ACTUARIAL VALUATION REPORT

Chelsea
Contributory Retirement System
January 1, 2013

PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION
COMMONWEALTH OF MASSACHUSETTS

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1. INTRODUCTION & CERTIFICATION

This report presents the results of the actuarial valuation of the Chelsea Contributory Retirement System. The valuation was performed as of January 1, 2013 pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts.

This valuation was based on member data as of December 31, 2012, 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, 2012 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.

I am a member of the 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

James R. Lamenzo
Member of the American Academy of Actuaries
Associate of the Society of Actuaries
Enrolled Actuary Number 14-4709

Joseph E. Connarton
Executive Director

John F. Boorack
Senior Actuarial Associate

May 9, 2014

2. EXECUTIVE SUMMARY

PART A | COSTS UNDER CURRENT VALUATION

The principal results of the January 1, 2013 actuarial valuation are shown below.

Present Value of Future Benefits

Actives	$130,573,910
Retirees, Survivors, and Inactives	85,197,283
Total	$215,771,193

Normal Cost

Total Normal Cost	$4,614,344
Expected Employee Contributions	2,722,197
Net Normal Cost	$1,892,147

Actuarial Liability and Development of Unfunded Actuarial Liability

Actives	$89,521,875
Retirees, Survivors, and Inactives	85,197,283
Total	$174,719,158
Assets	92,679,560
Unfunded Actuarial Liability	$82,039,598

The Board recently adopted a funding schedule effective in FY14. The appropriation for FY14 under this funding schedule is shown on page 9 and the complete funding schedule is shown on page 10.

2. EXECUTIVE SUMMARY *(continued)*

PART B | COMPARISON WITH PRIOR VALUATION

The last full valuation was performed by PERAC as of January 1, 2011. Our Local Experience Study Analysis (issued in March, 2002) forms the basis for most of the actuarial assumptions (other than the investment return assumption) used in this valuation. The investment return assumption was decreased from 8.0% to 7.75% effective with this valuation. In addition, the mortality assumption has been modified to reflect future mortality improvement and the salary increase assumption has been lowered to better reflect the current economic environment (see Part C). Below we have shown the comparison between the two valuations.

	PERAC 1/1/13	PERAC 1/1/11	Increase (Decrease)	% Increase (Decrease)
Total Normal Cost	$4,614,344	$4,462,615	$151,729	3.4%
Expected Employee Contributions	2,722,197	2,575,232	146,965	5.7%
Net Normal Cost	$1,892,147	$1,887,383	$4,764	0.3%
Actuarial Liability				
Actives	$89,521,875	$81,710,753	$7,811,122	9.6%
Retirees and Inactives	85,197,283	75,918,137	9,279,146	12.2%
Total	$174,719,158	$157,628,890	$17,090,268	10.8%
Assets	92,679,560	84,087,066	8,592,494	10.2%
Unfunded Actuarial Liability	$82,039,598	$73,541,824	$8,497,774	11.6%
Funded Ratio	53.0%	53.3%	(0.3%)	

2. EXECUTIVE SUMMARY *(continued)*

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

Actives	PERAC 1/1/13	PERAC 1/1/11	% Difference
Number	670	659	1.7%
Total Payroll	$31,121,488	$29,750,417	4.6%
Average Salary	$46,450	$45,145	2.9%
Average Age	46.3	46.3	0.0%
Average Service	12.2	11.9	2.5%

Retirees and Survivors	PERAC 1/1/13	PERAC 1/1/11	% Difference
Number	372	384	(3.1%)
Total Benefits*	$8,787,325	$8,299,498	5.9%
Average Benefits*	$23,622	$21,613	9.3%
Average Age	73.0	73.7	(0.9%)

**excluding State reimbursed COLA*

2. EXECUTIVE SUMMARY *(continued)*

PART C | PLAN EXPERIENCE AND CHANGES FROM PRIOR VALUATION

Plan Experience

Plan Liabilities
Since the last valuation, there was a gain on plan liabilities of approximately $4.5 million (the actuarial liability was less than expected). This gain is primarily due to salary increases for continuing active members increasing less than assumed (average pay increased 2.3% per year for continuing actives). This gain is determined before reflecting the assumption changes discussed on the next page.

You provided information to us regarding a number of union contract settlements during 2013. These contracts had pay increases retroactive to July 1, 2010, July 1, 2011, and July 1, 2012. The data provided to us as of December 31, 2012 included only pay for 2012 before these contracts were settled. In addition, the data does not provide any union affiliation that we could use to help determine how to adjust pay to reflect the retroactive increases. Determining the 2012 pay for each member including retroactive increases would need to be done by the Board on a case by case basis. To complete the valuation as quickly as possible, we estimated pay by job group based on our review of the various contract settlements.

We increased the pay provided for Group 4 members by 6.5%. We increased the pay provided for all Group 1 members by 1.0%. Note that some active members are not subject to union negotiated contracts and would not have an adjusted pay increase. But since we cannot identify union members individually, our adjustments reflect the estimated impact on total pay for each job group. We believe our estimates are conservative and if the actual 2012 pay for each member were available, our calculated actuarial liabilities would be somewhat lower. We will carefully review this issue when we perform the January 1, 2015 actuarial valuation.

Plan Assets
The Board previously adopted an asset smoothing methodology to determine the actuarial value of assets. As of January 1, 2013, the actuarial value of assets is $92.7 million compared with the market value of $94.8 million. There was an asset loss on a market value basis of approximately $2.0 million over the 2-year period. The rates of return on a market value basis in 2011 and 2012 were .18% and 13.8 % respectively.

As of January 1, 2013, the 2008 investment loss has been completely recognized. However, the final recognition of the 2008 loss and the investment return during 2011 and 2012 generated an asset loss of approximately $10.6 million over the two year period on an actuarial value basis.

Total
There was a total net loss of approximately $6.1 million since the last valuation ($4.5 million gain on actuarial liability less $10.6 million loss on the actuarial value of assets). We indicated in the January 1, 2011 actuarial valuation that such a loss and the corresponding increase in the Unfunded Actuarial Liability (UAL) was a likely scenario due to the final recognition of the 2008 investment loss.

Actuarial Assumptions

Investment Return
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. We believe this assumption could still be considered reasonable as of January 1, 2013. However, based on the current environment, asset allocation, and future expected returns, we recommended that the investment return assumption be decreased to 7.75% this year. The trend both in Massachusetts and across the country over the past several years has been to reduce this assumption. A reduction in the investment return assumption increases the plan's liabilities.

Salary increase
In the current environment, we believe the salary increase assumption used in the prior valuation is conservative. Therefore, we lowered the salary increase assumption in this valuation. This change decreases the plan's liability. Over the long term, the investment return assumption and the salary increase assumption should move together. This is because both assumptions have an inflation component. The change in the salary increase assumption partially mitigates the impact of the change in the investment return assumption.

The prior salary increase assumption is based on job group and service. The largest increases are in the first few years of service. The assumption grades down each year to an ultimate rate of 4.75% - 5.25% after 10 years of service. For the past 4-5 years, most plans have had significant actuarial gains due to actual salary increases being less than assumed. Our revised assumption slightly reduces the assumption at each year of service. The revised ultimate rates are 4.25% - 4.75%. Although these may still seem somewhat high in the current environment, these are intended to be long term, not short term, rates.

Mortality
In local actuarial valuations performed by PERAC as of January 1, 2010, we used the RP-2000 mortality table. This is a standard table we have used since 2002 and is based on an experience analysis of local systems we performed in 2002. 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 adjusted 10 years with Scale AA (the assumption used in your prior valuation). In our 2012 valuations, to reflect future mortality improvement, we extended this mortality improvement scale beyond 2012. We are using this same approach in our 2013 valuations.

Overall Impact
The overall impact of these assumption changes increased the plan's actuarial liability by approximately $4.0 million. However the total normal cost decreased by $71,000. 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 first actuarial valuation to reflect these changes.

As of January 1, 2013, there were 40 members hired after April 1, 2012. Since these members have less than one year of service and are generally young, there is relatively little impact on plan costs in this valuation. The normal cost decreased approximately $45,000 and the actuarial liability decreased approximately $104,000 for these members compared to the figures under the prior provisions.

Funding Schedule

The funding schedule presented in this report was recently adopted by the board. The FY14 payment and the amortization of the Early Retirement Incentive Programs (ERIs) are maintained from the prior schedule and are based on the average payment date of August 1 and February 1 of each fiscal year. The subsequent years are based on a payment date of August 1 in each fiscal year. The schedule has total appropriations increasing 4.6% each year until FY27 with a final amortization payment in FY28.

3. SUMMARY OF VALUATION RESULTS

A. Number of Members on Current Valuation Date	
Active Members	670
Vested Terminated Members	14
Retired Members and Survivors	372
Total	1,056
B. Total Regular Compensation of Active Members	$31,121,488
C. Normal Cost	
Superannuation	$3,064,459
Death	301,105
Disability	890,241
Termination	358,539
Total Normal Cost	$4,614,344
Expected Employee Contributions	2,722,197
Net Employer Normal Cost	$1,892,147
D. Actuarial Liability	
Active	
Superannuation	$81,539,561
Death	1,851,371
Disability	4,637,880
Termination	1,493,063
Total Active	$89,521,875
Vested Terminated Members	4,232,000
Non-Vested Terminated Members	577,771
Retirees and Survivors	80,387,512
Total Actuarial Liability	$174,719,158
E. Actuarial Value of Assets	92,679,560
F. Unfunded Actuarial Liability: D – E	$82,039,598
G. Funded Ratio: E/D	53.0%

4. APPROPRIATION DEVELOPMENT FOR FISCAL YEAR 2014

PART A | DERIVATION OF APPROPRIATION

Cost Under Current Funding Schedule

1. a. Normal Cost as of January 1, 2013	$1,892,147
b. For FY14 (adjusted for timing)*	$2,014,348
c. Estimated Expenses	$325,000
d. Total Employer Normal Cost (b+c)	$2,339,348
2. a. Unfunded Actuarial Liability as of January 1, 2013	$81,764,000
b. FY14 amortization payment (15-year, total appropriation increasing 4.6%)**	$7,117,805
3. a. Unfunded Liability due to 2002 ERI	$195,432
b. FY14 amortization payment (6-year level)	$41,452
4. a. Unfunded Liability due to 2003 ERI	$80,166
b. FY14 amortization payment (15-year, 4.5% increasing)	$6,989
5. Net 3(8)(c) payments	$150,000
6. Total FY14 Payment [Sum of 1(d), 2(b), 3(b), 4(b) and 5]	$9,655,593

Figures may not add due to rounding.

* For FY14, the appropriation is assumed to be paid in equal installments on August 1 and February 1. Beginning in FY15, the appropriation is assumed to be paid in full on August 1.

** FY14 appropriation was maintained at the same level as the prior schedule.

4. APPROPRIATION DEVELOPMENT FOR FISCAL YEAR 2014
(continued)

PART B | CURRENT FUNDING SCHEDULE

Fiscal Year	Normal Cost	Net 3(8)(c)	Amort. of UAL	Amort. of 2002 ERI	Amort. of 2003 ERI	Total Cost	Unfunded Act. Liab.
2014	2,339,348	150,000	7,117,805	41,452	6,989	9,655,593	85,218,632
2015	2,409,628	147,149	7,303,394	40,664	7,164	9,908,000	84,288,819
2016	2,530,110	147,227	7,638,513	40,664	7,487	10,364,000	82,947,736
2017	2,656,615	147,227	7,988,670	40,664	7,824	10,841,000	81,143,449
2018	2,789,446	147,227	8,354,487	40,664	8,176	11,340,000	78,823,936
2019	2,928,918	147,227	8,736,647	40,664	8,544	11,862,000	75,932,477
2020	3,075,364	147,227	9,176,481		8,928	12,408,000	72,407,227
2021	3,229,132	147,227	9,593,311		9,330	12,979,000	68,180,832
2022	3,390,589	147,227	10,028,434		9,750	13,576,000	63,180,018
2023	3,560,119	147,227	10,482,466		10,188	14,200,000	57,325,156
2024	3,738,124	147,227	10,957,002		10,647	14,853,000	50,529,785
2025	3,925,031	147,227	11,452,617		11,126	15,536,000	42,699,035
2026	4,121,282	147,227	11,970,864		11,627	16,251,000	33,730,064
2027	4,327,346	147,227	12,512,277		12,150	16,999,000	23,510,397
2028	4,543,714	147,227	11,990,136		12,697	16,681,076	11,918,269
2029	4,770,899	147,227				4,918,126	0

For FY14, the appropriation is assumed to be paid in equal installments on August 1 and February 1.
Beginning in FY15, the appropriation is assumed to be paid in full on August 1.
Normal cost includes assumed expenses of $325,000 and is assumed to increase 5% per year.
FY14 appropriation was maintained at the same level as the prior schedule.
Total appropriation increases 4.6% per year through FY27 with final amortization payment in FY28.

5. GASB STATEMENT NO. 25: ACTUARIAL INFORMATION

The actuarial information required by Governmental Accounting Standards Board (GASB) Statement No. 25 is shown below.

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)
1/1/2013	$92,679,560	$174,719,158	$82,039,598	53.0%	$31,121,488	263.6%
1/1/2011	$84,087,066	$157,628,890	$73,541,824	53.3%	$29,750,417	247.2%
1/1/2009	$65,231,613	$143,082,153	$77,850,540	45.6%	$29,412,382	264.7%

**excludes State reimbursed COLA*

Notes To Schedules

Additional information as of the latest actuarial valuation follows.

Valuation Date	January 1, 2013
Actuarial Cost Method	Individual entry age normal
Amortization Method	Total appropriation increasing 4.6%
Remaining Amortization Period	15 years
Asset Valuation Method	Actuarial value, 5-year smoothing

Principal Actuarial Assumptions:

Investment Rate of Return	7.75%
Projected Salary Increases	Service based table with ultimate rates of 4.25%, 4.50%, and 4.75% for groups 1, 2, and 4 respectively.

6. PLAN ASSETS

A | BREAKDOWN OF ASSETS BY INVESTMENT TYPE

Cash and Cash Equivalents	$290,468
PRIT Cash	450,081
PRIT Fund	89,264,397
Accounts Receivable	4,809,132
Accounts Payable	(166)
Total	$94,813,912

B | BREAKDOWN OF ASSETS BY FUND

Annuity Savings Fund	$31,970,392
Annuity Reserve Fund	6,385,943
Military Fund	2,404
Pension Fund	15,430,755
Pension Reserve Fund	41,024,418
Total	$94,813,912

C | MARKET VALUE OF ASSETS $94,813,912

D | ACTUARIAL VALUE OF ASSETS $92,679,560

6. PLAN ASSETS *(continued)*

E | DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

	2012	2013
A. Development of total investment income including appreciation		
1. Beginning of year market value	80,835,316	94,813,912
2a. Employee contributions	2,744,863	
b. Employer contributions	10,072,290	
c. Other receipts	658,997	
d. Total receipts: (a) + (b) + (c)	13,476,150	
e. Benefit payments	9,199,290	
f. Expenses	641,837	
g. Other disbursements	588,218	
h. Total disbursements: (e) + (f) + (g)	10,429,345	
i. Cash flow: (d) – (h)	3,046,805	
3. End of year market value	94,813,912	
4. Investment income including appreciation: (3) – (1) – (2(i))	10,931,791	
B. Expected market value development		
1. Beginning of year market value	80,835,316	
2. Cash flow (A2(i))	3,046,805	
3. Expected Return on (1)	6,466,825	
4. Expected return on cash flow A2(i) x 0.08 / 2	121,872	
5. Expected market value end of year (1)+(2)+(3)+(4)	90,470,818	
C. Gain/(loss) for year: A3-B5	4,343,094	
D. Development of Actuarial Value of Assets		
1. Beginning of year market value	80,835,316	94,813,912
2a. Asset gain/(loss) in prior year	(6,361,767)	4,343,094
b. Asset gain/(loss) in 2nd prior year	3,652,723	(6,361,767)
c. Asset gain/(loss) in 3rd prior year	5,079,237	3,652,723
d. Asset gain/(loss) in 4th prior year	(28,488,753)	5,079,237
3. Unrecognized gain/(loss) .8 x [2a] + .6 x [2b] + .4 x [2c] +.2 x [2d]	(6,563,835)	2,134,352
4. Beginning of year actuarial value of assets: [1] - [3]	87,399,151	92,679,560
5. Actuarial value / Market value	108.1%	97.7%
6. Adjusted actuarial value: (4) but not less than 85% nor greater than 115% of market value	87,399,151	92,679,560

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	670	14
Average Age	46.3	53.6
Average Service	12.2	15.8
Average Salary	$46,450	$54,235
Average Annuity Savings Fund Balance	$45,276	$50,457

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	56	6						62
30 - 34	22	23	7					52
35 - 39	20	24	6	6				56
40 - 44	12	16	19	21	9			77
45 - 49	16	22	33	24	23	7		125
50 - 54	14	17	22	20	12	19	2	106
55 - 59	12	13	13	22	13	10	7	90
60 - 64	4	12	10	9	7	11	8	61
65+	1	2	5	0	5	6	0	19
Total	179	135	115	102	69	53	17	670

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	$745,573	$33,890
25 - 29	62	$2,355,533	$37,992
30 - 34	52	$2,472,302	$47,544
35 - 39	56	$2,353,071	$42,019
40 - 44	77	$3,822,282	$49,640
45 - 49	125	$6,116,187	$48,929
50 - 54	106	$5,426,418	$51,193
55 - 59	90	$3,956,340	$43,959
60 - 64	61	$3,245,787	$53,210
65+	19	$627,995	$33,052
Total	670	$31,121,488	$46,450

7. INFORMATION ON SYSTEM MEMBERSHIP *(continued)*

PART B | RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	210	10	64	88	372
Average Age	72.6	76.0	67.4	77.5	73.0
Average Annual Benefit	$24,237	$16,188	$32,847	$19,060	$24,277

Benefit by Payment and Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Total Annuity	$821,931	$17,388	$173,706	$72,234	$1,085,259
Pension (excluding State reimbursed COLA)	$4,217,357	$134,301	$1,859,507	$1,490,901	$7,702,066
State reimbursed COLA	$50,492	$10,190	$69,019	$114,166	$243,867
Total	$5,089,780	$161,879	$2,102,232	$1,677,301	$9,031,192

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	5	$105,221	$21,044
40 - 44	0	$0	$0
45 - 49	5	$131,714	$26,343
50 - 54	7	$257,395	$36,771
55 - 59	17	$493,159	$29,009
60 - 64	51	$1,562,542	$30,638
65 - 69	68	$2,148,972	$31,603
70 - 74	55	$1,288,866	$23,434
75 - 79	50	$858,907	$17,178
80 - 84	53	$1,036,445	$19,556
85 - 89	44	$881,124	$20,026
90+	17	$266,847	$15,697
Totals	372	$9,031,192	$24,277

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 85% and 115% of market value.

9. ACTUARIAL ASSUMPTIONS

INVESTMENT RETURN

7.75% per year

INTEREST RATE CREDITED TO THE ANNUITY SAVINGS FUND

3.5% per year

COST OF LIVING INCREASES

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

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%

MORTALITY

Pre-retirement rates reflect the RP-2000 Employees table projected 10 years with Scale AA (gender distinct). Post-retirement rates reflect the RP- 2000 Healthy Annuitant table projected 10 years with Scale AA (gender distinct). The liabilities are then increased .75% to approximate mortality improvement to 2020 for active members and 2015 for retirees. For disabled retirees, this table is 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.

9. ACTUARIAL ASSUMPTIONS *(continued)*

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

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

EXPENSES

An amount of $325,000 has been included in the Normal Cost for FY14. This amount includes estimated administrative expenses and a portion of the investment related expenses. This amount is assumed to increase by 5% each year.

9. ACTUARIAL ASSUMPTIONS *(continued)*

RETIREMENT (SUPERANNUATION)

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

10. SUMMARY OF PLAN PROVISIONS

ADMINISTRATION

There are 105 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 $774.36 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 $774.36 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 $100,000.00 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.

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.

PERAC
Five Middlesex Avenue | Third Floor
Somerville, MA | 02145
Ph: 617.666.4446 | Fax: 617.628.4002
TTY: 617.591.8917 | Web: www.mass.gov/perac