Maynard Retirement System

Actuarial Valuation Report

January 1, 2015

PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION
COMMONWEALTH OF MASSACHUSETTS

Saugus Retirement System

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1. INTRODUCTION & CERTIFICATION

This report presents the results of the actuarial valuation of the Saugus Contributory Retirement System. The valuation was performed as of January 1, 2015 pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts. The actuarial assumptions used in this valuation are the same as those used in the January 1, 2013 valuation with the exception of the investment return assumption (reduced from 7.75% to 7.6%) and the mortality assumption which now reflects a fully generational table.

This valuation was based on member data as of December 31, 2014, which was supplied by the Retirement Board. Such tests as we deemed necessary were performed on the data to ensure accuracy. Asset information as of December 31, 2014 was provided in the Annual Statement for the Financial Condition as submitted to this office in accordance with G.L. c. 32, ss. 20(5)(h), 23(1) and 23(2)(e). Both the membership data and financial information were reviewed for reasonableness, but were not audited by us.

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 and demographic assumptions, increases or decreases expected as part of natural operation of the methodology used for these measurements such as additional contribution requirements based on the plan's funded status and changes in plan provisions or applicable law. As part of this valuation, we have not performed an analysis of the potential range of future measurements.

I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report. In my opinion, the actuarial assumptions used in this report are reasonable, are related to plan experience and expectations, and represent our best estimate of anticipated experience under the system. I believe this report represents an accurate appraisal of the actuarial status of the system performed in accordance with generally accepted actuarial principles and practices relating to pension plans.

Respectfully submitted,
Public Employee Retirement Administration Commission

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October 30, 2015

2. EXECUTIVE SUMMARY

PART A | COSTS UNDER CURRENT VALUATION

The principal results of the January 1, 2015 actuarial valuation are shown below.

Present Value of Future Benefits

Actives	$75,443,337
Retirees, Survivors, and Inactives	64,903,414
Total	$140,346,751

Normal Cost

Total Normal Cost	$2,655,073
Expected Employee Contributions	1,498,530
Net Normal Cost	$1,156,543

Actuarial Liability and Development of Unfunded Actuarial Liability

Actives	$51,034,182
Retirees, Survivors, and Inactives	64,903,414
Total	$115,937,596
Assets	80,567,346
Unfunded Actuarial Liability	$35,370,250

The Board recently adopted a funding schedule effective in FY16. The appropriation for FY16 under this funding schedule is shown on page 10 and the complete funding schedule is shown on page 11.

2. EXECUTIVE SUMMARY *(continued)*

PART B | COMPARISON WITH PRIOR VALUATION

The last full valuation was performed by PERAC as of January 1, 2013. The investment return assumption was decreased from 7.75% to 7.60% effective with this valuation. The salary increase assumption, which was adjusted in the 2013 valuation, has been maintained in this valuation. The mortality assumption has been modified once again to reflect future mortality improvement (see Part C). Other assumptions are based on our Local Experience Study Analysis issued in March, 2002. Below we have shown a comparison of the results between the two valuations.

	PERAC 1/1/15	PERAC 1/1/13	Increase (Decrease)	% Increase (Decrease)
Total Normal Cost	$2,655,073	$2,157,325	$497,748	23.1%
Expected Employee Contributions	1,498,530	1,256,287	242,243	19.3%
Net Normal Cost	$1,156,543	$901,038	$255,505	28.4%
Actuarial Liability				
Actives	$51,034,182	$44,935,423	$6,098,759	13.6%
Retirees and Inactives	64,903,414	59,924,363	4,979,051	8.3%
Total	$115,937,596	$104,859,786	$11,077,810	10.6%
Assets	80,567,346	67,378,206	13,189,140	19.6%
Unfunded Actuarial Liability	$35,370,250	$37,481,580	($2,111,330)	(5.6%)
Funded Ratio	69.5%	64.3%	5.2%	

2. EXECUTIVE SUMMARY *(continued)*

PART B | COMPARISON WITH PRIOR VALUATION *(continued)*

Actives	PERAC 1/1/15	PERAC 1/1/13	% Difference
Number	372	336	10.7%
Total Payroll	$17,091,787	$14,545,631	17.5%
Average Salary	$45,946	$43,291	6.1%
Average Age	46.7	48.3	(3.3%)
Average Service	11.8	13.3	(11.3%)

Retirees and Survivors	PERAC 1/1/15	PERAC 1/1/13	% Difference
Number	276	279	(1.1%)
Total Benefits*	$6,830,987	$6,538,500	4.5%
Average Benefits*	$24,750	$23,435	5.6%
Average Age	74.2	74.7	(0.7%)

**excluding State reimbursed COLA*

2. EXECUTIVE SUMMARY *(continued)*

PART C | FUNDED STATUS AND PLAN EXPERIENCE SINCE PRIOR VALUATION

Funded Status

The unfunded actuarial liability (UAL) and funded ratio are measures of the plan's funded status. These measures reflect the plan's position as of January 1, 2015. We believe these measures by themselves are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions. However, we believe these measures, in conjunction with the plan's funding schedule shown on page 11, are appropriate for assessing the amount of future contributions.

The UAL in this valuation reflects the actuarial value of assets, a method that recognizes investment gains and losses over five years. As of January 1, 2015, the actuarial value of assets is 96.2% of the market value. On a market value basis, the UAL is $32.2 million and the funded ratio is 72.3%.

Plan Experience

Plan Liabilities
Since the last valuation, there was a gain on plan liabilities of approximately $1.2 million (the actuarial liability was less than expected). This gain is determined before reflecting the assumption changes discussed on the next few pages.

Plan Assets
The Board previously adopted an asset smoothing methodology to determine the actuarial value of assets (AVA). As of January 1, 2015, the actuarial value of assets is $80.6 million compared with the market value of $83.8 million. There was an asset gain on a market value basis of approximately $4.8 million over the 2-year period. The rates of return on a market value basis in 2013 and 2014 were 15.3% and 8.2% respectively. On an AVA basis, the rates of return for 2013 and 2014 were 10.9% and 9.8% respectively.

The final recognition of the 2008 investment loss was completed in the 2013 actuarial valuation. The calculated AVA at that time was approximately 97.7% of the market value. As of January 1, 2015, the AVA is 96.2% of the market value. The recognition of the overall investment return gains during 2013 and 2014 partially contributed to an asset gain of approximately $3.8 million over the 2-year period on an actuarial value basis.

Total
There was a total net gain of approximately $5.0 million since the last valuation ($1.2 million gain on actuarial liability plus $3.8 million gain on the actuarial value of assets).

PART C | FUNDED STATUS AND PLAN EXPERIENCE SINCE PRIOR VALUATION *(continued)*

Actuarial Assumptions

Investment Return

For local retirement systems, PERAC's "standard" investment return assumption was 8.0% in our 2012 actuarial valuations. This had been our standard assumption (assuming a reasonable asset allocation) for over 15 years. Beginning with our January 1, 2013 actuarial valuations of local systems, we recommended an investment return assumption of 7.75% for most local systems (assuming a reasonable asset allocation). The trend both in Massachusetts and across the country over the past 10 years has been to reduce this assumption.

In January 2015, PRIT's investment consultant provided figures for 30 year expected return projections using a building block approach and the target allocation and expected long term returns by asset class. The gross expected annual return is 7.9% (7.4% assuming investment related expenses of 50 basis points) in this study which was a 30 basis point decrease from the 2014 study. Projected returns are one measure we use to determine the long term investment return assumption. Based on the recent study and the fact that investment return assumptions continue to move lower, we indicated the Board should consider reducing the investment return assumption as of January 1, 2015.

The Board decided to decrease this assumption in this valuation to 7.6%. In addition, we will continue to monitor this assumption and we may recommend decreasing this assumption further as part of the January 1, 2017 actuarial valuation. Any reduction in the investment return assumption increases the plan's liabilities.

This change increased the normal cost by approximately $83,000 and the total actuarial liability by approximately $1.7 million.

Salary increase

Beginning with our January 1, 2013 actuarial valuations of local systems, we decreased the salary increase assumption in conjunction with the decrease in the investment return assumption. Since the investment return assumption and the salary increase assumption both have an inflation component, we expect these assumptions should move together over the longer term. Therefore, if we make a change in the investment return assumption, we would also consider making a corresponding change in the salary increase assumption. We did not adjust the salary increase assumption in this valuation as the change in the investment return assumption is due primarily to a review of the target asset allocation. A decrease in the salary increase assumption would partially mitigate the impact of a decrease in investment return assumption.

Most systems have had actuarial gains (salary increases less than expected) from this assumption over the past 7 years due to the economic climate but it is important to emphasize the salary increase assumption is a long-term assumption. We will continue to monitor this assumption in each valuation.

Mortality

A revision to the actuarial standards of practice in 2010 required that future mortality improvements (longer life expectancy) be considered in valuations performed after July, 2011. To begin recognizing this change, as part of our January 1, 2011 local actuarial valuations, we used the RP-2000 mortality table projected 10 years with Scale AA (a mortality improvement scale). In our 2012, 2013 and 2014 valuations, we gradually extended the mortality improvement scale beyond the valuation date. In our 2014 valuations, we projected mortality improvement to 2022 for active members and 2017 for retirees.

A revised mortality table (the RP-2014 mortality table) was published in 2014. The revised table has no experience related to public plans. We have found that this table does not appear to match our experience.

However, we believe that the mortality assumption as of January 1, 2015 should reflect a "fully generational" table. A fully generational projection is two-dimensional. The mortality improvement projection is developed based on both the age of a member and the calendar year. We used retiree data from the State Retirement System over the past three years as a proxy in determining the mortality assumption for local systems. We found that the RP-2000 mortality table with projected mortality improvement using the more recently developed projection Scale BB and a base year of 2009 is appropriate for 2015 valuations. As is the case with all our assumptions, we will continue to monitor this assumption in each actuarial valuation.

This change increased the normal cost by approximately $175,000. The total actuarial accrued liability increased by approximately $3.1 million.

Overall Impact

The overall impact of these assumption changes increased the plan's actuarial liability by approximately $4.8 million. The normal cost increased by $258,000. The funding schedule shown in this report reflects these revised assumptions.

Chapter 176 Provisions

Chapter 176 of the Acts of 2011, An Act Providing for Pension Reform and Benefit Modernization made a number of changes to the Chapter 32 pension law. There are several changes that will have the most impact on decreasing plan liabilities over the longer term. These include an increase in the normal retirement age by two years (for example, from age 65 to age 67 for Group 1 members), an increase in the age (early retirement) reduction factor for ages below the maximum age (from a 4.0% to a 6.0% annual reduction), and an increase in the period for determining a member's average annual compensation (from 3 years to 5 years). Since these changes are effective only for members hired after April 1, 2012, this is the second actuarial valuation to reflect these changes.

As of January 1, 2014, there were 95 members hired after April 1, 2012. Since these members have less than two years of service and are generally young, there is relatively little impact on plan costs in this valuation. The normal cost decreased approximately $80,000 and the actuarial liability decreased approximately $240,000 for these members compared to the figures under the prior provisions.

PART C | FUNDED STATUS AND PLAN EXPERIENCE SINCE PRIOR VALUATION *(continued)*

COLA Base

This valuation reflects a $12,000 base. The 2013 valuation reflected the same base.

Funding Schedule

The funding schedule presented in this report was recently adopted by the board. The FY16 and FY17 payments and the amortization of the Early Retirement Incentive programs (ERIs) were maintained from the prior schedule except the ERI payments were adjusted to reflect the revised investment return assumption. Beginning in FY18, the schedule amortizes the remaining unfunded actuarial liability through 2025 with payments increasing 2.0% each year.

GASB 67/68

The results of the 2013 valuation were used to implement two statements of the Governmental Accounting Standards Board (GASB) that replace GASB 25 and GASB 27. The statements are commonly referred to as GASB 67 and GASB 68. GASB 67 relates to financial reporting for state and local government pension plans (plan financials) and was effective for fiscal years beginning after June 15, 2013. Therefore, GASB 67 was first effective for the plan year ending December 31, 2014. GASB 68 relates to financial reporting by state and local governments for pension plans (employer financials) and is effective for fiscal years beginning after June 15, 2014. GASB 68 was first effective for the fiscal year ending June 30, 2015 and was determined using a measurement date of December 31, 2014. We have not provided any GASB 67/68 exhibits in this report. These disclosure exhibits have been provided under separate cover. The results of this valuation will be used in next year's GASB disclosures using a measurement date of December 31, 2015.

3. SUMMARY OF VALUATION RESULTS

A. Number of Members on Current Valuation Date	
Active Members	372
Vested Terminated Members	7
Retired Members and Survivors	276
Total	655
B. Total Regular Compensation of Active Members	$17,091,787
C. Normal Cost	
Superannuation	$1,780,132
Death	182,057
Disability	531,005
Termination	161,879
Total Normal Cost	$2,655,073
Expected Employee Contributions	1,498,530
Net Employer Normal Cost	$1,156,543
D. Actuarial Liability	
Active	
Superannuation	$46,750,667
Death	975,812
Disability	2,702,665
Termination	605,038
Total Active	$51,034,182
Vested Terminated Members	735,883
Non-Vested Terminated Members	389,400
Retirees and Survivors	63,778,131
Total Actuarial Liability	$115,937,596
E. Actuarial Value of Assets	80,567,346
F. Unfunded Actuarial Liability: D – E	$35,370,250
G. Funded Ratio: E/D	69.5%

4. APPROPRIATION DEVELOPMENT FOR FISCAL YEAR 2016

PART A | DERIVATION OF APPROPRIATION

Cost Under Current Funding Schedule

1. a. Normal Cost as of January 1, 2015	$1,156,543
b. For FY16 (adjusted for timing)	$1,244,440
c. Estimated Expenses	$250,000
d. Total Employer Normal Cost (b+c)	$1,494,440
2. a. Unfunded Actuarial Liability as of January 1, 2015	$33,412,710
b. FY16 amortization payment (10-year, 2.0% increasing) *	$3,966,761
3. a. Unfunded Liability due to 2002 ERI	$1,957,540
b. FY16 amortization payment (13-year, 3.0% increasing)	$207,798
4. Total FY16 Payment [Sum of 1(d), 2(b) and 3(b)]	$5,669,000

Figures may not add due to rounding.

* FY16 appropriation was maintained at the same level as the prior schedule.

All amounts assume payments will be made January 1 of each fiscal year.

4. APPROPRIATION DEVELOPMENT FOR FISCAL YEAR 2016 *(continued)*

PART B | CURRENT FUNDING SCHEDULE

Fiscal Year	Normal Cost	Amort. of UAL	Amort. of 2002 ERI	Total Cost	Unfunded Act. Liab.	% Change
2016	1,494,440	3,966,761	207,798	5,669,000	36,714,320	
2017	1,561,690	4,347,278	214,032	6,123,000	35,171,415	8.0%
2018	1,631,966	4,839,838	220,453	6,692,257	33,109,803	9.3%
2019	1,705,405	4,936,635	227,067	6,869,106	30,373,565	2.6%
2020	1,782,148	5,035,368	233,879	7,051,394	27,322,034	2.7%
2021	1,862,344	5,136,075	240,895	7,239,315	23,929,031	2.7%
2022	1,946,150	5,238,796	248,122	7,433,068	20,166,342	2.7%
2023	2,033,727	5,343,572	255,566	7,632,865	16,003,563	2.7%
2024	2,125,244	5,450,444	263,233	7,838,921	11,407,928	2.7%
2025	2,220,880	5,559,453	271,130	8,051,463	6,344,135	2.7%
2026	2,320,820		279,264	2,600,084	774,144	-67.7%
2027	2,425,257		287,642	2,712,898	543,104	4.3%
2028	2,534,394		296,271	2,830,664	285,808	4.3%
2029	2,648,441			2,648,441	0	-6.4%

All amounts assume payments will be made January 1 of each fiscal year.
Amortization of unfunded liability on 2.0% annual increasing basis to FY25.
FY16 normal cost includes assumed expenses of $250,000 and is assumed to increase 4.5% per year.
FY16 and FY17 appropriations were maintained at the same level as the prior schedule.

5. GASB INFORMATION

The actuarial information required by Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 replaces the information required by Statement Nos. 25 and 27.

The information required by GASB 67 (plan) is to be reported and measured as of December 31 each year. For the initial measurement as of December 31, 2014, we rolled the liabilities forward from the prior valuation to December 31, 2014.

The information required by GASB 68 (employer) is to be reported as of the end of the fiscal year (June 30 for cities and towns). We are allowed to select a measurement date at any date during the fiscal year. For the initial measurement as of June 30, 2015, we selected a measurement date of December 31, 2014 which is consistent with GASB 67.

We have not provided any GASB 67 or 68 exhibits in this valuation report. We have provided the disclosure exhibits under separate cover.

Although GASB 25 no longer applies, we are including the schedule of funding progress previously required by the Statement to provide historical context.

Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL)* (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Cov. Payroll ((b-a)/c)
1/1/2015	$80,567,346	$115,937,596	$35,370,250	69.5%	$17,091,787	206.9%
1/1/2013	$67,378,206	$104,859,786	$37,481,580	64.3%	$14,545,631	257.7%
1/1/2011	$67,248,581	$99,151,437	$31,902,856	67.8%	$15,092,728	211.4%
1/1/2009	$55,581,339	$92,728,717	$37,147,378	59.9%	$14,176,916	262.0%
1/1/2007	$55,897,335	$84,272,310	$28,374,975	66.3%	$14,220,109	199.5%

**excludes State reimbursed COLA*

6. PLAN ASSETS

A | BREAKDOWN OF ASSETS BY INVESTMENT TYPE

Cash and Cash Equivalents	$341,287
PRIT Cash	$150,047
PRIT Fund	$80,653,954
Accounts Receivable	$2,624,795
Accounts Payable	(3,906)
Total	$83,766,177

B | BREAKDOWN OF ASSETS BY FUND

Annuity Savings Fund	$17,085,608
Annuity Reserve Fund	$4,748,489
Military Fund	$25,937
Pension Fund	$2,865,482
Pension Reserve Fund	59,040,661
Total	$83,766,177

C | MARKET VALUE OF ASSETS $83,766,177

D | ACTUARIAL VALUE OF ASSETS $80,567,346

6. PLAN ASSETS *(continued)*

E | DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

	2014	2015
A. Development of total investment income including appreciation		
1. Beginning of year market value	78,319,855	83,766,177
2a. Employee contributions	1,590,970	
b. Employer contributions	5,249,000	
c. Other receipts	591,978	
d. Total receipts: (a) + (b) + (c)	7,431,948	
e. Benefit payments	6,972,211	
f. Expenses	562,527	
g. Other disbursements	610,283	
h. Total disbursements: (e) + (f) + (g)	8,145,021	
i. Cash flow: (d) – (h)	(713,073)	
3. End of year market value	83,766,177	
4. Investment income including appreciation: (3) – (1) – (2(i))	6,159,395	
B. Expected market value development		
1. Beginning of year market value	78,319,855	
2. Cash flow (A2(i))	(713,073)	
3. Expected Return on (1)	6,069,789	
4. Expected return on cash flow A2(i) x 0.0775 / 2	(27,632)	
5. Expected market value end of year (1)+(2)+(3)+(4)	83,648,939	
C. Gain/(loss) for year: A3-B5	117,238	
D. Development of Actuarial Value of Assets		
1. Beginning of year market value	78,319,855	83,766,177
2a. Asset gain/(loss) in prior year	4,692,660	117,238
b. Asset gain/(loss) in 2nd prior year	3,161,722	4,692,660
c. Asset gain/(loss) in 3rd prior year	(4,876,219)	3,161,722
d. Asset gain/(loss) in 4th prior year	2,755,202	(4,876,219)
3. Unrecognized gain/(loss) .8 x [2a] + .6 x [2b] + .4 x [2c] +.2 x [2d]	4,251,714	3,198,831
4. Beginning of year actuarial value of assets: [1] - [3]	74,068,141	80,567,346
5. Actuarial value / Market value	94.6%	96.2%
6. Adjusted actuarial value: (4) but not less than 90% nor greater than 110% of market value	74,068,141	80,567,346

7. INFORMATION ON SYSTEM MEMBERSHIP

A critical element of an actuarial valuation is accurate and up-to-date membership information. PERAC conducted an extensive review of member data submitted for this valuation.

PART A | ACTIVE MEMBERS

	Actives	Vested Terminations
Number of Members	372	7
Average Age	46.7	47.7
Average Service	11.8	13.6
Average Salary	$45,946	$41,811
Average Annuity Savings Fund Balance	$43,662	$45,747

Age by Service Distribution of Active Members

	Years of Service							
Present Age	0 - 4	5 –9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total
0 - 24	22							22
25 - 29	33	1						34
30 - 34	10	7	4					21
35 - 39	8	6	7	3				24
40 - 44	13	6	9	13	3			44
45 - 49	16	10	5	12	9	4		56
50 - 54	14	6	16	13	10	12	5	76
55 - 59	9	5	10	11	4	5	2	46
60 - 64	0	6	3	10	3	5	8	35
65+	2	2	1	3	2	1	3	14
Total	127	49	55	65	31	27	18	372

7. INFORMATION ON SYSTEM MEMBERSHIP *(continued)*

PART A | ACTIVE MEMBERS *(continued)*

Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	22	$567,774	$25,808
25 - 29	34	$1,320,789	$38,847
30 - 34	21	$984,791	$46,895
35 - 39	24	$1,185,280	$49,387
40 - 44	44	$2,480,949	$56,385
45 - 49	56	$2,822,295	$50,398
50 - 54	76	$3,574,643	$47,035
55 - 59	46	$1,878,353	$40,834
60 - 64	35	$1,726,753	$49,336
65+	14	$550,160	$39,297
Total	372	$17,091,787	$45,946

7. INFORMATION ON SYSTEM MEMBERSHIP *(continued)*

PART B | RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	204	2	34	36	276
Average Age	73.9	75.8	68.1	81.5	74.2
Average Annual Benefit	$25,071	$21,956	$35,128	$16,288	$25,142

Benefit by Payment and Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Total Annuity	$884,970	$5,983	$92,276	$23,214	$1,006,443
Pension (excluding State reimbursed COLA)	$4,207,186	$35,948	$1,071,022	$510,388	$5,824,544
State reimbursed COLA	$22,350	$1,980	$31,039	$52,749	$108,118
Total	$5,114,506	$43,911	$1,194,337	$586,351	$6,939,105

7. INFORMATION ON SYSTEM MEMBERSHIP *(continued)*

PART B | RETIREES & SURVIVORS *(continued)*

Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	0	$0	$0
40 - 44	0	$0	$0
45 - 49	3	$45,486	$15,162
50 - 54	2	$68,459	$34,230
55 - 59	16	$439,310	$27,457
60 - 64	28	$956,440	$34,159
65 - 69	55	$1,667,888	$30,325
70 - 74	50	$1,345,755	$26,915
75 - 79	35	$751,855	$21,482
80 - 84	39	$872,672	$22,376
85 - 89	31	$543,648	$17,537
90+	17	$247,592	$14,564
Totals	276	$6,939,105	$25,142

8. VALUATION COST METHODS

PART A | ACTUARIAL COST METHOD

The Actuarial Cost Method which was used to determine pension liabilities in this valuation is known as the *Entry Age Normal Cost Method***.** Under this method the *Normal Cost* for each active member on the valuation date is determined as the level percent of salary, which, if paid annually from the date the employee first became a member of the retirement system, would fully fund by retirement, death, disability or termination, the projected benefits which the member is expected to receive. The *Actuarial Liability* for each member is determined as the present value as of the valuation date of all projected benefits which the member is expected to receive, minus the present value of future annual Normal Cost payments expected to be made to the fund. Since only active members have a Normal Cost, the Actuarial Liability for inactives, retirees and survivors is simply equal to the present value of all projected benefits. The sum of Normal Cost and Actuarial Liability for each member is equal to the Normal Cost and Actuarial Liability for the Plan. The *Unfunded Actuarial Liability* is the Actuarial Liability less current assets.

The Normal Cost for a member will remain a level percent of salary for each year of membership except for changes in provisions of the Plan or the actuarial assumptions employed in projection of benefits and present value determinations. The Normal Cost for the entire system will also change due to the addition of new members or the retirement, death or termination of members. The Actuarial Liability for a member will increase each year to reflect the additional accrual of Normal Cost. It will also change if the Plan provisions or actuarial assumptions are changed.

Differences each year between the actual experience of the Plan and the experience projected by the actuarial assumptions are reflected by adjustments to the Unfunded Actuarial Liability. An experience difference which increases the Unfunded Actuarial Liability is called an *Actuarial Loss* and one which decreases the Unfunded Actuarial Liability is called an *Actuarial Gain.*

PART B | ASSET VALUATION METHOD

The actuarial value of assets is determined in accordance with the deferred recognition method under which 20% of the gains or losses occurring in the prior year are recognized, 40% of those occurring 2 years ago, etc., so that 100% of gains or losses occurring 5 years ago are recognized. The actuarial value of assets will be adjusted, if necessary, in order to remain between 90% and 110% of market value.

9. ACTUARIAL ASSUMPTIONS

Investment Return

7.60% per year net of investment expenses *(prior assumption 7.75%)*

The investment return assumption is a long term assumption and is based on capital market expectations by asset class, historical returns, and professional judgment. We considered analysis prepared by PRIM's investment advisor using a building block approach which included expected returns by asset class, risk analysis, and the determination of a 30 year expected target rate of return.

Interest Rate Credited to the Annuity Savings Fund

3.5% per year

Assumed Rate of Cost of Living Increases (COLA)

3.0% per year (on the first $12,000 of an allowance)

Mortality

Pre-retirement mortality reflects RP-2000 Employees table projected generationally with Scale BB and a base year of 2009 (gender distinct). *(Prior assumption- RP-2000 Employees table projected 20 years with Scale AA.)*

Post-retirement mortality reflects RP-2000 Healthy Annuitant table projected generationally with Scale BB and a base year of 2009 (gender distinct). *(Prior assumption- RP-2000 Healthy Annuitant table projected 15 years with Scale AA.)*

For disabled members, the mortality rate is assumed to be in accordance with the RP-2000 Healthy Annuitant Table projected generationally with Scale BB and a base year of 2012 (gender distinct). *(Prior assumption RP-2000 Healthy Annuitant table projected 15 years with Scale AA set forward 2 years.)*

It is assumed that 55% of pre-retirement deaths are job-related for Group 1 and 2 members and 90% are job-related for Group 4 members. For members retired under an Accidental Disability, 40% of deaths are assumed to be from the same cause as the disability.

We reviewed a sampling of a few local retirement systems and compared those results with the results we found in performing our analysis on the State Retirement System for the years 2012-2014. We found the results comparable, so we used the same assumption we used with the State Retirement System. For that analysis, the mortality assumptions reflect our recent experience analysis published in 2014 (based on the years 2006-2011), updated to reflect data through January 1, 2015 for post-retirement mortality, and professional judgment. As such, this assumption reflects observed current mortality as well as expected mortality improvement.

9. ACTUARIAL ASSUMPTIONS *(continued)*

Salary Increase

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%
10+	4.25%	4.50%	4.75%

The salary increase assumption reflects both prior experience and professional judgment.

Withdrawal

Based on analysis of past experience. Annual rates are based on years of service. Sample annual rates for Groups 1 and 2 are shown below. For Group 4 members the rate is 0.015 each year for service up to and including 10 years. No withdrawal is assumed thereafter.

Service	Groups 1 & 2
0	0.150
5	0.076
10	0.054
15	0.033
20	0.020

Withdrawal rates are based on our most recent experience analysis which reviewed age, gender and job group. The assumption reflects this analysis as well as professional judgment.

9. ACTUARIAL ASSUMPTIONS *(continued)*

Disability

Based on an analysis of past experience. It is also assumed that the percentage of job-related disabilities is 55% for Groups 1 & 2 and 90% for Group 4.

Age	Groups 1 & 2	Group 4
20	0.00010	0.0010
30	0.00030	0.0030
40	0.00101	0.0030
50	0.00192	0.0125
60	0.00280	0.0085

Disability rates are based on our most recent experience analysis which reviewed age, gender and job group. The assumption reflects this analysis as well as professional judgment.

Expenses

An amount of $250,000 has been included in the Normal Cost for FY16. This amount includes estimated administrative expenses and a portion of the investment related expenses. This amount is assumed to increase by 4.5% each year.

Members Hired on or After April 2, 2012

Chapter 176 of the Acts of 2011 changed the retirement eligibility for the different job groups. For example, Group 1 eligibility changed from 55 years old with 10 years of service to 60 years old with 10 years of service (Chapter 176 removed the provision that allowed retirement at any age with 20 years of service). Our software system is programmed such that at any given age, a member is assumed to either retire or terminate, but not both. Therefore, we adjusted the retirement and termination rates for members impacted by Chapter 176. For example, for Group 1 members, we removed retirement rates for ages 50-59. Termination rates remain in effect for those years. We will monitor these assumptions going forward.

9. ACTUARIAL ASSUMPTIONS *(continued)*

Retirement

Age	Groups 1 & 2		Group 4
	Male	Female	
45-49	0.000	0.000	0.010
50	0.010	0.015	0.020
51	0.010	0.015	0.020
52	0.010	0.020	0.020
53	0.010	0.025	0.050
54	0.020	0.025	0.075
55	0.020	0.055	0.150
56	0.025	0.065	0.100
57	0.025	0.065	0.100
58	0.050	0.065	0.100
59	0.065	0.065	0.150
60	0.120	0.050	0.200
61	0.200	0.130	0.200
62	0.300	0.150	0.250
63	0.250	0.125	0.250
64	0.220	0.180	0.300
65	0.400	0.150	1.000
66	0.250	0.200	1.000
67	0.250	0.200	1.000
68	0.300	0.250	1.000
69	0.300	0.200	1.000
70 and after	1.000	1.000	1.000

Retirement rates are based on our most recent experience analysis which reviewed age, service, gender and job group. The assumption reflects this analysis as well as professional judgment.

10. SUMMARY OF PLAN PROVISIONS

ADMINISTRATION

There are 104 contributory retirement systems for public employees in Massachusetts. Each system is governed by a retirement board and all boards, although operating independently, are governed by Chapter 32 of the Massachusetts General Laws. This law in general provides uniform benefits, uniform contribution requirements and a uniform accounting and funds structure for all systems.

PARTICIPATION

Participation is mandatory for all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by the retirement board, and approved by PERAC. Membership is optional for certain elected officials.

There are 3 classes of membership in the retirement system:

Group 1:

General employees, including clerical, administrative, technical and all other employees not otherwise classified.

Group 2:

Certain specified hazardous duty positions.

Group 4:

Police officers, firefighters, and other specified hazardous positions.

MEMBER CONTRIBUTIONS

Member contributions vary depending on the most recent date of membership:

Prior to 1975:	5% of regular compensation
1975 - 1983:	7% of regular compensation
1984 to 6/30/96:	8% of regular compensation
7/1/96 to present:	9% of regular compensation
1979 to present:	an additional 2% of regular compensation in excess of $30,000.

In addition, members of Group 1 who join the system on or after April 2, 2012 will have their withholding rate reduced to 6 % after achieving 30 years of creditable service.

10. SUMMARY OF PLAN PROVISIONS *(continued)*

RATE OF INTEREST

Interest on regular deductions made after January 1, 1984 is a rate established by PERAC in consultation with the Commissioner of Banks. The rate is obtained from the average rates paid on individual savings accounts by a representative sample of at least 10 financial institutions.

RETIREMENT AGE

The mandatory retirement age for some Group 2 and Group 4 employees is age 65. Most Group 2 and Group 4 members may remain in service after reaching age 65. Group 2 and Group 4 members who are employed in certain public safety positions are required to retire at age 65. There is no mandatory retirement age for employees in Group 1.

SUPERANNUATION RETIREMENT

A person who became a member before April 2, 2012 is eligible for a superannuation retirement allowance (service retirement) upon meeting the following conditions:

- completion of 20 years of service, or
- attainment of age 55 if hired prior to 1978, or if classified in Group 4, or
- attainment of age 55 with 10 years of service, if hired after 1978, and if classified in Group 1 or 2

A person who became a member on or after April 2, 2012 is eligible for a superannuation retirement allowance (service retirement) upon meeting the following conditions:

- attainment of age 60 with 10 years of service if classified in Group 1, or
- attainment of age 55 with 10 years of service if classified in Group 2, or
- attainment of age 55 if hired prior to 1978, or if classified in Group 4.

10. SUMMARY OF PLAN PROVISIONS *(continued)*

AMOUNT OF BENEFIT

A member's annual allowance is determined by multiplying average salary by a benefit rate related to the member's age and job classification at retirement, and the resulting product by his creditable service. The amount determined by the benefit formula cannot exceed 80% of the member's highest three year (or five year salary as discussed below) average salary. For veterans as defined in G.L. c. 32, s. 1, there is an additional benefit of $15 per year for each year of creditable service, up to a maximum of $300.

- Salary is defined as gross regular compensation. For employees who become 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 persons who became members prior to April 2, 2012, Average Salary is the average annual rate of regular compensation received during the 3 consecutive years that produce the highest average, or, if greater, during the last 3 years (whether or not consecutive) preceding retirement.

- For persons who became members on or after April 2, 2012, Average Salary is the average annual rate of regular compensation received during the 5 consecutive years that produce the highest average, or, if greater, during the last 5 years (whether or not consecutive) preceding retirement.

- The Benefit Rate varies with the member's retirement age. For persons who became members prior to April 2, 2012 the highest rate of 2.5% applies to Group 1 employees who retire at or after age 65, Group 2 employees who retire at or after age 60, and to Group 4 employees who retire at or after age 55. A .1% reduction is applied for each year of age under the maximum age for the member's group. For Group 2 employees who terminate from service under age 55, the benefit rate for a Group 1 employee shall be used.

- For persons who became members on or after April 2, 2012 and retire with less than 30 years of creditable service, the highest rate of 2.5% applies to Group 1 employees who retire at or after age 67, Group 2 employees who retire at or after age 62, and to Group 4 employees who retire at or after age 57. A .15% reduction is applied for each year of age under the maximum age for the member's group.

- For persons who became members on or after April 2, 2012 and retire with more than 30 years of creditable service, the highest rate of 2.5% applies to Group 1 employees who retire at or after age 67, Group 2 employees who retire at or after age 62, and to Group 4 employees who retire at or after age 55. A .125% reduction is applied for each year of age under the maximum age for the member's group.

10. SUMMARY OF PLAN PROVISIONS *(continued)*

DEFERRED VESTED BENEFIT

A participant who has attained the requisite years of creditable service can elect to defer his or her retirement until a later date. Group 4 employees cannot defer beyond age 65. All participants must begin to receive a retirement allowance or withdraw their accumulated deductions no later than April 15 of the calendar year following the year they reach age 70½.

WITHDRAWAL OF CONTRIBUTIONS

Member contributions may be withdrawn upon termination of employment. The interest rate for employees who first become members on or after January 1, 1984 who voluntarily withdraw their contributions with less than 10 years of service will be 3%. Interest payable on all other withdrawals will be set at regular interest.

DISABILITY RETIREMENT

The Massachusetts Retirement Plan provides 2 types of disability retirement benefits:

ORDINARY DISABILITY

Eligibility: Non-veterans who become totally and permanently disabled by reason of a non-job related condition with at least 10 years of creditable service (or 15 years creditable service in systems in which the local option contained in G.L. c. 32, s.6(1) has not been adopted).

Veterans with ten years of creditable service who become totally and permanently disabled by reason of a non-job related condition prior to reaching "maximum age". "Maximum age" applies only to employees classified in Group 4 who are subject to mandatory retirement.

Retirement Allowance: For persons who became members prior to April 2, 2012, the benefit is equal to the accrued superannuation retirement benefit as if the member was age 55. If the member is a veteran, the benefit is 50% of the member's final rate of salary during the preceding 12 months, plus an annuity based upon accumulated member contributions plus credited interest. If the member is over age 55, he or she will receive not less than the superannuation allowance to which he or she is entitled.

For persons in Group 1 who became members on or after April 2, 2012, the benefit is equal to the accrued superannuation retirement benefit as if the member was age 60. If the member is a veteran, the benefit is 50% of the member's final rate of salary during the preceding 12 months, plus an annuity based upon accumulated member contributions plus credited interest. If the member is over age 60, he or she will receive not less than the superannuation allowance to which he or she would have been entitled had they retired for superannuation.

10. SUMMARY OF PLAN PROVISIONS *(continued)*

ORDINARY DISABILITY *(continued)*

For persons in Group 2 and Group 4 who became members on or after April 2, 2012, the benefit is equal to the accrued superannuation retirement benefit as if the member was age 55. If the member is a veteran, the benefit is 50% of the member's final rate of salary during the preceding 12 months, plus an annuity based upon accumulated member contributions plus credited interest. If the member is over age 55, he or she will receive not less than the superannuation allowance to which he or she is entitled

ACCIDENTAL DISABILITY

Eligibility: Applies to members who become permanently and totally unable to perform the essential duties of the position as a result of a personal injury sustained or hazard undergone while in the performance of duties. There are no minimum age or service requirements.

Retirement Allowance: 72% of salary plus an annuity based on accumulated member contributions, with interest. This amount is not to exceed 100% of pay. For those who became members in service after January 1, 1988 or who have not been members in service continually since that date, the amount is limited to 75% of pay. There is an additional pension of $821.52 per year (or $312.00 per year in systems in which the local option contained in G.L. c. 32, s. 7(2)(a)(iii) has not been adopted), per child who is under 18 at the time of the member's retirement, with no age limitation if the child is mentally or physically incapacitated from earning. The additional pension may continue up to age 22 for any child who is a full time student at an accredited educational institution. For systems that have adopted Chapter 157 of the Acts of 2005, veterans as defined in G.L. c. 32, s. 1 receive an additional benefit of $15 per year for each year of creditable service, up to a maximum of $300.

ACCIDENTAL DEATH

Eligibility: Applies to members who die as a result of a work-related injury or if the member was retired for accidental disability and the death was the natural and proximate result of the injury or hazard undergone on account of which such member was retired.

Allowance: An immediate payment to a named beneficiary equal to the accumulated deductions at the time of death, plus a pension equal to 72% of current salary and payable to the surviving spouse, dependent children or the dependent parent, plus a supplement of $821.52 per year, per child (or $312.00 per year in systems in which the local option contained in G.L. c. 32, s. 9(2)(d)(ii) has not been adopted), payable to the spouse or legal guardian until all dependent children reach age 18 or 22 if a full time student, unless mentally or physically incapacitated.

The surviving spouse of a member of a police or fire department or any corrections officer who, under specific and limited circumstances detailed in the statute, suffers an accident and is killed or sustains injuries while in the performance of his duties that results in his death, may receive a pension equal to the maximum salary for the position held by the member upon his death.

In addition, an eligible family member may receive a one-time payment of $150,000.00 from the State Retirement Board.

10. SUMMARY OF PLAN PROVISIONS *(continued)*

DEATH AFTER ACCIDENTAL DISABILITY RETIREMENT

Effective November 7, 1996, Accidental Disability retirees were allowed to select Option C at retirement and provide a benefit for an eligible survivor. For Accidental Disability retirees prior to November 7, 1996, who could not select Option C, if the member's death is from a cause unrelated to the condition for which the member received accidental disability benefits, a surviving spouse will receive an annual allowance of $6,000. For Systems that accept the provisions of Section 28 of Chapter 131 of the Acts of 2010 the amount of this benefit is $9,000 and for Systems that accept the provisions of Section 65 of Chapter 139 of the Acts of 2012 the amount of this benefit is $12,000.

DEATH IN ACTIVE SERVICE

Allowance: An immediate allowance equal to that which would have been payable had the member retired and selected Option C on the day before his or her death. For a member who became a member prior to April 2, 2012 whose death occurred prior to the member's superannuation retirement age, the age 55 benefit rate is used. For a member classified in Group 1 who became a member on or after April 2, 2012 whose death occurred, the age 60 benefit rate is used. If the member died after age 60, the actual age is used. The minimum annual allowance payable to the surviving spouse of a member in service who dies with at least two years of creditable service is $3,000 unless the retirement system has accepted the local option increasing this minimum annual allowance to $6,000, provided that the member and the spouse were married for at least one year and living together on the member's date of death

The surviving spouse of such a member in service receives an additional allowance equal to the sum of $1,440 per year for the first child and $1,080 per year for each additional child until all dependent children reach age 18 or 22 if a full time student, unless mentally or physically incapacitated.

COST OF LIVING

If a system has accepted Chapter 17 of the Acts of 1997, and the Retirement Board votes to pay a cost of living increase (COLA) for that year, the percentage is determined based on the increase in the Consumer Price Index used for indexing Social Security benefits, but cannot exceed 3.0%. Section 51 of Chapter 127 of the Acts of 1999, if accepted, allows boards to grant COLA increases greater than that determined by CPI but not to exceed 3.0%. The first $12,000 of a retiree's total allowance is subject to a COLA. The total COLA for periods from 1981 through 1996 is paid for by the Commonwealth of Massachusetts.

Under the provisions of Chapter 32, Section 103(j) inserted by Section 19 of Chapter 188 of the Acts of 2010, systems may increase the maximum base on which the COLA is calculated in multiples of $1,000. Each increase must be accepted by a majority vote of the Retirement Board and approved by the legislative body.

10. SUMMARY OF PLAN PROVISIONS *(continued)*

METHODS OF PAYMENT

A member may elect to receive his or her retirement allowance in one of 3 forms of payment.

Option A: Total annual allowance, payable in monthly installments, commencing at retirement and terminating at the member's death.

Option B: A reduced annual allowance, payable in monthly installments, commencing at retirement and terminating at the death of the member, provided, however, that if the total amount of the annuity portion received by the member is less than the amount of his or her accumulated deductions, including interest, the difference or balance of his accumulated deductions will be paid in a lump sum to the retiree's beneficiary or beneficiaries of choice.

Option C: A reduced annual allowance, payable in monthly installments, commencing at retirement. At the death of the retired employee, 2/3 of the allowance is payable to the member's designated beneficiary (who may be the spouse, or former spouse who is unmarried at the time of retirement for a member whose retirement becomes effective on or after February 2, 1992, child, parent, sister, or brother of the employee) for the life of the beneficiary. For members who retired on or after January 12, 1988, if the beneficiary pre-deceases the retiree, the benefit payable increases (or "pops up" to Option A) based on the factor used to determine the Option C benefit at retirement. For members who retired prior to January 12, 1988, if the System has accepted Section 288 of Chapter 194 of the Acts of 1998 and the beneficiary pre-deceases the retiree, the benefit payable "pops up" to Option A in the same fashion. The Option C became available to accidental disability retirees on November 7, 1996.

ALLOCATION OF PENSION COSTS

If a member's total creditable service was partly earned by employment in more than one retirement system, the cost of the "pension portion" is allocated between the different systems pro rata based on the member's service within each retirement system. If a member received regular compensation concurrently from two or more systems on or after January 1, 2010, and was not vested in both systems as of January 1, 2010, such a pro-ration will not be undertaken. This is because such a person will receive a separate retirement allowance from each system.

11. GLOSSARY OF TERMS

ACTUARIAL ACCRUED LIABILITY

That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employee contributions. It is the portion of the Actuarial Present Value attributable to service rendered as of the Valuation Date.

ACTUARIAL ASSUMPTIONS

Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the amount and duration of pension benefits, such as: mortality, withdrawal, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

ACTUARIAL COST METHOD (OR FUNDING METHOD)

A procedure for allocating the Actuarial Present Value of all past and future pension plan benefits to the Normal Cost and the Actuarial Accrued Liability.

ACTUARIAL GAIN OR LOSS (OR EXPERIENCE GAIN OR LOSS)

A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between two Actuarial Valuation dates.

Note: The effect on the Accrued Liability and/or the Normal Cost resulting from changes in the Actuarial Assumptions, the Actuarial Cost Method, or pension plan provisions would be described as such, not as an Actuarial Gain (Loss).

ACTUARIAL PRESENT VALUE

The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

AMORTIZATION PAYMENT

That portion of the pension plan appropriation which represents payments made to pay interest on and the reduction of the Unfunded Accrued Liability.

11. GLOSSARY OF TERMS *(continued)*

ANNUAL STATEMENT

The statement submitted to PERAC each year that describes the asset holdings and Fund balances as of December 31 and the transactions during the calendar year that affected the financial condition of the retirement system.

ANNUITY RESERVE FUND

The fund into which total accumulated deductions, including interest, is transferred at the time a member retires, and from which annuity payments are made.

ANNUITY SAVINGS FUND

The fund in which employee contributions plus interest credited are held for active members and for former members who have not withdrawn their contributions and are not yet receiving a benefit (inactive members).

ASSETS

The value of securities as described in Section VIII.

COST OF BENEFITS

The estimated payment from the pension system for benefits for the fiscal year. This was the minimum amount payable during the first six years of some funding schedules.

FUNDING SCHEDULE

The schedule based upon the most recently approved actuarial valuation which sets forth the amount which would be appropriated to the pension system in accordance with Section 22(6A), Section 22D or Section 22F of M.G.L. Chapter 32.

GASB

Governmental Accounting Standards Board

11. GLOSSARY OF TERMS *(continued)*

NORMAL COST

Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits, which is to be paid in a single fiscal year. The Employee Normal Cost is the amount of the expected employee contributions for the fiscal year. The Employer Normal Cost is the difference between the Total Normal Cost and the Employee Normal Cost.

PENSION FUND

The fund into which appropriation amounts as determined by PERAC are paid and from which pension benefits are paid.

PENSION RESERVE FUND

The fund which shall be credited with all amounts set aside by a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts would include excess interest earnings.

SPECIAL FUND FOR MILITARY SERVICE CREDIT

The fund which is credited with amounts paid by the retirement board equal to the amount which would have been contributed by a member during a military leave of absence as if the member had remained in active service of the retirement board. In the event of retirement or a non-job related death, such amount is transferred to the Annuity Reserve Fund. In the event of termination prior to retirement or death, such amount shall be transferred to the Pension Fund.

UNFUNDED ACCRUED LIABILITY

The excess of the Actuarial Accrued Liability over the Assets.

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