

ACTUARIAL VALUATION REPORT
FOR THE
MASSACHUSETTS HOUSING FINANCE AGENCY
CONTRIBUTORY RETIREMENT SYSTEM
AS OF
JANUARY 1, 2002

Prepared for: Mr. John Doherty
Executive Secretary
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Boston, Massachusetts 02152

March 20, 2003

John Hancock

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SUMMARY AND CERTIFICATION

This actuarial valuation report is prepared as of January 1, 2002 for the Massachusetts Housing Finance Agency, in order to develop a funding schedule for the Retirement System for the fiscal years ending in 2003, 2004 and 2005.

This Management Summary presents the basic results and optional funding amounts and describes the changes from the last actuarial valuation, which was performed as of January 1, 2000. The exhibits which follow contain the details supporting the calculations, the basic information used and the actuarial cost method and assumptions, as well as information for disclosure under GASB statement No. 25. At the end of the report we have included a "Quick Reference" summary of principal valuation results, which includes a comparison with the prior actuarial valuation.

Pension Appropriation

The Appropriation consists of three components: Normal Cost (for the current year of service), an amortization payment toward the Unfunded Actuarial Accrued (Past Service) Liability (UAAL), plus an allowance for administrative expenses.

In this actuarial valuation, as was the case with the 2000 calculations, the Assets exceed the Actuarial Accrued Liability. We have taken the same approach as was used in the 2000 valuation, and assumed that this overfunding will be used to offset any costs that would otherwise apply.

However, this year, the overfunded amount is substantially smaller than in the prior actuarial valuation. During the past two years, the plan experienced an actuarial loss of about \$10.7 million. The vast bulk of this was attributable to investment return far below the assumed 8%, with the balance of the loss due to demographic factors and a 13% increase in the total number of members.

Prior actuarial valuations had projected that no contributions would be due for several years. The current year's results indicate that contributions will not be required for the fiscal year ending June 30, 2003, but that beginning with FY 2004, contributions will resume:

Fiscal Year Ending June 30th	Pension Appropriation
2003	\$ 0
2004	691,072
2005	788,574

The full projection is shown in Exhibit II.

Between January 1, 2002 and the time this report is being prepared, the investment experience has again been dismal. Barring a recovery between now and the next actuarial valuation (January 1, 2004) we would expect the funding schedule amounts to be substantially higher than what is projected in this report.

Summary and Certification (continued)

Assumption Change

For this actuarial valuation we have adopted many of the changes indicated by PERAC's recent study of experience among the local retirement systems. We detail the assumptions in Exhibit VIII. Absent the change in assumptions, the Pension Appropriation for FY2004 would have been about \$600,000 higher.

Actuarial Certification

The valuation was performed pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts. To the best of my knowledge, the information in this report and in the accompanying exhibits is complete and accurate, and in my opinion, the assumptions used in the determination of costs are reasonably related to the experience of the plan and to reasonable expectations, and represent my best estimate of anticipated long-term experience under the plan.

In my opinion, this report represents an accurate appraisal of the actuarial status of the Massachusetts Housing Finance Agency Retirement System performed in accordance with generally accepted actuarial principles and practices relating to pension plans.

If I can be of any further assistance regarding this valuation, please do not hesitate to contact me.

Respectfully submitted,

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Exhibit I

Basic Actuarial Valuation Results

Shown below are the Actuarial Accrued Liability and Total Normal Cost for the System, calculated as of January 1, 2002. From these we compute the Unfunded Actuarial Accrued Liability (which is used to derive the amortization amounts and the actuarial gain or loss since the last valuation), and the Employer Normal Cost (which is a component of the Appropriation calculation, shown in Exhibit II).

	<u>Actuarial Accrued Liability</u>	<u>Normal Cost</u>
A. Active Members		
1. Superannuation	\$ 24,158,353	\$ 1,543,334
2. Death	794,843	114,870
3. Disability	751,524	116,142
4. Withdrawal	<u>(1,145,677)</u>	<u>481,899</u>
5. Total	\$ 24,559,043	\$ 2,256,245
B. Inactive Members		
1. Retired Members	\$ 12,213,528	
2. Disabled	822,404	
3. Deferred Retirees	880,541	
4. Terminated Members	<u>1,024,248</u>	
5. Total	\$ 14,940,721	
C. Unfunded Actuarial Accrued Liability (UAAL)		
1. Total Actuarial Accrued Liability (A.5 + B.4)	\$ 39,499,764	
2. Valuation Assets (Exhibit IV)	40,255,334	
3. Unfunded Actuarial Accrued Liability (1 - 2)	\$ (755,570)	
4. Funded Ratio (2 / 1)	101.9%	
D. Employer Normal Cost		
1. Total Normal Cost (A.5)		\$ 2,256,245
2. Anticipated Member Contributions		1,778,969
3. Employer Normal Cost payable January 1, 2002 (1 - 2)		\$ 477,276
4. Employer Normal Cost payable December 1, 2002 (Item D.3 with simple interest for 11 months)		\$ 512,276

Exhibit II

Projected Pension Appropriation

This exhibit shows a projection of the components of the Pension Appropriation from the current fiscal year until the year when the Unfunded Actuarial Accrued Liability is completely amortized. All costs shown are computed assuming payments are made on December 1st.

The amount shown as “Amortization” below was developed by using the overfunding as of the valuation date to offset Normal Cost plus Expenses in each year until the UAAL again reaches zero. Alternate approaches, such as amortizing the overfunding over a longer period (resulting in appropriations which are nonzero but smaller) or using the overfunding to offset costs only until the funded ratio reaches a pre-determined percentage (e.g. 105%) would also be possible, with PERAC’s approval.

FY ending June 30 th	Employer Normal Cost	Amortization of UAAL	Estimated Expenses	Total Appropriation	UAAL at Beginning of Fiscal Year
2003	512,276	(742,276)	230,000	0	(785,793)
2004	521,471	(74,199)	243,800	691,072	(71,895)
2005	530,146	0	258,428	788,574	0
2006	538,205	0	273,934	812,139	0
2007	548,080	0	290,370	838,450	0
2008	557,305	0	307,792	865,097	0
2009	565,883	0	326,260	892,143	0
2010	575,863	0	345,836	921,699	0
2011	584,512	0	366,586	951,098	0
2012	593,134	0	388,581	981,715	0
2013	600,626	0	411,896	1,012,522	0
2014	608,919	0	436,610	1,045,529	0
2015	615,930	0	462,807	1,078,737	0

Exhibit III

Actuarial Gain (Loss) Since the Prior Actuarial Valuation

The actuarial gain or loss represents the effect of deviations from the actuarial assumptions since the prior actuarial valuation. A *gain* results in reduced plan costs; a *loss* results in increased costs. We measure the gain or loss by comparing the expected and actual Unfunded Actuarial Accrued Liability.

Under the current funding schedule, actuarial gains or losses are combined with the current overfunded Liability and used to offset the other annual costs. After the overfunding is fully absorbed, the Board will need to establish a policy for amortizing future gains and losses.

A. Expected Unfunded Actuarial Accrued Liability

1. Unfunded Actuarial Accrued Liability (UAAL) as of January 1, 2000	\$ (11,024,467)
2. 2000 Employer Normal Cost	970,130
3. 2000 Employer Contribution	0
4. Interest to end of year	(804,347)
5. Expected UAAL, January 1, 2001 (1 + 2 + 3 + 4)	(10,858,684)
6. 2001 Employer Normal Cost	1,028,338
7. 2001 Employer Contribution	0
8. Interest to end of year	(786,428)
9. Expected UAAL, January 1, 2002 (5 + 6 + 7 + 8)	(10,616,774)
 B. Actual Unfunded Actuarial Accrued Liability, January 1, 2002 (prior actuarial assumptions)	 46,652
 C. Actuarial Gain (Loss) as of January 1, 2002 (A.9 - B)	 \$ (10,663,426)

Exhibit IV

Valuation Assets

(as of December 31, 2001)

A. As shown in Annual Statement -- By Investment Type		
1. Cash, Short Term		\$ 1,174,989.48
2. Fixed Income		15,991,322.52
3. Equities		18,949,843.92
4. Venture Capital		1,105,186.00
5. Real Estate		3,050,080.06
6. Accrued Interest		178,079.14
7. Accounts Receivable		329,633.09
8. Accounts Payable		<u>(523,800.34)</u>
9. Total		\$ 40,255,333.87
B. Asset Breakdown by Fund		
1. Annuity Savings Fund		\$ 13,746,082.82
2. Annuity Reserve Fund		2,907,011.22
3. Military Service Fund		0.00
4. Pension Fund		4,103,068.75
5. Expense Fund		0.00
6. Pension Reserve Fund		<u>19,499,171.08</u>
7. Total		\$ 40,255,333.87
C. Reconciliation from Prior Actuarial Valuation		
1. Assets as of December 31, 1999		\$ 42,763,077.75
2. Receipts		
a. Employer Contributions	0.00	
b. Member Contributions	3,203,726.33	
c. Funds Received from other Systems	473,047.45	
d. Interest Not Refunded	15,595.82	
e. Total		3,692,369.60
3. Disbursements		
a. Benefits and Refunds paid to Members	3,193,031.22	
b. Funds Paid to other Systems	107,170.28	
c. Administrative Expenses	588,107.58	
d. Total		3,888,309.08
3. Total Investment Return, net of Investment Expenses		(2,311,804.40)
4. Assets as of December 31, 2001		\$ 40,255,333.87

Exhibit V

Information on System Membership

Active Members

SERVICE	0-1	2	3-4	5-6	7-9	10-14	15-19	20-24	25-29	30-34	35-40	OVER	TOTALS
AGE													
0-19	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
20-24	4	0	0	0	0	0	0	0	0	0	0	0	4
	158632	0	0	0	0	0	0	0	0	0	0	0	158632
	39658	0	0	0	0	0	0	0	0	0	0	0	39658
25-29	13	3	4	1	3	0	0	0	0	0	0	0	24
	588537	147232	177961	37919	117525	0	0	0	0	0	0	0	1069174
	45272	49077	44490	37919	39175	0	0	0	0	0	0	0	44549
30-34	14	8	5	5	6	3	0	0	0	0	0	0	41
	658020	418595	286854	303473	254186	129520	0	0	0	0	0	0	2050648
	47001	52324	57371	60695	42364	43173	0	0	0	0	0	0	50016
35-39	16	5	1	6	8	6	5	0	0	0	0	0	47
	870146	256846	117700	328680	544734	350722	279443	0	0	0	0	0	2748272
	54384	51369	117700	54780	68092	58454	55889	0	0	0	0	0	58474
40-44	7	5	8	5	9	6	9	1	0	0	0	0	50
	554653	352173	432767	330955	645642	359333	536368	73771	0	0	0	0	3285663
	79236	70435	54096	66191	71738	59889	59596	73771	0	0	0	0	65713
45-49	14	2	8	6	6	8	5	7	0	0	0	0	56
	845370	102052	491863	418408	396016	564262	456683	547132	0	0	0	0	3821786
	60384	51026	61483	69735	66003	70533	91337	78162	0	0	0	0	68246
50-54	7	2	4	1	12	14	7	6	2	0	0	0	55
	385500	195158	246503	71785	794272	1160076	497033	465884	139837	0	0	0	3956048
	55071	97579	61626	71785	66189	82863	71005	77647	69919	0	0	0	71928
55-59	2	0	2	2	4	6	0	5	1	0	0	0	22
	146157	0	138210	123480	291155	473003	0	439561	94422	0	0	0	1705989
	73079	0	69105	61740	72789	78834	0	87912	94422	0	0	0	77545
60-64	1	1	0	0	1	4	1	1	1	0	0	0	10
	41622	33047	0	0	43413	300150	61550	112912	129786	0	0	0	722479
	41622	33047	0	0	43413	75037	61550	112912	129786	0	0	0	72248
65+	0	0	0	0	1	0	1	1	0	0	0	0	3
	0	0	0	0	75305	0	69244	66768	0	0	0	0	211317
	0	0	0	0	75305	0	69244	66768	0	0	0	0	70439
TOTAL	78	26	32	26	50	47	28	21	4	0	0	0	312
	4248637	1505103	1891859	1614701	3162248	3337064	1900323	1706028	364045	0	0	0	19730007
	54470	57889	59121	62104	63245	71001	67869	81239	91011	0	0	0	63237

The first figure in each group is the number of Members in that group. The second figure is their annual rate of pay as of the valuation date. The third is their average annual pay. The data is classified by attained age and completed years of service, based on reported dates of hire.

Average Age: 43.6
 Average Service: 7.9
 Average Annuity Savings Fund Balance: \$39,329



Exhibit V (continued)

Information on System Membership

Members in Pay Status

(totals may not add, due to rounding)

	<u>Super- Annuation</u>	<u>Accidental Disability</u>	<u>Ordinary Disability</u>	<u>Survivors and Beneficiaries</u>	<u>Total</u>
Number	59	2	1	2	64
Average Age	66.4	63.1	81.9	69.9	66.7
<u>Annual Benefit</u>					
Annuity	299,953	3,997	506	2,423	306,879
Pension and COLA from MHFA	849,438	67,838	13,983	11,282	942,541
Pension from Other Systems	175,203	0	0	1,128	176,331
Total	1,324,594	71,835	14,489	14,832	1,425,750
Average Annual Benefit	22,451	35,918	14,489	7,416	22,277

Distribution of Benefit by Age

<u>Present Age</u>	<u>Number</u>	<u>Total Benefits</u>	<u>Average Benefit</u>
Less than 45	0	0	n/a
45 - 49	1	32,759	32,759
50 - 54	3	56,717	18,906
55 - 59	8	190,049	23,756
60 - 64	19	410,802	21,621
65 - 69	12	321,859	26,822
70 - 74	7	178,334	25,476
75 - 79	9	155,885	17,321
80 - 84	4	75,998	19,000
85 - 89	0	0	n/a
90 and older	<u>1</u>	<u>3,347</u>	<u>3,347</u>
Total	64	1,425,750	22,277

Exhibit V (continued)

Information on System Membership

Terminated Members

There were also 65 Members who were not active on the valuation date but retained annuity savings fund balances in the System. Based on information provided by the Agency, 4 of these were considered “Deferred Retirees” and expected to eventually receive a pension benefit from the System.

The remaining 61 Members are expected to either withdraw their Annuity Savings Fund balances or transfer them to another System.

Deferred Retirees

Number	4
Average Estimated Benefit	\$ 21,316
Total Annuity Savings Fund Balance	\$ 380,474

Other Terminated Members

	61
Total Annuity Savings Fund Balance	\$ 1,024,248

Data Reconciliation

	Active	Terminated Members	Deferred Retirees	Disabled	Retirees & Beneficiaries	Total
January 1, 2000	288	45	7	3	49	392
Terminations	(44)	44				0
Refunds		(24)				(24)
Retirements	(11)		(3)		14	0
New Entrants	75					75
Deaths					(5)	(5)
Rehires	4	(4)				0
Data Correction	—	—	—	—	<u>3</u>	<u>3</u>
January 1, 2002	312	61	4	3	61	441

Exhibit VI

GASB Statement No. 25 Required Schedules

Paragraphs 37 and 38 of the Statement require two schedules of historical information, covering the prior 6 years. Note that some values for years in which an actuarial valuation was not performed are estimated.

A. Schedule of Funding Progress

1. <u>Actuarial Valuation Date</u>	01/01/2002	01/01/2001	01/01/2000	01/01/1999	01/01/1998	01/01/1997
2. Actuarial Value of Plan Assets	40,255,334	41,746,380	42,763,078	38,000,556	31,639,644	27,457,882
3. Actuarial Accrued Liability	39,499,764	35,341,468 *	31,738,611	33,943,345 *	27,017,925	25,498,462 *
4. Unfunded Actuarial Accrued Liability (UAAL)	(755,570)	(6,404,912)	(11,024,467)	(4,057,211)	(4,621,719)	(1,959,420)
5. Funded Ratio	102%	118%	135%	112%	117%	108%
6. Annual Covered Payroll	20,321,907	18,022,128 *	17,002,008	15,803,835	14,197,650	17,669,365 *
7. Ratio of UAAL to Covered Payroll	-4%	-36%	-65%	-26%	-33%	-11%

B. Schedule of Employer Contributions

1. <u>Fiscal Year Ending</u>	06/30/2003	06/30/2002	06/30/2001	06/30/2000	06/30/1999	06/30/1998
2. Actuarially Required Contribution	0	0	0	0	0	0
3. Contribution Made	n/a	0	0	0	0	0
4. Ratio	n/a	n/a	n/a	n/a	n/a	n/a

*estimated values

Exhibit VI (continued)

GASB Statement No. 25 Required Schedules

A. Schedule of Funding Progress

1. <u>Actuarial Valuation Date</u>	01/01/1996	01/01/1995	01/01/1994	01/01/1993	01/01/1992
2. Actuarial Value of Plan Assets	24,292,125	27,771,536	17,707,818	15,248,367	13,790,226
3. Actuarial Accrued Liability	22,196,309	24,740,916 *	14,474,340	11,975,313 *	10,380,630
4. Unfunded Actuarial Accrued Liability (UAAL)	(2,095,816)	(3,030,620)	(3,233,478)	(3,273,054)	(3,409,596)
5. Funded Ratio	109%	112%	122%	127%	133%
6. Annual Covered Payroll	16,669,212	14,231,643 *	13,426,078	11,096,959 *	10,468,829
7. Ratio of UAAL to Covered Payroll	-13%	-21%	-24%	-29%	-33%

B. Schedule of Employer Contributions

1. <u>Fiscal Year Ending</u>	06/30/1997	06/30/1996	06/30/1995	06/30/1994	06/30/1993
2. Actuarially Required Contribution	310,712	276,851	247,992	245,542	210,206
3. Contribution Made	335,189	276,851	247,992	246,000	223,206
4. Ratio	108%	100%	100%	100%	106%

*estimated values

Exhibit VII

Summary of Plan Provisions

Employee Contributions

Rate: 5%, 7%, 8% or 9%, depending on hire date (1/1/75, 1/1/84, 7/1/96 cutoffs).

Since the \$30,000 cap on Compensation was repealed by the System, Members who joined after January 1, 1979 are required to make extra contributions equal to 2% of compensation in excess of \$30,000.

Retirement

Eligibility: Earlier of 20 years of service or age 55. If hired after January 1, 1978, the Member must have at least 10 years of service to retire, even if over age 55.

Benefit: Benefit Rate x creditable service x Average Annual Pay.

- *Maximum benefit* is 80% of Average Annual Pay
- *Benefit rate* is 2.5%, grading down by .1% per year less than 65 (Group 1) or 55 (Group 4).
- *Average Annual Pay* is based on the highest 3 years.
- *Veterans* get extra annual benefit equal to \$15 x years of service up to 20.

Vesting

Eligibility: 10 years

Benefit: Retirement Benefit with Benefit Rate based on age the Member begins to receive benefits.

Disability - Ordinary

Eligibility: 15 years (10 for veterans)

Benefit: Benefit Rate x creditable service x Average Annual Pay

- *Maximum* is 80% of Average Annual Pay
- *Pay* is capped in same manner as for Retirement Benefit
- For *Members under age 55*, Benefit Rate for age 55 is used.
- For *veterans*, minimum benefit is the sum of the annuity purchasable by accumulated employee contributions, plus 50% of prior year's pay.

Exhibit VII (continued)

Disability - Accidental (Job Related)

Eligibility: Immediate

Benefit: Sum of annuity purchasable by accumulated employee contributions, plus pension equal to 72% of rate of pay.

Death - Ordinary

Eligibility: 2 years

Benefit: Benefit Rate x creditable service x Average Annual Pay x "Option C"
(Contingent Annuitant) reduction x 2/3

- Benefit is payable for *life of the spouse*
- For Members *under age 55*, Benefit Rate for age 55 is used.
- *Minimum Benefit* = \$3,000 per year

Death - Accidental (Job Related)

Eligibility: Immediate

Benefit: Sum of annuity purchasable by accumulated employee contributions, plus pension equal to 72% of rate of pay.

Veterans' Buy Back

Veterans who are vested and who elect to do so within 180 days of their eligibility may purchase up to 4 years of credit for combat duty in the military. Payment of 10% of the compensation at the time the Member joined the System must be made for each year to be credited.

Cost of Living Adjustment

Each year, the Legislature may choose to grant a cost of living adjustment to the first \$12,000 of benefit. If the System is sponsored by a municipality, adjustments after 1981 but before 1998 are paid for by the Commonwealth via the State Retirement System.

Exhibit VIII

Actuarial Cost Method, Assumptions and Techniques

Actuarial Cost Method

This valuation was done using the Entry Age Actuarial Cost Method. Under this method, a level Normal Cost rate is developed for each individual to fund all expected benefits over the participant's career. The Normal Cost is the portion of the present value of expected benefits which the method allocates to the current year. The Actuarial Accrued Liability is the portion of the value of benefits which is allocated to past years and is equal to the hypothetical accumulation of past Normal Costs. The Actuarial Accrued Liability for non-active participants or those assumed to retire on the valuation date is equal to the total present value of their benefit.

The excess of the Actuarial Accrued Liability over assets in the plan is called the Unfunded Actuarial Accrued Liability (UAAL), which is amortized over a period of time which depends on the funding schedule adopted.

The total cost for a year is equal to the Normal Cost, less expected employee contributions for the year, plus the amortization payment toward the Unfunded Actuarial Accrued Liability and an allowance for anticipated administrative expenses.

Differences between the actual experience of the Plan and the experience projected by the actuarial assumptions result in changes in the Unfunded Actuarial Accrued Liability. An increase results in an Actuarial Loss, and a decrease creates an Actuarial Gain. These amounts are amortized over a period which depends on the funding schedule adopted.

Summary of Actuarial Assumptions

Economic Assumptions

1. Investment Return: 8.00%
2. Salary increases:

<u>Service</u>	<u>Group 1</u>	<u>Group 4</u>	<u>Service</u>	<u>Group 1</u>	<u>Group 4</u>
0	7.00%	8.00%	5	5.50%	6.00%
1	6.50%	7.50%	6	5.50%	5.50%
2	6.50%	7.00%	7	5.00%	5.50%
3	6.00%	6.50%	8	5.00%	5.25%
4	6.00%	6.00%	9	4.75%	5.25%
			10+	4.75%	5.25%

Prior Assumption was 5.50% for all.

3. Interest on Employee Contribution Accumulations: 5.50%
4. Expenses: An allocation for expenses is added to the pension appropriation. Projected to increase at 6% per year.
5. Cost of Living: all Cost of Living increases are paid for by the System and are included in the calculations. Future increases are assumed at 3% on the first \$12,000 of annual benefit.

Exhibit VIII (continued)

Demographic Assumptions

1. Mortality (pre and post retirement): RP2000 Table published by the Society of Actuaries. "Employee" rates pre-retirement and "Annuitant" rates post-retirement. *Prior assumption was Unisex Pension 1994 Mortality Table.*

2. Disabled Mortality: RP2000 Annuitant rates, with ages set forward two years. *Prior assumption was Unisex Pension 1994 Mortality Table, with ages set forward ten years.*

3. Termination rates (sample):

<u>Service</u>	<u>Rate</u>	<u>Prior assumption</u>	
		<u>Age</u>	<u>Rate</u>
0	0.150	25	0.149
10	0.054	35	0.074
20	0.021	45	0.027
30	0.000	55	0.002

4. Disablement rates (sample):

<u>Age</u>	<u>Rate</u>	<u>Prior Assumption</u>
20	.0001	.0008
30	.0003	.0011
40	.0010	.0024
50	.0019	.0060
60	.0028	.0114

5. Retirement rates:

<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Prior (unisex)</u>	<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Prior (unisex)</u>
50	0.010	0.015	0.000	61	0.200	0.130	0.069
51	0.010	0.015	0.000	62	0.300	0.150	0.151
52	0.010	0.020	0.000	63	0.250	0.125	0.107
53	0.010	0.025	0.000	64	0.220	0.180	0.104
54	0.020	0.025	0.000	65	0.400	0.150	0.357
55	0.020	0.055	0.126	66	0.250	0.200	0.221
56	0.025	0.065	0.032	67	0.250	0.200	0.216
57	0.025	0.065	0.031	68	0.300	0.250	0.216
58	0.050	0.065	0.033	69	0.300	0.200	0.254
59	0.065	0.065	0.035	70	1.000	1.000	1.000
60	0.120	0.050	0.078				

6. Age that Deferred Vested Benefits commence: 55 for current non-actives, 65 for current actives.

Exhibit VIII (continued)

7. Percentage Married: 100% of males, 100% of females, female spouses three years younger than male spouses.
8. Assumptions for children, remarriages: none
9. Percentage of deaths and disabilities assumed occupational: 25%

Actuarial Procedures and Techniques

Employee Data

Employee data was derived from spreadsheets provided by the Massachusetts Housing Finance Agency, supplemented by verbal clarification of questions. Data was examined for completeness and consistency. For retirees, the benefit payable by the System was reduced by the Pension benefit payable by other Systems, as reported by the MHFA.

No information was available on former Members who transferred to other systems but have not yet retired, nor was accurate information available on current members' prior service with other systems. Ordinarily we assume that the benefits to be paid by the System to other systems will roughly offset the benefits to be received from other systems, and consider all service prior to employment with this System. This is usually borne out by the ratio of incoming to outgoing reimbursements. However, for current retirees, MHFA receives a far greater reimbursement from other systems than it pays to other systems. We reflect the expectation that incoming reimbursements will also exceed outgoing reimbursements for future retirees by counting only MHFA service in the calculations for active members.

Benefits for the Deferred Retirees were estimated based on available salary and employment data. For other terminated Members we held a liability equal to their Annuity Savings Fund balance.

Asset Data

Assets were reported as of December 31, 2001. All assets were valued at market.

Adjustment and Projection of Liability Results

Liability calculations (present values, accrued liabilities, normal costs) were made as of January 1, 2002, the census date.

Total Normal Cost was increased by 6%. Employee contributions were estimated using the projected amounts for current participants combined with a percentage of the additional payroll imputed to new participants (based on the assumption that total payroll would increase according to the salary increase assumption). This percentage is based on the blended contribution rate for a "typical" new entrant each year.

All January 1 results were increased with simple interest to bring them forward to December 1, the date that contributions are assumed to be made.

Exhibit IX

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 -- In order to fund a plan with reasonably level contributions, one must anticipate the plan's future experience. The actuary does this with a combination of actuarial assumptions, which represent his or her best estimate of future experience. Assumptions for pension plans include estimates of asset appreciation, Member turnover, salary increases, pre-retirement mortality, and the cost of an annuity at retirement. The combination of assumptions is intended to reasonably represent a plan's future financial experience over the long term.

ACTUARIAL COST METHOD (or FUNDING METHOD) -- A procedure for allocating the Actuarial Present Value of all expected pension plan benefits between past and future time periods. This is done via calculation of the Normal Cost and the Actuarial Accrued Liability. Over the years, actuaries have developed various approaches for the systematic accumulation of assets sufficient to provide plan benefits. These approaches or cost methods differ in many respects: some spread costs over an average working lifetime of a group, others spread an individual's cost over that individual's working lifetime; some accumulate assets quickly, others take longer to accumulate sizable assets. The choice of a cost method depends on such factors as the size of the plan and the type of benefit promised.

Entry Age Actuarial Cost Method - Spreads cost for each individual as level percentage of pay. Required under MGL Chapter 32 to develop a Funding Schedule amount.

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. Differences due to changes in the Actuarial Assumptions, the Actuarial Cost Method or pension plan provisions would be described as such, rather than as an Actuarial Gain(Loss).

Exhibit IX (continued)

ACTUARIAL PRESENT VALUE OF BENEFITS -- 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, taking into account appropriate discounts for the time value of money and the probability that the benefits will be paid.

ACTUARIAL VALUATION -- An estimation of the present value of future benefits expected to be provided by a Retirement System, and the allocation of this value between past and future periods. The current year's funding requirement is determined, based on data on existing employees and pensioners in the System, using Actuarial Assumptions and an Actuarial Cost Method, as well as a procedure to determine the amortization payment to be used in the funding schedule.

AMORTIZATION PAYMENT -- That portion of the pension plan appropriation which represents payments made to pay interest on and to reduce the Unfunded Actuarial Accrued Liability. Payments can either be "Level" (fixed amount each year), or "Increasing" (amount calculated on the basis that it will increase each year at 4.5%).

ANNUAL STATEMENT -- The statement submitted to PERAC each year that describes the asset holdings and Fund balances as of December 31 and the transactions during the calendar year that affected the financial condition of the retirement system.

ANNUITY 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).

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.

ASSETS -- The total value of the Annuity Savings Fund, Annuity Reserve Fund, Military Service Credit Fund, Pension Fund and Pension Reserve Fund held on behalf of the Retirement System. For valuation purposes, the Expense Fund is not considered an asset.

COST OF BENEFITS -- The estimated payment from the pension system for benefits for the fiscal year. This is the minimum amount payable during the first six years of a Funding Schedule under Sections 22(6A) and 22D of MGL Chapter 32.

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

Exhibit IX (continued)

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 of MGL 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 allocated to a particular fiscal year. The Employer Normal Cost is the difference between the total Normal Cost and the amount of the expected employee contributions for the fiscal year.

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

PENSION FUND -- The fund into which appropriation amounts as determined by PERAC are paid and from which pension benefits are paid.

PENSION RESERVE FUND -- The fund which is credited with all amounts set aside by a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts include excess interest earnings.

PERAC -- The Commonwealth of Massachusetts Public Employee Retirement Administration Commission, which oversees all the contributory retirement systems established under MGL Chapter 32.

SALARY CAP -- The \$30,000 limit on compensation considered by the System for benefit purposes for Members hired after 1978, unless the System has elected to remove this cap.

UNFUNDED ACTUARIAL ACCRUED LIABILITY -- The excess of the Actuarial Accrued Liability over the Assets.

Appendix

Quick Reference Summary

	<u>2002 Valuation</u>	<u>2000 Valuation</u>
Number of Participants (Exh. V)		
Active	312	288
Retirees and Beneficiaries	61	49
Disabled	3	3
Deferred Retirees	4	7
Terminated Members	<u>61</u>	<u>45</u>
Total	441	392
Active Members		
Average Age	43.6	43.0
Average Service	7.9	7.8
Valuation Payroll (all Members)	\$ 20,321,907	\$ 17,002,008
(Members below latest assumed ret. age)	20,321,907	16,968,389
Average Salary (below latest assumed ret. age)	65,134	59,035
Retired and Disabled Members		
Average age	66.7	67.4
Average Benefit	\$ 22,277	\$ 21,586
Normal Cost as of January 1 (Exh. I)		
Total Normal Cost	\$ 2,256,245	\$ 2,258,436
Percentage of Pay	11.1%	13.3%
Anticipated Member Contributions	1,778,969	1,435,511
Percentage of Pay	8.8%	8.5%
Employer Normal Cost	\$ 477,276	\$ 822,925
Percentage of Pay	2.3%	4.8%
Actuarial Accrued Liability (Exh. I)		
Active Members	\$ 24,559,043	\$ 20,386,659
Retirees	12,213,528	8,591,226
Disabled Members	822,404	621,337
Terminated Vested	880,541	1,600,912
Terminated Non-vested	<u>1,024,248</u>	<u>538,477</u>
Total	\$ 39,499,764	\$ 31,738,611
Valuation Assets (Exh. IV)	\$ 40,255,334	\$ 42,763,078
Unfunded Actuarial Accrued Liability (Exh. I)	\$ (755,570)	\$ (11,024,467)
Funded Percentage	102%	135%
FY'03 Pension Appropriation (Exh. II)		
Dollar Amount	\$ 0	\$ 0
Percentage of Pay	0.0%	0.0%
FY'04 Pension Appropriation (Exh. II)		
Dollar Amount	\$ 691,073	\$ 0
Percentage of Pay	3.2%	0.0%