Hull
Retirement System
Actuarial Valuation Report

January 1, 2024

PUBLIC EMPLOYEE RETIREMENT
ADMINISTRATION COMMISSION
COMMONWEALTH OF MASSACHUSETTS

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1. INTRODUCTION & CERTIFICATION

This report presents the results of the actuarial valuation of the Hull Contributory Retirement System. The valuation was performed as of January 1, 2024 pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts. The actuarial assumptions used in this valuation are the same as those used in the January 1, 2022 valuation except the mortality assumption was modified to reflect a more current mortality improvement scale. In addition, this valuation reflects an increase in the COLA base from $17,000 to $19,000.

This valuation was based on member data as of December 31, 2023, which was supplied by the Retirement Board. Such tests as we deemed necessary were performed on the data to ensure accuracy. Asset information as of December 31, 2023 was provided in the Annual Statement for the Financial Condition as submitted to this office in accordance with G.L. c. 32, ss. 20(5)(h), 23(1) and 23(2)(e). Both the membership data and financial information were reviewed for reasonableness but were not audited by us.

This report was prepared by PERAC for the exclusive use of the Hull Retirement Board, its staff and its auditors. The report was performed to determine the funded status of the System and to determine the contribution requirements to ensure that System assets along with the contributions are sufficient to provide the prescribed benefits. Use of this report by other parties may not be appropriate and may result in mistaken conclusions because of the failure to understand applicable assumptions, methods, or the inapplicability of the report for purposes other than those intended. PERAC should be asked to review any statement to be made based on the results presented in this report. PERAC will accept no responsibility for any such statement made without its prior review.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic and demographic assumptions, and increases or decreases expected as part of natural operation of the methodology used for these measurements such as additional contribution requirements based on the plan's funded status and changes in plan provisions or applicable law. As part of this valuation, we have not performed an analysis of the potential range of future measurements.

We, the undersigned actuaries, are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report. In 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 under the system. We believe this report represents an accurate appraisal of the actuarial status of the system performed in accordance with generally accepted actuarial principles and practices relating to pension plans.

Respectfully submitted,
Public Employee Retirement Administration Commission

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March 10, 2025

2. EXECUTIVE SUMMARY

A | COMPARISON WITH PRIOR VALUATION

The last full valuation was performed by PERAC as of January 1, 2022. The investment return assumption of 7.40% was maintained in this valuation. We maintained the base mortality assumption determined from our local system retiree mortality analysis completed in 2019 but updated the mortality improvement scale (see Part B). Other assumptions are based on our Local Experience Study Analysis issued in 2002 with a subsequent adjustment to the salary increase assumption. In addition, the COLA base was increased from $17,000 to $19,000 as part of this valuation. Below we have shown a comparison of the results between the two valuations.

	1/1/24	1/1/22	Increase/ (Decrease)	% Increase/ (Decrease)
Total Normal Cost	$2,082,725	$1,896,391	$186,334	9.8%
Expected Employee Contributions	1,081,423	971,132	$110,291	11.4%
Net Normal Cost	$1,001,302	$925,259	$76,043	8.2%
Total Actuarial Liability	$90,794,183	$84,438,349	$6,355,834	7.5%
Assets	74,822,800	66,736,520	$8,086,280	12.1%
Unfunded Actuarial Liability	$15,971,383	$17,701,829	($1,730,446)	(9.8%)
Funded Ratio	82.4%	79.0%	3.4%	
Number of Active Employees	163	166	(3)	(1.8%)
Total Salary	$11,901,786	$10,967,813	$933,973	8.5%
Average Salary	$73,017	$66,071	$6,946	10.5%
Average Age	49.1	49.9	(0.8)	(1.6%)
Average Service	11.7	11.8	(0.1)	(0.8%)
Number of Retirees/Survivors	154	152	2	1.3%
Total Benefits*	$5,657,287	$5,160,023	$497,264	9.6%
Average Benefits*	$36,736	$33,948	$2,788	8.2%
Average Age	73.6	72.4	1.2	1.7%

**excluding State reimbursed COLA*

2. EXECUTIVE SUMMARY *(continued)*

B | FUNDED STATUS AND PLAN EXPERIENCE SINCE PRIOR VALUATION

Funded Status

The unfunded actuarial liability (UAL) and funded ratio are measures of the plan's funded status. These measures reflect the plan's position as of January 1, 2024. We believe these measures, by themselves, are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions. However, we believe these measures, in conjunction with the plan's funding schedule shown on page 10, are appropriate for assessing the amount of future contributions.

The UAL in this valuation reflects the actuarial value of assets, a method that recognizes investment gains and losses over five years. As of January 1, 2024, the actuarial value of assets is 103.6% of the market value. On a market value basis, the UAL is $18.5 million and the funded ratio is 79.6%.

Plan Experience

Plan Liabilities
The System experienced a gain on the actuarial liability of approximately $415,000 since the last valuation (the actuarial liability was less than expected). This gain is primarily due to more members terminating than expected over the past 2 years. This gain is determined before reflecting the assumption change discussed on the next few pages.

Plan Assets
The System previously adopted an asset smoothing methodology to determine the actuarial value of assets (AVA). As of January 1, 2024, the AVA is $74.8 million compared with the market value of assets (MVA) of $72.3 million. The AVA is 103.6% of the MVA. The rates of return on a market value basis in 2022 and 2023 were -10.7% and 10.9% respectively. The returns on an AVA basis were approximately 6.5% and 6.8% respectively. The recognition of a portion of prior deferred investment gains and losses contributed to an asset loss of approximately $1.07 million over the 2-year period on an AVA basis.

Total
There was a total net loss of approximately $658,000 since the last valuation ($415,000 gain on actuarial liability less $1.07 million loss on the AVA).

2. EXECUTIVE SUMMARY *(continued)*

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

Actuarial Assumptions

Investment Return
Early in 2024, NEPC, the Pension Reserves Investment Trust's (PRIT) investment consultant, provided figures for 30-year expected return projections using a building block approach, the target allocation and expected long-term returns by asset class. The expected annual return is 7.7% in this study (7.2% if we assume expenses of 50 basis points and the expected return reflects a gross return). This figure is the same as the figure from the 2023 study. Note that the 7.7% average expected return does not mean that the expected return each year will be 7.7%. In fact, over the shorter term (10 years) the average expected return is 6.6% (40 basis points less than last year). Greater expected returns in later years determine NEPC's long-term projection. The NEPC projected returns are the first measure we use to determine a reasonable range for the long-term investment return assumption.

A comparison of recent expected return projections as well as historical PRIT returns is shown below.

	Expected Annual Return						
	2018	2019	2020	2021	2022	2023	2024
10-year expected return *	6.6%	6.8%	6.2%	5.8%	5.7%	7.0%	6.6%
30-year expected return	7.7%	7.9%	7.3%	6.8%	6.9%	7.7%	7.7%

* In years prior to 2020, NEPC's short-term horizon was 5-7 years

Actual Returns as of December 31, 2023	
2023	11.4%
5 years (2019-2023)	9.5%
10 years (2014-2023)	8.0%
20 years (2004-2023)	7.8%
39 years (1985-2023)	9.4%

Besides the NEPC analysis, we review the capital market assumptions (CMAs) of other investment consultants for comparison. We estimate the short-term and long-term expected returns using these capital market assumptions and PRIT's asset allocation. The expected returns using these CMAs are generally consistent with that of NEPC.

In addition, we also review the Horizon Actuarial Services Survey of Capital Market Assumptions. The latest survey compares the assumptions of 42 different investment consultants including NEPC. The Horizon study used in our analysis was published in August 2023. Since it reflects 2023 capital market assumptions, there is a one-year lag between the current results of the Horizon survey and the current NEPC study. The Horizon long-term (20 years) expected return based on its hypothetical portfolio is 7.2% (6.3% in the prior study) and is consistent with the 80-basis point increase we saw with NEPC a year ago. We also estimated the short-term and long-term results using the Horizon average expected returns by asset class and PRIT's asset allocation. This result is consistent with NEPC. The results of the Horizon survey appear to show a bottoming of the long-term expected returns two years ago.

The National Association of State Retirement Administrators (NASRA) periodically publishes a survey of investment return assumptions used by over 100 large public plans. The most recent survey available at the time of our analysis was published in July 2023. In this survey, the average investment return assumption was 6.91%, a slight decrease from the 6.93% figure published in March 2023. Although the NASRA survey does not consider different asset allocations between the plans, it demonstrates the continuing reduction, and again, perhaps a bottoming of this assumption.

2. EXECUTIVE SUMMARY *(continued)*

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

The system used an investment return assumption of 7.40% in the 2022 actuarial valuation. After an initial discussion with the Board, we used our recommended assumption of 7.25% in the development of the funding schedules attached to our December 19, 2024 letter. However, the Board also requested we show the valuation results with a 7.40% assumption.

The Board ultimately decided to maintain the 7.40% assumption in this valuation. The 7.40% assumption falls slightly outside the high end of our reasonable assumption range as of January 1, 2024 (6.0% to 7.35%). Using our recommended assumption of 7.25% the UAL is $16.9 million and the funded ratio is 81.7%.

We will continue to monitor this assumption in each future valuation.

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

Mortality
We completed a local system retiree mortality analysis in 2019. As part of our analysis, we compared our experience to the public retirement plan mortality tables released in 2019 (the Pub-2010 Mortality Tables- which did not include Massachusetts public plan experience). We found that our experience was not consistent with these tables. Based on our findings, we adopted the RP-2014 Blue Collar table projected generationally with Scale MP-2018 and updated to Scale MP-2020 in our 2022 valuations. We continue to use this base table for our 2024 local system actuarial valuations. However, we updated the mortality improvement scale to the more current MP-2021.

This modest change increased the normal cost by approximately $2,000 and increased the actuarial accrued liability by approximately $193,000.

Chapter 176 Provisions

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

As of January 1, 2024, there were 110 members hired after April 1, 2012. The normal cost is approximately $104,000 lower and the actuarial liability is approximately $975,000 lower for these members under the new provisions compared to the figures under the prior provisions.

COLA Base

This valuation reflects a COLA base of $19,000. The 2022 valuation reflected a $17,000 base. This change increased the normal cost by approximately $8,000 and the actuarial liability by approximately $659,000.

We recommend that if a system increases the COLA base, there should be a corresponding increase in appropriation to recognize the cost of the benefit enhancement. The funding schedule adopted by the Board does not reflect an increased level of appropriation from the prior schedule.

2. EXECUTIVE SUMMARY *(continued)*

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

Expenses

We have generally included administrative expenses paid by the plan in the development of normal cost in our actuarial valuations. However, that is not the case with investment-related expenses. Historically, most local systems have used an investment return assumption that is net of investment related expenses. For a number of years, we have been reflecting a portion of investment related expenses in the normal cost. We used an expense assumption of $275,000 in this valuation, which reflects approximately $115,000 of investment related expenses. Over time, we expect the total administrative and investment expenses to be included in the normal cost. Alternatively, a lower investment return assumption can achieve a similar result.

Net 3(8)(c) Reimbursements

A common assumption is that §3(8)(c) payments paid from a system are approximately equal to §3(8)(c) payments paid to a system. However, we found for most local systems, this is not true. For your system, there is net §3(8)(c) cash outflow during the year. In order to better reflect the actual cost to the System, we have once again included expected net §3(8)(c) payments in the funding schedule.

Funding Schedule

The funding schedule presented in this report was recently adopted by the Board. The FY25 payment was maintained from the prior schedule. The schedule amortizes the unfunded actuarial liability by increasing the total appropriation by 4.0% per year until fiscal year 2029 with a final amortization payment in fiscal yar 2030. This schedule was developed to increase at the same level as the schedule adopted in 2022.

GASB 67/68

We used the results of the January 1, 2022 valuation rolled forward to December 31, 2023 to prepare the Governmental Accounting Standards Board (GASB) disclosures for the fiscal year ending June 30, 2024 and the plan year ending December 31, 2023. The statements are commonly referred to as GASB 67 and GASB 68. GASB 67 relates to financial reporting for state and local government pension plans (plan financials). GASB 68 relates to financial reporting by state and local governments for pension plans (employer financials). We have used a measurement date of December 31 in each year we have provided these disclosures. We have not provided any GASB 67/68 exhibits in this report. These disclosure exhibits were provided under separate cover.

COVID-19 Pandemic

The assumptions in this report do not reflect any potential impacts of the COVID-19 pandemic on the System. In the short-term, the pandemic likely had a material effect on the mortality experience, and to a lesser extent, the retirement and withdrawal experience in ways not anticipated by the assumptions on which the projections are based.

3. SUMMARY OF VALUATION RESULTS

A. Number of Members on Current Valuation Date	
Active Members	163
Vested Terminated Members	7
Non-Vested Terminated Members	58
Retired Members and Survivors	154
Total	382
B. Total Regular Compensation of Active Members	$11,901,786
C. Present Value of Future Benefits	
Active Members	$53,498,069
Retirees, Survivors, and Inactive Members	$55,153,645
Total Present Value of Future Benefits	$108,651,714
D. Normal Cost	
Total Normal Cost	$2,082,725
Expected Employee Contributions	$1,081,423
Net Employer Normal Cost	$1,001,302
E. Actuarial Liability	
Active Members	$35,640,538
Vested Terminated Members	$515,777
Non-Vested Terminated Members	$507,835
Retirees and Survivors	$54,130,033
Total Actuarial Liability	$90,794,183
F. Actuarial Value of Assets	$74,822,800
G. Unfunded Actuarial Liability: E – F	$15,971,383
H. Funded Ratio: F/E	82.4%

4. APPROPRIATION DEVELOPMENT FOR FISCAL YEAR 2025

A | DERIVATION OF APPROPRIATION

Cost Under Current Funding Schedule

1. a. Employer Normal Cost as of January 1, 2024	$1,001,302
b. Estimated Expenses	$275,000
c. Total Employer Normal Cost (a+b, adjusted for timing)	$1,331,396
2. Net 3(8)(c) payments	$85,000
3. a. Unfunded Actuarial Liability as of January 1, 2024	$15,971,383
b. FY25 amortization payment (6-year, 4.0% total increasing) *	$3,154,710
4. Total FY25 Payment [Sum of 1(c), 2, 3(b)]	$4,571,106

* FY25 appropriation was maintained at the same level as the prior schedule.

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

4. APPROPRIATION DEVELOPMENT FOR FISCAL YEAR 2025 *(continued)*

B | CURRENT FUNDING SCHEDULE

Fiscal Year	Normal Cost	Net 3(8)(c)	Amort. Of UAL	Total Cost	Unfunded Act. Liab.	Change in Cost
2025	1,331,396	85,000	3,154,710	4,571,106	16,562,324	
2026	1,391,309	85,000	3,277,642	4,753,950	14,419,806	4.0%
2027	1,453,917	85,000	3,405,191	4,944,108	11,987,494	4.0%
2028	1,519,344	85,000	3,537,529	5,141,873	9,239,013	4.0%
2029	1,587,714	85,000	3,674,833	5,347,547	6,145,854	4.0%
2030	1,659,161	85,000	2,693,128	4,437,289	2,677,207	-17.0%
2031	1,733,824	85,000		1,818,824	0	-59.0%

All amounts assume payments will be made August 1 of each fiscal year.
Total appropriation assumed to increase 4.0% each year until FY29, with a final amortization payment in FY30.
FY25 normal cost includes assumed expenses of $275,000 and is assumed to increase 4.5% per year.
FY25 appropriation was maintained at the same level as the prior schedule.

5. PLAN ASSETS

A | BREAKDOWN OF ASSETS BY INVESTMENT TYPE

Cash	$9,209,218
PRIT Cash	$4,113,297
PRIT Fund	$58,910,432
Accounts Receivable	$21,307
Accounts Payable	($979)
Total	$72,253,275

B | BREAKDOWN OF ASSETS BY FUND

Annuity Savings Fund	$11,982,004
Annuity Reserve Fund	$4,263,660
Pension Fund	$2,408,563
Pension Reserve Fund	$53,599,048
Total	$72,253,275

C | MARKET VALUE OF ASSETS $72,253,275

D | ACTUARIAL VALUE OF ASSETS $74,822,800

5. PLAN ASSETS *(continued)*

E | DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

	2022	2023	2024
1A. Development of total investment income including appreciation			
1. Beginning of year market value	74,151,689	65,965,039	72,253,275
2a. Employee contributions	1,208,664	1,242,172	
b. Employer contributions	4,226,244	4,395,294	
c. Other receipts	385,767	286,117	
d. Total receipts: (a) + (b) + (c)	5,820,675	5,923,583	
e. Benefit payments	5,252,601	5,600,209	
f. Expenses	498,241	449,257	
g. Other disbursements	369,621	596,692	
h. Total disbursements: (e) + (f) + (g)	6,120,463	6,646,158	
i. Cash flow: (d) – (h)	(299,788)	(722,575)	
3. End of year market value	65,965,039	72,253,275	
4. Investment income including appreciation: (3) – (1) – (2(i))	(7,886,862)	7,010,811	
B. Expected market value development			
1. Beginning of year market value	74,151,689	65,965,039	
2. Cash flow (A2(i))	(299,788)	(722,575)	
3. Expected Return on (1)	5,487,225	4,881,413	
4. Expected return on cash flow A2(i) x 0.074 / 2	(11,092)	(26,735)	
5. Expected market value end of year (1)+(2)+(3)+(4)	79,328,034	70,097,142	
C. Gain/(loss) for year: A3-B5	(13,362,995)	2,156,133	
D. Development of Actuarial Value of Assets			
1. Beginning of year market value	74,151,689	65,965,039	72,253,275
2a. Asset gain/(loss) in prior year	7,890,428	(13,362,995)	2,156,133
b. Asset gain/(loss) in 2nd prior year	2,835,968	7,890,428	(13,362,995)
c. Asset gain/(loss) in 3rd prior year	0	2,835,968	7,890,428
d. Asset gain/(loss) in 4th prior year	0	0	2,835,968
3. Unrecognized gain/(loss) .8 x [2a] + .6 x [2b] + .4 x [2c] +.2 x [2d]	8,013,923	(4,821,752)	(2,569,525)
4. Beginning of year actuarial value of assets: [1] - [3]	66,137,766	70,786,791	74,822,800
5. Actuarial value / Market value	89.2%	107.3%	103.6%
6. Adjusted actuarial value: (4) but not less than 90% nor greater than 110% of market value	66,736,520	70,786,791	74,822,800

6. DEVELOPMENT OF THE ACTUARIAL GAIN OR LOSS (In thousands)

A | GAIN/(LOSS) ON ACTUARIAL LIABILITY

1. Actuarial Liability 1/1/22	84,438
2. Total Normal Cost 1/1/22	1,896
3. Interest on (1) and (2)	6,389
4. Benefits paid during 2022 [a]	5,160
5. Interest on (4) assuming mid-year payment	191
6. Expected Actuarial Liability 1/1/23: (1)+(2)+(3)-(4)-(5)	87,372
7. Estimated Total Normal Cost 1/1/23:	1,981
8. Interest on (6) and (7)	6,612
9. Benefits paid during 2023 [a]	5,408
10. Interest on (9) assuming mid-year payment	200
11. Expected Actuarial Liability 1/1/24 before adjustments: (6)+(7)+(8)-(9)-(10)	90,357
12. Increase due to change in assumptions	193
13. Increase due to COLA base change	659
14. Expected Actuarial Liability 1/1/24: (11)+(12)+(13)	91,209
15. Actuarial Liability 1/1/24	90,794
16. Total Gain/(Loss): (14)-(15)	415

B | GAIN/(LOSS) ON PLAN ASSETS

1. Actuarial Value of Assets (AVA) 1/1/22	66,737
2. Interest on (1)	4,939
3. Net Receipts 2022 [b]	5,821
4. Net Disbursements 2022 [b]	6,121
5. Net Cash Flow 2022: (3)-(4)	(300)
6. Interest on (5) assuming mid-year payment	(11)
7. Expected AVA 1/1/23: (1)+(2)+(5)+(6)	71,364
8. Interest on (7)	5,281
9. Net receipts 2023 [b]	5,923
10. Net disbursements 2023 [b]	6,646
11. Net Cash Flow 2023: (9)-(10)	(723)
12. Interest on (11) assuming mid-year payment	(27)
13. Expected AVA 1/1/24: (7)+(8)+(11)+(12)	75,896
14. AVA 1/1/24	74,823
15. Total Gain/(Loss) on Assets: (14)-(13)	(1,073)

C | TOTAL GAIN/(LOSS)

1. Actuarial liability Gain/(Loss) (A16)	415
2. Asset Gain/(Loss) (B15)	(1,073)
3. Total Gain/(Loss): (1)+(2)	(658)

[a] Estimated
[b] From Annual Statement

7. GASB INFORMATION

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

The information required by GASB 67 (plan) is to be reported and measured as of December 31 each year.

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

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

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

Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL)* (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Cov. Payroll ((b-a)/c)
1/1/24	$74,822,800	$90,794,183	$15,971,383	82.4%	$11,901,786	134.2%
1/1/22	$66,736,520	$84,438,349	$17,701,829	79.0%	$10,967,813	161.4%
1/1/20	$55,323,815	$79,509,644	$24,185,829	69.6%	$10,469,577	231.0%
1/1/18	$48,465,175	$75,817,761	$27,352,586	63.9%	$10,062,298	271.8%
1/1/16	$38,527,396	$65,494,475	$26,967,079	58.8%	$9,701,015	278.0%

** excludes State reimbursed COLA*

8. INFORMATION ON SYSTEM MEMBERSHIP

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

A | ACTIVE MEMBERS

	Actives	Vested Terminations
Number of Members	163	7
Average Age	49.1	63.4
Average Service	11.7	13.6
Average Salary	$73,017	$20,620
Average Annuity Savings Fund Balance	$69,160	$29,355

Age by Service Distribution of Active Members

	Years of Service							
Present Age	0 - 4	5 –9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total
< 25	9							9
25 - 29	8	2						10
30 - 34	11	4	1					16
35 - 39	4	4	2					10
40 - 44	9	3	4	2				18
45 - 49	7		1	2	3			13
50 - 54	4	4	2	4	3	1	2	20
55 - 59	5	8	2	3	5	2		25
60 - 64	3	3	3	2	6	1	6	24
65+	1	3	1	3	5	2	3	18
Total	61	31	16	16	22	6	11	163

8. INFORMATION ON SYSTEM MEMBERSHIP *(continued)*

A | ACTIVE MEMBERS *(continued)*

Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	9	$362,813	$40,313
25 - 29	10	$547,429	$54,743
30 - 34	16	$1,004,549	$62,784
35 - 39	10	$855,202	$85,520
40 - 44	18	$1,378,038	$76,558
45 - 49	13	$1,113,020	$85,617
50 - 54	20	$1,595,340	$79,767
55 - 59	25	$2,048,850	$81,954
60 - 64	24	$1,767,442	$73,643
65+	18	$1,229,103	$68,284
Total	163	$11,901,786	$73,017

8. INFORMATION ON SYSTEM MEMBERSHIP *(continued)*

B | RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	116	1	17	20	154
Average Age	73.9	53.8	73.2	73.3	73.6
Average Annual Benefit	$38,571	$24,517	$37,394	$27,534	$36,917

Benefit by Payment and Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Total Annuity	$784,549	$5,354	$50,578	$50,486	$890,967
Pension (excluding State reimbursed COLA)	$3,687,696	$19,163	$576,065	$483,396	$4,766,320
State reimbursed COLA	$2,027	$0	$9,060	$16,800	$27,887
Total	$4,474,272	$24,517	$635,703	$550,682	$5,685,174

8. INFORMATION ON SYSTEM MEMBERSHIP *(continued)*

B | RETIREES & SURVIVORS *(continued)*

Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	0	$0	$0
40 - 44	0	$0	$0
45 - 49	1	$51,906	$51,906
50 - 54	3	$136,099	$45,366
55 - 59	6	$206,343	$34,391
60 - 64	16	$687,243	$42,953
65 - 69	26	$1,010,576	$38,868
70 - 74	39	$1,635,233	$41,929
75 - 79	28	$966,362	$34,513
80 - 84	15	$402,375	$26,825
85 - 89	14	$480,310	$34,308
90+	6	$108,727	$18,121
Totals	154	$5,685,174	$36,917

9. VALUATION COST METHODS

A | ACTUARIAL COST METHOD

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

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

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

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 are recognized, etc., so that 100% of gains or losses occurring 5 years ago are recognized. The actuarial value of assets will be adjusted, if necessary, in order to remain between 90% and 110% of market value.

C | LOW-DEFAULT-RISK OBLIGATION MEASURE (LDROM)

The Low-Default-Risk Obligation Measure (LDROM) was determined using the *Entry Age Normal Cost Method* (the same method used to determine the plan's actuarial liabilities). The LDROM was calculated using the same assumptions as used to determine the plan's actuarial liabilities except the LDROM was calculated using a 4.76% discount rate.

For more information on the LDROM, see our discussion in Section 10 of this report.

10. ACTUARIAL DISCLOSURES

A | RISK

Risk is defined as the potential for differences in future plan measurements resulting from actual future experience deviating from actual assumed experience. The plan is subject to a number of risks that could affect the plan's future financial condition. Examples of risk include the following:

Investment risk – the potential that investment returns will be different than expected;

Asset/liability mismatch risk – the potential that changes in asset values are not matched by changes in the liabilities;

Interest rate risk – the potential that interest rates will be different than expected;

Longevity and demographic risk – the potential that mortality or other demographic experience will be different than expected;

Contribution risk – the potential that employer contributions to the plan will not be made or will not be made at the assumed level.

In this section, we provide a brief analysis of several risk measures that we believe are most significant for the plan. A more detailed risk assessment that includes further scenario testing (assessing the impact of one or several events on the plan's financial condition, for example projecting plan investment returns), stress testing (assessing the impact of an adverse change in one or several factors), sensitivity testing (assessing the impact of a change in an actuarial assumption), or stochastic modeling (generating numerous possible outcomes by allowing for random variations in input items to assess the distribution of the outcomes) may provide a better understanding than the analysis in this section.

Unfunded Actuarial Liability and Funded Ratio

The plan's unfunded actuarial liability (UAL) and the funded ratio for the past 10 years are shown below. The UAL is the Actuarial Liability less the Actuarial Value of Assets. The funded ratio is the Actuarial Value of Assets divided by the Actuarial Liability. The retirement system is said to be fully funded when the UAL is zero, or said another way, when the funded ratio is 100%. Actuarial valuations have been performed every two years over this period and the valuation results are determined as of January 1.

	Valuation Date					
	2014	2016	2018	2020	2022	2024
UAL (in millions)	$29.7	$27.0	$27.4	$24.2	$17.7	$16.0
Funded Ratio	54.0%	58.8%	63.9%	69.6%	79.0%	82.4%

The UAL has generally decreased over this period. Reductions in the investment return assumption and changes to the mortality assumption in the past 10 years have increased the plan's actuarial liability and therefore the UAL. The plan has reduced its investment return assumption several times from 7.75% in the 2014 valuation to the current assumption. The mortality assumption has also been updated several times including the adoption of a fully generational table in 2016 and the update described in this report. For comparison, using the January 1, 2014 plan assumptions, the UAL as of January 1, 2024 would be approximately $10 million.

The funded ratio has generally increased over this period. The assumption changes described above have also significantly impacted the funded ratio. For comparison, using the 2014 plan assumptions, the 2024 funded ratio would be approximately 90%.

10. ACTUARIAL DISCLOSURES *(continued)*

A | RISK *(continued)*

Investment Return Assumption and Funding Schedule

Investment return assumption:	7.40%
Amortization of UAL basis:	4.0% total appropriation increase to FY29 with a final amortization payment in FY30

The System maintained the investment return assumption at 7.40% in this valuation. This is slightly above what we believe is a reasonable assumption as of January 1, 2024. For comparison, currently about 75 of Massachusetts systems use an assumption of 7.0% or below.

Many boards have adopted schedules that increase the total appropriation by a set percentage for a period (or the entire length of the schedule). The Board's current schedule reflects this methodology. The level of annual increase does not exceed 6.0% so there is minimal risk in whether such a level of increase is sustainable.

10. ACTUARIAL DISCLOSURES *(continued)*

A | RISK *(continued)*

Maturity and Volatility Measures

There are several plan maturity and volatility ratios that can provide significant insight into the level of a plan's risk. To illustrate, we are providing two such measures. In both cases, we show the 10-year history of the ratio. In addition, we comment on how the results compare with other local systems. We believe that these measures are more useful when compared to historical averages and the results of other plans. See our notes earlier in this section regarding the assumption changes over this period which significantly affect these results.

Retiree Actuarial Liability / Total Actuarial Liability

This ratio measures the percentage of actuarial liability due to the plan's retirees. Higher ratios and/or an increase in this ratio indicate a system that is more mature or becoming more mature. As this ratio increases, it generally indicates the retired population is increasing faster than the active member population and there is a greater likelihood of negative cash flow (benefit payments exceeding employer and employee contributions). Retirees in pay status are more expensive than younger members. As a plan matures, it becomes more sensitive to investment volatility and the plan will have more difficulty recovering from losses even with increases in employer contributions.

	Valuation Date					
	2014	2016	2018	2020	2022	2024
Retiree/Total Liability	0.54	0.57	0.57	0.57	0.60	0.60

The ratios for this system show a slow steady increase indicating the plan has become more mature. Public sector plans often have aging populations generating an increase in this ratio. We have found this to be generally true for the systems for which PERAC is the actuary. In 2014, this ratio ranged from .35 to .63. In recent valuations this range has increased to .51 to .67. Many local systems have seen an increase in this ratio over the past 10-15 years as the number of retirees, and specifically the retiree liability has increased as a percentage of the total. A number of systems have had fairly consistent ratios and a few have had decreasing ratios. Such systems have already reached and or maintained a more mature level.

Actuarial Liability / Pay

This measure reflects how a change in actuarial liability (and therefore UAL) may impact the adequacy of contributions. As this ratio increases, plan contributions (using a traditional amortization schedule) increase as a percentage of pay. Furthermore, like the Retiree Liability ratio noted above, higher ratios exacerbate the impact of investment losses on plan contributions.

	Valuation Date					
	2014	2016	2018	2020	2022	2024
Actuarial Liability/Pay	6.9	6.8	7.5	7.6	7.7	7.6

This system shows mostly increasing rates. For comparison with other PERAC systems, in 2014, this ratio ranged from 4.5 to 7.6. For more recent valuations this range has increased. The ratios currently range from 5.1 to 8.7. This ratio has increased for most local systems indicating increasing levels of risk.

10. ACTUARIAL DISCLOSURES *(continued)*

A | RISK *(continued)*

Impact of Investment Returns on Unfunded Liability and Funded Ratio (Market Value Basis)

We have prepared a simple 5-year projection illustrating the potential impact of actual investment returns on funding levels. For this estimate, we used the market value of assets and did not attempt to develop an actuarial value of assets. In projecting the actuarial liability, we assumed the January 1, 2024 actuarial assumptions are exactly realized over the next 5 years and that there are no changes in assumptions over this period.

We first projected the market value of assets assuming the actual return for each of the next 5 years is 7.40% (the assumption used in the valuation). For comparison, we have also shown the results if the return were 3.0% each year. The 3.0% assumption is not intended to be a worst-case basis, but only to reflect the impact of a lower short-term return than the current plan assumption. As discussed earlier in the Executive Summary, projected returns are lower over the next 10 years than over the next 30 years.

	Valuation Date					
	2024	2025	2026	2027	2028	2029
UAL (in thousands)						
7.40%	$18,541	$17,288	$15,849	$14,207	$12,342	$10,235
3.00%	$18,541	$20,451	$22,470	$24,602	$26,854	$29,231
Funded Ratio						
7.40%	79.6%	81.6%	83.8%	85.9%	88.2%	90.6%
3.00%	79.6%	78.3%	77.0%	75.7%	74.4%	73.1%

For this comparison, we assumed that for the 3.0% projections, the appropriation for the next 5 years would remain as in the current funding schedule (and the same as that if the actual returns were 7.4% per year). If returns were actually 3.0% per year, the funding schedule might have to be increased before FY29.

Cash Flow

Cash flow reflects receipts (primarily employee and employer contributions) less disbursements (primarily benefit payments and expenses). We use the information provided in the Annual Statement but subtract any investment income credit or excess investment income entries from the total receipts. Then we measure the ratio of receipts to disbursements. A ratio greater than 1.0 means receipts are greater than disbursements (positive cash flow). Likewise, a ratio less than 1.0 means receipts are less than disbursements (negative cash flow).

Most Massachusetts public systems have negative cash flow. This is not a significant issue for long-term funding but presents potential issues for short-term funding. All else being equal, over the short term, a negative cash flow produces a yearly funded ratio lower than it would have been if there were positive cash flow. This is because a portion of the investment earnings are being used to pay the net benefits and expenses. Therefore, less of the investment earnings are included in the end of the year value of the plan assets resulting in a lower MVA and a lower funded ratio. This may dampen funded ratio expectations somewhat when reviewing 5-year projections. This plan had a ratio of 1.01, 0.90, 0.95 and 0.89 using the and 2020-2023 Annual Statements respectively. The ratio has generally decreased over the past 2 years. Since the ratio is near 1.0, there is not a significant impact on our 5-year funded ratio projections.

10. ACTUARIAL DISCLOSURES *(continued)*

B | LOW-DEFAULT-RISK OBLIGATION MEASURE (LDROM)

For plan years after February 15, 2023, Actuarial Standard of Practice Number 4 (ASOP 4) requires the disclosure of a new liability measure. This measure is known as the Low-Default-Risk Obligation Measure (LDROM). The LDROM is calculated using a different discount rate than the discount rate used for funding purposes. The discount rate used for the LDROM is based on the short duration Financial Times Stock Exchange (FTSE) Pension Liability Index published as of December 31, 2023. The LDROM discount rate will typically be vastly lower than the discount rate based on the plan's actual investment portfolio. As a result, the LDROM will be significantly greater than the plan's funding liability. For the LDROM calculation, we used a discount rate of 4.76%.

The LDROM is not intended to be a measure of the plan's funding nor is it intended to be a measure of the plan's health. Most importantly, the LDROM is not the "true measure" of the plan's liabilities.

LDROM Liability as of January 1, 2024	$118,140,901
Funding Actuarial Accrued Liability as of January 1, 2024	$90,794,183

The LDROM helps understand the cost of investing in an all-bond portfolio and significantly lowering expected long-term investment returns. The funded status and Actuarially Determined Contributions are determined using the expected return on assets which reflects the actual investment portfolio. Benefit security for members of the plan relies on a combination of the assets in the plan, the investment returns generated on those assets and the promise of future contributions from the plan sponsors.

Since the assets are not invested in an all-bond portfolio, the LDROM does not indicate the funding status or progress, nor provide information on necessary plan contributions or the security of plan participants. The difference between the plan's Actuarial Accrued Liability and the LDROM can be thought of as representing the expected taxpayer savings from investing in the plan's diversified portfolio compared to investing only in high quality bonds.

C | REASONABLE ACTUARIALLY DETERMINED CONTRIBUTION (ADC)

For plan years after February 15, 2023, Actuarial Standard of Practice Number 4 (ASOP 4) also requires the disclosure of a reasonable Actuarially Determined Contribution (ADC). This reasonable ADC, if different from the System's scheduled ADC, is not intended to be the System's true funding measure. We believe that the system's current schedule meets the requirements of a reasonable amortization method under ASOP 4. As such, the System's reasonable ADC for FY25 is equal to the scheduled FY25 payment of $4.57 million.

D | ACTUARIAL MODELS

The software used in our actuarial valuations measures the present value of the plan's actuarial liabilities from which we develop funding schedules that determine annual appropriations for each system. The software was created and is maintained by a national vendor of actuarial software. We have used this software for over 20 years. We periodically review the results of the software by analyzing detailed individual test lives and have compared our results to those of other actuaries using the same data set. The valuation output is prepared before a final review by the actuary.

In addition, we used a simple projection model prepared in a spreadsheet, to perform a rough analysis of the impact of investment returns on the unfunded actuarial liability and funded ratio for the next five years. The work is tailored to each valuation and reviewed by the actuary.

11. ACTUARIAL ASSUMPTIONS

Investment Return/Discount Rate

7.40% per year net of investment expenses *(same as the prior assumption)*

The investment return assumption is a long-term assumption and is based on capital market expectations by asset class, historical returns, and professional judgment. We considered analysis prepared by PRIM's investment advisor using a building block approach which included expected returns by asset class, risk analysis, and the determination of a 30-year expected target rate of return. We recommended a 7.25% assumption for this valuation.

Discount Rate (for LDROM only)

4.76% (based on short duration FTSE Pension Liability Index published as of December 31, 2023)

Inflation

2.5% per year

Interest Rate Credited to the Annuity Savings Fund

3.5% per year

Assumed Rate of Cost-of-Living Increases (COLA)

3.0% per year (on the first $19,000 of an allowance)

Mortality

Pre-retirement mortality reflects the RP-2014 Blue Collar Employees table projected generationally with Scale MP-2021 (gender distinct). *(Prior assumption reflected the same base table projected generationally with Scale MP-2020.)*

Post-retirement mortality reflects the RP-2014 Blue Collar Healthy Annuitant table projected generationally with Scale MP-2021 (gender distinct). *(Prior assumption reflected the same base table projected generationally with Scale MP-2020.)*

For disabled members, the mortality rate is assumed to be in accordance with the RP-2014 Blue Collar Healthy Annuitant Table (set forward one year for both males and females) projected generationally with Scale MP-2021 (gender distinct). *(Prior assumption reflected the same base table projected generationally with Scale MP-2020.)*

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

We completed a local system retiree mortality study in 2019. As part of our analysis, we compared our experience to the new public retirement plan mortality tables released in early 2019 (the Pub-2010 Mortality Tables). Public plans from Massachusetts were not included in this study. We found that our experience was not consistent with these tables. The mortality assumptions selected reflect observed current mortality and expected mortality improvement as well as professional judgement.

11. ACTUARIAL ASSUMPTIONS *(continued)*

Salary Increase

Service	Group 1	Group 2	Group 4
0	6.00%	6.00%	7.00%
1	5.50%	5.50%	6.50%
2	5.50%	5.50%	6.00%
3	5.25%	5.25%	5.75%
4	5.25%	5.25%	5.25%
5	4.75%	4.75%	5.25%
6	4.75%	4.75%	4.75%
7	4.50%	4.50%	4.75%
8	4.50%	4.50%	4.75%
9	4.25%	4.50%	4.75%
10+	4.25%	4.50%	4.75%

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

Withdrawal

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

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

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

Disability

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

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

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

11. ACTUARIAL ASSUMPTIONS *(continued)*

Expenses

An amount of $275,000 has been included in the Normal Cost for FY25. This amount includes $160,000 which represents the estimated administrative expenses and $115,000 which represents a portion of the investment related expenses. This amount is assumed to increase by 4.5% each year.

Members Hired on or After April 2, 2012

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

Retirement

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

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

12. SUMMARY OF PLAN PROVISIONS

ADMINISTRATION

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

PARTICIPATION

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

There are 4 classes of membership under Chapter 32, but one of these classes, Group 3, is made up exclusively of the State Police who are in the State Retirement System. The other 3 classes are as follows:

Group 1:

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

Group 2:

Certain specified hazardous duty positions.

Group 4:

Police officers, firefighters, and other specified hazardous positions.

MEMBER CONTRIBUTIONS

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

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

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

12. SUMMARY OF PLAN PROVISIONS *(continued)*

RATE OF INTEREST

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

RETIREMENT AGE

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

SUPERANNUATION RETIREMENT

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

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

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

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

AMOUNT OF SUPERANNUATION BENEFIT

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

- Salary is defined as gross regular compensation. For persons who become members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a)(17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit "spiking" of a member's salary to increase the retirement benefit.

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

12. SUMMARY OF PLAN PROVISIONS *(continued)*

AMOUNT OF BENEFIT *(continued)*

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

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

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

• For persons who became members on or after April 2, 2012 and retire with more than 30 years of creditable service, the highest rate of 2.5% applies to Group 1 employees who retire at or after age 67, Group 2 employees who retire at or after age 62, and to Group 4 employees who retire at or after age 57. A .125% reduction is applied for each year of age under the maximum age for the member's group.

DEFERRED VESTED BENEFIT

A participant who has attained the requisite years of creditable service can elect to defer his or her retirement until a later date. Certain public safety employees cannot defer beyond age 65. All participants must begin to receive a retirement allowance or withdraw their accumulated deductions no later than April 15 of the calendar year following the year they reach age 73.

WITHDRAWAL OF CONTRIBUTIONS

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

12. 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 with at least 10 years of creditable service (or 15 years creditable service in systems in which the local option contained in G.L. c. 32, s.6(1) has not been adopted).

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

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

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

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

ACCIDENTAL DISABILITY

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

Retirement Allowance: 72% of salary plus an annuity based on accumulated member contributions, with interest. This amount is not to exceed 100% of pay. For those who became members in service after January 1, 1988 or who have not been members in service continually since that date, the amount is limited to 75% of pay. There is an additional pension of $1,092.60 per year (or $312.00 per year in systems in which the local option contained in G.L. c. 32, s. 7(2)(a)(iii) has not been adopted), per child who is under 18 at the time of the member's retirement, with no age limitation if the child is mentally or physically incapacitated from earning. The additional pension may continue up to age 22 for any child who is a full-time student at an accredited educational institution. For systems that have adopted Chapter 157 of the Acts of 2005, veterans as defined in G.L. c. 32, s. 1 receive an additional benefit of $15 per year for each year of creditable service, up to a maximum of $300.

12. SUMMARY OF PLAN PROVISIONS *(continued)*

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 $1,092.60 per year, per child (or $312.00 per year in systems in which the local option contained in G.L. c. 32, s. 9(2)(d)(ii) has not been adopted), payable to the spouse or legal guardian until all dependent children reach age 18 or 22 if a full time student, unless mentally or physically incapacitated.

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

In addition, an eligible family member may receive a one-time payment of $300,000.00 from the State Retirement Board.

DEATH AFTER ACCIDENTAL DISABILITY RETIREMENT

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

DEATH IN ACTIVE SERVICE *(OPTION D)*

Allowance: An immediate allowance equal to that which would have been payable had the member retired and selected Option C on the day before his or her death. For a member who became a member prior to April 2, 2012 whose death occurred prior to the member's minimum superannuation retirement age, the age 55 benefit rate is used. For a member classified in Group 1 who became a member on or after April 2, 2012 whose death occurred prior to the member's minimum superannuation retirement age, the age 60 benefit rate is used. If the member died after age 60, the actual age is used. For a member classified in Group 2 or Group 4 who became a member on or after April 2, 2012 and whose death occurred prior to the member's minimum superannuation retirement age, the benefit shall be calculated using an age 55 factor. The minimum annual allowance payable to the surviving spouse of a member in service who dies with at least two years of creditable service is $3,000 unless the retirement system has accepted the local option increasing this minimum annual allowance to $6,000, provided that the member and the spouse were married for at least one year and living together on the member's date of death.

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

12. SUMMARY OF PLAN PROVISIONS *(continued)*

COST OF LIVING

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

Under the provisions of Chapter 32, Section 103(j) inserted by Section 19 of Chapter 188 of the Acts of 2010, systems may increase the maximum base on which the COLA is calculated in multiples of $1,000. For many years, the COLA was calculated upon the first $12,000 of a retiree's allowance. Now the maximum base upon which the COLA is calculated varies from System to System. Each increase must be accepted by a majority vote of the Retirement Board and approved by the legislative body.

METHODS OF PAYMENT

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

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

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

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

ALLOCATION OF PENSION COSTS

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

13. 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 PERAC each year that describes the asset holdings and Fund balances as of December 3l and the transactions during the calendar year that affected the financial condition of the retirement system.

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

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

Assets – The value of securities as described in Section 8.

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

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

GASB – Governmental Accounting Standards Board

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.

13. GLOSSARY OF TERMS *(continued)*

Pension Fund – The fund into which appropriation amounts as determined by PERAC are deposited 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.

Present Value of Future Benefits - The value on the valuation date of all of the future benefits that are expected to be paid to members of the System discounted with interest and the probability of benefit receipt

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

Unfunded Actuarial Accrued Liability – The excess of the Actuarial Accrued Liability over the Assets.

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