City of Salem Contributory Retirement System

Governmental Accounting Standards Board (GASB) Statements No. 67 and 68 Accounting Valuation Report as of December 31, 2016

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Retirement Board
City of Salem Contributory Retirement System
20 Central Street, Suite 110
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Dear Board Members:

We are pleased to submit this Governmental Accounting Standards Board (GASB) Statements No. 67 and 68 Accounting Valuation as of December 31, 2016 for the City of Salem Contributory Retirement System, a cost-sharing multiple-employer defined benefit pension plan. It contains the actuarial information that will need to be disclosed in order to comply with GASB 67 and 68.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist the Board and the member units in preparing their financial reports. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board and may only be provided to other parties in its entirety. The census and financial information on which our calculations were based was provided by the City of Salem Contributory Retirement System. 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; 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 with you and to answering any questions.

Sincerely,

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

By: ________________________________

Kathleen A. Riley, FSA, MAAA, EA
Senior Vice President and Actuary

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SECTION 1

VALUATION SUMMARY

SECTION 2

ACCOUNTING INFORMATION

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SUPPLEMENTAL INFORMATION

Segal Consulting

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. The 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.

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 System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.

Purpose

This report has been prepared by Segal Consulting to present certain disclosure information required by Governmental Accounting Standards Board Statements No. 67 and 68 as of December 31, 2016. This report is based on financial information as of December 31, 2016 provided by the Retirement System and the City of Salem Contributory Retirement System Actuarial Valuation and Review as of January 1, 2016, dated November 10, 2016, which reflects:

- The benefit provisions of Massachusetts General Laws Chapter 32;
- The characteristics of covered active participants, inactive 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.

Significant Issues in Valuation Year

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

- The Net Pension Liability (NPL) is equal to the difference between the Total Pension Liability (TPL) and the Plan's Fiduciary Net Position. The Plan's Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to an Unfunded Actuarial Accrued Liability (UAAL) on a market value basis. The NPL increased from $124.1 million as of December 31, 2015 to $130.8 million as of December 31, 2016 and the Plan's Fiduciary Net Position as a percent of the TPL increased from 52.77% to 53.48%.
- The NPL measured as of December 31, 2016 was determined based upon the results of the actuarial valuation as of January 1, 2016. The NPL measured as of December 31, 2015 was determined based on the results of the actuarial valuation as of January 1, 2014.
- The discount rate used to determine the TPL and NPL as of December 31, 2016 was 7.50% and as of December 31, 2015 was 7.75%.

EXHIBIT 1

Net Pension Liability

The components of the net pension liability of the City of Salem Contributory Retirement System are as follows:

	December 31, 2016	December 31, 2015
Total pension liability	$281,283,635	$262,648,642
Plan fiduciary net position	150,440,259	138,598,253
System's net pension liability	130,843,376	124,050,389
Plan fiduciary net position as a percentage of the total pension liability*	53.48%	52.77%

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

Actuarial assumptions. The total pension liability as of December 31, 2016 was based on an actuarial valuation as of December 31, 2015, using the following actuarial assumptions:

Inflation	3.50% (previously, 4.00%)
Salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2 and 4.75% for Group 4
Investment rate of return	7.50% (previously, 7.75%), net of pension plan investment expense, including inflation
Cost of Living Adjustment	3% of first $12,000
Pre-retirement:	RP-2000 Employee Mortality Table projected generationally from 2009 using Scale BB2D (previously, projected generationally from 2010 using Scale AA)
Healthy Retiree:	RP-2000 Combined Healthy Annuitant Mortality Table projected generationally from 2009 using Scale BB2D (previously, projected generationally from 2010 using Scale AA)
Disabled Retiree:	RP-2000 Combined Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D (previously, projected generationally from 2010 using Scale AA)

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of December 31, 2016 and the target allocation as of December 31, 2016 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Domestic equity	18.00%	6.44%
International developed markets equity	16.00%	7.40%
International emerging markets equity	6.00%	9.42%
Core fixed income	13.00%	2.02%
High-yield fixed income	10.00%	4.43%
Real estate	10.00%	5.00%
Commodities	4.00%	4.43%
Hedge fund, GTAA, Risk parity	13.00%	3.75%
Private equity	10.00%	10.47%
	100.00%	

Note: Some asset classes included in the pension plan's target asset allocation have been combined.

Discount rate: The discount rate used to measure the total pension liability was 7.50%. The projection of cash flows used to determine the discount rate assumed plan member contributions will be made at the current contribution rate and that contributions will be made at rates equal to the actuarially determined contribution rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability, calculated using the discount rate of 7.50%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.50%) or 1-percentage-point higher (8.50%) than the current rate:

	1% Decrease (6.50%)	Current Discount (7.50%)	1% Increase (8.50%)
City of Salem Contributory Retirement System's net pension liability as of December 31, 2016	$161,707,064	$130,843,376	$104,648,641

EXHIBIT 2

Schedule of Changes in the Net Pension Liability – Last Ten Years

	Year End December 31,									
	2016	**2015**	**2014**	**2013**	**2012**	**2011**	**2010**	**2009**	**2008**	**2007**
Total pension liability										
Service cost	$6,350,728	$6,097,323	$5,854,030							
Interest	20,274,844	19,386,667	18,557,932							
Differences between expected and actual experience	-5,574,549	0	0							
Changes of assumptions	12,360,928	0	0							
Changes of benefit terms	0	0	0	(Historical information prior to implementation of GASB 67/68 is not required)						
Benefit payments, including refunds of employee contributions	-14,776,958	-13,777,133	-14,146,675							
Net change in total pension liability	$18,634,993	$11,706,857	$10,265,287							
Total pension liability - beginning	262,648,642	250,941,785	240,676,498							
Total pension liability - ending (a)	$281,283,635	$262,648,642	$250,941,785							
Plan fiduciary net position										
Contributions - employer	$12,527,730	$12,181,169	$11,942,341							
Contributions - employee	4,311,175	4,121,727	3,939,454							
Net investment income	10,046,274	659,962	9,022,646							
Benefit payments, including refunds of employee contributions	-14,776,958	-13,777,133	-14,146,675	(Historical information prior to implementation of GASB 67/68 is not required)						
Administrative expenses	-266,215	-238,373	-242,295							
Net change in fiduciary net position	$11,842,006	$2,947,352	$10,515,471							
Plan fiduciary net position - beginning	138,598,253	135,650,901	125,135,430							
Plan fiduciary net position - ending (b)	$150,440,259	$138,598,253	$135,650,901							
Net pension liability – ending: (a)-(b)	$130,843,376	$124,050,389	$115,290,884							
Plan's fiduciary net position as a percentage of the total pension liability	53.48%	52.77%	54.06%	(Historical information prior to implementation of GASB 67/68 is not required)						
Covered-employee payroll	$45,841,256	$42,015,665	$40,399,678							
Net pension liability as a percentage of covered-employee payroll	285.43%	295.25%	285.38%							

Notes: Covered employee payroll for 2016 as estimated in the January 1, 2016 funding valuation report.
Covered-employee payroll for 2015 and 2014 as estimated in the January 1, 2014 funding valuation report.

Notes to Schedule:

Changes in Assumptions and Methods: The following changes were reflected in the January 1, 2014 actuarial valuation:

- The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.
- The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally using Scale AA from 2010.
- The mortality assumption for non-disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale AA from 2010.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table set forward three years for males only projected generationally using Scale AA from 2010.
- The assumed retirement age for inactive vested participants was changed from age 65 to age 55 for Group 1 and 2 members hired prior to April 2, 2012. For participants hired April 2, 2012 or later, the assumption is age 60 for Group 1 members, age 55 for Group 2 members, and age 50 for Group 4 members.
- The investment return assumption was lowered from 8.00% to 7.75%.
- The salary increase assumption was changed from a level 5% to rates based on years of service with ultimate rates of 4.25% per year for Group 1 members, 4.50% per year for Group 2 members and 4.75% per year for Group 4 members, including an allowance for inflation of 4.0% per year.

The following changes were effective January 1, 2016:

- The investment 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 inflation allowance in the salary increase assumption was lowered form 4.0% to 3.5%.
- The administrative expense assumption was decreased from $350,000 increasing by 4.5% per year to $305,000 increasing by 3.5% per year.

Changes in Plan Provisions:

The following change was reflected in the January 1, 2014 actuarial valuation:

- Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

EXHIBIT 3
Schedule of Contributions – Last Ten Years

	Year End December 31,									
	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Actuarially determined contribution	$12,527,730	$12,013,682	$11,942,341							
Contributions in relation to the actuarially determined contribution	12,527,730	12,181,169	11,942,341							
Contribution deficiency (excess)	$0	-$167,487	$0							
Covered-employee payroll	$45,841,256	$42,015,665	$40,399,678							
Contributions as a percentage of covered-employee payroll	27.33%	28.99%	29.56%		(Historical information prior to implementation of GASB 67/68 is not required)					

Notes: Actuarially determined contributions for 2016 and 2015 are based on results from the January 1, 2014 actuarial valuation.
Actuarially determined contribution for 2014 is based on results from the January 1, 2012 actuarial valuation.

EXHIBIT 4

Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions

A. Pension expense for the year ended June 30, 2017

Service cost	$6,350,728
Interest	20,274,844
Contributions – employee	-4,311,175
Projected earnings on pension plan investments	-10,810,949
Administrative expenses	266,215
Recognized portion of current-period difference between expected and actual experience	-1,114,910
Recognized portion of current-period difference between projected and actual earnings on pension plan investments	152,935
Recognized portion of current year period assumption change	2,472,186
Recognized portion of current year period plan change	0
Recognition of deferred outflows of resources	2,134,963
Recognition of deferred inflows of resources	0
Pension expense for fiscal year ended June 30, 2017	$15,414,837

B. Deferred outflows/inflows of resources related to pensions

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	$0	$4,459,639
Changes of assumptions	9,888,742	0
Net difference between projected and actual earnings on pension plan investments	6,869,991	0
Total	$16,758,733	$4,459,639

C. Projected recognition of deferred outflows/(inflows)

Year Ended June 30,	Recognition
2018	$3,645,175
2019	3,645,175
2020	3,498,534
2021	1,510,210
Thereafter	0

EXHIBIT 5

Determination of Proportionate Share

Employer Name	FY 2016 Total Appropriation with Payment at Beginning of Year	Percent of FY 2016 Total Appropriation	Share of NPL as of January 1, 2016	Percent of NPL as of January 1, 2016	FY 2017 Total Appropriation	Percent of FY 2017 Total Appropriation	Share of NPL as of January 1, 2017	Percent of NPL as of January 1, 2017
City of Salem	$10,071,175	83.926458%	$105,037,687	84.673404%	$10,513,908	83.925085%	$110,864,595	84.730766%
Water	266,614	2.221783%	2,780,660	2.241557%	278,357	2.221927%	2,935,153	2.243257%
South Essex Sewerage	816,337	6.802808%	7,409,968	5.973353%	852,318	6.803451%	7,731,226	5.908764%
Housing	315,214	2.626783%	3,287,536	2.650162%	329,114	2.627084%	3,470,364	2.652304%
Essex Tech	530,660	4.422167%	5,534,538	4.461524%	554,033	4.422453%	5,842,038	4.464909%
Grand Total	**$12,000,000**	**100.000000%**	**$124,050,389**	**100.000000%**	**$12,527,730**	**100.000000%**	**$130,843,376**	**100.000000%**

Notes: January 1, 2016 and January 1, 2017 NPL reflect adjustment due to prior contributions for South Essex Sewerage not previously reflected.

EXHIBIT 6

Determination of Pension Amounts by Employer as of June 30, 2017

				Discount Rate Sensitivity		
Employer Name	Employer's Proportionate Share Allocation (1)	Net Pension Liability (2)	Covered Employee Payroll (3)	1% Decrease (6.50%) (4)	Current Discount (7.50%) (5)	1% Increase (8.50%) (6)
City of Salem	84.730766%	$110,864,595	$35,015,154	$137,015,634	$110,864,595	$88,669,595
Water	2.243257%	2,935,153	931,322	3,627,505	2,935,153	2,347,538
South Essex Sewerage	5.908764%	7,731,226	4,093,497	9,554,889	7,731,226	6,183,441
Housing	2.652304%	3,470,364	1,437,356	4,288,963	3,470,364	2,775,600
Essex Tech	4.464909%	5,842,038	4,363,926	7,220,073	5,842,038	4,672,467
Grand Total	**100%**	**$130,843,376**	**$45,841,256**	**$161,707,064**	**$130,843,376**	**$104,648,641**

Employer Name	Schedule of Contributions: Statutory Required Contribution (7)	Contributions In Relation to the Statutory Required Contribution (8)	Contribution Deficiency/ (Excess) (9)	Contributions as a Percentage of Covered Employee Payroll (10)	Pension Expense: Proportionate Share of Plan Pension Expense (11)	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (12)	Total Employer Pension Expense (13)
City of Salem	$10,513,908	-$10,513,908	$0	30.03%	$13,061,111	$165,446	$13,226,557
Water	278,357	-278,357	0	29.89%	345,794	$32,363	378,157
South Essex Sewerage	852,318	-852,318	0	20.82%	910,826	-$119,864	790,962
Housing	329,114	-329,114	0	22.90%	408,848	-$42,438	366,410
Essex Tech	554,033	-554,033	0	12.70%	688,258	-$35,507	652,751
Grand Total	**$12,527,730**	**-$12,527,730**	**$0**	**27.33%**	**$15,414,837**	**$0**	**$15,414,837**

Employer Name	Deferred Outflows of Resources					Deferred Inflows of Resources				
	Differences Between Expected and Actual Experience (14)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (15)	Changes of Assumptions (16)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (17)	Total Deferred Outflows of Resources (18)	Differences Between Expected and Actual Experience (19)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (20)	Changes of Assumptions (21)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (22)	Total Deferred Inflows of Resources (23)
City of Salem	$0	$5,820,995	$8,378,808	$435,574	$14,635,377	$3,778,686	$0	$0	$118,522	$3,897,208
Water	0	154,112	221,830	68,936	444,878	100,041	0	0	4,494	104,535
South Essex Sewerage	0	405,932	584,302	134,024	1,124,258	263,510	0	0	358,799	622,309
Housing	0	182,213	262,279	1,982	446,474	118,283	0	0	87,127	205,410
Essex Tech	0	306,739	441,523	3,131	751,393	199,119	0	0	74,705	273,824
Grand Total	**$0**	**$6,869,991**	**$9,888,742**	**$643,647**	**$17,402,380**	**$4,459,639**	**$0**	**$0**	**$643,647**	**$5,103,286**

	Deferred Inflows/(Outflows) Recognized In Future Pension Expense (Year Ended June 30):					
Employer Name	2018 (24)	2019 (25)	2020 (26)	2021 (27)	2022 (28)	Thereafter (29)
City of Salem	$3,254,028	$3,254,028	$2,957,418	$1,272,696	$0	$0
Water	114,132	114,132	78,340	33,739	0	0
South Essex Sewerage	95,523	95,523	214,196	96,707	0	0
Housing	54,244	54,244	92,655	39,920	0	0
Essex Tech	127,248	127,248	155,925	67,148	0	0
Grand Total	**$3,645,175**	**$3,645,175**	**$3,498,534**	**$1,510,210**	**$0**	**$0**

EXHIBIT 7

Notes to Required Supplementary Information

Valuation date	Actuarial determined contributions for fiscal 2016 and 2017 are determined with the January 1, 2014 actuarial valuation.
Actuarial cost method	Entry Age Normal Cost Method
Amortization method	Increasing at 4.5% per year for 2002 and 2003 ERI and remaining unfunded liability and level dollar amortization for 2010 ERI.
Remaining amortization period	As of July 1, 2014, 8 years remaining on 2010 ERI, 17 years remaining on the 2002 and 2003 ERI and the remaining unfunded liability.
Asset valuation method	The difference between the expected return on an actuarial basis and actual investment return on a market value basis is recognized over a five-year period.
Actuarial assumptions:	
Investment rate of return	7.75%
Discount rate	7.75%
Inflation rate	4.00%
Projected salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2 and 4.75% for Group 4
Cost of living adjustments	3.00% of first $12,000 of retirement income
Plan membership:	
Retired participants and beneficiaries receiving benefits	571
Inactive participants entitled to a return of their employee contributions	207
Inactive participants with a vested right to a deferred or immediate benefit	26
Active participants	827
Total	1,631

EXHIBIT I

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.

* *Same assumptions used in the January 1, 2016 Actuarial Valuation and Review.*

Termination Rates before Retirement:

Groups 1 and 2 – Rate (%)

	Mortality		
Age	**Male**	**Female**	**Disability**
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.

	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.

Withdrawal Rates:

Rate per year (%)			
Years of Service	**Groups 1 and 2**	**Years of Service**	**Group 4**
0	15.0	0 – 10	1.5
1	12.0	11+	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.

Retirement Rates:

	Rate per year (%)		
Age	Groups 1 and 2		Group 4
	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.

Retirement Age for Inactive Vested Participants:	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. 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.
Unknown Data for Participants:	Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.
Family Composition:	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.
Benefit Election:	All participants are assumed to elect Option A. The benefit election reflects the fact that all benefit elections are actuarially equivalent.
Net Investment Return:	7.50% (Previously, 7.75%) 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.
Interest on Employee Contributions:	3.5%
Administrative Expenses:	$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.

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.

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.

EXHIBIT II
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 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 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

Date of Hire	Contribution Rate
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 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.

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 be 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.

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.

Appendix A
Glossary

Definitions of certain terms *as they are used in Statement 68;* the terms may have different meanings in other contexts.

Active employees:	Individuals employed at the end of the reporting or measurement period, as applicable.
Actual contributions:	Cash contributions recognized as additions to a pension plan's fiduciary net position.
Actuarial present value of projected benefit payments:	Projected benefit payments discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial valuation:	The determination, as of a point in time (the actuarial valuation date), of the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial valuation date:	The date as of which an actuarial valuation is performed.
Actuarially determined contribution:	A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.
Ad hoc cost-of-living adjustments (ad hoc COLAs):	Cost-of-living adjustments that require a decision to grant by the authority responsible for making such decisions.
Ad hoc postemployment benefit changes:	Postemployment benefit changes that require a decision to grant by the authority responsible for making such decisions.
Agent employer:	An employer whose employees are provided with pensions through an agent multiple-employer defined benefit pension plan.

Agent multiple-employer defined benefit pension plan (agent pension plan):	A multiple-employer defined benefit pension plan in which pension plan assets are pooled for investment purposes but separate accounts are maintained for each individual employer so that each employer's share of the pooled assets is legally available to pay the benefits of only its employees.
Allocated insurance contract:	A contract with an insurance company under which related payments to the insurance company are currently used to purchase immediate or deferred annuities for individual employees. Also may be referred to as an annuity contract.
Automatic cost-of-living adjustments (automatic COLAs):	Cost-of-living adjustments that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).
Automatic postemployment benefit changes:	Postemployment benefit changes that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).
Closed period:	A specific number of years that is counted from one date and declines to zero with the passage of time. For example, if the recognition period initially is five years on a closed basis, four years remain after the first year, three years after the second year, and so forth.
Collective deferred outflows of resources and deferred inflows of resources related to pensions:	Deferred outflows of resources and deferred inflows of resources related to pensions arising from certain changes in the collective net pension liability.
Collective net pension liability:	The net pension liability for benefits provided through (1) a cost-sharing pension plan or (2) a single-employer or agent pension plan in circumstances in which there is a special funding situation.

Collective pension expense:	Pension expense arising from certain changes in the collective net pension liability.
Contributions:	Additions to a pension plan's fiduciary net position for amounts from employers, nonemployer contributing entities (for example, state government contributions to a local government pension plan), or employees. Contributions can result from cash receipts by the pension plan or from recognition by the pension plan of a receivable from one of these sources.
Cost-of-living adjustments:	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-sharing employer:	An employer whose employees are provided with pensions through a cost-sharing multiple-employer defined benefit pension plan.
Cost-sharing multiple-employer defined benefit pension plan (cost-sharing pension plan):	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-employee payroll:	The payroll of employees that are provided with pensions through the pension plan.
Deferred retirement option program (DROP):	A program that permits an employee to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The employee continues to provide service to the employer and is paid for that service by the employer after the DROP entry date; however, the pensions that would have been paid to the employee (if the employee had retired and not entered the DROP) are credited to an individual employee account within the defined benefit pension plan until the end of the DROP period.
Defined benefit pension plans:	Pension plans that are used to provide defined benefit pensions.

Defined benefit pensions:	Pensions for which the income or other benefits that the employee will receive at or after separation from employment are defined by the benefit terms. The pensions may be stated as a specified dollar amount or as an amount that is calculated based on one or more factors such as age, years of service, and compensation. (A pension that does not meet the criteria of a defined contribution pension is classified as a defined benefit pension for purposes of Statement 68.)
Defined contribution pension plans:	Pension plans that are used to provide defined contribution pensions.
Defined contribution pensions:	Pensions having terms that (1) provide an individual account for each employee; (2) define the contributions that an employer is required to make (or the credits that it is required to provide) to an active employee's account for periods in which that employee renders service; and (3) provide that the pensions an employee will receive will depend only on the contributions (or credits) to the employee's account, actual earnings on investments of those contributions (or credits), and the effects of forfeitures of contributions (or credits) made for other employees, as well as pension plan administrative costs, that are allocated to the employee's account.
Discount rate:	The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following: 1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's fiduciary net position is projected (under the requirements of Statement 68) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments. 2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.

Entry age actuarial cost method:	A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the *normal cost.* The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the *actuarial accrued liability.*
Inactive employees:	Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits.
Measurement period:	The period between the prior and the current measurement dates.
Multiple-employer defined benefit pension plan:	A defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Net pension liability:	The liability of employers and nonemployer contributing entities to employees for benefits provided through a defined benefit pension plan.
Nonemployer contributing entities:	Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statement 68, employees are not considered nonemployer contributing entities.
Other postemployment benefits:	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits, regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
Pension plans:	Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed, and benefits are paid as they come due.
Pensions:	Retirement income and, if provided through a pension plan, postemployment benefits other than retirement income (such as death benefits, life insurance, and disability benefits). Pensions do not include postemployment healthcare benefits and termination benefits.

Plan members:	Individuals that are covered under the terms of a pension plan. Plan members generally include (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members).
Postemployment:	The period after employment.
Postemployment benefit changes:	Adjustments to the pension of an inactive employee.
Postemployment healthcare benefits:	Medical, dental, vision, and other health-related benefits paid subsequent to the termination of employment.
Projected benefit payments:	All benefits estimated to be payable through the pension plan to current active and inactive employees as a result of their past service and their expected future service.
Public employee retirement system:	A special-purpose government that administers one or more pension plans; also may administer other types of employee benefit plans, including postemployment healthcare plans and deferred compensation plans.
Real rate of return:	The rate of return on an investment after adjustment to eliminate inflation.
Service costs:	The portions of the actuarial present value of projected benefit payments that are attributed to valuation years.
Single employer:	An employer whose employees are provided with pensions through a single-employer defined benefit pension plan.
Single-employer defined benefit pension plan (single-employer pension plan):	A defined benefit pension plan that is used to provide pensions to employees of only one employer.
Special funding situations:	Circumstances in which a nonemployer entity is legally responsible for making contributions directly to a pension plan that is used to provide pensions to the employees of another entity or entities and either of the following conditions exists: The amount of contributions for which the nonemployer entity legally is responsible is *not* dependent upon one or more events or circumstances unrelated to the pensions. The nonemployer entity is the only entity with a legal obligation to make contributions directly to a pension plan.

Termination benefits:	Inducements offered by employers to active employees to hasten the termination of services, or payments made in consequence of the early termination of services. Termination benefits include early-retirement incentives, severance benefits, and other termination-related benefits.
Total pension liability:	The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of Statement.

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