

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT A

Table of Plan Coverage

Category	Year Ended December 31		Change From Prior Year
	2015	2013	
Active participants in valuation:			
Number	910	827	10.0%
Average age	48.6	49.2	N/A
Average years of service	12.2	12.6	N/A
Total payroll*	\$43,910,174	\$38,667,679	13.6%
Average payroll	48,253	46,757	3.2%
Account balances	43,682,341	38,850,603	12.4%
Inactive participants entitled to a return of their employee contributions			
	182	207	-12.1%
Inactive participants with a vested right to a deferred or immediate benefit			
	24	26	-7.7%
Retired participants:			
Number in pay status	432	427	1.2%
Average age	75.2	75.4	N/A
Average monthly benefit	\$1,921	\$1,837	4.6%
Disabled participants:			
Number in pay status	62	61	1.6%
Average age	67.5	67.2	N/A
Average monthly benefit	\$3,165	\$3,148	0.5%
Beneficiaries in pay status:			
Number in pay status	79	83	-4.8%
Average age	76.9	76.7	N/A
Average monthly benefit	\$1,149	\$1,208	-4.9%

* Salaries for firefighters were reduced to reflect retroactive payments received in 2015 and salaries for Police Patrolmen, Police Superiors and Police Chief were increased to reflect retroactive payments received in 2016.

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT B

**Participants in Active Service as of December 31, 2015
By Age, Years of Service, and Average Payroll**

Age	Years of Service									
	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	29	29	--	--	--	--	--	--	--	--
	\$25,064	\$25,064	--	--	--	--	--	--	--	--
25 - 29	75	71	4	--	--	--	--	--	--	--
	\$30,373	\$29,032	\$54,166	--	--	--	--	--	--	--
30 - 34	73	46	22	5	--	--	--	--	--	--
	\$44,044	\$37,171	\$54,257	\$62,338	--	--	--	--	--	--
35 - 39	58	22	22	7	7	--	--	--	--	--
	\$49,122	\$31,647	\$51,495	\$72,916	\$72,795	--	--	--	--	--
40 - 44	78	28	18	17	10	5	--	--	--	--
	\$52,426	\$37,104	\$51,940	\$63,989	\$65,589	\$74,342	--	--	--	--
45 - 49	107	28	15	18	19	14	13	--	--	--
	\$56,641	\$44,607	\$33,052	\$47,690	\$72,698	\$79,349	\$74,252	--	--	--
50 - 54	169	47	24	17	20	15	35	11	--	--
	\$55,102	\$39,797	\$38,158	\$46,228	\$48,725	\$70,038	\$83,203	\$72,992	--	--
55 - 59	143	21	21	22	25	15	25	11	2	1
	\$50,377	\$30,781	\$26,367	\$45,178	\$47,911	\$57,610	\$73,032	\$84,530	\$64,813	\$62,698
60 - 64	121	12	19	20	26	17	11	5	10	1
	\$46,469	\$33,834	\$28,624	\$38,034	\$42,059	\$46,100	\$66,648	\$71,162	\$87,296	\$73,070
65 - 69	40	5	2	8	3	6	9	6	--	1
	\$50,387	\$30,391	\$42,800	\$45,866	\$49,510	\$54,749	\$48,777	\$63,115	--	\$116,274
70 & over	17	4	3	2	2	--	1	2	3	--
	\$31,580	\$20,797	\$29,182	\$33,942	\$13,896	--	\$12,555	\$35,582	\$62,242	--
Total	910	313	150	116	112	72	94	35	15	3
	\$48,253	\$33,994	\$41,070	\$49,514	\$53,472	\$62,632	\$73,275	\$72,526	\$79,287	\$84,014

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT C

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended December 31, 2015	Year Ended December 31, 2014
Net assets at actuarial value at the beginning of the year	\$132,916,596	\$120,440,960
Contribution income:		
Employer contributions	\$12,181,169	\$11,942,341
Employee contributions	4,121,727	4,739,752
Less administrative expenses	<u>-238,373</u>	<u>-242,295</u>
Net contribution income	16,064,523	16,439,798
Net investment income	<u>8,372,256</u>	<u>9,726,784</u>
Total income available for benefits	\$24,436,779	\$26,166,582
Less benefit payments:		
Pensions	-\$11,136,044	-\$11,060,550
Net 3(8)(c) reimbursements	-304,097	-183,386
Refunds, annuities, & Option B refunds	-2,354,901	-2,447,010
Workers Compensation Settlements	<u>17,909</u>	<u>0</u>
Net benefit payments	-\$13,777,133	-\$13,690,946
Change in reserve for future benefits	\$10,659,646	\$12,475,636
Net assets at actuarial value at the end of the year	\$143,576,242	\$132,916,596

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT D

Development of the Fund Through December 31, 2015

Year Ended December 31	Employer Contributions	Employee Contributions	Net Investment Return*	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
2006	\$8,468,103	\$2,848,916	\$6,050,918	\$312,365	\$10,804,187	\$91,047,430
2007	9,176,126	3,112,895	8,383,232	401,427	11,319,785	99,998,471
2008	9,257,251	2,811,235	-13,989,510	365,143	11,076,469	86,635,835
2009	9,628,758	2,996,026	12,996,591	244,673	11,965,806	100,046,731
2010	9,991,587	3,133,826	5,296,489	334,755	12,158,408	105,975,469
2011	10,497,479	3,380,606	33,718	309,600	12,771,512	106,806,161
2012	10,941,379	3,467,085	959,265	421,160	12,920,683	108,832,047
2013	11,433,741	3,555,601	9,865,386	226,939	13,018,876	120,440,960
2014	11,942,341	4,739,752	9,726,785	242,295	13,690,946	132,916,596
2015	12,181,169	4,121,727	8,372,257	238,373	13,777,133	143,576,242

* Net of investment fees.

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT E

Table of Amortization Bases as of July 1, 2016

Type	Annual Payment	Years Remaining	Outstanding Balance
2002 ERI	\$67,503	15	\$836,778
2003 ERI	175,947	15	2,181,073
2010 ERI	19,375	6	97,762
Remaining unfunded liability	<u>9,642,922</u>	15	<u>127,220,812</u>
Total	\$9,905,747		\$130,336,425

Notes: Amortization payments increase at 4.5% per year, except 2010 ERI payment which is level.

Payment on remaining unfunded liability reflects adjustment to set fiscal 2017 appropriation to the budgeted amount.

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT F

Department Statistics as of January 1, 2016

Category	Water	South Essex Sewerage	Housing	Essex Technical High School	City	Total
Active participants in valuation						
Number	14	61	23	113	699	910
Average age	51.1	52.3	50.3	49.6	48.1	48.6
Average service	18.6	16.6	14.3	7.0	12.4	12.2
Total payroll	\$892,090	\$3,921,057	\$1,376,807	\$4,180,094	\$33,540,126	\$43,910,174
Average payroll	63,721	64,280	59,861	36,992	47,983	48,253
Inactive participants entitled to a return of their employee contributions						
	0	0	1	19	162	182
Inactive participants with a vested right to a deferred or immediate benefit						
	0	2	2	2	18	24
Retired participants and beneficiaries in pay status						
Retired participants	12	23	15	14	368	432
Disabled participants	0	3	2	2	55	62
Beneficiaries	2	4	2	3	68	79
Total number in pay status	14	30	19	19	491	573
Total monthly benefits	\$34,426	\$80,146	\$29,522	\$22,439	\$950,285	\$1,116,818
Average monthly benefit	2,459	2,672	1,554	1,181	1,935	1,949

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT G

Department Results

Category	Water	South Essex Sewer	Housing	Essex Technical High School	City	Salem Retirement Board	Total
1. Total normal cost	\$88,788	\$445,638	\$162,421	\$581,983	\$5,342,422	\$15,573	\$6,636,825
2. Administrative expenses	4,080	20,480	7,464	26,745	245,515	716	305,000
3. Expected employee contributions	<u>-82,348</u>	<u>-392,408</u>	<u>-136,903</u>	<u>-416,036</u>	<u>-3,323,047</u>	<u>-13,814</u>	<u>-4,364,556</u>
4. Employer normal cost: (1) + (2) - (3)	\$10,520	\$73,710	\$32,982	\$192,692	\$2,264,890	\$2,475	\$2,577,269
5. Employer normal cost as a percent of payroll	0.65%	1.98%	2.11%	4.82%	6.25%	3.11%	5.52%
6. Actuarial accrued liability	\$7,241,000	\$22,802,246	\$7,884,709	\$10,677,740	\$219,188,078	\$1,490,080	\$269,283,853
7. Actuarial value of assets	<u>3,813,692</u>	<u>14,155,382</u>	<u>4,040,778</u>	<u>5,615,027</u>	<u>115,160,848</u>	<u>790,515</u>	<u>143,576,242</u>
8. Unfunded actuarial accrued liability: (6) – (7)	\$3,427,308	\$8,646,864	\$3,843,931	\$5,062,713	\$104,027,230	\$699,565	\$125,707,611
9. Reallocation of Retirement Board unfunded actuarial accrued liability:	<u>19,180</u>	<u>48,389</u>	<u>21,511</u>	<u>28,332</u>	<u>582,153</u>	<u>-699,565</u>	<u>0</u>
10. Unfunded actuarial accrued liability with reallocation: (8) + (9)	\$3,446,488	\$8,695,253	\$3,865,442	\$5,091,045	\$104,609,383	\$0	\$125,707,611
11. Reallocation of Retirement Board normal cost	10	71	32	185	2,177	-2,475	0
12. Employer normal cost with reallocation: (4) + (11)	10,530	73,780	33,014	192,878	2,267,067	0	2,577,269
13. Employer normal cost projected to July 1, 2016	10,713	75,060	33,587	196,224	2,306,399	0	2,621,983
14. 2002 ERI payments	0	39,727	22,420	5,356	0	0	67,503
15. 2003 ERI payments	4,382	0	0	2,482	169,083	0	175,947
16. 2010 ERI payments	0	0	0	0	19,375	0	19,375
17. Payment on remaining liability	<u>265,886</u>	<u>650,408</u>	<u>275,817</u>	<u>352,094</u>	<u>8,098,717</u>	<u>0</u>	<u>9,642,922</u>
18. Budgeted appropriation for fiscal 2017: (13)+(14)+(15)+(16)+(17)	\$280,981	\$765,195	\$331,824	\$556,156	\$10,593,574	\$0	\$12,527,730
19. Fiscal 2018 appropriation	297,233	800,774	357,229	629,979	11,087,694	0	13,172,909
20. Fiscal 2019 appropriation	313,388	843,228	376,116	661,327	11,657,254	0	13,851,313

Notes: Administrative expenses allocated in proportion to total normal cost.

Actuarial value of assets allocated in proportion to actuarial accrued liability less present value of future ERI payments and adjusted for additional contributions by South Essex Sewerage.

Recommended contributions are assumed to be paid July 1.

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

EXHIBIT H

Definitions of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Assumptions or actuarial assumptions:

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age;
- (d) Withdrawal rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

Normal cost:

The amount of contributions required to fund the benefit allocated to the current year of service.

Actuarial accrued liability for actives:

The equivalent of the accumulated normal cost allocated to the years before the valuation date.

Actuarial accrued liability for pensioners:

The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Unfunded actuarial accrued liability:

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There are many approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

SECTION 3: Supplemental Information for the City of Salem Contributory Retirement System

Amortization of the unfunded actuarial accrued liability:

Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

Investment return:

The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

SECTION 4: Reporting Information for the City of Salem Contributory Retirement System

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 79 beneficiaries in pay status)	573
2. Participants active during the year ended December 31, 2015 with total accumulated contributions of \$43,682,341 and projected 2016 payroll of \$45,841,256	910
3. Inactive participants entitled to a return of their employee contributions	182
4. Inactive participants with a vested right to a deferred or immediate benefit as of December 31, 2015	24

The actuarial factors as of January 1, 2016 are as follows:

1. Normal cost, including administrative expenses	\$6,941,825
2. Expected employee contributions	<u>-4,364,556</u>
3. Employer normal cost: (1) + (2)	\$2,577,269
4. Actuarial accrued liability	269,283,853
Retired participants and beneficiaries	\$124,374,215
Active participants	140,901,672
Inactive participants	4,007,966
5. Actuarial value of assets (\$138,598,253 at market value)	143,576,242
6. Unfunded actuarial accrued liability	\$125,707,611

The actuarial factors projected to July 1, 2016 are as follows:

1. Projected employer normal cost	\$2,621,983
2. Projected unfunded actuarial liability	130,336,425
3. Payment on projected unfunded actuarial accrued liability	9,905,747
4. Recommended contribution: (1) + (3)	\$12,527,730
5. Projected payroll	\$46,636,579
6. Total recommended contribution as a percentage of projected payroll: (4) ÷ (5)	26.86%

*Notes: Amortization payments increase at 4.5% per year.
Recommended contributions are assumed to be paid July 1.*

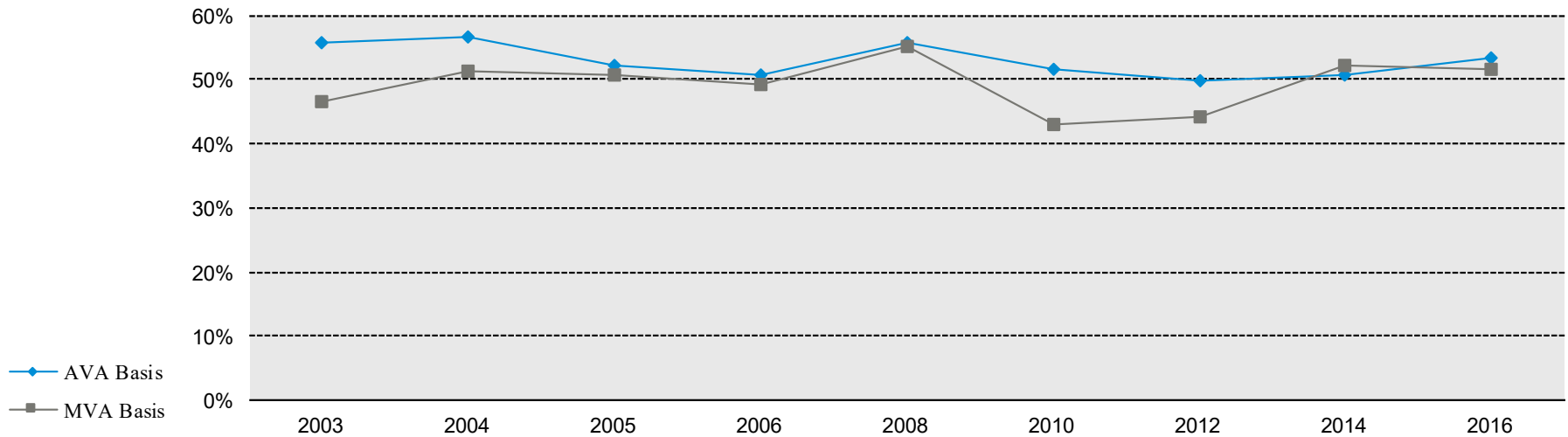
SECTION 4: Reporting Information for the City of Salem Contributory Retirement System

**EXHIBIT II
Funded Ratio**

A critical piece of information regarding the Plan's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the Plan as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

These measurements are not necessarily appropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.

The chart below depicts a history of the funded ratios for this plan. On a market value basis, the funded ratio has decreased from 52.15% as of January 1, 2014 to 51.47% as of January 1, 2016. On an actuarial value basis, the funded ratio has increased from 50.71% as of January 1, 2014 to 53.32% as of January 1, 2016. The chart below depicts a history of the funded ratios for this plan.



SECTION 4: Reporting Information for the City of Salem Contributory Retirement System

**EXHIBIT III
Actuarial Assumptions and Actuarial Cost Method**

Mortality Rates:

- Pre-Retirement:* RP-2000 Employee Mortality Table projected generationally using Scale BB2D from 2009 (Previously, RP-2000 Employee Mortality Table projected generationally with Scale AA from 2010)
- Healthy Retiree:* RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2009 (Previously, RP-2000 Healthy Annuitant Mortality Table projected generationally with Scale AA from 2010)
- Disabled Retiree:* RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2015 (Previously, RP-2000 Employee Mortality Table set forward three years for males only projected generationally with Scale AA from 2010)

The underlying tables with generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience of the Plan as of the measurement date based on historical and current demographic data. As part of the analysis, a comparison was made between the actual number of retiree deaths and the projected number based on the prior years' assumption over the past six years. The mortality tables were then adjusted to future years using the generational projection under Scale BB2D to reflect future mortality improvement between the measurement date and those years.

SECTION 4: Reporting Information for the City of Salem Contributory Retirement System

Termination Rates before Retirement:

Groups 1 and 2 – Rate (%)

Age	Mortality		Disability
	Male	Female	
20	0.03	0.02	0.01
25	0.04	0.02	0.02
30	0.04	0.03	0.03
35	0.08	0.05	0.06
40	0.11	0.07	0.10
45	0.15	0.11	0.15
50	0.21	0.17	0.19
55	0.30	0.25	0.24
60	0.49	0.39	0.28

*Notes: Mortality rates do not reflect generational projections.
 55% of the disability rates shown represent accidental disability.
 20% of the accidental disabilities will die from the same cause as the disability.
 55% of the death rates shown represent accidental death.*

SECTION 4: Reporting Information for the City of Salem Contributory Retirement System

Group 4 – Rate (%)

Mortality

Age	Male	Female	Disability
20	0.03	0.02	0.10
25	0.04	0.02	0.20
30	0.04	0.03	0.30
35	0.08	0.05	0.30
40	0.11	0.07	0.30
45	0.15	0.11	1.00
50	0.21	0.17	1.25
55	0.30	0.25	1.20
60	0.49	0.39	0.85

*Notes: Mortality rates do not reflect generational projections.
 90% of the disability rates shown represent accidental disability.
 60% of the accidental disabilities will die from the same cause as the disability.
 90% of the death rates shown represent accidental death.*

SECTION 4: Reporting Information for the City of Salem Contributory Retirement System

Withdrawal Rates:

Years of Service	Rate per year (%)	
	Groups 1 and 2	Group 4
0	15.0	1.5
1	12.0	0.0
2	10.0	
3	9.0	
4	8.0	
5 – 9	7.6	
10 – 14	5.4	
15 – 19	3.3	
20 – 24	2.0	
25 - 29	1.0	
30+	0.0	

The termination rates and disability rates were based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of terminations and disability retirements and the projected number based on the prior years' assumption over the past six years.

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Retirement Rates:

Age	Rate per year (%)		Group 4
	Groups 1 and 2		
	Male	Female	
45 – 49	--	--	1.0%
50 – 51	1.0	1.5	2.0
52	1.0	2.0	2.0
53	1.0	2.5	5.0
54	2.0	2.5	7.5
55	2.0	5.5	15.0
56 – 57	2.5	6.5	10.0
58	5.0	6.5	10.0
59	6.5	6.5	15.0
60	12.0	5.0	20.0
61	20.0	13.0	20.0
62	30.0	15.0	25.0
63	25.0	12.5	25.0
64	22.0	18.0	30.0
65	40.0	15.0	100.0
66 - 67	25.0	20.0	--
68	30.0	25.0	--
69	30.0	20.0	--
70	100.0	100.0	--

The retirement rates were based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior years' assumption over the past six years.

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Retirement Age for Inactive Vested Participants:	<p>Age 55 for participants hired prior to April 2, 2012. For participants hired April 2, 2012 or later, age 60 for Group 1 members, age 55 for Group 2 members and age 50 for Group 4 members.</p> <p>The retirement age for inactive vested participants was based on historical and current demographic data, adjusted to reflect the economic conditions of the area and estimated future experience and professional judgment.</p>
Unknown Data for Participants:	<p>Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.</p>
Family Composition:	<p>80% of participants are assumed to be married. Non are assumed to have dependent children. Females are assumed to be three years younger than their spouses.</p>
Benefit Election:	<p>All participants are assumed to elect Option A. The benefit election reflects the fact that all benefit elections are actuarially equivalent.</p>
Net Investment Return:	<p>7.50% (Previously, 7.75%)</p> <p>The net investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.</p>
Interest on Employee Contributions:	<p>3.5%</p>
Administrative Expenses:	<p>\$305,000 for calendar year 2016 increasing by 3.50% per year (previously, \$350,000 for calendar 2014 increasing by 4.50% per year). The administrative expense assumption is based on information on expenses provided by the Retirement System.</p>

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Salary Increases:

Years of Service	Group 1	Group 2	Group 4
0	6.00%	6.00%	7.00%
1	5.50%	5.50%	6.50%
2	5.50%	5.50%	6.00%
3	5.25%	5.25%	5.75%
4	5.25%	5.25%	5.25%
5	4.75%	4.75%	5.25%
6	4.75%	4.75%	4.75%
7	4.50%	4.50%	4.75%
8	4.50%	4.50%	4.75%
9+	4.25%	4.50%	4.75%

The salary scale assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment.

2015 Salary:

Salary reported in the data, except for employees hired in 2015 for whom salaries were annualized. Salaries for firefighters were reduced to reflect a 2.5% increase effective July 1, 2014 paid in 2015. Salaries for Police Patrolmen, Police Superiors and Police Chief were increased to reflect 2.5% increase effective July 1, 2014 and 2.5% increase effective July 1, 2015 paid in 2016.

Total Service:

Total creditable service reported in the data.

Actuarial Value of Assets:

Market value of assets less unrecognized return in each of the last five years. Unrecognized return is equal to the difference between the actual market value return and the expected actuarial value return and is recognized over a five-year period, further adjusted, if necessary, to be within 20% of the market value. Market value of assets as reported in the Annual Statement.

Actuarial Cost Method:

Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant less total creditable service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. Normal Cost is determined by using the plan of benefits applicable to each participant.

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Justification for Changes in Assumptions:

Based on past experience and future expectations the following actuarial assumptions were changed:

- The investment rate of return assumption was lowered from 7.75% to 7.50%.
- The mortality assumption for non-disabled participants was changed from the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale AA from 2010 to the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale BB2D from 2009.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward 3 years for males only projected generationally using Scale AA from 2010 to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2015.
- The administrative expense assumption was decreased from \$350,000 increasing by 4.5% per year to \$305,000 increasing by 3.5% per year.

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**EXHIBIT IV
Summary of Plan Provisions**

This exhibit summarizes the major provisions of Chapter 32 of the Laws of Massachusetts.

Plan Year: January 1 – December 31

Retirement Benefits

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 4 comprises mainly police and firefighters. Group 2 is for other specified hazardous occupations. (Officers and inspectors of the State Police are classified as Group 3.)

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following table based on the age of the member at retirement:

Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.5	65 or over	60 or over	55 or over
2.4	64	59	54
2.3	63	58	53
2.2	62	57	52
2.1	61	56	51
2.0	60	55	50
1.9	59	--	49
1.8	58	--	48
1.7	57	--	47
1.6	56	--	46
1.5	55	--	45

A member's final three-year average salary is defined as the greater of the highest consecutive three-year average annual rate of regular compensation and the average

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annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member’s final five-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following tables based on the age and years of creditable service of the member at retirement:

For members with less than 30 years of creditable service:

Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.50	67 or over	62 or over	57 or over
2.35	66	61	56
2.20	65	60	55
2.05	64	59	54
1.90	63	58	53
1.75	62	57	52
1.60	61	56	51
1.45	60	55	50

For members with 30 years of creditable service or greater:

Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.500	67 or over	62 or over	57 or over
2.375	66	61	56
2.250	65	60	55
2.125	64	59	54
2.000	63	58	53
1.875	62	57	52
1.750	61	56	51
1.625	60	55	50

A member’s final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average

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annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a)(17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit “spiking” of a member’s salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80 percent of the member’s final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of \$15 per year of creditable service, not exceeding \$300. The veteran allowance is paid in addition to the 80 percent maximum.

Employee Contributions

<u>Date of Hire</u>	<u>Contribution Rate</u>
Prior to January 1, 1975	5%
January 1, 1975 – December 31, 1983	7%
January 1, 1984 – June 30, 1996	8%
July 1, 1996 onward	9%

In addition, employees hired after December 31, 1978 contribute an additional 2 percent of salary in excess of \$30,000.

Employees hired after 1983 who voluntarily withdraw their contributions with less than 10 ten years of credited service receive 3% interest on their contributions.

Employees in Group 1 hired on or after April 2, 2012 with 30 years of creditable service or greater will pay a base contribution rate of 6%.

Retirement Benefits (Superannuation)

Members of Group 1, 2 or 4 hired prior to April 2, 2012 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

Members hired prior to April 2, 2012 who terminate before age 55 with ten or more years of creditable service are eligible for a retirement allowance upon the attainment

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of age 55 (provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System).

Members of Group 1 hired April 2, 2012 or later may retire upon the attainment of age 60. Members of Group 2 or 4 hired April 2, 2012 or later may retire upon the attainment of age 55. Members of Group 4 may retire upon attainment of age 50 with ten years of creditable service.

Members hired April 2, 2012 or later who terminate before age 55 (60 for members of Group 1) with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (60 for members of Group 1) provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System.

Ordinary Disability Benefits

A member who is unable to perform his or her job due to a non-occupational disability will receive a retirement allowance if he or she has ten or more years of creditable service and has not reached age 55. The annual amount of such allowance shall be determined as if the member retired for superannuation at age 55 (age 60 for Group 1 members hired on or after April 2, 2012), based on the amount of creditable service at the date of disability. For veterans, there is a minimum benefit of 50 percent of the member's most recent year's pay plus an annuity based on his or her own contributions.

Accidental Disability Benefit

For a job-connected disability, the benefit is 72 percent of the member's most recent annual pay plus an annuity based on his or her own contributions, plus additional amounts for surviving children. Benefits are capped at 75 percent of annual rate of regular compensation for employees who become members after January 1, 1988.

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Death Benefits

In general, the beneficiary of an employee who dies in active service will receive a refund of the employee's own contributions. Alternatively, if the employee were eligible to retire on the date of death, a spouse's benefit will be paid equal to the amount the employee would have received under Option C. The surviving spouse of a member who dies with two or more years of credited service has the option of a refund of the employee's contributions or a monthly benefit regardless of eligibility to retire, if they were married for at least one year. There is also a minimum widow's pension of \$250 per month, and there are additional amounts for surviving children.

If an employee's death is job-connected, the spouse will receive 72 percent of the member's most recent annual pay, in addition to a refund of the member's accumulated deductions, plus additional amounts for surviving children. However, in accordance with Section 100 of Chapter 32, the surviving spouse of a police officer, firefighter or corrections officer is killed in the line of duty will be eligible to receive an annual benefit equal to the maximum salary held by the member at the time of death.

Upon the death of a job-connected disability retiree who retired prior to November 7, 1996 and could not elect an Option C benefit, a surviving spouse will receive an allowance of \$6,000 per year if the member dies for a reason unrelated to cause of disability.

"Heart And Lung Law" And Cancer Presumption

Any case of hypertension or heart disease resulting in total or partial disability or death to a uniformed fireman, permanent member of a police department, or certain employees of a county correctional facility is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. Any case of disease of the lungs or respiratory tract resulting in total disability or death to a uniformed fireman is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. There is an additional presumption for uniformed firemen that certain types of cancer are job-related if onset occurs while actively employed or within five years of retirement.

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Options

Members may elect to receive a full retirement allowance payable for life under Option A. Under Option B a member may elect to receive a lower monthly allowance in exchange for a guarantee that at the time of death any contributions not expended for annuity payments will be refunded to the beneficiary. Option C allows the member to take a lesser retirement allowance in exchange for providing a survivor with two-thirds of the lesser amount. Option C pensioners will have benefits converted from a reduced to a full retirement if the beneficiary predeceases the retiree.

Post-Retirement Benefits

The Board has adopted the provisions of Section 51 of Chapter 127 of the Acts of 1999, which provide that the Retirement Board may approve an annual COLA in excess of the Consumer Price Index but not to exceed a 3% COLA on the first \$12,000 of a retirement allowance. Cost-of-living increases granted prior to July 1, 1998 are reimbursed by the Commonwealth and not reflected in this report.

Changes in Plan Provisions

None.