

**Massachusetts Turnpike Authority Employees' Retirement
System**

*Actuarial Valuation and Review
as of January 1, 2004*

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THE PARENT OF THE SEGAL COMPANY
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July 16, 2004

*Retirement Board
Massachusetts Turnpike Authority Employees' Retirement System
10 Park Plaza Suite 4155
Boston, MA 02116*

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2004. It summarizes the actuarial data used in the valuation, establishes the funding requirements for calendar 2005 and later years and analyzes the preceding two-years' experience.

The census information and financial information on which our calculations were based was prepared by the staff of the Massachusetts Turnpike Authority Employees' Retirement System. That assistance is gratefully acknowledged. The actuarial calculations were completed under my supervision.

This actuarial valuation has been completed in accordance with generally accepted actuarial principles and practices. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

THE SEGAL COMPANY

*By: _____
Kathleen A. Riley, FSA, MAAA, EA
Senior Vice President and Actuary*

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SECTION 1: Valuation Summary for the Massachusetts Turnpike Authority Employees' Retirement System

Purpose

This report has been prepared by The Segal Company to present a valuation of the Massachusetts Turnpike Authority Employees' Retirement System as of January 1, 2004. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of M.G.L. Chapter 32;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of January 1, 2004;
- The assets of the Plan as of December 31, 2003;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

- The actuarial valuation report as of January 1, 2004 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected.
- During the plan years ended 2002 and 2003, the market value rates of return were (10.51)% and 19.23%, respectively. Because the actuarial value of assets gradually recognizes market value fluctuations over a five-year period, the actuarial rates of return for the plan years ended 2002 and 2003 were (10.77)% and 18.31%, respectively. The actuarial value of assets as of December 31, 2003 was \$194.8 million, or 109.6% of the market value of assets.
- As indicated in Section 2, Subsection B of this report, the total unrecognized investment loss as of December 31, 2003 is \$17.0 million. This investment loss will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment gains derived from future experience. This implies that earning the assumed rate of investment return of 8.50% per year (net of expenses) on a **market value** basis will result in investment losses on the actuarial value of assets in the next few years. Therefore, if the actual market return is equal to the assumed 8.50% rate and all other actuarial assumptions are met, the contribution requirements would still increase in each of the next few years.

SECTION 1: Valuation Summary for the Massachusetts Turnpike Authority Employees' Retirement System

- The Plan's asset valuation method requires that the actuarial value of assets be no more than 110% or no less than 90% of the market value of assets. Since the preliminary calculation of the actuarial value exceeded 110% of the market value of assets as of December 31, 2001 and December 31, 2002, the actuarial value of assets has been set equal to 110% of the market value of assets for those years. Consequently the actuarial return was approximately equal to the market return for 2002 and 2003. Since the actuarial value of assets was 109.6% as of December 31, 2003, investment returns less than the assumed 8.50% in 2004 will be fully reflected.
- As of January 1, 2002 the System was overfunded by \$5.8 million. As of January 1, 2004 the System had an unfunded liability of \$31.1 million (prior to the changes in actuarial assumptions). The change is due to an investment loss of \$24.2 million, the additional liability of \$11.1 million associated with the 2002 ERI and the net effect of other gains and losses.
- Effective with this valuation, we recommend the following assumption changes:
 - The salary increase assumption was changed from 5.0% for all years to 4.0% for the next 4 years and 5.0% thereafter.
 - The administrative expense assumption increased from \$330,000 to \$360,000.
- The calendar year 2004 appropriation of \$1,187,000 has already been made. The results of this valuation will be reflected in the appropriation for calendar 2005 and later years. Due to the substantial increase in the appropriation, the Board has elected to phase in the increase by adopting a funding schedule with an appropriation of \$3,000,000 for calendar 2005, \$4,500,000 for calendar 2006 and \$4,871,188 for calendar 2007. This funding schedule will fully fund the System by June 30, 2023 with amortization payments that increase 4½% per year (beginning in 2008).

SECTION 1: Valuation Summary for the Massachusetts Turnpike Authority Employees' Retirement System

Summary of Key Valuation Results

	2004	2002¹
Contributions for plan years beginning January 1, 2004 and 2002:		
Recommended for 2005 and 2003	\$1,187,000	\$656,878 ²
Recommended for 2006 and 2004	3,000,000	679,875 ²
	4,500,000	1,187,000
Funding elements for plan year beginning January 1:		
Normal cost, including administrative expenses	\$7,611,939	\$6,735,771
Market value of assets	177,805,125	179,212,586
Actuarial value of assets	194,783,817	197,133,845
Actuarial accrued liability	224,272,432	191,294,378
Unfunded/(overfunded) actuarial accrued liability	29,488,615	-5,839,467
GASB 25/27 for plan year beginning January 1:		
Annual required contributions	\$1,187,000	\$637,000
Actual contributions	--	307,538
Percentage contributed	--	48.28%
Funded ratio	86.85%	103.05%
Demographic data for plan year beginning January 1:		
Number of retired participants and beneficiaries	695	611
Number of vested former participants	154	131
Number of active participants	1,259	1,335
Total payroll	\$61,812,794	\$58,681,260
Average payroll	49,097	43,956

¹ 2002 figures are from the January 1, 2002 valuation report completed by prior actuary.

² Contribution amounts do not reflect PERAC interest adjustment.

SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

A. PARTICIPANT DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A and B.

A historical perspective of how the participant population has changed over the past five valuations can be seen in this chart.

CHART 1
Participant Population: 1997 – 2003

Year Ended December 31	Active Participants	Inactive Participants	Retired Participants and Beneficiaries
1997	1,293	71	606
1999	1,404	110	595
2001	1,335	131	611
2003	1,259	154	695

SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 1,259 active participants with an average age of 45.6, average years of service of 11.2 years and average payroll of \$49,097.

Among the active participants, there were none with unknown age and/or service information.

Inactive Participants

In this year's valuation, there were 154 participants with a vested right to a deferred or immediate vested benefit or entitled to a return of their employee contributions.

These graphs show a distribution of active participants by age and by years of service.

CHART 2
Distribution of Active Participants by Age as of December 31, 2003

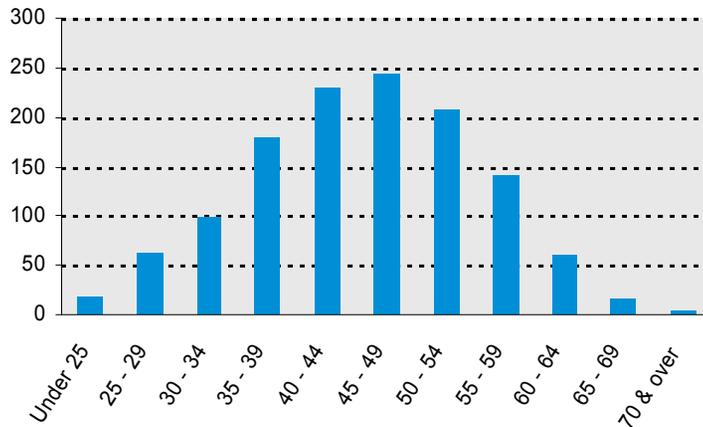
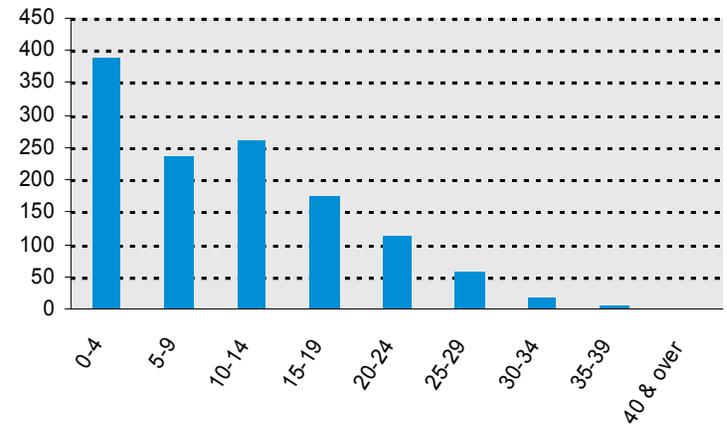


CHART 3
Distribution of Active Participants by Years of Service as of December 31, 2003



SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

Retired Participants and Beneficiaries

As of December 31, 2003, 569 retired participants and 126 beneficiaries were receiving total monthly benefits of \$1,067,253. For comparison, in the previous valuation, there were 497 retired participants and 114 beneficiaries receiving monthly benefits of \$837,304.

These graphs show a distribution of the current retired participants and beneficiaries based on their monthly amount and age, by type of pension.

CHART 4
Distribution of Retired Participants and Beneficiaries by Type and by Monthly Amount as of December 31, 2003

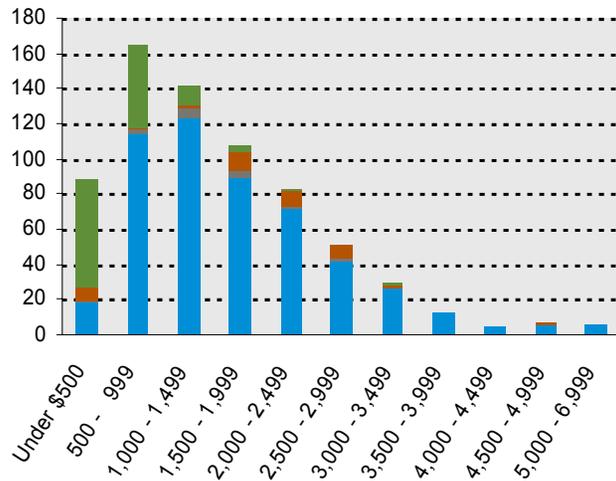
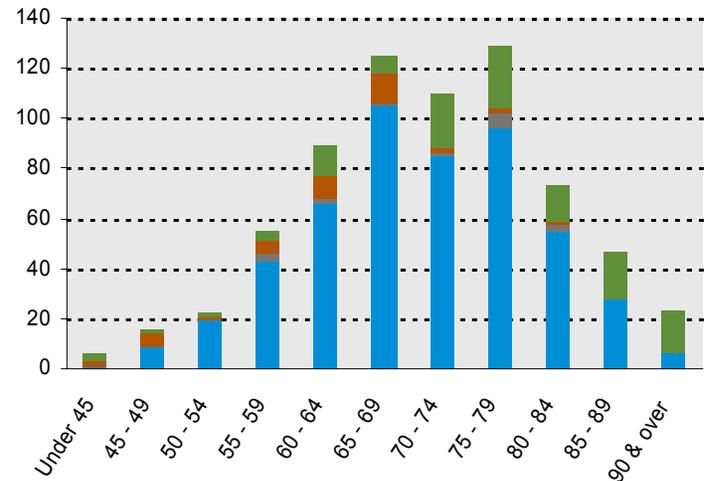


CHART 5
Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2003



SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

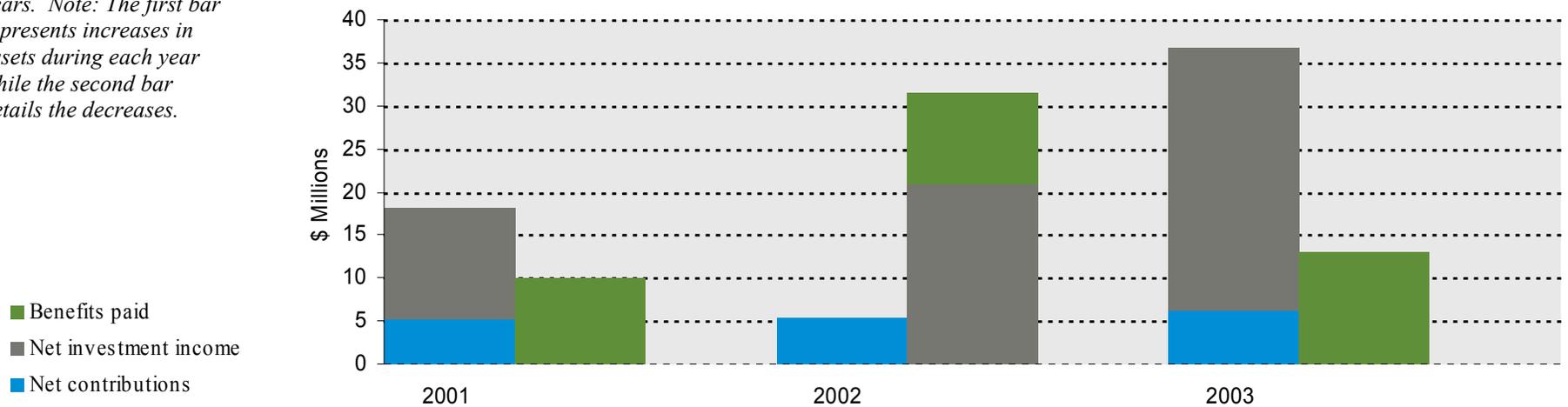
B. FINANCIAL INFORMATION

Retirement plan funding anticipates that, over the long term, both net contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

Retirement plan assets change as a result of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits C and D.

The chart depicts the components of changes in the actuarial value of assets over the last three years. Note: The first bar represents increases in assets during each year while the second bar details the decreases.

CHART 6
Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 2001 – 2003

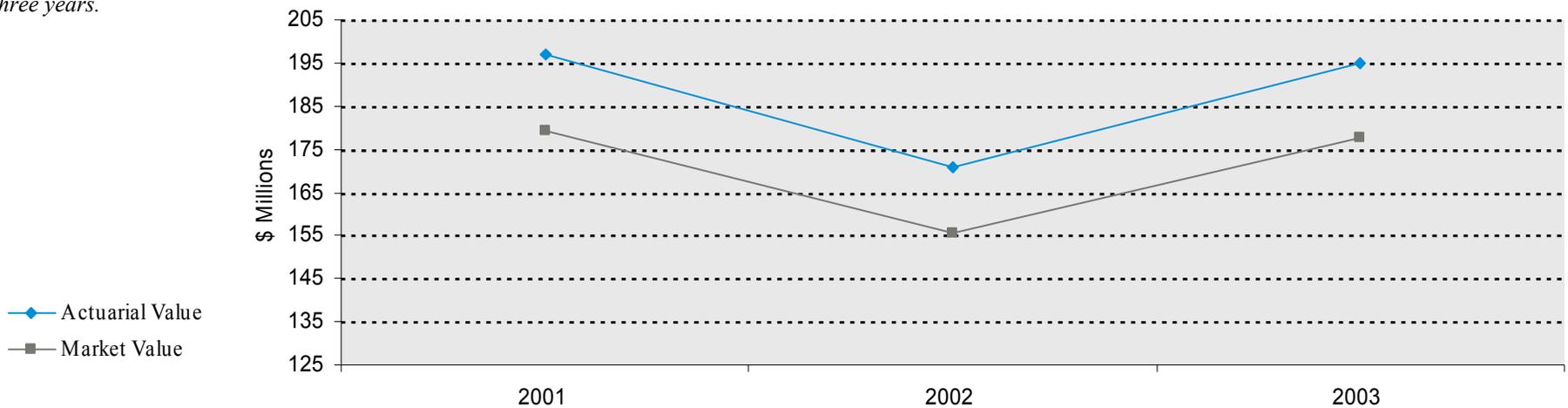


SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

Both the actuarial value and market value of assets are representations of the Massachusetts Turnpike Authority Employees' Retirement System's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Massachusetts Turnpike Authority Employees' Retirement System's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

This chart shows the change in the actuarial value of assets versus the market value over the past three years.

CHART 8
Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2001 – 2003



SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

C. ACTUARIAL EXPERIENCE

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total gain/(loss) is (\$35,542,222), (\$24,225,892) from investments and (\$11,316,330) from all other sources. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience over the past two years.

CHART 9
Actuarial Experience for Two-Year Period Ended December 31, 2003

1. Net loss from investments*	-\$24,225,892
2. Net gain from administrative expenses	86,541
3. Net (loss) from other experience	<u>-11,402,871</u>
4. Net experience (loss): (1) + (2) + (3)	-\$35,542,222

** Details in Chart 10*

SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Massachusetts Turnpike Authority Employees' Retirement System's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 8.50%. The actual rate of return on an actuarial basis for the 2003 and 2002 plan years was 18.31% and (10.77%), respectively.

Since the actual return for the past two years was less than the assumed return, the Massachusetts Turnpike Authority Employees' Retirement System experienced an actuarial loss during the two-year period ending December 31, 2003 with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

**CHART 10
Actuarial Value Investment Experience**

	Year Ended	
	December 31, 2003	December 31, 2002
1. Actual return	\$30,671,636	-\$20,940,534
2. Average value of assets	167,519,913	194,501,012
3. Actual rate of return: (1) ÷ (2)	18.31%	-10.77%
4. Assumed rate of return	8.50%	8.50%
5. Expected return: (2) x (4)	\$14,239,193	\$16,532,586
6. Actuarial gain/(loss): (1) – (5)	<u>\$16,432,443</u>	<u>-\$37,473,120</u>

SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last three years.

Based upon this experience and future expectations, we have maintained the assumed rate of return of 8.50%.

CHART 11
Investment Return – Actuarial Value vs. Market Value: 2001 - 2003

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2001	\$12,908,809	6.92	-\$4,849,665	-2.60
2002	-20,940,534	-10.77	-18,558,151	-10.51
2003	<u>30,671,636</u>	18.31	<u>29,231,820</u>	19.23
Total	\$22,639,911		\$5,824,004	

SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The goal of an asset valuation method is to stabilize the actuarial rate of return and level pension plan costs. The Board has adopted a method which limits the actuarial value of assets to 110% of market value. Because there were large investment losses in 2000, 2001 and 2002, the actuarial value was limited to 110% of market value as of December 31, 2001 and December 31, 2002. Consequently, the full market volatility in 2002 and 2003 was reflected in the actuarial return.

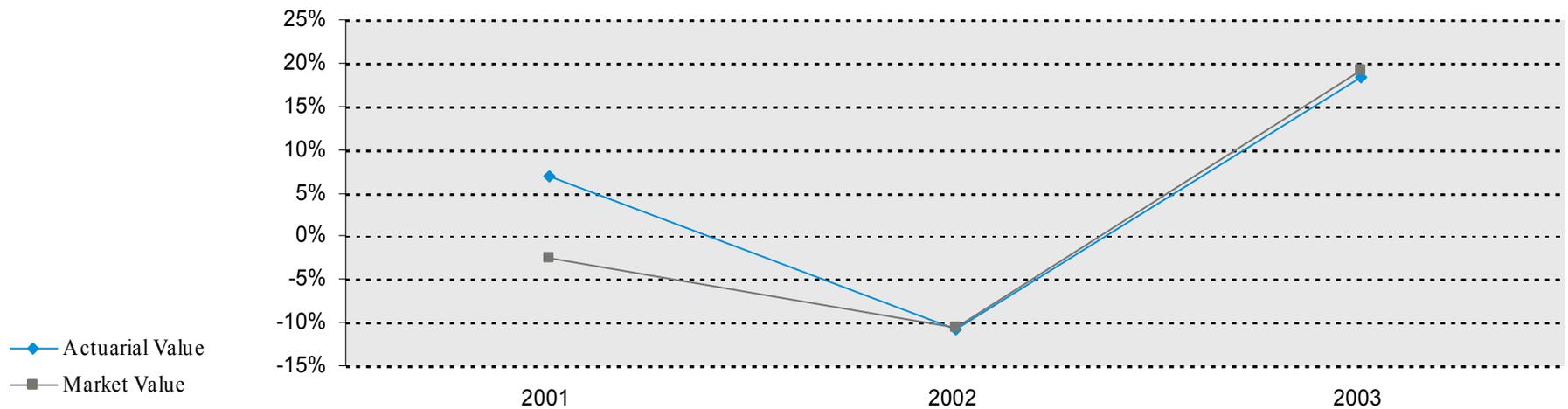
Administrative Expenses

Administrative expenses for the years ended December 31, 2003 and 2002 totaled \$307,253 and \$287,836, respectively, compared to the assumption of \$330,000. This resulted in a gain of \$86,541 for the two-year period, including an adjustment for interest. We have increased the assumption to \$360,000 for calendar year 2004 because the System's expense budget has increased.

This chart illustrates how this leveling effect has actually worked over the years 2001 - 2003 .

CHART 12

Market and Actuarial Rates of Return for Years Ended December 31, 2001 - 2003



SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),

- the number of disability retirements, and
- salary increases different than assumed.

The net loss from this other experience for the two-year period ending December 31, 2003 amounted to (\$11,402,871).

A brief summary of the demographic gain/(loss) experience of the Massachusetts Turnpike Authority Employees' Retirement System for the two-year period ending December 31, 2003 is shown in the chart below.

The chart shows elements of the experience gain/(loss) for the most recent years.

CHART 13

Experience Due to Changes in Demographics for Two-Year Period Ended December 31, 2003

1. 2002 ERI loss	-\$11,074,029
2. Gain from section 3(8)c reimbursements	966,704
3. Miscellaneous	<u>-1,295,546</u>
4. Total	-\$11,402,871

SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

D. RECOMMENDED CONTRIBUTION

The amount of annual contribution required to fund the Plan is comprised of an employer normal cost payment and a payment on the unfunded/(overfunded) actuarial accrued liability.

The preliminary recommended contribution is based on a 20-year increasing amortization (4.50% per year) of the unfunded actuarial accrued liability.

The Massachusetts Turnpike Authority has made a contribution for calendar 2004 of \$1,187,000 based on the prior valuation. The results of this valuation will be used for the appropriation for calendar 2005 and later years.

Due to the significant increase in the funding requirement, the Board has chosen to phase in the increase by 2007 and has adopted a funding schedule with an appropriation of \$3,000,000 for calendar 2005 and \$4,500,000 for calendar 2006.

The chart compares this valuation's recommended contribution with the prior valuation.

CHART 14
Recommended Contribution

	Year Beginning January 1			
	2004		2002	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	\$7,251,939	11.28%	\$6,405,771	10.40%
2. Administrative expenses	360,000	0.56%	330,000	0.53%
3. Expected employee contributions	<u>-5,672,352</u>	<u>-8.82%</u>	<u>-5,258,635</u>	<u>-8.53%</u>
4. Employer normal cost: (1) + (2) + (3)	\$1,939,587	3.02%	\$1,477,136	2.40%
5. Actuarial accrued liability	224,272,432		191,294,378	
6. Actuarial value of assets	<u>194,783,817</u>		<u>197,133,845</u>	
7. Unfunded/(overfunded) actuarial accrued liability: (5) - (6)	\$29,488,615		-\$5,839,467	
8. Payment on unfunded/(overfunded) actuarial accrued liability	2,058,080	3.20%	-820,258	-1.33%
9. Total recommended contribution: (4) + (8)	3,997,667	6.22%	656,878	1.07%
10. Budgeted appropriation	<u>\$1,187,000</u>	1.85%	<u>\$637,000</u>	1.03%
11. Projected payroll	\$64,285,304		\$61,615,228	

Note: Assumes payment at beginning of the calendar year.

SECTION 2: Valuation Results for the Massachusetts Turnpike Authority Employees' Retirement System

E. INFORMATION REQUIRED BY THE GASB

Governmental Accounting Standards Board (GASB) reporting information provides standardized information for comparative purposes of governmental pension plans. This information allows a reader of the financial statements to compare the funding status of one governmental plan to another on relatively equal terms.

Critical information to GASB is the historical comparison of the GASB required contribution to the actual contributions. This comparison demonstrates whether a plan is being funded on an actuarially sound basis and in accordance with the GASB funding requirements. Chart 16 below presents a graphical representation of this information for the Plan.

The other critical piece of information regarding the Plan's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the plan as calculated under GASB. High ratios indicate a well-funded plan with assets sufficient to pay most benefits. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other changes.

The details regarding the calculations of these values and other GASB numbers may be found in Section 4, Exhibits II, III, and IV.

These graphs show key GASB factors.

CHART 15
Required Versus Actual Contributions

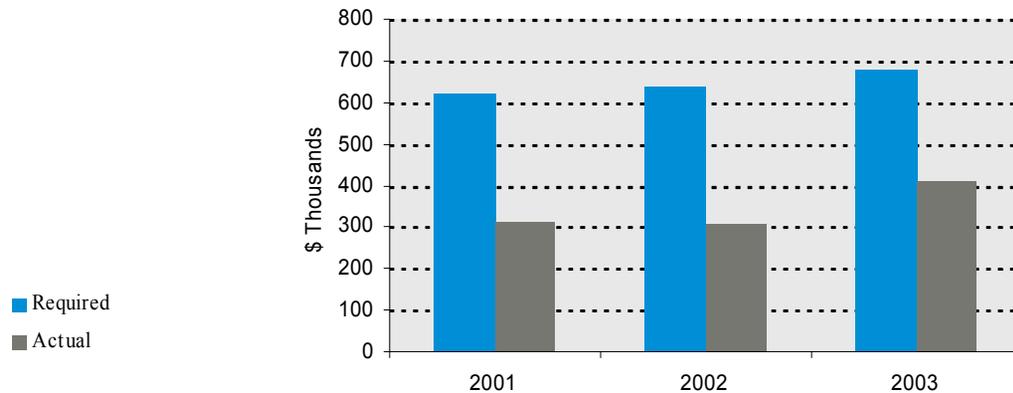
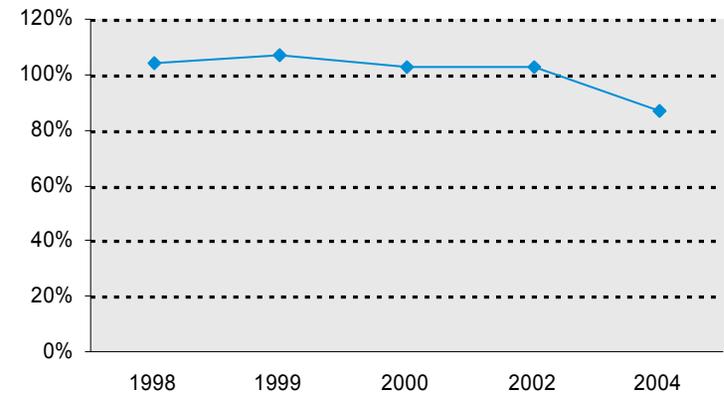


CHART 16
Funded Ratio



SECTION 3: Supplemental Information for the Massachusetts Turnpike Authority Employees' Retirement System

EXHIBIT A

Table of Plan Coverage

Category	Year Ended December 31		Change From Prior Year
	2003	2001	
Active participants in valuation:			
Number	1,259	1,335	-5.7%
Average age	45.6	N/A	N/A
Average service	11.2	N/A	N/A
Total payroll	\$61,812,794	\$58,681,260	5.3%
Average payroll	49,097	43,956	11.7%
Account balances	49,334,019	N/A	N/A
Inactive participants with a vested right to a return of their contributions or a deferred or immediate benefit			
	154	131	17.6%
Retired participants:			
Number in pay status	513	440	16.6%
Average age	70.1	72.3	N/A
Average monthly benefit	\$1,732	\$1,353 ³	N/A
Disabled participants:			
Number in pay status	56	57	-1.8%
Average age	63.8	66.9	N/A
Average monthly benefit	\$1,740	\$1,538	13.1%
Beneficiaries in pay status	126	114	10.5%

³ Combined with beneficiaries' benefit amounts.

SECTION 3: Supplemental Information for the Massachusetts Turnpike Authority Employees' Retirement System

EXHIBIT B

**Participants in Active Service as of December 31, 2003
By Age, Years of Service, and Average Payroll**

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	18	16	2	--	--	--	--	--	--	--
	\$36,386	\$36,187	\$37,973	--	--	--	--	--	--	--
25 - 29	62	45	17	--	--	--	--	--	--	--
	\$40,849	\$39,547	\$44,294	--	--	--	--	--	--	--
30 - 34	99	41	35	20	3	--	--	--	--	--
	\$42,927	\$40,250	\$43,770	\$45,034	\$55,652	--	--	--	--	--
35 - 39	179	60	42	53	23	1	--	--	--	--
	\$46,888	\$42,623	\$49,066	\$47,895	\$51,411	\$53,891	--	--	--	--
40 - 44	229	62	37	60	49	19	2	--	--	--
	\$49,298	\$44,565	\$49,023	\$48,744	\$53,116	\$55,452	\$65,712	--	--	--
45 - 49	243	65	36	40	38	40	22	2	--	--
	\$51,898	\$46,495	\$54,551	\$52,945	\$50,386	\$54,910	\$58,731	\$52,120	--	--
50 - 54	208	43	32	41	27	27	23	13	2	--
	\$51,878	\$45,264	\$49,116	\$50,570	\$49,896	\$54,185	\$59,467	\$62,079	\$107,123	--
55 - 59	140	36	16	35	24	14	10	4	1	--
	\$49,863	\$43,759	\$43,833	\$53,295	\$51,002	\$55,918	\$52,064	\$60,912	\$67,609	--
60 - 64	61	16	13	8	8	11	3	--	1	1
	\$53,738	\$51,680	\$54,151	\$55,453	\$51,771	\$50,578	\$49,132	--	\$90,000	\$95,636
65 - 69	16	3	4	4	3	1	--	--	1	--
	\$54,721	\$47,264	\$59,328	\$47,160	\$51,361	\$102,846	--	--	\$50,857	--
70 & over	4	--	2	1	--	--	--	1	--	--
	\$39,252	--	\$30,043	\$11,648	--	--	--	\$85,272	--	--
Total	1,259	387	236	262	175	113	60	20	5	1
	\$49,097	\$43,519	\$48,618	\$49,863	\$51,464	\$54,947	\$57,655	\$62,009	\$84,542	\$95,636

SECTION 3: Supplemental Information for the Massachusetts Turnpike Authority Employees' Retirement System

EXHIBIT C

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended December 31, 2003	Year Ended December 31, 2002
Contribution income:		
Employer contributions	\$409,913	\$307,538
Employee contributions	6,067,547	5,357,221
Less administrative expenses	<u>-307,253</u>	<u>-287,836</u>
Net contribution income	\$6,170,207	\$5,376,923
Net investment income	<u>30,671,635</u>	<u>-20,940,533</u>
Total income available for benefits	\$36,841,842	-\$15,563,610
Less benefit payments:		
Pensions	\$12,918,854	\$10,298,149
Net 3(8)(c) reimbursements	-493,901	-472,802
Refunds, annuities, & Option B refunds	<u>560,718</u>	<u>817,243</u>
Net benefit payments	\$12,985,670	\$10,642,590
Change in reserve for future benefits	\$23,856,172	-\$26,206,200

SECTION 3: Supplemental Information for the Massachusetts Turnpike Authority Employees' Retirement System

EXHIBIT D

Development of the Fund Through December 31, 2003

Year Ended December 31	Employer Contributions	Employee Contributions	Net Investment Return*	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
2001	\$310,056	\$5,152,856	\$12,908,809	\$263,040	\$10,029,165	\$197,133,845
2002	307,538	5,357,221	-20,940,533	287,836	10,642,590	170,927,645
2003	409,913	6,067,547	30,671,635	307,253	12,985,670	194,783,817

* Net of investment fees

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EXHIBIT E

Development of Unfunded Actuarial Accrued Liability and (Gain)/Loss

	Year Ended	
	December 31, 2003	December 31, 2002
1. Unfunded/(overfunded) actuarial accrued liability at beginning of year	-\$4,897,092	-\$5,839,467
2. Normal cost at beginning of year	7,038,881	6,735,771
3. Total contributions	-6,477,460	-5,664,759
4. Interest		
(a) For whole year on (1) + (2)	\$182,052	\$76,186
(b) For half year on (3)	<u>-248,634</u>	<u>-204,823</u>
(c) Total interest	<u>-66,582</u>	<u>-128,637</u>
5. Expected unfunded/(overfunded) actuarial accrued liability	-\$4,402,253	-\$4,897,092
6. Unfunded actuarial accrued liability at end of year, prior to changes in actuarial assumptions	31,139,969	N/A
7. (Gain)/loss for two-year period: (6) – (5)	<u>\$35,542,222</u>	N/A
8. Unfunded actuarial accrued liability at end of year, after changes in actuarial assumptions	\$29,488,615	N/A
9. Effect of changes in actuarial assumptions: (8) – (6)	<u>-\$1,651,353</u>	N/A

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EXHIBIT F

Funding Schedule

(1) Fiscal Year Beginning January 1	(2) Employer Normal Cost	(3) Amortization of Unfunded Actuarial Accrued Liability	(4) Total Plan Cost: (2) + (3)	(5) Total Unfunded Actuarial Accrued Liability
2004	\$1,939,587	\$(752,587)	\$1,187,000	\$29,488,615
2005	2,007,473	992,527	3,000,000	32,811,704
2006	2,077,735	2,422,265	4,500,000	34,523,807
2007	2,150,456	2,720,732	4,871,188	34,830,173
2008	2,247,227	2,843,165	5,090,392	34,838,743
2009	2,348,352	2,971,108	5,319,460	34,715,202
2010	2,454,028	3,104,807	5,558,835	34,442,342
2011	2,564,459	3,244,524	5,808,983	34,001,225
2012	2,679,860	3,390,527	6,070,387	33,371,021
2013	2,800,454	3,543,101	6,343,555	32,528,836
2014	2,926,474	3,702,541	6,629,015	31,449,522
2015	3,058,165	3,869,155	6,927,320	30,105,474
2016	3,195,782	4,043,267	7,239,049	28,466,406
2017	3,339,592	4,225,214	7,564,806	26,499,106
2018	3,489,874	4,415,349	7,905,223	24,167,173
2019	3,646,918	4,614,039	8,260,957	21,430,729
2020	3,811,029	4,821,671	8,632,700	18,246,109
2021	3,982,525	5,038,646	9,021,171	14,565,515
2022	4,161,739	5,265,385	9,427,124	10,336,653
2023	4,349,017	5,502,328	9,851,345	5,502,328
2024	4,544,723	-	4,544,723	-
2025	4,749,236	-	4,749,236	-
2026	4,962,952	-	4,962,952	-
2027	5,186,285	-	5,186,285	-
2028	5,419,668	-	5,419,668	-

Notes: Item (2) increases 3.5% per year through 2007 and 4.5% per year thereafter.

Amortization payments increase 4.5% per year.

Assumes payment at beginning of the calendar year.

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EXHIBIT G

Definitions of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Assumptions or Actuarial

Assumptions:

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age;
- (d) Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

Normal Cost:

The amount of contributions required to fund the benefit allocated to the current year of service.

Actuarial Accrued Liability

For Actives:

The equivalent of the accumulated normal costs allocated to the years before the valuation date.

Actuarial Accrued Liability

For Pensioners:

The single sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Unfunded Actuarial Accrued

Liability:

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There is a wide range of approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

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Amortization of the Unfunded

Actuarial Accrued Liability: Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

Investment Return:

The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

SECTION 4: Reporting Information for the Massachusetts Turnpike Authority Employees' Retirement System

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 126 beneficiaries in pay status)	695
2. Participants active during the year ended December 31, 2003 with total accumulated contributions of \$49,334,019 and projected payroll of \$64,285,304	1,259
3. Inactive participants with a vested right to a return of their contributions or a deferred or immediate benefit as of December 31, 2003	154

The actuarial factors as of January 1, 2004 are as follows:

1. Normal cost, including administrative expenses	\$7,611,939
2. Expected employee contributions	-5,672,352
3. Employer normal cost: (1) + (2)	1,939,587
4. Actuarial accrued liability	224,272,432
Retired participants and beneficiaries	\$116,743,269
Active participants	104,490,260
Inactive participants	3,038,903
5. Actuarial value of assets (\$177,805,125 at market value)	194,783,817
6. Unfunded actuarial accrued liability	29,488,615
7. Payment on unfunded actuarial accrued liability (20-year amortization payment, increasing at 4.50% per year)	2,058,080
8. Preliminary recommended contribution: (3) + (7)	3,997,667
9. Budgeted appropriation	<u>\$1,187,000</u>
10. Projected payroll	\$64,285,304

Note: Assumes payment at beginning of the calendar year.

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EXHIBIT II

Supplementary Information Required by the GASB – Schedule of Employer Contributions

Plan Year Ended December 31	Annual Required Contributions	Actual Contributions	Percentage Contributed
2001	\$623,000	\$310,056	49.76%
2002	637,000	307,538	48.28%
2003	680,000	409,913	60.28%

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EXHIBIT III

Supplementary Information Required by the GASB – Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) - (a) / (c)]
01/01/1997	\$128,744,051	\$132,298,183	\$3,554,132	97.31%	\$48,878,082	7.27%
01/01/1998	149,545,039	143,697,064	-5,847,975	104.07%	48,254,760	-12.12%
01/01/1999	162,179,395	151,774,632	-10,404,763	106.86%	50,667,500	-20.54%
01/01/2000	177,069,820	172,188,630	-4,881,190	102.83%	60,575,696	-8.06%
01/01/2002	197,133,845	191,294,378	-5,839,467	103.05%	61,615,228	-9.48%
01/01/2004	194,783,817	224,272,432	29,488,615	86.85%	64,285,304	45.87%

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EXHIBIT IV

Supplementary Information Required by the GASB

Valuation date	January 1, 2004
Actuarial cost method	Entry Age Normal Cost Method
Amortization method	Increasing at 4.50% per year
Remaining amortization period	20 years remaining as of January 1, 2004
Asset valuation method	The difference between the expected return and actual investment return on a market value basis is recognized over a five-year period.

Actuarial assumptions:

Investment rate of return	8.50%
Projected salary increases	4.00% for the first four years then increasing to an ultimate rate of 5.00%
Cost of living adjustments	3.00% of first \$12,000 of retirement income

Plan membership:

Retired participants and beneficiaries receiving benefits	695
Inactive participants	154
Active participants	<u>1,259</u>
Total	2,108

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EXHIBIT V

Actuarial Assumptions and Actuarial Cost Method

Mortality Rates:

Healthy: RP-2000 Combined Healthy Mortality Table
Disabled: RP-2000 Combined Healthy Mortality Table set forward 2 years

Termination Rates before Retirement:

Age	Groups 1 and 2 - Rate (%)			
	Mortality		Disability	Withdrawal
	Male	Female		
20	0.03	0.02	0.06	12.00
25	0.04	0.02	0.09	8.78
30	0.04	0.03	0.11	5.55
35	0.08	0.05	0.18	3.93
40	0.11	0.07	0.24	2.31
45	0.15	0.11	0.43	1.89
50	0.21	0.17	0.61	1.46
55	0.36	0.27	0.82	--
60	0.67	0.51	1.23	--

*Notes: 50% of the disability rates shown represent accidental disability.
 25% of the accidental disabilities will die from the same cause as the disability.
 50% of the death rates shown represent accidental death
 Withdrawal rates for CAT employees increased by 50%.*

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Retirement Rates:

Age	Rate per year (%)
55	11.0
56	4.0
57	3.0
58	3.5
59	3.0
60	5.5
61	6.0
62	23.0
63	19.0
64	17.0
65 - 66	30.0
67	22.0
68	28.5
69	16.5
70	100.0

Unknown Data for Participants: Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.

Age of Spouse: Female (or male) spouses 3 years younger (or older) than their spouses.

Percent Married: 80%

Net Investment Return: 8.5%

Interest on Employee Contributions: 3.5%

Investment Expenses: \$360,000 (previously, \$330.00).

Salary Increases: 4.0% through 2007 and 5.0% thereafter (previously, 5.0% for all years). Includes allowance for inflation of 3.5% through 2007 and 4.5% thereafter.

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Actuarial Value of Assets: Market value of assets less unrecognized return in each of the last five years. Unrecognized return is equal to the difference between the actual market value return and the expected market value return and is recognized over a five-year period, further adjusted, if necessary, to be within 10% of the market value.

Actuarial Cost Method: Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant less reported service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary.

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EXHIBIT VII
Summary of Plan Provisions

This exhibit summarizes the major provisions of Chapter 32 of the Laws of Massachusetts.

Plan Year: January 1 – December 31

Retirement Benefits

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 4 comprises mainly police and firefighters. Group 2 is for other specified hazardous occupations. (Officers and inspectors of the State Police are classified as Group 3.)

The annual amount of the retirement allowance is based on the member's final three-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following table based on the age of the member at retirement:

Age Last Birthday at Date of Retirement			
Percent	Group 1	Group 2	Group 4
2.5	65 or over	60 or over	55 or over
2.4	64	59	54
2.3	63	58	53
2.2	62	57	52
2.1	61	56	51
2.0	60	55	50
1.9	59	--	49
1.8	58	--	48
1.7	57	--	47
1.6	56	--	46
1.5	55	--	45

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A member's final three-year average salary is defined as the greater of the highest consecutive three-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement. The \$30,000 cap on salary used in a benefit determination for any employee hired after January 1, 1979 has been removed.

The maximum annual amount of the retirement allowance is 80 percent of the member's final three-year average salary. Any member who is a veteran also receives an additional yearly retirement allowance of fifteen dollars per year of creditable service, not exceeding three hundred dollars. The veteran allowance is paid in addition to the 80 percent maximum.

Employee Contributions

Employees hired before January 1, 1975 contribute 5 percent of their salary; employees hired after December 31, 1974 and before January 1, 1984 contribute 7 percent; employees hired after January 1, 1984 contribute 8 percent; employees hired after July 1, 1996 contribute 9 percent. In addition, employees hired after December 31, 1978 contribute an additional 2 percent of salary in excess of \$30,000.

Employees hired after 1983 who leave with less than five years of credited service receive no interest on their contributions and employees who leave with five but less than ten years receive one-half the rate of regular interest otherwise payable.

Retirement Benefits (Superannuation)

Members of Group 1, 2 or 4 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

Members who terminate before age 55 with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the system).

Ordinary Disability Benefits

A member who is unable to perform his job due to a non-occupational disability will receive a retirement allowance if he has ten or more years of creditable service and has not reached age 55. The annual amount of such allowance shall be determined as if the member retired for superannuation at age 55, based on the amount of creditable

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service at the date of disability. For veterans, there is a minimum benefit of 50 percent of the member's most recent year's pay plus an annuity based on his own contributions.

Accidental Disability Benefit

For a job-connected disability the benefit is 72 percent of the member's most recent annual pay plus an annuity based on his own contributions, plus additional amounts for surviving children. Benefits are capped at 75 percent of annual rate of regular compensation for employees who become members after January 1, 1988.

Death Benefits

In general, the beneficiary of an employee who dies in active service will receive a refund of the employee's own contributions. Alternatively, if the employee were eligible to retire on the date of his death, a spouse's benefit will be paid the full amount the employee would have received under Option C (previously, two-thirds of the amount). The surviving spouse of a member who dies with two or more years of credited service has the option of a refund of the employee's contributions or a monthly benefit regardless of eligibility to retire, if they were married for at least one year. There is also a minimum widow's pension of \$500 per month, and there are additional amounts for surviving children.

If an employee's death is job-connected, the spouse will receive 72 percent of the member's most recent annual pay in addition to a refund of the member's accumulated deductions, plus additional amounts for surviving children. However, in accordance with Section 100 of Chapter 32, the surviving spouse of a police officer, firefighter or corrections officer is killed in the line of duty will be eligible to receive an annual benefit equal to the maximum salary held by the member at the time of death.

"Heart And Lung Law" And Cancer Presumption

Any case of hypertension or heart disease resulting in total or partial disability or death to a uniformed fireman or permanent member of a police department is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. Any case of disease of the lungs or respiratory tract resulting in total disability or death to a uniformed fireman is presumed to have been suffered in

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the line of duty, unless the contrary is shown by competent evidence. There is an additional presumption for uniformed firemen that certain types of cancer are job-related if onset occurs while actively employed or within five years of retirement.

Options

Members may elect to receive a full retirement allowance payable for life under Option A. Under Option B a member may elect to receive a lower monthly allowance in exchange for a guarantee that at his death any of his contributions not expended for annuity payments will be refunded to his beneficiary. Option C allows the member to take a lesser retirement allowance in exchange for providing his survivor with two-thirds of the lesser amount. Option C pensioners will have their benefits converted from a reduced to a full retirement if the beneficiary predeceases the retiree.

Post-Retirement Benefits

The Board has adopted the provisions of Section 51 Chapter 127 of the Acts of 1999, which provide that the Retirement Board may approve an annual COLA in excess of the Consumer Price Index but not to exceed a 3% COLA on the first \$12,000 of a retirement allowance.