

# Actuarial Valuation Report

AS OF JANUARY 1, 1998  
FOR THE COMMONWEALTH'S TOTAL PENSION OBLIGATION



PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION



TABLE OF CONTENTS



	PAGE
I. Introduction and Certification	1
II. Summary Discussion	
A. Comparison of Current Valuation	2
B. Comparison with Prior Valuations	3
C. Comparison with Other Plans	4
D. Other Issues	4
III. Summary of Valuation Results	5
IV. Development of Actuarial Cost or Loss	6

*Commonwealth of Massachusetts*

**ACTUARIAL VALUATION REPORT**

VI. Assets		
A. Breakdown of Assets by Asset Type	11	
B. Assets for Defined Plans	11	
		<b>As of January 1, 1998</b>
VII. Information on System Membership		
A. State Employees	12-13	
B. Municipal Employees	16-19	
C. Boston Teachers	20-21	
		<b>for the</b>
		<b>Commonwealth's Total Pension Obligation</b>
VIII. Valuation Cost Methods		
A. Actuarial Cost Method	24	
B. Asset Valuation Method	25	
C. Valuation Method for COLA	25	
IX. Actuarial Assumptions	26-28	
X. Summary of Plan Provisions (as of 1/1/98)	29-30	
XI. Glossary of Terms	30-32	

**Public Employee Retirement  
Administration Commission**

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Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

TABLE OF CONTENTS

	<u>PAGE</u>
I. Introduction and Certification .....	1
II. Summary Discussion	
A. Costs under Current Valuation .....	2
B. Comparison with Prior Valuation .....	3
C. Considerations for the Future.....	4
D. Other Information Available in the Report.....	4
III. Summary of Valuation Results.....	5
IV. Development of Actuarial Gain or Loss.....	6
V. Information Required by Auditors	
A. GASB Statement No. 27 .....	7-10
VI. Assets	
A. Breakdown of Assets by Investment Type .....	11
B. Assets for Boston Teachers.....	11
VII. Information on System Membership	
A. State Employees.....	12-15
B. Massachusetts Teachers .....	16-19
C. Boston Teachers.....	20-23
VIII. Valuation Cost Methods	
A. Actuarial Cost Method.....	24
B. Asset Valuation Method .....	25
C. Valuation Method for COLA.....	25
IX. Actuarial Assumptions .....	26-28
X. Summary of Plan Provisions (as of 1/1/98).....	29-33
XI. Glossary of Terms .....	34-35



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Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION I

INTRODUCTION AND CERTIFICATION

This report presents the results of the actuarial valuation of all of the pension benefits which are the obligation of the Commonwealth of Massachusetts as follows:

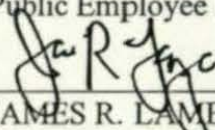
- State Employees Retirement System
- Massachusetts Teachers' Retirement System
- Boston Teachers
- Cost of Living Allowances to Local Systems

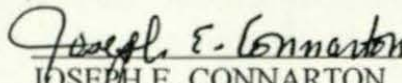
The valuation was performed as of January 1, 1998 pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts. The actuarial assumptions used to calculate the accrued liability and the normal cost are comparable to those used in the actuarial valuation as of January 1, 1996, with exception of the mortality table and the investment return assumption. The use of the 1983 Group Annuity Mortality Table in place of the 1971 Group Annuity Mortality Table is in keeping with general practice. In addition, the investment return assumption has been adjusted from 8.5% to 8.25%. Also, the figures in the valuation reflect a change from market value of assets to a market related or actuarial value of assets. This change in methodology allows investment gains and losses to be phased over several years and reduces the potential volatility of the market value approach. In this Report assets are valued at 97% of Market Value as the first step in using Actuarial Value of Assets. Past Reports have valued assets at market. It is our opinion that the actuarial assumptions used in this report are each reasonably related to plan experience and expectations and represent our best estimate of anticipated experience under the system.

This valuation was based on member data as of December 31, 1997, which was supplied by the Boston, State, and Teachers' Retirement Boards. Such tests as we deemed necessary were performed on the data to ensure accuracy. Asset information as of December 31, 1997 was provided by the Pension Reserve Investment Management Board and by the Annual Statement for the Financial Condition as submitted to this office by the Boston Retirement Board.

In our opinion, 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.

Respectfully submitted,  
Public Employee Retirement Administration Commission

  
\_\_\_\_\_  
JAMES R. LAMENZO  
Member of the American Academy of Actuaries  
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\_\_\_\_\_  
JOSEPH E. CONNARTON  
Deputy Executive Director  
Dated: October 26, 1998



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Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION II  
SUMMARY DISCUSSION

PART A Costs under Current Valuation

Section 22C of G.L., c. 32 mandates the establishment of a funding schedule for the Commonwealth of Massachusetts pension obligation. The schedule, as mandated by law, calls for payment of the Normal Cost plus an amortization payment on the Unfunded Actuarial Liability. The provisions of Chapter 32, Section 22C require amortization payments such that the Unfunded Actuarial Liability is reduced to 0 by June 30, 2028. Under the present schedule, the amortization payments to eliminate that initial unfunded liability by FY2017 are level. In addition there are various bases (gains, ERI) which are also being amortized on a level dollar basis.

The results of the January 1, 1998 actuarial valuation are as follows (\$000 omitted):

Total Normal Cost	\$18,375,586	\$12,974,371	\$772,751
Employee Contributions	11,293,321	10,214,188	503,131
Net Normal Cost	\$7,082,265	\$2,760,183	<u>\$269,620</u>
Total Actuarial Liability	28,724,477	15,462,349	\$26,587,227
Assets	2,837,250	2,837,250	<u>20,783,497</u>
Unfunded Actuarial Liability			<u>\$5,803,730</u>

Please see page 5 for more detail of these amounts.



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## Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION II  
SUMMARY DISCUSSION (Continued)

PART B Comparison with Prior Valuation

Below we have shown the comparison between the current valuation and the January 1, 1996 valuation. (\$000's omitted).

	<u>1/1/98</u>	<u>1/1/96</u>	<u>Increase (Decrease)</u>	<u>Increase (Decrease)</u>
Total Normal Cost	\$772,751	\$716,099	\$56,652	7.9%
Employee Contributions	503,131	439,892	63,239	14.4%
Net Normal Cost	<u>\$269,620</u>	<u>\$276,207</u>	<u>\$(6,587)</u>	(2.4%)
Actuarial Liability				
Actives	\$15,323,506	\$12,074,571	\$3,248,935	26.9%
Retirees and Inactives	<u>11,263,721</u>	<u>10,114,484</u>	<u>1,149,237</u>	11.4%
Total	\$26,587,227	\$22,189,055	4,398,172	19.8%
Assets	<u>20,783,497</u>	<u>15,467,239</u>	<u>5,316,258</u>	34.4%
Unfunded Actuarial Liability	<u>\$5,803,730</u>	<u>\$6,721,816</u>	<u>\$(918,086)</u>	(13.7%)
Funded Ratio	<u>78.2%</u>	<u>69.7%</u>	<u>8.5%</u>	

The development of the Expected Unfunded Actuarial Liability based on the January 1, 1998 valuation is displayed on Page 6. The difference between this amount and the actual Unfunded Actuarial Liability is known as the Actuarial Gain or Loss. For the period from January 1, 1996 to January 1, 1998, the Actuarial Gain was \$2.463 billion, which primarily reflects an asset gain of \$2.33 billion.

There was an actuarial liability gain for State employees of approximately \$462 million primarily due to salary increases less than expected. There was a liability loss for State Teachers of approximately \$259 million primarily due to an increase in the number of active members, and therefore payroll. For Boston teachers there was a liability gain of \$60 million. A decrease in the number of active members more than offset a greater than expected increase in average pay for the continuing members.

There have been a number of assumption and plan provision changes since the last valuation. The effect of these changes is also outlined in the gain/loss analysis on page 6.



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Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION II  
SUMMARY DISCUSSION (Continued)

PART C Considerations for the Future

The Commonwealth of Massachusetts must make payments in accordance with s. 22C of G.L. c. 32 for the Massachusetts Teachers' Contributory Retirement System, State Employees' Contributory Retirement System, Boston Teachers and for the cost-of-living allowances (COLA) granted to retirees and survivors of all local systems from 1981-1996.

The most recent funding schedule was adopted in FY98 and effective for FY99. The results of this valuation indicate the schedule is sufficient to meet plan obligations.

PART D Other Information Available in this Report

As we stated in Part A of this section, the valuation results by type of benefit are on page 5. The development of the Actuarial Gain (Loss), as discussed in Part B, is on Page 6.

In addition, we have included a summary of asset information on Page 11. Assets are shown on both market value and actuarial value basis. For purposes of developing the Unfunded Actuarial Liability, we have used actuarial value of assets. See Section VIII for discussion.

On Pages 12 to 23, demographic information regarding the members of the State Employees' Retirement System, Massachusetts' Teachers' Retirement System, and Boston Teachers is presented. In conducting valuations PERAC uses data provided by the retirement boards and works with those boards to improve the accuracy of that data. These charts display age, service and salary information for retirees and survivors. We have also included a description of the principal data issues and any assumptions which were made in consideration of such data.

A description of the funding method used in calculating valuation results is on Page 24 to 25, and the actuarial assumptions used are on Pages 26 to 28.

A brief summary of plan provisions appears on Pages 29 to 33.

Finally, a glossary of actuarial terminology is presented on Pages 34 to 35.



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Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION III  
SUMMARY OF VALUATION RESULTS

A. Number of Members on Current Valuation Date					
	State	State	Boston	Local	Total
	Employees	Teachers	Teachers	COLA	
1. Active Members	82,631	74,899	5,450	N/A	
2. Vested Terminated Members	2,073	1,850	96	N/A	
3. Retired Members and Survivors	43,144	30,499	2,742	N/A	
Total	<u>127,848</u>	<u>107,248</u>	<u>8,288</u>	N/A	
B. Total Active Payroll <b>**</b> (000's omitted)					
	\$3,110,976	\$3,175,210	\$285,285		
C. Normal Cost (000's omitted)					
1. Superannuation	\$264,233	\$247,101	\$24,181		
2. Termination	26,249	21,096	1,718		
3. Disability	83,918	37,477	3,549		
4. Death	<u>32,505</u>	<u>28,297</u>	<u>2,427</u>		
Total Normal Cost	\$406,905	\$333,971	\$31,875		\$772,751
Employee Contribution	<u>250,194</u>	<u>231,855</u>	<u>21,082</u>		<u>503,131</u>
Net Employer Normal Cost	<u>\$156,711</u>	<u>\$102,116</u>	<u>\$10,793</u>	N/A	<u>\$269,620</u>
D. Actuarial Liability (000's omitted)					
1. Active					
a. Superannuation	\$5,096,841	\$7,617,741	\$681,564		
b. Termination	68,097	62,981	4,330		
c. Disability	572,133	416,976	37,978		
d. Death	<u>302,181</u>	<u>426,854</u>	<u>35,830</u>		
Total Actives	\$6,039,252	\$8,524,552	\$759,702		\$15,323,506
Vested Terminated Members	262,062	181,477	10,371		453,910
Non-Vested Terminated Members	58,609	18,365	2,910		79,884
Retirees and Survivors	<u>5,001,088</u>	<u>\$4,370,340</u>	<u>446,470</u>	<u>\$912,029</u>	<u>10,729,927</u>
Total Actuarial Liability	\$11,361,011	\$13,094,734	\$1,219,453	\$912,029	\$26,587,227
Assets (Actuarial Value)	<u>9,914,030</u>	<u>10,169,993</u>	<u>699,474</u>	<u>0</u>	<u>20,783,497</u>
Unfunded Actuarial Liability	<u>\$1,446,981</u>	<u>\$2,924,741</u>	<u>\$519,979</u>	<u>\$912,029</u>	<u>\$5,803,730</u>
Funded Ratio (Ratio of Assets to Actuarial Liability)	87.3%	77.7%	57.4%	0.0%	78.2%



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION IV  
DEVELOPMENT OF THE ACTUARIAL GAIN OR LOSS  
(\$000,000's omitted)

	State	Teachers	Boston Teachers	Local COLA	Total
1. Unfunded Actuarial Liability 1/96 (UAL)	2,076	2,699	477	1,470	6,722
2. Adjust for change in investment return assumption to 8.25%	273	296	30	42	641
3. Employer Normal Cost (8.25%)	146	111	10	49	316
4. Interest on (1),(2), and (3) at 8.25%	206	256	43	129	634
5. Appropriation paid during 1996 *	457	410	35	108	1,010
6. Interest on (5) assuming mid year payment	19	17	1	4	42
7. Expected UAL 1/97: (1)+(2)+(3)+(4)-(5)-(6)	2,225	2,935	523	1,578	7,261
8. Estimated employer normal cost for 1997	152	115	10	51	329
9. Interest on (7) and (8) at 8.25%	196	252	44	134	626
10. Appropriation paid during 1997 *	485	438	35	104	1,062
11. Interest on (10) assuming mid year payment	20	18	1	4	44
12. Expected UAL 1/98: (7)+(8)+(9)-(10)-(11)	2,068	2,846	541	1,655	7,110
13. Change in COLA provisions	125	144	13	(917)	(635)
14. Change in mortality assumption and asset valuation method	794	887	78	33	1,792
15. Expected UAL 1/98 after plan changes	2,987	3,877	632	771	8,267
16. UAL 1/98	1,447	2,925	520	912	5,804
17. Total gain/(loss): (15)-(16)	1,540	952	112	(141)	2,463

\* estimated as benefits paid



SECTION V  
INFORMATION REQUIRED BY AUDITORS

In November of 1994, GASB issued Statements No. 25, 26 and 27, relating to Financial Reporting and Accounting for Pension Plans. We have included in this report the actuarial information required by Statement No. 27. The Commonwealth of Massachusetts chose to begin implementing Statement No. 27 for the reporting year Fiscal 1996.

Under GASB Statement No. 27, the calculation of an Annual Required Contribution (ARC) is required for each year. This calculation is to be based upon the same methods and assumptions as are applied in determining funding requirements, but with certain limiting parameters within which these methods and assumptions must fall. 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.

In order to calculate the ARC in the first year for which Statement No. 27 is in effect, a Net Pension Obligation (NPO) at transition must be calculated. This is 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.

As part of this valuation we brought the NPO forward from FY96 to FY98. For FY98 in accordance with GASB Statement NO 27, amortization cost was determined on a schedule which is equivalent to that of the current schedule.

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

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 (typically 15 years) are part of the funding schedule. However, the amortization cost GASB reflects is an amortization of the entire unfunded liability which is roughly equivalent to the current schedule.



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION V  
INFORMATION REQUIRED BY AUDITORS- (Cont'd)

3. Although there is no difference in the totals, contributions have been allocated slightly differently among the State and COLA portions. For purposes of Statement No. 27, a larger contribution was made to COLA, with lesser amounts to State. This was done so the NPO for the local COLA remains at 0. No assets are attributed to the local COLA.

	STATE	COLA	TOTAL
1. Annual Budget Contributions (ABC) by FY92			
a. Fiscal Cost	194,239	107,796	302,035
b. Administrative Cost	111,274	134,772	246,046
c. ABC	305,513	242,568	548,081
2. Assets under (over) funded from prior year (NFO)	(770,974)	(597,638)	(1,368,612)
3. Insurance Cost (IC) - (2A) - (2B)	(66,472)	(66,472)	(132,944)
4. Annual Contributions*	(61,296)	(66,472)	(127,768)
5. (3) - (4)	244,217	176,096	420,313
6. Net Pension Obligation (Asset) (3) - (5)	(1,614,861)	(711,542)	(2,326,403)

\* determined based on benefit payments



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION V

A. INFORMATION REQUIRED BY AUDITORS UNDER GASB STATEMENT NO. 27 (\$000's omitted)

	<u>STATE</u>	<u>TEACHERS</u>	<u>BOSTON TEACHERS</u>	<u>COLA</u>	<u>TOTAL</u>
1. <u>Annual Required Contribution (ARC) for FY97:</u>					
a. Normal Cost	134,762	100,709	9,063	48,320	292,854
b. Amortization Cost	111,274	144,718	25,557	78,836	360,385
c. ARC	246,037	245,426	34,621	127,155	653,239
2. Amount under (over) funded from prior year (NPO)	(770,324)	(527,438)	(24,490)	(0)	(1,322,253)
a. Interest on NPO	(65,478)	(44,832)	(2,082)	(0)	(112,391)
b. Amortization of NPO	(41,889)	(28,681)	(1,332)	(0)	(71,902)
3. Pension Cost (1c) + (2a) - (2b)	222,448	229,275	33,871	127,155	612,750
4. Actual Contribution *	463,590	418,519	35,000	127,155	1,044,264
5. (3) - (4)	(241,142)	(189,244)	(1,129)	0	(431,514)
6. Net Pension Obligation/(Asset) (2)+(5)	(1,011,466)	(716,682)	(25,619)	0	(1,753,767)

\* estimated based on benefit payments



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION V

A. INFORMATION REQUIRED BY AUDITORS UNDER GASB STATEMENT NO. 27 (\$000's omitted) - (Cont'd)

	<u>STATE</u>	<u>TEACHERS</u>	<u>BOSTON TEACHERS</u>	<u>COLA</u>	<u>TOTAL</u>
1. <u>Annual Required Contribution (ARC) for FY98:</u>	4 <sup>th</sup> funding schedule implemented; equivalent to 20 yr., 3.5% incr. Amort. Pymts.				
a. Normal Cost	155,218	101,144	10,690	0	267,052
b. Amortization Cost	106,037	214,330	38,105	66,835	425,307
c. ARC	261,255	315,474	48,795	66,835	692,359
2. Amount under (over) funded from prior year (NPO)	(1,011,466)	(716,682)	(25,619)	0	(1,753,767)
a. Interest on NPO	(83,446)	(59,126)	(2,114)	0	(144,686)
b. Amortization of NPO	(77,180)	(54,686)	(1,955)	0	(133,821)
3. Pension Cost (1c) + (2a) - (2b)	254,989	311,034	48,636	66,835	681,494
4. Actual Contribution *	494,289	446,619	35,000	66,835	1,042,743
5. (3) - (4)	(239,300)	(135,585)	13,636	0	(361,249)
6. Net Pension Obligation/(Asset) (2)+(5)	(1,250,766)	(852,267)	(11,983)	0	(2,115,016)

\* estimated based on benefit payments



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

**SECTION VI**  
**ASSETS**  
(000's omitted)

**A. Breakdown of Assets**

	State	Teachers
Investment in the Pension Reserve Investment Trust		
Market value	\$10,220,649	\$10,484,529
Actuarial value (97% of market value)	\$9,914,030	\$10,169,993

**B. Assets for Boston Teachers**

For Boston Teachers, we assumed that the market value portion of total assets to be allocated is the same proportion as shown in the January 1, 1994 actuarial valuation report for the City of Boston, performed by PERA.

Total City of Boston assets	
Market Value	\$2,410,904
Assets allocated to Boston Teachers	
Market value	\$721,108
Actuarial value (97% of market value)	\$699,474

Age	0-4	5-9	10-14	15-19	20-24	25-29	30+	Total
0-24	1,034	66						1,100
25-29	1,560	1,708	289					4,477
30-34	1,549	3,265	2,373	171				9,478
35-39	2,332	2,814	4,808	2,119	125			11,842
40-44	2,265	2,126	3,559	3,315	1,176	37		12,229
45-49	1,894	2,011	2,080	3,294	2,234	979	59	13,647
50-54	1,380	1,611	2,163	2,891	1,729	1,636	511	15,246
55-59	780	980	1,211	1,607	1,611	1,155	817	8,236
60-64	356	547	1,028	970	572	385	712	4,612
65+	111	262	424	607	318	263	739	2,816
Total	18,885	15,211	14,275	14,198	7,239	4,213	2,129	86,312



SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP

Part A - State Employees

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the Retirement Board. As part of this valuation, PERAC analyzed actual member information submitted as of 12/31/97 by the State Board of Retirement.

State Active Members

	<u>Actives</u>	<u>Vested Terms.</u>
Number of Members	82,631	2,073
Average Age	44.3	48.5
Average Service	11.5	14.7
Average Salary	\$37,649	\$36,508
Average Annuity Savings		
Fund Balance	\$28,987	\$36,448

Age by Service Distribution of Active Members

<i>Present</i> Age	Years of Service							Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 +	
0-24	1,438	68						1,506
25-29	4,560	1,708	209					6,477
30-34	3,549	3,365	2,393	171				9,478
35-39	2,552	2,818	4,028	2,119	125			11,642
40-44	2,266	2,326	3,519	3,355	1,176	87		12,729
45-49	1,894	2,017	3,080	3,094	2,284	979	59	13,407
50-54	1,380	1,610	2,561	2,399	1,729	1,656	511	11,846
55-59	769	990	1,803	1,662	1,032	1,165	817	8,238
60-64	356	547	1,068	972	572	595	572	4,682
65 +	121	262	616	647	318	263	399	2,626
<b>Total</b>	<b>18,885</b>	<b>15,711</b>	<b>19,277</b>	<b>14,419</b>	<b>7,236</b>	<b>4,745</b>	<b>2,358</b>	<b>82,631</b>



SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

State Active Members (continued)Salary by Age Distribution of Active Members

<i>Present Age</i>	<i>Number of Participants</i>	<i>Total Salary</i>	<i>Average Salary</i>
0 - 24	1,506	\$32,198,541	\$21,380
25 - 29	6,477	\$185,317,393	\$28,612
	1*	\$23,610	\$23,610
30 - 34	9,478	\$316,953,944	\$33,441
	63*	\$1,887,409	\$29,959
35 - 39	11,642	\$412,513,511	\$35,433
	210*	\$6,879,909	\$32,761
40 - 44	12,729	\$477,079,681	\$37,480
	390*	\$13,701,054	\$35,131
45 - 49	13,407	\$538,786,061	\$40,187
	459*	\$17,347,519	\$37,794
50 - 54	11,846	\$492,336,581	\$41,561
	522*	\$20,683,467	\$39,623
55 - 59	8,238	\$346,039,489	\$42,005
	260*	\$9,882,689	\$38,010
60 - 64	4,682	\$197,721,010	\$42,230
	113*	\$3,668,815	\$32,467
65 +	2,626	\$112,029,985	\$42,662
	55*	\$1,605,767	\$29,196
<b>Total</b>	82,631	\$3,110,976,196	\$37,649
	2,073*	\$75,680,239	\$36,508

\* Vested Terminated Members



SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

State Retirees and Survivors

Retiree data had very few errors or missing information. In the few cases where assumptions were necessary, a best estimate was made based on the data available in that particular record.

	<i>Superannuation</i>	<i>Acc Dis</i>	<i>Ord Dis</i>	<i>Survivors</i>	<b>Total</b>
Number of	33,540	2,423	762	6,419	43,144
Average Age	77.0	63.0	67.2	72.8	72.0
Avg. Annual	\$13,865	\$18,864	\$11,870	\$7,359	\$13,143
Annuity	\$72,338,553	\$2,166,931	\$872,320	\$5,835,670	\$81,213,474
Pension from the State	389,329,277	43,539,840	7,861,628	39,986,989	480,717,734
Pension from other	<u>3,363,637</u>	<u>N/A</u>	<u>311,337</u>	<u>1,414,597</u>	<u>5,089,571</u>
<b>TOTAL</b>	\$465,031,467	\$45,706,771	\$9,045,285	\$47,237,256	\$567,020,779



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

**SECTION VII**  
**INFORMATION ON SYSTEM MEMBERSHIP (Continued)**

State Retirees and Survivors (continued)

Benefit by Age Distribution

<i>Present Age</i>	<i>Number of Members</i>	<i>Total Benefits</i>	<i>Average Benefits</i>
less than 40	161	\$2,443,053	\$15,174
40 - 44	281	4,219,125	\$15,015
45 - 49	714	10,998,969	\$15,405
50 - 54	1,225	20,688,346	\$16,888
55 - 59	2,122	31,882,173	\$15,025
60 - 64	4,114	66,137,754	\$16,076
65 - 69	7,528	125,040,822	\$16,610
70 - 74	9,176	133,982,045	\$14,601
75 - 79	7,969	90,038,509	\$11,299
80 - 84	5,466	47,257,424	\$8,646
85 - 89	2,958	23,109,370	\$7,813
90 +	1,430	11,223,189	\$7,848
<b>Totals</b>	<b>43,144</b>	<b>\$567,020,779</b>	<b>\$13,143</b>



SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP

Part B - Massachusetts Teachers

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the Retirement Board. As a part of this valuation, PERAC analyzed actual member information submitted as of 12/31/97 by the Teachers' Board of Retirement.

Teachers' Active Members

We made several principal assumptions with regard to missing or unavailable data. Since credited service is not available, we estimated service based on the date of hire provided. For member data without a date of birth, we assumed (based on credited service) the member was hired at age 30.

We estimated there to be 1,850 vested terminations with assumed final pay of \$40,000.

	<u>Actives</u>
Number of Members	74,899
Average Age	45.1
Average Service	16.8
Average Salary	\$42,393
Average Annuity Savings	
Fund Balance	\$35,489

Age by Service Distribution of Teacher Active Members  
Years of Service

<i>Present Age</i>	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 +	Total
0-24	1,079							1,079
25-29	5,430	1,124						6,554
30-34	3,635	2,023	792					6,450
35-39	1,620	2,037	2,192	466				6,315
40-44	1,710	1,055	1,945	2,117	1,787			8,614
45-49	1,511	1,193	1,883	1,533	5,103	5,423		16,646
50-54	744	655	1,197	699	1,619	6,795	4,506	16,215
55-59	251	205	556	413	669	1,352	5,525	8,971
60-64	44	53	180	188	321	456	2,068	3,310
65 +	37	16	64	46	93	122	367	745
<b>Total</b>	16,061	8,361	8,809	5,462	9,592	14,148	12,466	74,899



SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Teachers' Active Members (continued)Salary by Age Distribution of Teacher Active Members

<i>Present Age</i>	<i>Number of Participants</i>	<i>Total Salary</i>	<i>Average Salary</i>
0 - 24	1,030	\$29,203,536	\$28,353
25 - 29	6,571	195,827,695	29,802
30 - 34	6,457	213,695,780	33,095
35 - 39	6,320	227,564,374	36,007
40 - 44	8,624	348,183,399	40,374
45 - 49	16,656	738,519,386	44,340
50 - 54	16,215	774,803,144	47,783
55 - 59	8,971	444,772,449	49,579
60 - 64	3,310	166,421,218	50,278
65 +	745	36,219,762	48,617
<b>Total</b>	<b>74,899</b>	<b>\$3,175,210,744</b>	<b>\$42,393</b>



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Teachers' Retirees and Survivors

	<i>Superannuation</i>	<i>Acc Dis</i>	<i>Ord Dis</i>	<i>Survivors</i>	<b>Total</b>
Number of Members	26,456	272	525	3,246	30,499
Average Age	72.6	63.7	65.0	64.4	71.5
Avg. Annual Benefit	\$18,791	\$24,994	\$13,904	\$7,208	\$17,530
Annuity Pension	N/A	N/A	N/A	N/A	N/A
TOTAL	\$497,145,636	\$6,798,346	\$7,299,421	\$23,397,261	\$534,640,664

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

**SECTION VII**  
**INFORMATION ON SYSTEM MEMBERSHIP (Continued)**

Teachers' Retirees and Survivors (continued)

Benefit by Age Distribution

<i>Present Age</i>	<i>Number of Members</i>	<i>Total Benefits</i>	<i>Average Benefits</i>
less than 40	402	\$669,533	\$1,666
40 - 44	34	149,173	\$4,387
45 - 49	198	1,860,380	\$9,396
50 - 54	677	7,966,222	\$11,767
55 - 59	1,631	25,628,147	\$15,713
60 - 64	4,144	94,535,834	\$22,813
65 - 69	6,418	147,713,047	\$23,015
70 - 74	5,623	105,456,459	\$18,754
75 - 79	4,142	62,124,238	\$14,999
80 - 84	3,014	38,553,773	\$12,792
85 - 89	2,407	29,252,123	\$12,153
90 +	1,809	20,731,737	\$11,460
<b>Totals</b>	<b>30,499</b>	<b>\$534,640,666</b>	<b>\$17,530</b>



SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Part C - Boston Teachers

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the Retirement Board. As part of this valuation, PERAC analyzed actual member information submitted as of 12/31/97 by the Boston Board of Retirement.

Boston Teachers- Active Members

	<u>Actives</u>	<u>Vested Terms.</u>
Number of Members	5,450	96
Average Age	48.1	N/A
Average Service	17.4	N/A
Average Salary	\$52,346	N/A
Average Annuity Savings Fund Balance	\$46,253	\$52,380

Terminated vested members were not coded as such. We estimated the number of terminated vested members based on credited service and estimated the liability assuming final average earnings of \$40,000-\$50,000 depending on the member's age.

Age by Service Distribution of Boston Teacher Active Members

<u>Present Age</u>	<u>Years of Service</u>							<u>Total</u>
	<u>0 - 4</u>	<u>5 - 9</u>	<u>10 - 14</u>	<u>15 - 19</u>	<u>20 - 24</u>	<u>25 - 29</u>	<u>30 +</u>	
0-24	7							7
25-29	136	77	4					217
30-34	107	179	58	5				349
35-39	58	121	189	31				399
40-44	65	123	255	135	105	1		684
45-49	55	123	290	134	347	229	1	1,179
50-54	42	78	187	114	153	480	280	1,334
55-59	24	43	95	72	78	111	348	771
60-64	7	18	38	30	47	58	128	326
65 +	1	5	31	20	31	34	62	184
<b>Total</b>	<b>502</b>	<b>767</b>	<b>1,147</b>	<b>541</b>	<b>761</b>	<b>913</b>	<b>819</b>	<b>5,450</b>

**SECTION VII**  
**INFORMATION ON SYSTEM MEMBERSHIP (Continued)**

Boston Teachers- Active Members (continued)

Salary by Age Distribution of Boston Teacher Active Members

<i>Present Age</i>	<i>Number of Participants</i>	<i>Total Salary</i>	<i>Average Salary</i>
0 - 24	7	\$245,348	\$35,050
25 - 29	217	8,931,989	\$41,161
30 - 34	349	16,346,120	\$46,837
35 - 39	399	19,850,982	\$49,752
40 - 44	684	34,785,972	\$50,857
45 - 49	1,179	63,601,987	\$53,946
50 - 54	1,334	72,148,677	\$54,084
55 - 59	771	41,998,967	\$54,473
60 - 64	326	17,642,989	\$54,120
65 +	184	9,731,876	\$52,891
<b>Total</b>	<b>5,450</b>	<b>\$285,284,906</b>	<b>\$52,346</b>



Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/98

SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Boston Teachers- Retirees and Survivors

Retirees and Survivors

	<i>Superannuation</i>	<i>Acc Dis</i>	<i>Ord Dis</i>	<i>Survivors</i>	<b>Total</b>
Number of Members	2,317	68	42	315	2,742
Average Age	74.5	67.2	66.5	73.0	74.1
Avg. Annual Benefit	\$21,425	\$21,107	\$14,392	\$9,494	\$19,938
Annuity	\$7,590,249	\$93,772	\$69,016	\$455,476	\$8,208,513
Pension	<u>42,050,394</u>	<u>1,341,498</u>	<u>535,429</u>	<u>2,535,284</u>	<u>46,462,605</u>
<b>TOTAL</b>	<b>\$49,640,643</b>	<b>\$1,435,270</b>	<b>\$604,445</b>	<b>\$2,990,760</b>	<b>\$54,671,118</b>

SECTION VII  
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Boston Teachers- Retirees and Survivors (continued)Benefit by Age Distribution

<i>Present Age</i>	<i>Number of Members</i>	<i>Total Benefits</i>	<i>Average Benefits</i>
less than 40	3	10,589	\$3,530
40 - 44	5	35,912	\$7,182
45 - 49	24	252,429	\$10,518
50 - 54	57	825,210	\$14,477
55 - 59	111	1,888,522	\$17,014
60 - 64	259	7,076,437	\$27,322
65 - 69	477	12,510,616	\$26,228
70 - 74	544	12,377,488	\$22,753
75 - 79	417	7,432,207	\$17,823
80 - 84	310	4,719,981	\$15,226
85 - 89	314	4,487,249	\$14,291
90 +	221	3,054,477	\$13,821
<b>Totals</b>	<b>2,742</b>	<b>54,671,118</b>	<b>\$19,938</b>



SECTION VIII  
VALUATION COST METHODS

Part A Actuarial Cost Method

The Actuarial Cost Method which was used to determine pension liabilities and costs for benefits payable under the State Employees' Contributory Retirement System, the Massachusetts Teachers' Retirement System, and for the Boston Teachers, for the year beginning January 1, 1998, is known as the Entry Age Normal Cost Method. Under this method the Normal Cost for each active participant on the valuation date is determined as the level percent of salary, which, if paid annually from the date the participant first became a member of the retirement system, would fully fund by retirement, death, disability or termination, the projected benefits which the participant is expected to receive. The Actuarial Liability for each participant is determined as the present value as of the valuation date of all projected benefits which the participant 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 participant is equal to the Normal Cost and Actuarial Liability for the Plan. The Unfunded Actuarial Liability is the Actuarial Liability minus current assets.

The Normal Cost for a participant will remain a level percent of salary for each year of participation 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 addition of new participants or the retirement, death or termination of participants. The Actuarial Liability for a participant 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

SECTION IX  
ACTUARIAL ASSUMPTIONS

In previous valuations, plan assets were determined at market value. With this valuation, we are adjusting this methodology to reduce the potential volatility in market value from year to year. Typical methodologies used to develop actuarial value of assets recognize asset gains and losses over a 5-year period. Since actual investment returns have exceeded the expected return over the past 5 years, if a 5-year average method were adopted, the actuarial value would likely be approximately 80% of the market value. For the 1998 valuation, we have begun to phase in an actuarial value of assets methodology by adopting an approach of using 97% of market value as the actuarial value of assets as of January 1, 1998. We intend to phase-in the 5 year average method (or a similar method) over several years.

Part C Valuation Method for COLA

The liabilities for local COLA reflect recent changes in Chapter 32. The total Cost of Living adjustment for periods from 1981 through 1996 is paid for by the Commonwealth of Massachusetts. Future COLA increases is the responsibility of local systems. The local COLA liabilities were determined based on data provided by the State Retirement Board.

For members, the mortality rate is assumed to be in accordance with the 1983 Group Annuity Mortality Table (sex distinct) with ages set forward 10 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 3 and 4 members. For members retired under an Accidental (job-related) Disability, it is assumed that 40% of deaths are from the same cause as the disability.

Rate of Withdrawal

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

Age	Teachers	Other Groups 1 & 2	Groups 3 & 4
20	.0586	.1200	.0210
30	.0444	.0855	.0165
40	.0185	.0231	.0055
50	.0117	.0146	0



SECTION IX  
ACTUARIAL ASSUMPTIONS

<u>Rate of Investment Return</u>	Based on an analysis of past experience. Sample annual rates are shown below:	8.25% per year																						
<u>Rate of Salary Increase</u>		6.0% per year																						
<u>Interest Rate credited to the Annuity Savings Fund</u>		5.5% per year																						
<u>Assumed Rate of Cost of Living Increases (COLA)</u>		3% per year																						
<u>Mortality Rate</u>	<p>1983 Group Annuity Mortality Table (sex distinct). This is applicable to both pre-retirement and post-retirement benefits. For disabled members, the mortality rate is assumed to be in accordance with the 1983 Group Annuity Mortality Table (sex distinct) with ages set forward 10 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 3 and 4 members. For members retired under an Accidental (job-related) Disability, it is assumed that 40% of deaths are from the same cause as the disability.</p>																							
<u>Rate of Withdrawal</u>	<p>Based on an analysis of past experience. Sample annual rates are shown below:</p> <table border="0" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: left;"><u>Age</u></th> <th style="text-align: left;">Teachers</th> <th style="text-align: left;">Other Groups 1 &amp; 2</th> <th style="text-align: left;">Groups 3 &amp; 4</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>.0960</td> <td>.1200</td> <td>.0210</td> </tr> <tr> <td>30</td> <td>.0444</td> <td>.0555</td> <td>.0165</td> </tr> <tr> <td>40</td> <td>.0185</td> <td>.0231</td> <td>.0056</td> </tr> <tr> <td>50</td> <td>.0117</td> <td>.0146</td> <td>0</td> </tr> </tbody> </table>				<u>Age</u>	Teachers	Other Groups 1 & 2	Groups 3 & 4	20	.0960	.1200	.0210	30	.0444	.0555	.0165	40	.0185	.0231	.0056	50	.0117	.0146	0
<u>Age</u>	Teachers	Other Groups 1 & 2	Groups 3 & 4																					
20	.0960	.1200	.0210																					
30	.0444	.0555	.0165																					
40	.0185	.0231	.0056																					
50	.0117	.0146	0																					

SECTION IX  
ACTUARIAL ASSUMPTIONS (Continued)

Rate of Disability

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

<u>Age</u>	<u>Teachers</u>	<u>Groups 1 &amp; 2</u>	<u>Group 3</u>	<u>Group 4</u>
20	0.0003	0.0006	0.0011	0.0010
30	0.0006	0.0011	0.0025	0.0023
40	0.0012	0.0024	0.0096	0.0087
50	0.0031	0.0061	0.0000	0.0110
60	0.0061	0.0123	0.0000	0.0150

It is also assumed that 55% of disabilities will be job-related.

Rate of Retirement (Superannuation)

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

<u>Age</u>	<u>Teachers</u>	<u>Groups 1 &amp; 2</u>	<u>Group 3</u>	<u>Group 4</u>
43		0.0000	0.0030	0.0000
44		0.0000	0.0050	0.0000
45		0.0000	0.0075	0.0000
46		0.0000	0.0105	0.0000
47		0.0000	0.0500	0.0000
48		0.0000	0.0500	0.0000
49		0.0000	0.1000	0.0000
50		0.0000	0.2000	0.3201
51		0.0000	0.2500	0.0718
52		0.0000	0.2500	0.0593
53		0.0000	0.2500	0.0803
54		0.0000	0.2500	0.0769
55		0.1255	1.0000	0.1554
56		0.0321	1.0000	0.0907
57		0.0310	1.0000	0.0909
58		0.0334	1.0000	0.1194
59		0.0348	1.0000	0.1136
60		0.0784	1.0000	0.2395
61		0.0692	1.0000	0.1360
62		0.1511	1.0000	0.1950
63		0.1071	1.0000	0.1253
64		0.1037	1.0000	0.1873
65		0.3568	1.0000	1.0000



**SECTION IX**  
**ACTUARIAL ASSUMPTIONS (Continued)**

<u>Age</u>	<u>Teachers Groups 1 &amp; 2</u>	<u>Group 3</u>	<u>Group 4</u>
66	0.2214	1.0000	1.0000
67	0.2159	1.0000	1.0000
68	0.2164	1.0000	1.0000
69	0.2536	1.0000	1.0000
70	1.0000	1.0000	1.0000

Administrative Expenses

Assumed to be paid separately and are not included in the appropriation.

Assumptions made with respect to data are discussed in Section VII.

MEMBER CONTRIBUTIONS

- 1974 to 1975 - 5% of regular compensation
- 1975 to 1981 - 7% of regular compensation
- 1981 to 6/30/86 - 8% of regular compensation
- 7/1/86 to present - 5% of regular compensation
- 7/1/86 to present - 12% - State Police
- 1978 to present - an additional 2% of regular compensation in excess of \$36,000.

RATE OF INTEREST: Regular interest on regular deductions made after January 1, 1984 is a rate established by the Commissioner of PERA 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: There is no mandatory retirement age for most employees. Certain public safety personnel are required to retire at age 65. Mandatory retirement age for most public employees is age 55, but the Commonwealth has been enjoined from enforcing this provision in compliance with ongoing litigation.

Members over the age of 20 may elect to make voluntary contributions to regular compensation and continue to accrue additional years of creditable service.

SECTION X  
SUMMARY OF PLAN PROVISIONS, AS OF JANUARY 1, 1998

**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 one retirement law, 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 the Commissioner of PERA. Membership is optional for certain elected officials.

There are four classes of membership in the retirement system:

Group 1 - General employees, including teachers, 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, state correction officers and other hazardous positions specified in the statute.

**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

7/1/96 to present - 12% - State Police

1979 to present - an additional 2% of regular compensation in excess of \$30,000.

**RATE OF INTEREST** : Regular Interest on regular deductions made after January 1, 1984 is a rate established by the Commissioner of PERA 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** : There is no mandatory retirement age for most employees. Certain public safety personnel are required to retire at age 65. Mandatory retirement age for state police officers is age 55, but the Commonwealth has been enjoined from enforcing this provision in conjunction with ongoing litigation.

Members over the age of 70 may elect to continue making contributions on regular compensation and continue to accrue additional years of creditable service.



SECTION X  
SUMMARY OF PLAN PROVISIONS (Continued)

**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

hired after 1978, with 10 years of service and age 55.

**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 employees' highest three year average salary. (75% for Group 3 members) For veterans as defined in G.L. c. 32, s. 1, there is an additional benefit of \$15 per year for each year of service, up to a maximum of 20 years.

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 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 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** : If a member is under age 55, member contributions may be withdrawn. 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 interest.



SECTION X  
SUMMARY OF PLAN PROVISIONS (Continued)

**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 before attaining age 55 with at least 10 years of creditable service.

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".

**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 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 incapacitated for further duty 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. The member must file his or her application prior to attaining statutory "maximum age."

**Retirement Allowance:** 72% of salary plus an annuity based on accumulated member contributions, with interest. This amount is not to exceed 100% of pay. (75% for members hired after 1987) There is an additional pension of \$501.36 per year (or \$312.00 per year in systems in which the local option contained in G.L. c. 32, s.7(2)(b)(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 21 for any child who is a full time student at an accredited educational institution. Those who became members in service after January 1, 1988 or who have not been members in service continually since that date.

**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.



SECTION X  
SUMMARY OF PLAN PROVISIONS (Continued)

**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 \$312 per year, per child, payable to the spouse or legal guardian until all dependent children reach age 18 or 21 if a full time student, unless mentally or physically incapacitated.

The surviving spouse of a member of a police department 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 may receive a one time payment of \$100,000.00 from the State Retirement Board.

**DEATH AFTER ACCIDENTAL DISABILITY RETIREMENT**

If the member's death is from a cause unrelated to the condition for which the member received accidental disability benefits, the spouse will receive an annual allowance of \$6,000 until remarriage or death.

**DEATH IN ACTIVE SERVICE :**

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

**Allowance:** An 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.

**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. The percentage is based on the increase in the Consumer Price Index used for indexing Social Security benefits but cannot exceed 3.0%. This benefit is subject to an annual vote of the Massachusetts General Court.



SECTION X  
SUMMARY OF PLAN PROVISIONS (Continued)

**METHODS OF PAYMENT**

A member may elect to receive his or her retirement allowance in one of 3 optional 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 pre-deceases the retiree, the benefit payable increases (or pops up) to the amount which would have been payable under Option A. Option C is not available to accidental disability recipients.

**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.



SECTION XI  
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.

**ANNUAL STATEMENT** The statement submitted to PERA 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).



SECTION XI  
GLOSSARY OF TERMS (Continued)

**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 is the minimum amount payable during the first six years of some Funding Schedules.

**EXPENSE FUND** The fund into which the appropriation for administrative expenses is paid and from which all such expenses are paid.

**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

**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 BENEFIT OBLIGATION** The portion of the Actuarial Present Value attributable to past service in accordance with the Projected Unit Credit cost method as stipulated by GASB Statement Number 5.

**PENSION FUND** The fund into which appropriation amounts as determined by PERA 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 Commonwealth 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 Commonwealth. 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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