

# Commonwealth

ACTUARIAL VALUATION REPORT

JANUARY 1, 2008

PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION  
COMMONWEALTH OF MASSACHUSETTS



# COMMONWEALTH ACTUARIAL VALUATION REPORT

January 1, 2008

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# I. INTRODUCTION & CERTIFICATION

This report presents the results of the actuarial valuation of the pension benefits that are the obligation of the Commonwealth of Massachusetts. The four components are:

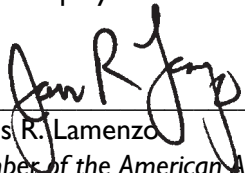
- State Employees' Retirement System
- Massachusetts Teachers' Retirement System
- Boston Teachers
- Cost of Living Allowance Reimbursements to Local Systems

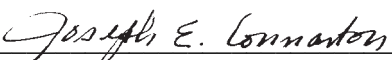
The valuation was performed as of January 1, 2008 pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts, and is based on the plan provisions in effect at that time. The actuarial assumptions used to calculate the accrued liability and the normal cost reflect the updated Experience Study Analysis reports we issued in 2007 (State) and 2008 (Teachers).

This valuation is based on member data as of December 31, 2007, which was supplied by the State, Massachusetts Teachers', and Boston Retirement Boards. We performed a number of tests on the data to ensure reasonableness and made specific assumptions for a number of Massachusetts Teacher data items. Asset information as of December 31, 2007 was provided by the Pension Reserves Investment Management Board and by the Boston Retirement Board's 2007 Annual Statement of Financial Condition. We reviewed both the membership data and financial information for reasonableness but we did not audit this information.

We believe this report represents an accurate appraisal of the actuarial status of the Commonwealth's total pension obligation performed in accordance with generally accepted actuarial principles and practices relating to pension plans. In our 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.

Respectfully submitted,  
Public Employee Retirement Administration Commission

  
\_\_\_\_\_  
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\_\_\_\_\_  
Joseph E. Connarton  
*Executive Director*

Dated: September 10, 2008

## 2. EXECUTIVE SUMMARY

### PART A | PRINCIPAL VALUATION RESULTS

Section 22C of G.L. c. 32 mandates the establishment of a funding schedule for the pension obligation of the Commonwealth of Massachusetts. The schedule, as mandated by law, calls for payment of the Normal Cost plus an amortization payment on the Unfunded Actuarial Liability (UAL). The provisions of Chapter 32, Section 22C require amortization payments such that the UAL is reduced to 0 by June 30, 2023. Under the current schedule, the amortization payments to eliminate the UAL increase by 4.5% per year.

The results of the January 1, 2008 actuarial valuation are as follows (in thousands):

Total Normal Cost	\$1,204,826
Expected Employee Contributions	<u>920,752</u>
Net Normal Cost	<u>\$284,074</u>

Total Actuarial Liability	\$56,636,710
Assets	<u>44,531,652</u>
Unfunded Actuarial Liability	<u>\$12,105,058</u>

## 2. EXECUTIVE SUMMARY *(continued)*

### PART B | COMPARISON WITH PRIOR VALUATION AND EXPERIENCE ANALYSIS

A comparison of the results of the current valuation and the January 1, 2007 valuation is shown below. (\$000's omitted)

	1/1/08	1/1/07	Increase (Decrease)	Increase (Decrease)
Total Normal Cost	\$1,204,826	\$1,189,823	\$15,003	1.3%
Expected Employee Contributions	<u>920,752</u>	<u>886,293</u>	<u>34,459</u>	3.9%
Net Normal Cost	<u>\$284,074</u>	<u>\$303,530</u>	<u>(\$19,456)</u>	(6.4%)
Actuarial Liability				
Actives	\$27,148,411	\$26,356,118	\$792,293	3.0%
Retirees and Inactives	<u>29,488,299</u>	<u>27,404,977</u>	<u>2,083,322</u>	7.6%
Total	\$56,636,710	\$53,761,095	\$2,875,615	5.3%
Assets	<u>44,531,652</u>	<u>40,411,920</u>	<u>4,119,732</u>	10.2%
Unfunded Actuarial Liability	<u>\$12,105,058</u>	<u>\$13,349,175</u>	<u>(\$1,244,117)</u>	(9.3%)
Funded Ratio	78.6%	75.2%	3.4%	

The development of the actuarial gain/(loss) is shown on page 9. During 2007, there was an overall actuarial gain of \$1.6 billion. There was a non-investment loss on actuarial liability of approximately \$194 million and a gain on assets (on an actuarial value basis) of approximately \$1.8 billion.

## 2. EXECUTIVE SUMMARY *(continued)*

### PART B | COMPARISON WITH PRIOR VALUATION AND EXPERIENCE ANALYSIS *(continued)*

We have detailed a number of the assumptions we made for missing or questionable data for active members of the Massachusetts Teachers' Retirement System in Part C of Section 7. We believe these assumptions provide reasonable valuation results on an overall basis for the Commonwealth.

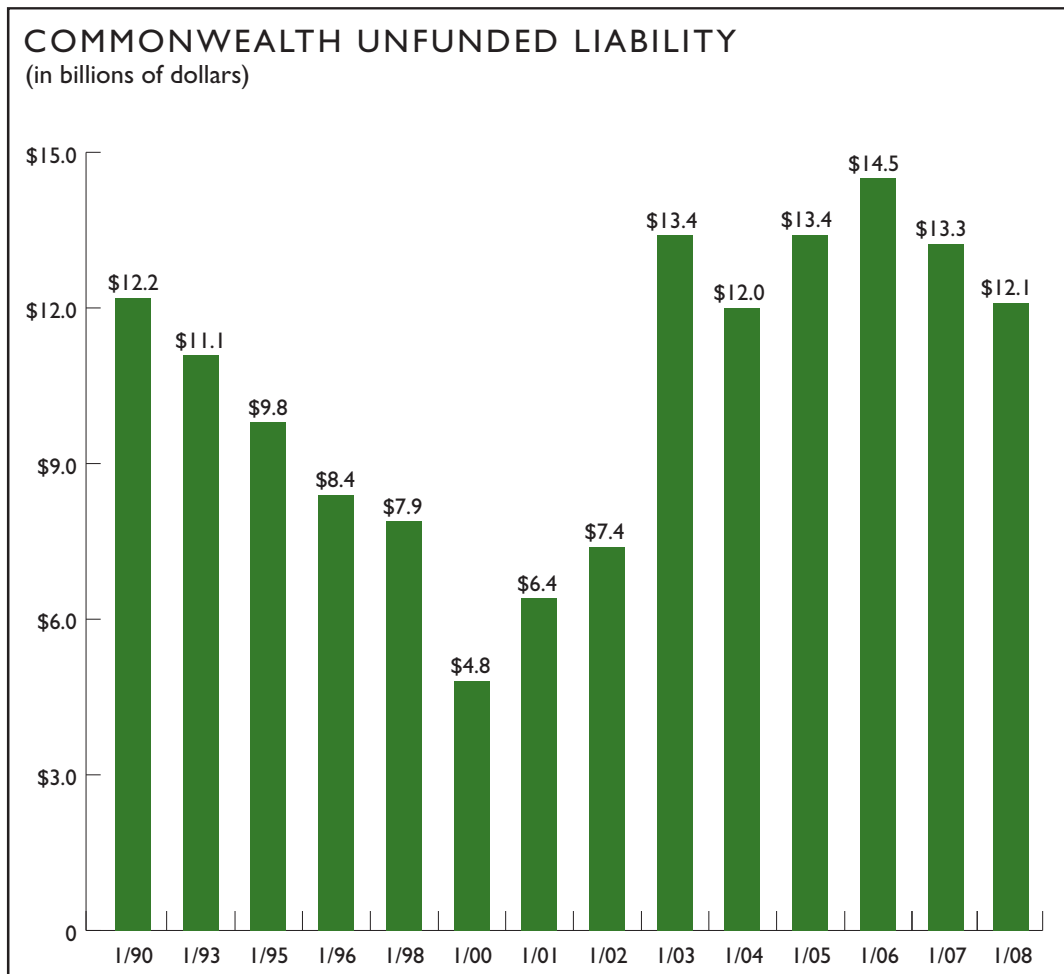
As in past valuations, the assets allocated to Boston teachers are based on the allocation of the total accrued liability between Boston teachers and other members of the State-Boston Retirement System. If only the annuity savings fund and annuity reserve fund for Boston teachers were included as Commonwealth valuation assets, the overall Commonwealth unfunded liability would increase by approximately \$900 million and the overall funded ratio would decrease to 77.0%.

We completed updated Experience Study Analyses (covering the years 2000-2005) of the State Retirement System in 2007 and the Massachusetts Teachers' Retirement System in 2008. This is the first actuarial valuation using the revised assumptions. Overall the total cost using the revised assumptions is about the same as the cost using the prior assumptions. There was a slight increase in actuarial accrued liability and a slight decrease in employer normal cost.

## 2. EXECUTIVE SUMMARY

### PART C | FUNDING PROGRESS UNFUNDED LIABILITY

The chart below shows the Commonwealth’s funded ratio progress since 1990. The funded ratio represents the actuarial value of plan assets divided by the actuarial accrued liability. When the funded ratio reaches 100%, a system is said to be “fully funded.” In this exhibit, for years prior to 2000, estimates were developed to reflect implementation of new actuarial software.

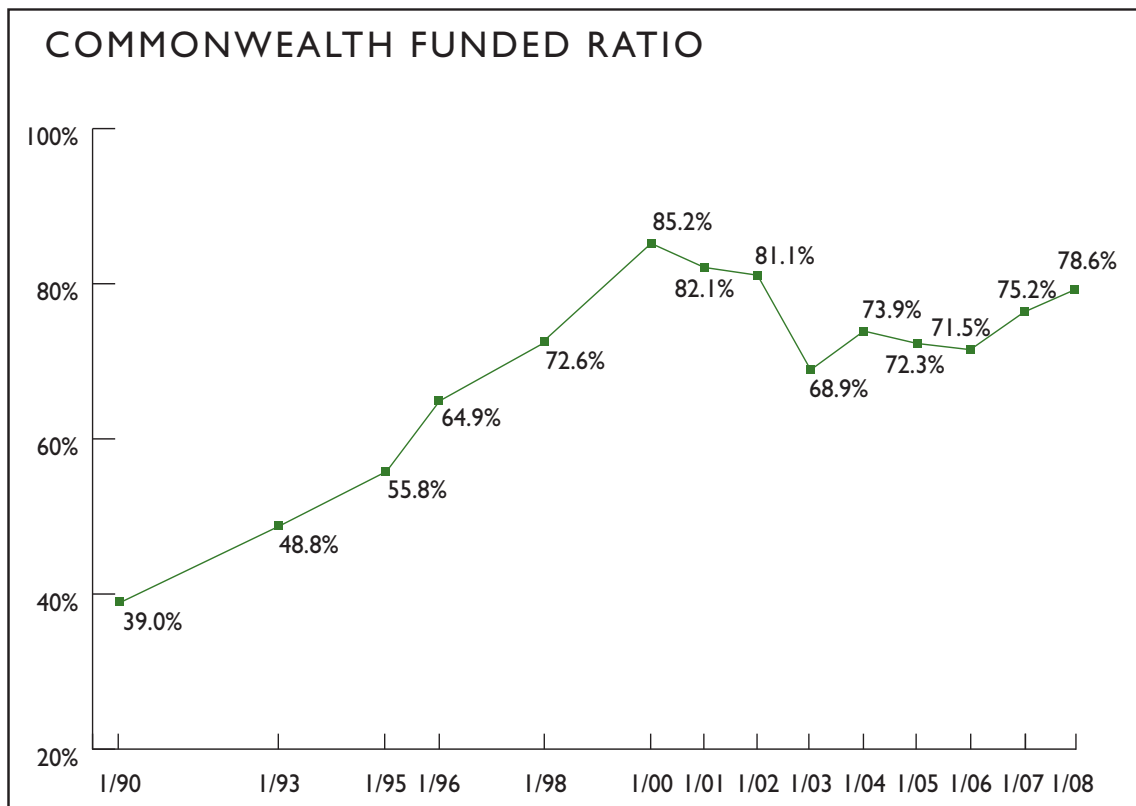




## 2. EXECUTIVE SUMMARY

### PART C | FUNDING PROGRESS FUNDED RATIO

The chart below shows the Commonwealth's funded ratio progress since 1990. The funded ratio represents the actuarial value of plan assets divided by the actuarial accrued liability. When the funded ratio reaches 100%, a system is said to be "fully funded." In this exhibit, for years prior to 2000, estimates were developed to reflect implementation of new actuarial software.

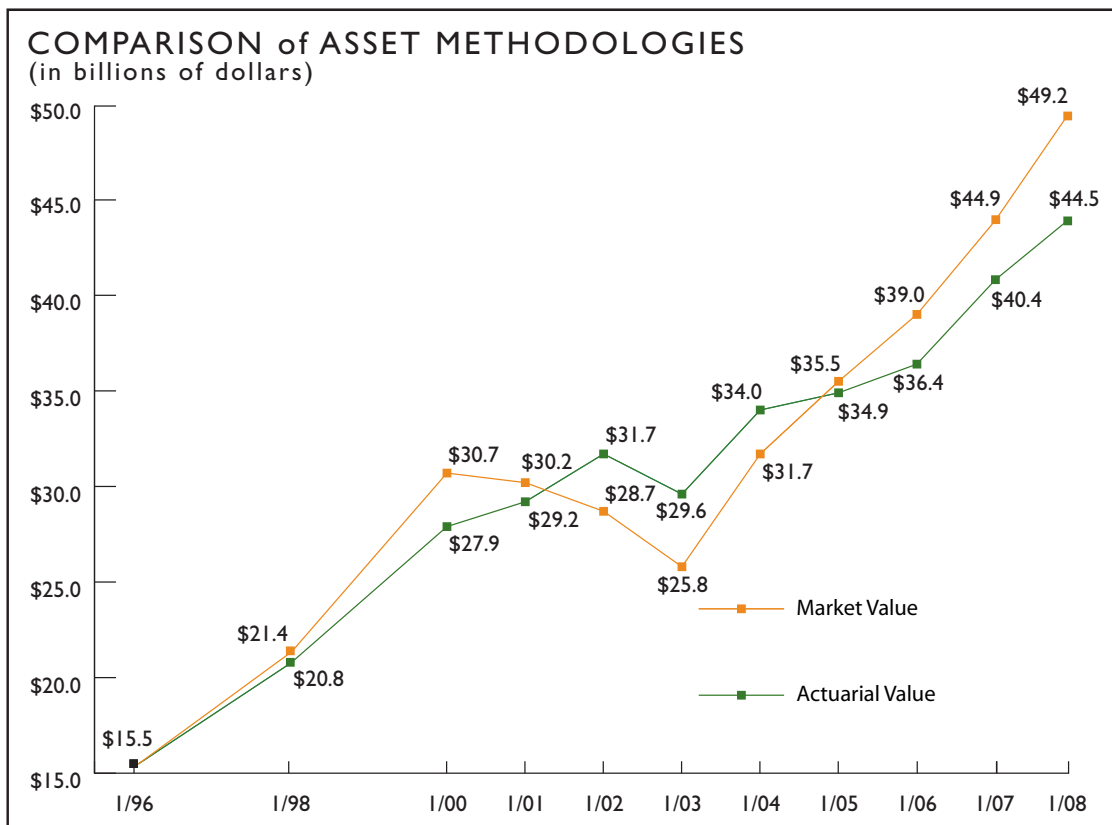


## 2. EXECUTIVE SUMMARY

### PART C | FUNDING PROGRESS

#### COMPARISON OF MARKET AND ACTUARIAL VALUE OF ASSETS

In valuations prior to 1998, plan assets were determined at market value. As part of the 1998 valuation, this methodology was adjusted to reduce the potential volatility in the market value approach from year to year. The actuarial method smoothes gains and losses over a five-year period. Investment gains and losses are not fully realized until five years have elapsed. Therefore, in some years the actuarial value will be less than the market value, and in other years, it will exceed the market value.



### 3. SUMMARY OF VALUATION RESULTS

(Dollars in thousands)

A. Number of Members	State	Mass. Teachers	Boston Teachers	Local COLA	Total
Active	85,602	89,636	5,797		181,035
Vested Terminated	3,955	N/A	162		4,117
Retired/ Beneficiaries	<u>50,495</u>	<u>50,024</u>	<u>3,696</u>		<u>104,215</u>
Total	140,052	139,660	9,655		289,367
<b>B. Total Payroll</b>	<b>\$4,574,233</b>	<b>\$5,163,498</b>	<b>\$418,521</b>		<b>\$10,156,252</b>
<b>C. Normal Cost</b>					
Superannuation	\$393,248	\$494,410	\$38,520		\$926,178
Death	40,258	27,068	2,091		69,417
Disability	64,026	8,131	633		72,790
Termination	<u>60,329</u>	<u>70,080</u>	<u>6,032</u>		<u>136,441</u>
Total Normal Cost	\$557,861	\$599,689	\$47,276		\$1,204,826
Expected Employee Contributions	<u>382,434</u>	<u>498,433</u>	<u>39,885</u>		<u>920,752</u>
Net Employer Normal Cost	\$175,427	\$101,256	\$7,391		\$284,074
<b>D. Actuarial Liability</b>					
Active					
Superannuation	\$10,819,606	\$13,735,873	\$1,042,264		\$25,597,743
Death	296,353	194,779	15,444		506,576
Disability	359,391	73,562	5,803		438,756
Termination	<u>274,386</u>	<u>308,072</u>	<u>22,878</u>		<u>605,336</u>
Total Active	\$11,749,736	\$14,312,286	\$1,086,389		\$27,148,411
Vested Terminated (a)	465,447	500,000	35,505		1,000,952
Non-Vested Terminated	145,710	N/A	13,994		159,704
Retirees and Survivors	<u>10,459,609</u>	<u>16,143,218</u>	<u>1,348,816</u>	<u>376,000</u>	<u>28,327,643</u>
Total Actuarial Liability	\$22,820,502	\$30,955,504	\$2,484,704	\$376,000	\$56,636,710
<b>E. Actuarial Value of Assets</b>	<u>20,400,656</u>	<u>22,883,553</u>	<u>1,247,443</u>	0	<u>44,531,652</u>
<b>F. Unfunded Actuarial Liability</b>	<b>\$2,419,846</b>	<b>\$8,071,951</b>	<b>\$1,237,261</b>	<b>\$376,000</b>	<b>\$12,105,058</b>
<b>G. Funded Ratio: E/D</b>	<b>89.4%</b>	<b>73.9%</b>	<b>50.2%</b>	<b>0.0%</b>	<b>78.6%</b>

(a) Massachusetts Teachers' amount is estimated and includes non-vested terminated members.

#### 4. DEVELOPMENT OF THE ACTUARIAL GAIN OR LOSS *(in millions)*

	State	Mass. Teachers	Boston Teachers	Local COLA	Total
A. Gain/(loss) on Actuarial Liability					
1. Actuarial Liability 1/1/2007	21,671	29,321	2,367	402	53,761
2. Total Normal Cost 1/1/2007	552	591	47	0	1,190
3. Interest on (1) and (2) at 8.25%	1,833	2,468	199	33	4,533
4. Benefits paid during 2007 [a]	1,140	1,732	140	54	3,066
5. Interest on (4) assuming mid year payment	47	71	6	2	126
6. Expected Actuarial Liability 1/1/2008: (1)+(2)+(3)-(4)-(5)	22,869	30,576	2,467	379	56,292
7. Increase (decrease) in liability due to assumption change	(15)	167	0	0	152
8. Expected Actuarial Liability after assumption change (6)+(7)	22,854	30,743	2,467	379	56,444
9. Actuarial Liability 1/1/2008	22,821	30,956	2,485	376	56,638
10. Gain/(loss): (8)-(9)	33	(213)	(18)	3	(194)
B. Gain/(loss) on assets					
11. Actuarial Value of Assets (AVA) 1/1/2007	18,445	20,821	1,146	0	40,412
12. Interest on (11) at 8.25%	1,522	1,718	95	0	3,334
13. Net Receipts [b]	443	559	133	0	1,135
14. Net Disbursements [b]	826	1,123	155	0	2,104
15. Net Cash Flow: (13)-(14)	(383)	(564)	(22)	0	(969)
16. Interest on (15) [c]	(28)	(33)	(1)	0	(62)
17. Expected AVA 1/1/2008: (11)+(12)+(13)+(14)	19,556	21,942	1,218	0	42,715
18. AVA 1/1/2008	20,401	22,883	1,247	0	44,531
19. Gain/(loss): (18)-(17)	845	941	29	0	1,816
C. Total Gain/(loss): (10)+(19)	879	729	11	3	1,622

[a] Estimated

[b] Amounts actually received or disbursed by the fund. Boston teachers estimated in the same manner as the asset allocation.

[c] Assumes time weighting based on the monthly cash flow for State and Massachusetts Teachers and mid-year for Boston.

## 5. AUDIT INFORMATION

### PART A | OVERVIEW

We have included the actuarial information required by GASB Statement No. 27 in this report. The Commonwealth of Massachusetts began implementing Statement No. 27 in Fiscal Year 1996.

Under GASB Statement No. 27, an Annual Required Contribution (ARC) must be calculated each year. The same methods and assumptions that are used to determine funding requirements are used in this calculation. At this time, the methods and assumptions used by the Commonwealth to determine the funding schedule are well within the parameters established by Statement No. 27.

When GASB 27 was implemented in FY96, a Net Pension Obligation (NPO) at transition was calculated. This was essentially the cumulative difference between the employer's required contributions and the contributions actually made by the employer for all years, beginning with Fiscal Year 1988. In each year since FY96, the NPO has been updated.

After the January 1, 2006 actuarial valuation was released, the Comptroller's office requested we recalculate the GASB 27 development from inception through FY06 assuming a zero pension obligation as of June 30, 1997. Those results were first shown in the January 1, 2007 valuation report.

As part of this valuation, we brought the NPO forward from FY07 to FY08. The FY07 NPO was adjusted to reflect a correction to the actual contribution for FY07. Our prior calculations used a figure of \$1.305 billion. Our adjusted calculation reflects the \$1.335 billion figure from the Commonwealth's funding schedule for FY07. For FY08, the amortization cost was determined using a 4.5% increasing amortization to FY23 which is the current schedule used by the Commonwealth to amortize its unfunded liability.

Note that, in any year, the amount of the ARC will not equal the Commonwealth's appropriation amounts for the following reasons:

1. The ARC is based upon the most recent valuation, whereas the funding schedule is generally submitted to the legislature 15 months after the valuation upon which it is based. The funding schedule is then set for the upcoming three fiscal years.
2. Amortization bases of actuarial gains and losses and plan amendments may be amortized on a different basis than the rest of the funding schedule. However, the amortization cost that GASB 27 reflects is an amortization of the entire unfunded liability which is roughly equivalent to the current schedule.
3. Although there is no difference in the totals, contributions have been allocated in a slightly different manner between the State and COLA portions. For purposes of Statement No. 27, a larger contribution was made to COLA, with lesser amounts to the State. This was done so the NPO for the local COLA remains at zero. No assets are attributed to the local COLA.

## 5. AUDIT INFORMATION *(continued)*

### PART B | GASB STATEMENT NO. 27 (\$000's omitted)

	State	Mass. Teachers	Boston Teachers	Local COLA	Total
I. Annual Required Contribution (ARC) for FY08					
Normal Cost	175,427	101,256	7,391	0	284,074
a. Amortization Cost	194,439	648,597	99,416	30,212	972,665
b. ARC: (a) + (b)	369,866	749,853	106,807	30,212	1,256,739
c.					
2. Amount under (over) funded from prior year (NPO)	(215,327)	262,431	139,801	0	186,905
3. Interest on NPO	(17,764)	21,651	11,534	0	15,420
4. Amortization of NPO	(17,302)	21,087	11,233	0	15,018
5. Pension Cost: (1c) + (3) – (4)	369,404	750,417	107,108	30,212	1,257,141
6. Actual Contribution *	460,788	809,000	99,000	30,212	1,399,000
7. (5) – (6)	(91,384)	(58,583)	8,108	0	(141,859)
8. Net Pension Obligation/(Asset): (2)+(7)	(306,711)	203,848	147,908	0	45,045

\* estimated allocation

Item 2 adjusted to reflect actual contribution of \$1.335 billion for FY07

Totals may not add exactly due to rounding.

## 6. ASSETS

All figures are shown in thousands.

### PART A | STATE AND MASS. TEACHERS' ASSET ALLOCATION

	State	Mass. Teachers
Pension Reserves Investment Trust		
Market Value	\$22,538,610	\$25,316,044
Actuarial Value	\$20,400,656	\$22,883,553
Actuarial Value as a Percentage of Market Value	90.5%	90.4%

Under the actuarial value of assets corridor approach, the actuarial value of assets cannot be less than 90% or greater than 110% of market value.

### PART B | BOSTON TEACHERS' ASSET ALLOCATION

For Boston Teachers, we assumed that the market value portion of total assets is allocated in the same proportion as shown in PERA's January 1, 1994 actuarial valuation report for the City of Boston. Assets were allocated to the Teachers in the same proportion as the Teachers' accrued liability compared to the system's total accrued liability at that time. Once the market value allocation is made, the determination of the actuarial value is based on the same percentage of the market value as the State and Massachusetts Teachers' systems' assets.

Total City of Boston Assets (Market Value)	\$4,613,556
Assets Allocated to Boston Teachers	
Market Value (29.91% of City total)	\$1,379,915
Actuarial Value (90.4% of Market Value)	\$1,247,443

## 6. ASSETS (continued)

### PART C | DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

A. Development of 12/31/07 expected actuarial value of assets (AVA)	State	Mass. Teachers	Total
1. Market Value (MV) 12/31/06	20,494,694	23,133,769	43,628,463
2. Actuarial Value 12/31/06 (as calculated)	18,150,019	20,504,714	38,654,733
3. Net Receipts 2007	442,546	559,130	1,001,676
4. Net Disbursements 2007	825,925	1,123,144	1,949,069
5. Net Cash Flow: (3)-(4)	(383,379)	(564,014)	(947,393)
6. Expected Investment Return on (2): 0.0825x(2)	1,497,377	1,691,639	3,189,015
7. Expected Investment Return on (5): $\frac{1}{2} \times 0.0825 \times (5)$	(15,814)	(23,266)	(39,080)
8. Expected AVA 12/31/07: (2)+(5)+(6)+(7)	19,248,202	21,609,073	40,857,276
B. Previous differences not yet amortized			
1. Unrecognized amount of 12/31/06 difference			
a. .2 x 2003 Gain/(loss)	355,681	379,348	735,029
b. .4 x 2004 Gain/(loss)	294,506	304,467	598,974
c. .6 x 2005 Gain/(loss)	441,012	492,054	933,066
d. .8 x 2006 Gain/(loss)	1,253,476	1,453,186	2,706,662
e. Total	2,344,675	2,629,055	4,973,730
C. Gain/(loss) from 2007			
1. Market Value 12/31/07	22,538,610	25,316,044	47,854,654
2. Expected Market Value 12/31/07: A(8)+B(1e)	21,592,878	24,238,128	45,831,006
3. Gain/ (loss) from 2007 investment: (1)-(2)	945,732	1,077,916	2,023,648
D. Development of AVA 12/31/07			
1. 2007 Gain/(loss)	945,732	1,077,916	2,023,648
2. 2006 Gain/(loss)	1,566,845	1,816,482	3,383,327
3. 2005 Gain/(loss)	735,020	820,090	1,555,110
4. 2004 Gain/(loss)	736,266	761,168	1,497,434
5. 2003 Gain/(loss)	1,778,405	1,896,741	3,675,146
6. 20% of 2007 Gain/(loss)	189,146	215,583	404,730
7. 20% of 2006 Gain/(loss)	313,369	363,296	676,665
8. 20% of 2005 Gain/(loss)	147,004	164,018	311,022
9. 20% of 2004 Gain/(loss)	147,253	152,234	299,487
10. 20% of 2003 Gain/(loss)	<u>355,681</u>	<u>379,348</u>	<u>735,029</u>
11. Total	1,152,454	1,274,479	2,426,933
12. Actuarial Value 12/31/07: A8+D11	20,400,656	22,883,553	43,284,209
13. Percentage of Market Value	90.5%	90.4%	90.4%
14. Actuarial Value 12/31/2007: not less than 90% of market value	20,400,656	22,883,553	43,284,209



## 7. SYSTEM MEMBERSHIP

### PART A | STATE ACTIVE MEMBERS

A critical element of an actuarial valuation is accurate and up-to-date membership information. As part of this valuation, PERAC analyzed the member data provided by the State Retirement System.

	Actives	Vested Terminations
Number of Members	85,602	3,955
Average Age	46.4	52.9
Average Service	12.8	15.6
Average Salary	\$53,436	\$46,321
Average Annuity Savings Fund Balance	\$47,099	\$47,529

### Age by Service Distribution of Active Members

Present Age	Years of Service							Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	
0 - 24	2,548	16						2,564
25 - 29	5,371	866	11					6,248
30 - 34	3,804	2,649	580	13				7,046
35 - 39	3,356	2,800	2,406	965	66			9,593
40 - 44	2,907	2,322	2,024	2,422	1,427	86		11,188
45 - 49	2,716	2,166	1,824	2,138	2,845	1,268	54	13,011
50 - 54	2,310	2,041	1,808	1,823	2,575	2,353	989	13,899
55 - 59	1,615	1,579	1,399	1,510	2,013	1,901	2,341	12,358
60 - 64	706	917	862	902	1,242	1,010	1,358	6,997
65+	198	362	363	316	420	340	699	2,698
Total	25,531	15,718	11,277	10,089	10,588	6,958	5,441	85,602

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART A | STATE ACTIVE MEMBERS *(continued)*

#### Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	2,564	\$78,154,214	\$30,481
25 - 29	6,248	\$243,412,496	\$38,958
30 - 34	7,046	\$321,749,272	\$45,664
35 - 39	9,593	\$489,021,536	\$50,977
40 - 44	11,188	\$592,218,056	\$52,933
45 - 49	13,011	\$711,430,361	\$54,679
50 - 54	13,899	\$797,241,938	\$57,360
55 - 59	12,358	\$742,794,194	\$60,106
60 - 64	6,997	\$429,778,960	\$61,423
65+	2,698	\$168,432,183	\$62,429
Total	85,602	\$4,574,233,210	\$53,436

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART B | STATE RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	40,381	656	2,917	6,541	50,495
Average Age	72.0	65.1	61.9	74.8	71.7
Average Annual Benefit	\$24,345	\$15,496	\$30,927	\$12,022	\$23,014

### Benefit by Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Annuity	\$160,520,898	\$1,337,202	\$5,365,782	\$10,837,659	\$178,061,541
Pension	\$822,555,872	\$8,828,223	\$84,849,565	\$67,801,236	\$984,034,896
Total	\$983,076,770	\$10,165,425	\$90,215,347	\$78,638,895	\$1,162,096,437

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART B | STATE RETIREES & SURVIVORS *(continued)*

#### Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	172	\$4,582,891	\$26,645
40 – 44	436	\$12,719,309	\$29,173
45 – 49	913	\$22,795,300	\$24,967
50 – 54	1,630	\$38,433,685	\$23,579
55 – 59	4,085	\$101,322,258	\$24,803
60 – 64	7,417	\$209,231,142	\$28,210
65 – 69	8,036	\$221,343,198	\$27,544
70 – 74	7,474	\$184,763,256	\$24,721
75 – 79	7,490	\$162,836,079	\$21,740
80 – 84	6,696	\$122,073,845	\$18,231
85 – 89	4,113	\$59,087,952	\$14,366
90+	2,033	\$22,907,522	\$11,268
Totals	50,495	\$1,162,096,437	\$23,014

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART C | MASSACHUSETTS TEACHERS' ACTIVE MEMBERS

A critical element of an actuarial valuation is accurate and up-to-date membership information. As part of this valuation, PERAC analyzed the member data provided by the Massachusetts Teachers' Retirement System (TRS). We made several assumptions about missing, questionable, or unavailable data.

Until the January 1, 2006 actuarial valuation, we had estimated the total creditable service for each member for the actuarial valuation. The estimate was based on either the employment date (date of hire as a teacher) or the adjusted employment date and was set equal to the greater of the two calculated service amounts. We used this methodology, which we believed was conservative, because we had no way to assess additional costs for members who buy back service near retirement. Several years ago, with the help of the TRS, we compared the service estimated for valuation purposes with actual service for over 6,800 members who retired in 2004 and 2005. We found that, in total, our methodology slightly understated service. To better reflect this cost, we adjusted our normal cost and liability figures as of January 1, 2006 and have again with this valuation. We used a 1% loading factor based on our analysis.

For members with a date of birth and/or date of hire that seemed questionable, we assumed (based on credited service or date of birth) the member was hired at age 30 (or at a younger age, if the member was under 30).

Based on our experience with prior years' data and buyback issues, we made several adjustments. Members whose pay was less than \$5,000 were assumed to be inactive. For members with pay between \$5,000 and \$10,000, we used an estimated pay of \$20,000. For members with submitted pay over \$150,000, we compared this year's figure to the pay used in last year's valuation. We adjusted this year's figure based on the amount contributed if we believed it was overstated.

Pay for all members hired in 2006 was annualized. We assumed a rate of pay of \$50,000 for members hired after October 1.

Because we could not determine the number of vested terminations, we estimated a combined inactive (terminated vested plus terminated with an ASF balance) liability. This is the same methodology we have used in prior valuations.

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART C | MASSACHUSETTS TEACHERS' ACTIVE MEMBERS *(continued)*

	Actives
Number of Members	89,636
Average Age	44.2
Average Service	12.9
Average Salary	\$57,605
Average Annuity Savings Fund Balance	\$48,941

#### Age by Service Distribution of Active Members

Present Age	Years of Service							Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	
0 - 24	2,551	1						2,552
25 - 29	8,818	2,027	3					10,848
30 - 34	4,121	5,389	1,398	2				10,910
35 - 39	2,545	3,632	4,519	542				11,238
40 - 44	2,273	2,271	2,536	1,650	668	2		9,400
45 - 49	2,115	2,457	1,986	1,119	2,266	401		10,344
50 - 54	1,497	2,340	2,130	1,218	1,696	2,782	1,830	13,493
55 - 59	1,192	1,453	1,575	1,257	1,563	1,326	6,798	15,164
60 - 64	265	510	519	459	651	330	2,148	4,882
65+	39	78	77	70	117	69	355	805
Total	25,416	20,158	14,743	6,317	6,961	4,910	11,131	89,636

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART C | MASSACHUSETTS TEACHERS' ACTIVE MEMBERS *(continued)*

#### Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	2,552	\$105,760,382	\$41,442
25 - 29	10,848	\$472,232,798	\$43,532
30 - 34	10,910	\$543,820,874	\$49,846
35 - 39	11,238	\$626,060,290	\$55,709
40 - 44	9,400	\$538,489,261	\$57,286
45 - 49	10,344	\$609,865,411	\$58,958
50 - 54	13,493	\$853,027,455	\$63,220
55 - 59	15,164	\$1,022,461,317	\$67,427
60 - 64	4,882	\$336,165,155	\$68,858
65+	805	\$55,615,117	\$69,087
Total	89,636	\$5,163,498,060	\$57,605

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART D | MASSACHUSETTS TEACHERS' RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	45,888	427	298	3,411	50,024
Average Age	69.6	67.1	67.7	71.6	69.7
Average Annual Benefit	\$35,889	\$18,256	\$32,813	\$15,741	\$34,347

#### Benefit by Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Annuity	\$231,377,803	\$586,811	\$383,014	\$3,761,975	\$236,109,603
Pension	\$1,415,514,569	\$7,208,511	\$9,395,211	\$49,929,860	\$1,482,048,151
Total	\$1,646,892,372	\$7,795,322	\$9,778,225	\$53,691,835	\$1,718,157,754



## 7. SYSTEM MEMBERSHIP *(continued)*

### PART D | MASSACHUSETTS TEACHERS' RETIREES & SURVIVORS *(continued)*

#### Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	101	\$2,036,689	\$20,165
40 – 44	40	\$607,003	\$15,175
45 – 49	70	\$1,034,102	\$14,773
50 – 54	296	\$6,053,186	\$20,450
55 – 59	5,995	\$255,331,690	\$42,591
60 – 64	12,863	\$554,089,993	\$43,076
65 – 69	9,600	\$361,389,529	\$37,645
70 – 74	7,027	\$223,492,442	\$31,805
75 – 79	6,024	\$159,943,866	\$26,551
80 – 84	4,078	\$87,743,106	\$21,516
85 – 89	2,377	\$41,953,730	\$17,650
90+	1,553	\$24,482,418	\$15,765
Totals	50,024	\$1,718,157,754	\$34,347

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART E | BOSTON TEACHERS' ACTIVE MEMBERS

A critical element of an actuarial valuation is accurate and up-to-date membership information. As part of this valuation, PERAC analyzed the member data provided by the Boston Retirement System.

	Actives	Vested Terminations
Number of Members	5,797	162
Average Age	43.8	50.9
Average Service	12.7	21.9
Average Salary	\$72,196	\$65,582
Average Annuity Savings Fund Balance	\$62,135	\$62,677

### Age by Service Distribution of Active Members

Present Age	Years of Service							Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	
0 - 24	157							157
25 - 29	688	103	3					794
30 - 34	409	344	61	5				819
35 - 39	191	226	216	47	12			692
40 - 44	111	123	124	145	52	2		557
45 - 49	102	102	105	108	153	26		596
50 - 54	76	94	97	112	198	134	80	791
55 - 59	63	75	90	81	222	90	328	949
60 - 64	15	35	39	42	85	42	101	359
65+	4	2	9	11	15	10	32	83
Total	1,816	1,104	744	551	737	304	541	5,797

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART E | BOSTON TEACHERS' ACTIVE MEMBERS *(continued)*

#### Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	157	\$7,938,061	\$50,561
25 - 29	794	\$44,392,880	\$55,910
30 - 34	819	\$53,036,145	\$64,757
35 - 39	692	\$48,404,881	\$69,949
40 - 44	557	\$41,490,409	\$74,489
45 - 49	596	\$44,423,398	\$74,536
50 - 54	791	\$63,065,235	\$79,728
55 - 59	949	\$78,784,862	\$83,019
60 - 64	359	\$30,151,661	\$83,988
65+	83	\$6,833,497	\$82,331
Total	5,797	\$418,521,030	\$72,196

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART F | BOSTON TEACHERS' RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	3,316	41	72	267	3,696
Average Age	70.0	64.5	68.8	71.7	70.0
Average Annual Benefit	\$41,713	\$19,247	\$37,004	\$16,433	\$39,546

#### Benefit by Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Annuity	\$18,596,324	\$78,799	\$169,721	\$368,105	\$19,212,949
Pension	\$119,724,305	\$710,318	\$2,494,567	\$4,019,592	\$126,948,782
Total	\$138,320,629	\$789,117	\$2,664,288	\$4,387,697	\$146,161,731

## 7. SYSTEM MEMBERSHIP *(continued)*

### PART F | BOSTON TEACHERS' RETIREES & SURVIVORS *(continued)*

#### Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	7	\$109,615	\$15,659
40 - 44	5	\$64,034	\$12,807
45 - 49	11	\$206,422	\$18,766
50 - 54	37	\$805,101	\$21,759
55 - 59	366	\$17,686,345	\$48,323
60 - 64	974	\$48,334,618	\$49,625
65 - 69	709	\$30,311,713	\$42,753
70 - 74	476	\$17,890,976	\$37,586
75 - 79	440	\$14,460,121	\$32,864
80 - 84	364	\$9,829,318	\$27,004
85 - 89	181	\$4,064,783	\$22,457
90+	126	\$2,398,685	\$19,037
Totals	3,696	\$146,161,731	\$39,546

## 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 retirement system member, 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 *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 be changed by the addition of new members or the retirement, death, disability, 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 change.

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 an *Actuarial Loss* and one which decreases the Unfunded Actuarial Liability is 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 and 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.

In valuations prior to 1998, plan assets were determined at market value. As part of the 1998 valuation, this methodology was adjusted to reduce the potential volatility in the market value approach from year to year. The actuarial value of assets as of January 1, 2008 is 90.4% of the market value.

## 9. ACTUARIAL ASSUMPTIONS

INVESTMENT RETURN 8.25% per year

INTEREST RATE CREDITED TO THE ANNUITY SAVINGS FUND 3.5% per year

COST OF LIVING INCREASES (COLA) 3% per year

MORTALITY Pre-retirement mortality reflects RP-2000 Employees table projected 10 years with Scale AA (gender distinct). Post-retirement mortality reflects RP-2000 Healthy Annuitant table projected 10 years with scale AA (gender distinct). For disabled members, the mortality rate is assumed to be in accordance with the RP-2000 Table (gender distinct) set forward 3 years for males. 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 3 and 4 members. For members retired under an Accidental Disability, 40% of deaths are assumed to be from the same cause as the disability.

SALARY INCREASE Based on an analysis of past experience. Annual rates are shown below.

<u>Service</u>	<u>Groups 1 &amp; 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Teachers</u>
0	8.00%	8.00%	10.00%	8.00%
1	7.50%	8.00%	9.00%	7.75%
2	7.00%	8.00%	8.50%	7.50%
3	6.50%	8.00%	8.00%	7.25%
4	6.25%	7.50%	7.50%	7.00%
5	6.00%	7.00%	7.00%	6.75%
6	5.75%	6.00%	6.50%	6.50%
7	5.50%	5.50%	6.00%	6.25%
8	5.50%	5.50%	5.50%	6.00%
9	5.50%	5.50%	5.50%	5.75%
10	5.25%	5.25%	5.25%	5.50%
11	5.25%	5.25%	5.25%	5.25%
12	5.25%	5.25%	5.25%	5.00%
13	5.00%	5.25%	5.25%	5.00%
14-15	5.00%	5.25%	5.25%	4.75%
16-19	4.75%	5.25%	5.25%	4.75%
20+	4.50%	5.00%	5.00%	4.75%

## 9. ACTUARIAL ASSUMPTIONS *(continued)*

### RETIREMENT

Age	Group 1		Group 2	Group 3	Group 4
	Male	Female			
45	0.000	0.000	0.000	0.020	0.040
46	0.000	0.000	0.000	0.020	0.040
47	0.000	0.000	0.000	0.050	0.060
48	0.000	0.000	0.000	0.050	0.060
49	0.000	0.000	0.000	0.050	0.060
50	0.015	0.030	0.020	0.050	0.050
51	0.010	0.030	0.020	0.075	0.050
52	0.010	0.030	0.020	0.075	0.100
53	0.015	0.025	0.040	0.075	0.100
54	0.020	0.035	0.050	0.075	0.150
55	0.040	0.050	0.100	0.080	0.250
56	0.035	0.060	0.100	0.080	0.150
57	0.040	0.055	0.100	0.080	0.150
58	0.045	0.070	0.100	0.110	0.150
59	0.050	0.090	0.130	0.110	0.200
60	0.080	0.080	0.150	0.110	0.200
61	0.100	0.100	0.150	0.150	0.250
62	0.160	0.160	0.150	0.150	0.250
63	0.160	0.160	0.150	0.150	0.200
64	0.160	0.160	0.200	0.250	0.300
65	0.250	0.250	0.200	0.250	0.650
66	0.250	0.250	0.200	0.250	0.250
67	0.250	0.250	0.200	0.250	0.250
68	0.250	0.250	0.200	0.250	0.250
69	0.250	0.250	0.200	0.250	0.250
70	1.000	1.000	1.000	1.000	1.000



## 9. ACTUARIAL ASSUMPTIONS *(continued)*

Teachers

Males

	Not in Retirement Plus	
	Less than 20	20+
47	0.00	0.00
48	0.00	0.00
49	0.00	0.00
50	0.00	0.02
51	0.00	0.02
52	0.00	0.02
53	0.00	0.02
54	0.00	0.02
55	0.06	0.05
56	0.06	0.05
57	0.07	0.05
58	0.07	0.06
59	0.10	0.07
60	0.15	0.20
61	0.20	0.35
62	0.20	0.35
63	0.20	0.35
64	0.25	0.35
65	0.30	0.40
66	0.30	0.30
67	0.30	0.30
68	0.30	0.30
69	0.30	0.30
70+	1.00	1.00

	Retirement Plus		
	Less than 20	20-30	30+
47	0.00	0.00	0.00
48	0.00	0.00	0.00
49	0.00	0.00	0.00
50	0.00	0.01	0.02
51	0.00	0.01	0.02
52	0.00	0.01	0.02
53	0.00	0.01	0.02
54	0.00	0.01	0.02
55	0.03	0.03	0.06
56	0.08	0.05	0.20
57	0.15	0.08	0.35
58	0.15	0.10	0.50
59	0.20	0.20	0.50
60	0.15	0.20	0.50
61	0.30	0.25	0.50
62	0.20	0.30	0.40
63	0.30	0.30	0.40
64	0.40	0.30	0.40
65	0.40	0.40	0.50
66	0.40	0.30	0.50
67	0.40	0.30	0.50
68	0.40	0.30	0.50
69	0.40	0.30	0.50
70+	1.00	1.00	1.00

## 9. ACTUARIAL ASSUMPTIONS *(continued)*

Teachers

Females

	Not in Retirement Plus		Retirement Plus		
	Less than 20	20+	Less than 20	20-30	30+
47	0.00	0.00	0.00	0.000	0.00
48	0.00	0.00	0.00	0.000	0.00
49	0.00	0.00	0.00	0.000	0.00
50	0.00	0.02	0.00	0.015	0.02
51	0.00	0.02	0.00	0.015	0.02
52	0.00	0.02	0.00	0.015	0.02
53	0.00	0.02	0.00	0.015	0.02
54	0.00	0.02	0.00	0.015	0.02
55	0.06	0.05	0.02	0.03	0.06
56	0.06	0.05	0.02	0.03	0.15
57	0.07	0.05	0.08	0.07	0.30
58	0.07	0.07	0.10	0.07	0.35
59	0.10	0.10	0.15	0.11	0.35
60	0.15	0.20	0.20	0.16	0.35
61	0.20	0.30	0.20	0.20	0.35
62	0.20	0.30	0.25	0.30	0.40
63	0.20	0.30	0.24	0.30	0.30
64	0.25	0.30	0.20	0.30	0.35
65	0.30	0.40	0.30	0.30	0.35
66	0.30	0.40	0.30	0.30	0.35
67	0.30	0.40	0.30	0.30	0.30
68	0.30	0.40	0.30	0.30	0.30
69	0.30	0.40	0.30	0.30	0.30
70+	1.00	1.00	1.00	1.00	1.00

## 9. ACTUARIAL ASSUMPTIONS *(continued)*

DISABILITY Based on an analysis of past experience. Sample annual rates are shown below.

<u>Age</u>	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Teachers</u>
20	0.00010	0.00060	0.0010	0.0020	0.00004
30	0.00010	0.00080	0.0016	0.0040	0.00006
40	0.00075	0.00166	0.0080	0.0070	0.00010
50	0.00140	0.00425	0.0140	0.0100	0.00050
60	0.00200	0.00550	0.0300	0.0080	0.00100

It is assumed that 75% of disabilities will be job-related for Group 1 and 2 members (other than Teachers), 95% will be job-related for Group 3 and 4 members, and 35% will be job-related for Teachers.

### WITHDRAWAL

Based on an analysis of past experience. For Groups 1 and 2, rates are both age and service based for service up to 10 years. After 10 years of service, rates are age based. In addition to being age and service based, Teacher rates are also gender based. For Groups 3 and 4, rates are service based. Sample annual rates are shown below.

#### Groups 1 & 2

<u>Age</u>	<u>Service</u>		
	<u>0</u>	<u>5</u>	<u>10+</u>
20	0.270	0.000	0.000
30	0.230	0.100	0.055
40	0.160	0.080	0.040
50	0.140	0.060	0.030

<u>Service</u>	<u>Group 3</u>	<u>Group 4</u>
0	0.008	0.080
5	0.008	0.045
10	0.006	0.030
15	0.006	0.025
20+	0.006	0.040

# 9. ACTUARIAL ASSUMPTIONS *(continued)*

## Teachers

Age	Service					
	0		5		10+	
	Male	Female	Male	Female	Male	Female
20	0.120	0.100	0.045	0.090	0.010	0.050
30	0.114	0.120	0.045	0.090	0.010	0.050
40	0.097	0.110	0.054	0.065	0.017	0.029
50	0.100	0.082	0.048	0.042	0.022	0.021

## 10. SUMMARY OF PLAN PROVISIONS

### ADMINISTRATION

There are 106 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 establishes benefits, contribution requirements, and an accounting and funds structure for all systems.

### MEMBERSHIP

Membership is mandatory for nearly all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal, or intermittent employment is governed by regulations promulgated by each retirement board, and approved by PERAC. Membership is optional for certain elected officials. There are 4 classes of membership in the Commonwealth:

#### **Group 1:**

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

#### **Group 2:**

Certain specified hazardous duty positions.

#### **Group 3:**

State police officers and inspectors

#### **Group 4:**

Police officers, firefighters, corrections officers, and other specified hazardous positions.

### MEMBER CONTRIBUTIONS

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

<u>Date of Membership</u>	<u>Contribution Rate</u>
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
7/1/96 to present:	12% of regular compensation (State Police)
7/1/01 to present:	11% of regular compensation (for teachers hired after 7/1/01 and those accepting provisions of Chapter 114 of the Acts of 2000)
1979 to present:	an additional 2% of regular compensation in excess of \$30,000.

### RATE OF INTEREST

Interest on regular deductions made after January 1, 1984 is at a rate established by PERAC in consultation with the Commissioner of Banks. The rate is obtained from the average

## 10. SUMMARY OF PLAN PROVISIONS *(continued)*

rates paid on individual savings accounts by a representative sample of at least 10 financial institutions.

### RETIREMENT AGE

There is no mandatory retirement age for employees in Groups 1 and 2. Most Group 4 members must retire at age 65. As the result of a federal court decision, there is no mandatory retirement age for Group 3 members.

### SUPERANNUATION RETIREMENT

A member 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

### AMOUNT OF BENEFIT

A member's annual allowance is determined by multiplying the member's 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 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.
- 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 three years (whether or not consecutive) preceding retirement.
- The Benefit Rate varies with the member's retirement age, but 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 a teacher who is subject to the provisions of Chapter 114 of the Acts of 2000 and who has completed at least 30 years of creditable service, the benefit rate is multiplied by the creditable service and the resulting percentage is increased by 2% per year for

## 10. SUMMARY OF PLAN PROVISIONS *(continued)*

each year of service in excess of 24. The amount determined cannot exceed 80% of the average salary.

- For Group 3 members, the rate is 3% for any age.

### DEFERRED VESTED BENEFIT

A participant who has completed 10 or more years of creditable service is eligible for a deferred vested retirement benefit. Elected officials and others who were hired prior to 1978 may be vested after 6 years in accordance with G.L. c. 32, s. 10.

The participant's accrued benefit is payable commencing at age 55, or the completion of 20 years, or may be deferred until later at the participant's option.

### WITHDRAWAL OF CONTRIBUTIONS

Member contributions may be withdrawn upon termination of employment. Employees who first become members on or after January 1, 1984, may receive only limited interest on their contributions if they voluntarily terminate their service. Those who leave service with less than 5 years receive no interest; those who leave service with greater than 5 but less than 10 years receive 50% of the interest credited.

### ORDINARY DISABILITY

**Eligibility:** Non-veterans who become permanently incapacitated from the essential duties of their positions 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 permanently incapacitated from the essential duties of their positions by reason of a non-job related condition prior to reaching "maximum age".

**Retirement Allowance:** 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/she will receive an allowance that is not less than the allowance he/she would have received if retired for superannuation.

## 10. SUMMARY OF PLAN PROVISIONS *(continued)*

### ACCIDENTAL DISABILITY

**Eligibility:** Applies to members who become permanently incapacitated from 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. However, 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 \$667.92 per year, 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.

### 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 \$667.92 per year, per child, 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 resulting 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 of a firefighter, public prosecutor, police officer or corrections officer killed in the line of duty may receive a one time payment of \$100,000 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.

### DEATH IN ACTIVE SERVICE

**Eligibility:** At least 2 years of service

**Allowance:** An immediate allowance equal to that which would have been payable had the member retired and elected Option C on the day before his or her death. For death occurring prior to the member's superannuation retirement age, the age 55 benefit rate 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, 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 full time students, unless mentally or physically incapacitated.

### COST OF LIVING

Chapter 17 of the Acts of 1997 provides that the first \$12,000 of a retiree's total allowance is subject to an annual cost-of-living adjustment (COLA). Each year PERAC notifies the Massachusetts General Court of the percentage increase in the Consumer Price Index used for indexing Social Security benefits. This COLA is subject to an annual vote of the Massachusetts General Court, but cannot exceed 3.0%.

## 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 remains unmarried 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 predeceases the retiree, the benefit payable increases (or "pops up") 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 predeceases the retiree, the benefit payable "pops up" 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.

## II. 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, rather than 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 reduce the Unfunded Accrued Liability.

## II. 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 as well as 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, are 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 and inactive members.

### ASSETS

The value of securities held by the plan.

### COST OF BENEFITS

The estimated payment from the pension system for benefits for the fiscal year.

### 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 22C of M.G.L. Chapter 32.

### GASB

Governmental Accounting Standards Board

## II. 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 that 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 that is credited with an amount paid by the retirement board equaling the amount that would have been contributed by a member if the member had remained in active service instead of taking a military leave of absence. 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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