Gloucester Contributory Retirement System

Actuarial Valuation and Review as of January 1, 2012

SEGAL

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August 22, 2012

Gloucester Retirement Board
Gloucester Contributory Retirement System
P.O. Box 114
Gloucester, MA 01931-0114

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2012. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2013 and later years and analyzes the preceding two years' experience.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the Gloucester Contributory Retirement System. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

The actuarial calculations were directed under my supervision. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in my 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

SECTION 2

VALUATION RESULTS

SECTION 3

SUPPLEMENTAL INFORMATION

SECTION 4

REPORTING INFORMATION

Purpose

This report has been prepared by The Segal Company to present a valuation of the Gloucester Contributory Retirement System as of January 1, 2012. 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, 2012;
- The assets of the Plan as of December 31, 2011;
- 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:

1. The actuarial valuation report as of January 1, 2012 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected.
2. During the plan years ended 2010 and 2011, the market value rates of return were 13.03% and 0.35%, respectively. Because the actuarial value of assets gradually recognizes market value fluctuations, the actuarial rates of return for the plan years ended 2010 and 2011 were 6.65% and -0.92%, respectively. The actuarial value of assets as of December 31, 2011 was $67.3 million, or 102.6% of the market value of assets of $65.6 million. As of December 31, 2009, the actuarial value was 110.0% of market value.
3. As indicated in Section 2, Subsection B of this report, the total unrecognized investment loss as of December 31, 2011 is $1,699,197. 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 7.875% 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.

4. This valuation reflects the following changes in actuarial assumptions:
   - The administrative expense assumption was reset to $275,000 for the 2012 calendar year, increasing by the inflation assumption thereafter.
   - The salary scale assumption was changed from 4.0% in 2012 and 4.5% in 2013 and later to 3.0% in 2012, 3.5% in 2013, 4.0% in 2014 and 4.5% in 2015 and later.
   - The pre-retirement mortality table was changed from the RP-2000 Employee Mortality Table to the RP-2000 Employee Mortality Table projected 12 years with Scale AA.
   - The healthy retiree mortality table was changed from the RP-2000 Healthy Annuitant Mortality Table to the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA.
   - The mortality table for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward 5 years to the RP-2000 Healthy Annuitant Mortality Table set forward 5 years projected 12 years using Scale AA.

   Changing these assumptions resulted in a net increase in the unfunded liability of $2,904,834 and a net decrease in the normal cost of $12,647.

5. As of January 1, 2010 the System had an unfunded liability of $73.7 million. The unfunded liability was expected to increase to $76.2 million as of January 1, 2012. The actual unfunded liability of $84.7 million is $8.5 million higher than expected due to an experience loss of $5.6 million, which is detailed in Section 2 of this report, and the change in assumptions of $2.9 million described above.

6. The recommended contribution for fiscal 2013 is equal to the previously budgeted amount of $6,793,146. The results of this valuation will first be reflected in the fiscal 2014 appropriation. The funding schedule in Section 3 Exhibit G fully funds the Retirement System by June 30, 2037. Because the fiscal 2014 appropriation would have increased by approximately 7.0%, this schedule gradually phases in the increase with appropriations that increase by 4.50% through fiscal 2017, and by 4.41% in fiscal 2019. Thereafter the amortization payments increase 4.00% per year.

Summary of Key Valuation Results

	2012	2010
Contributions for fiscal year beginning July 1:		
Recommended for fiscal 2013 and 2011	$6,793,146	$6,292,539
Recommended for fiscal 2014 and 2012	7,098,838	6,543,097
Recommended for fiscal 2015 and 2013	7,418,285	6,793,146
Funding elements for plan year beginning January 1:		
Normal cost, including administrative expenses	$3,685,027	$3,898,904
Market value of assets	65,619,370	59,217,729
Actuarial value of assets	67,318,567	65,139,502
Actuarial accrued liability	152,051,654	138,859,148
Unfunded/(overfunded) actuarial accrued liability	84,733,087	73,719,646
GASB 25/27 for fiscal year beginning July 1:		
Annual required contributions (ARC)	$6,793,146	$6,292,539
Actual contributions	--	6,292,539
Percentage of ARC contributed	--	100.00%
Funded ratio	44.27%	46.91%
Demographic data for plan year beginning January 1:		
Number of retired participants and beneficiaries	433	437
Number of inactive participants entitled to a return of their employee contributions	51	70
Number of inactive participants with a vested right to a deferred or immediate benefit	14	13
Number of active participants	506	515
Total payroll in prior calendar year*	$22,490,770	$22,266,531
Average payroll in prior calendar year*	44,448	43,236

** Reflects salary adjustments for retroactive payments and newly settled contracts as detailed in Exhibit V of Section 4.*

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 three valuations can be seen in this chart.

CHART 1

Participant Population: 2005 – 2011

Year Ended December 31	Active Participants	Inactive Participants	Retired Participants and Beneficiaries
2005	539	94	411
2007	547	97	408
2009	515	83	437
2011	506	65	433

Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 506 active participants with an average age of 50.3, average years of service of 13.1 years and average payroll of $44,448. The 515 active participants in the prior valuation had an average age of 49.8, average service of 12.0 years and average payroll of $43,326.

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

Inactive Participants

In this year's valuation, there were 14 participants with a vested right to a deferred or immediate vested benefit and 51 participants 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, 2011

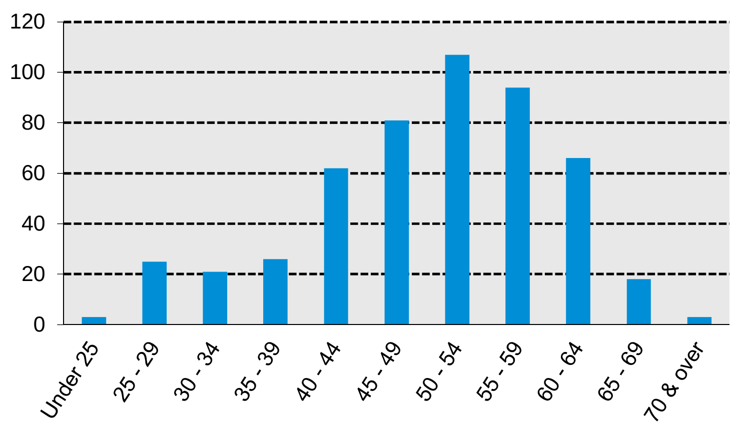
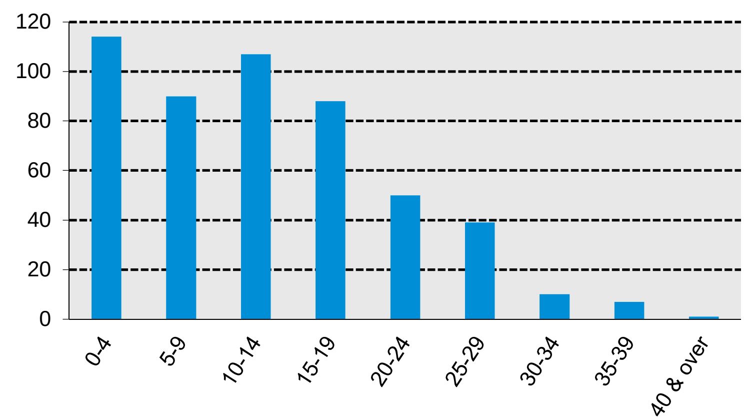


CHART 3

Distribution of Active Participants by Years of Service as of December 31, 2011



Retired Participants and Beneficiaries

As of December 31, 2011, 369 retired participants and 64 beneficiaries were receiving total monthly benefits of $786,618. For comparison, in the previous valuation, there were 368 retired participants and 69 beneficiaries receiving monthly benefits of $731,256.

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, 2011

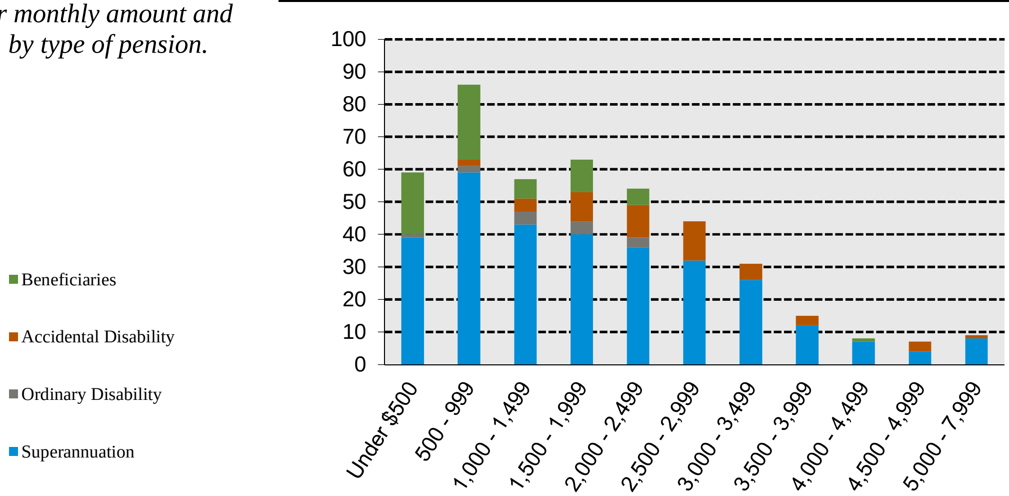
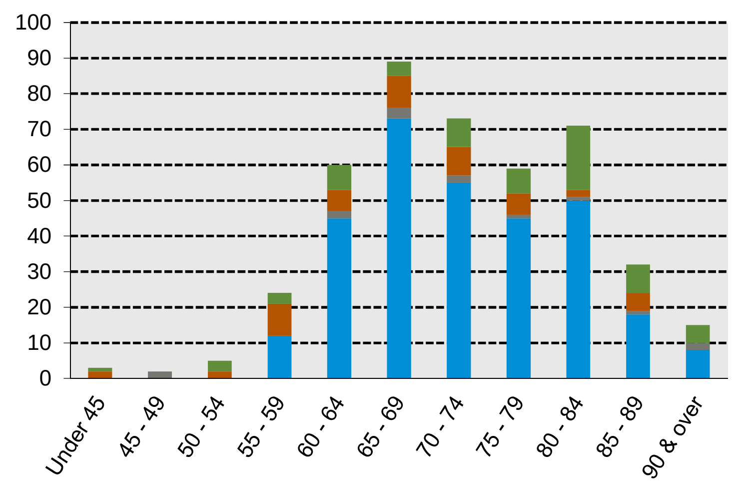


CHART 5

Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2011



B. FINANCIAL INFORMATION

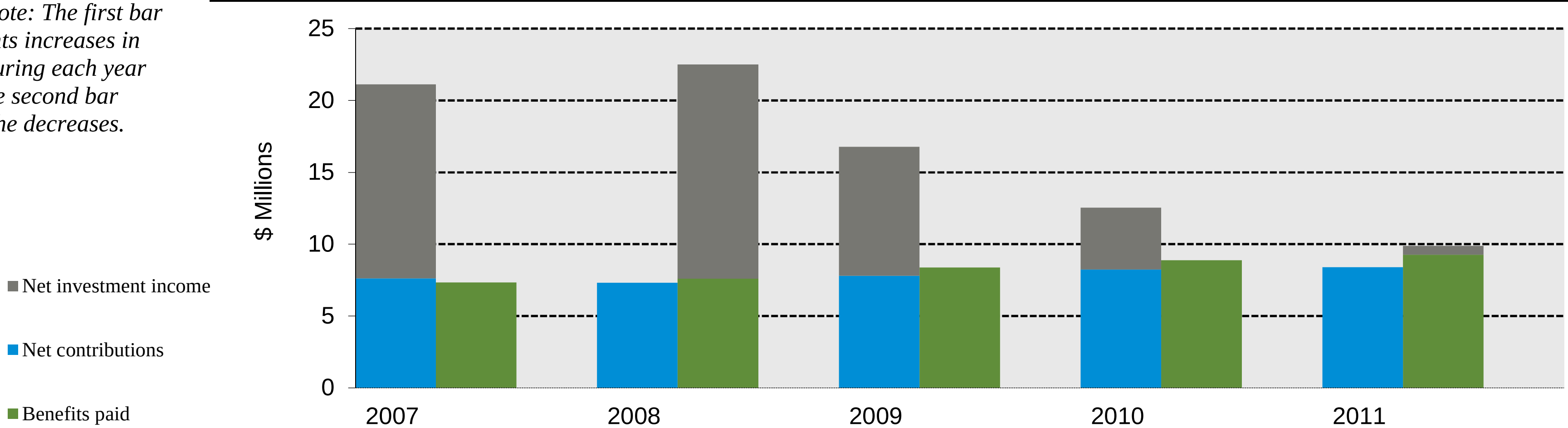
Retirement plan funding anticipates that, over the long term, both net contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

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 five 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, 2007 – 2011



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart shows the determination of the actuarial value of assets as of the valuation date.

CHART 7

Determination of Actuarial Value of Assets

				Year Ended	
			December 31, 2011		December 31, 2010
1. Market value of assets			$65,619,370		$66,236,896
	Original	Unrecognized		Unrecognized	
2. Calculation of unrecognized return*	Amount	Return		Return	
(a) Year ended December 31, 2011	-$5,153,688	-$3,865,266		N/A	
(b) Year ended December 31, 2010	3,048,332	1,219,333		$2,438,666	
(c) Year ended December 31, 2009	3,786,944	946,736		1,893,472	
(d) Year ended December 31, 2008	-27,563,741	0		-6,890,936	
(e) Year ended December 31, 2007	235,988	N/A		0	
(f) Total unrecognized return			-1,699,197		-2,558,798
3. Preliminary actuarial value: (1) - (2f)			67,318,567		68,795,694
4. Adjustment to be within 10% corridor			0		0
5. Final actuarial value of assets: (3) + (4)			67,318,567		$68,795,694
6. Actuarial value as a percentage of market value: (5) ÷ (1)			102.6%		103.9%

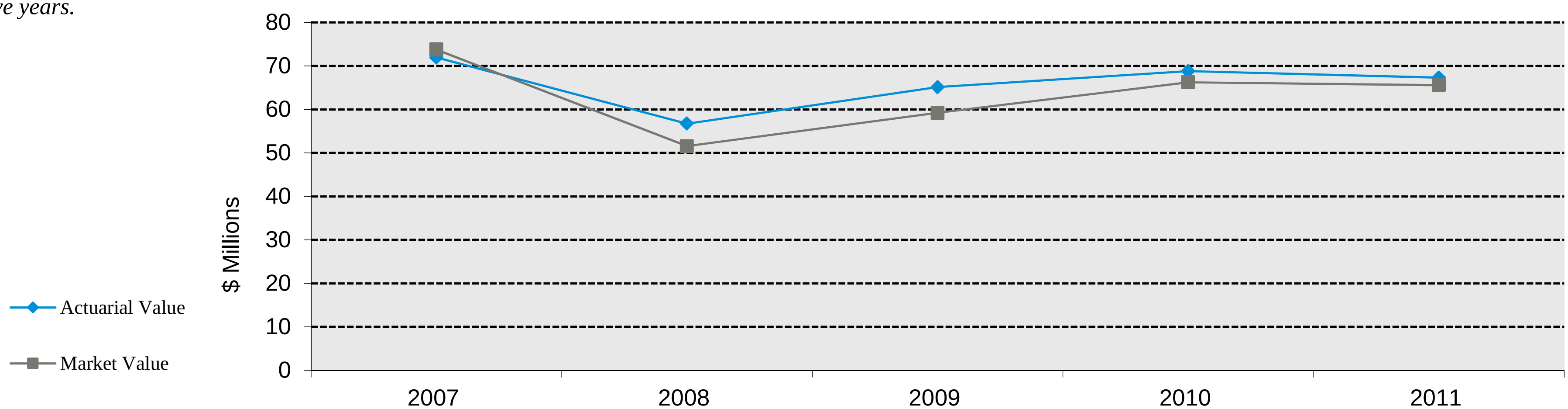
* *Unrecognized return is the difference between the actual market return and the expected return on an actuarial value basis and is recognized over a four-year period.*

Both the actuarial value and market value of assets are representations of the Gloucester Contributory 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 Gloucester Contributory 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 five years.

CHART 8

Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2007 – 2011



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 experience loss over the two-year period is $5,586,162. 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, 2011

1. Net loss from investments*	-$6,804,577
2. Net gain from administrative expenses	28,077
3. Net gain from other experience**	1,190,338
4. Net experience loss: (1) + (2) + (3)	-$5,586,162

* *Details in Chart 10*

** *Details in Chart 13*

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 Gloucester Contributory Retirement System's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.875%. The actual rate of return on an actuarial basis for the 2011 plan year was -0.92% and 6.65% for the 2010 year.

Since the actual return for the year was less than the assumed return, the Gloucester Contributory Retirement System experienced an actuarial loss during the two-year period ending December 31, 2011 with regard to its investments of $6,866,891, including an adjustment for interest.

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

CHART 10

Actuarial Value Investment Experience

	Year Ended December 31, 2011	Year Ended December 31, 2010
1. Actual return	-$629,021	$4,312,600
2. Average value of assets	68,371,641	64,811,298
3. Actual rate of return: (1) ÷ (2)	-0.92%	6.65%
4. Assumed rate of return	7.875%	7.875%
5. Expected return: (2) x (4)	$5,384,267	$5,103,889
6. Actuarial gain/(loss): (1) – (5)	-$6,013,288	-$791,289

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 five years, including a five-year average.

Based upon this experience and future expectations, we have maintained the assumed rate of return of 7.875%.

CHART 11

Investment Return – Actuarial Value vs. Market Value: 2007 - 2011

	Actuarial Value Investment Return		Market Value Investment Return	
Year Ended December 31	**Amount**	**Percent**	**Amount**	**Percent**
2007	$13,501,091	23.16%	$5,520,803	8.11%
2008	-14,930,384	-20.80	-21,909,752	-29.76
2009	8,993,139	15.94	8,228,098	16.05
2010	4,312,600	6.65	7,675,576	13.03
2011	-629,022	-0.92	230,579	0.35
Total	$11,247,424		-$254,696	
	Five-year average return	3.52%		-0.08%

Note: Each year's yield is weighted by the average asset value in that year.

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

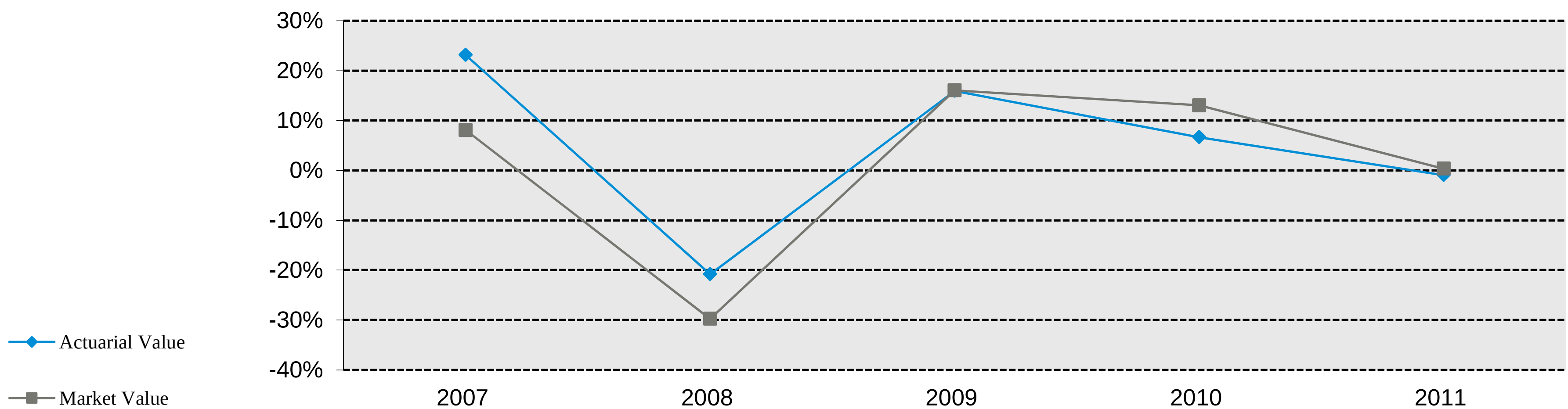
Administrative Expenses

Administrative expenses for the two years ended December 31, 2010 and 2011 were $282,917 and $253,431, respectively compared to the assumption of $275,000 for 2010 and $287,375 for 2011. This resulted in a gain of $28,077 for the year. We have assumed administrative expenses will be $275,000 for the 2012 calendar year, increasing by the inflation assumption thereafter.

This chart illustrates how this leveling effect has actually worked over the years 2007 - 2011.

CHART 12

Market and Actuarial Rates of Return for Years Ended December 31, 2007 - 2011



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 gain from this other experience for the two-year period ending December 31, 2011 amounted to $1,190,338, which is 0.8% of the actuarial accrued liability.

A brief summary of the demographic gain experience of the Gloucester Contributory Retirement System for the two-year period ending December 31, 2011 is shown in the chart below.

This valuation reflects the following changes in actuarial assumptions:

- The administrative expense assumption was reset to $275,000 for the 2012 calendar year, increasing by the inflation assumption thereafter.
- The salary scale assumption was changed from 4.0% in 2012 and 4.5% in 2013 and later to 3.0% in 2012, 3.5% in 2013, 4.0% in 2014 and 4.5% in 2015 and later.
- The pre-retirement mortality table was changed from the RP-2000 Employee Mortality Table to the RP-2000 Employee Mortality Table projected 12 years using Scale AA.
- The healthy retiree mortality table was changed from the RP-2000 Healthy Annuitant Mortality Table to the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA.
- The mortality table for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward 5 years to the RP-2000 Healthy Annuitant Mortality Table set forward 5 years projected 12 years using Scale AA.

Changing these assumptions resulted in a net increase in the unfunded liability of $2,904,834 and a net decrease in the normal cost of $12,647.

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, 2011

1.	Salary increases less than expected for continuing actives	$4,353,652
2.	Fewer deaths than expected amongst members and beneficiaries	-153,523
3.	Miscellaneous experience, including data adjustments	-3,009,791
4.	Total	$1,190,338

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 actuarial accrued liability.

The recommended contribution for fiscal 2013 is equal to the previously budgeted amount of $6,793,146. The results of this valuation will first be reflected in the fiscal 2014 appropriation. The funding schedule in Section 3 Exhibit G fully funds the Retirement System by June 30, 2037. Because the fiscal 2014 appropriation would have increased by approximately 7.0%, this schedule gradually phases in the increase with appropriations that increase by 4.50% through fiscal 2017, and by 4.41% in fiscal 2019. Thereafter the amortization payments increase 4.00% per year.

These figures assume that contributions will be made on September 30.

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

CHART 14

Recommended Contribution

	Year Beginning January 1			
	2012		2010	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	$3,410,027	14.73%	$3,623,904	15.61%
2. Administrative expenses	275,000	1.19%	275,000	1.18%
3. Expected employee contributions	-2,161,269	-9.34%	-2,141,820	-9.22%
4. Employer normal cost: (1) + (2) + (3)	$1,523,758	6.58%	$1,757,084	7.57%
5. Actuarial accrued liability	152,051,654		138,859,148	
6. Actuarial value of assets	67,318,567		65,139,502	
7. Unfunded actuarial accrued liability: (5) - (6)	$84,733,087		$73,719,646	
8. Employer normal cost projected to July 1, 2012 and 2010, adjusted for timing*	1,568,362	6.71%	1,800,613	7.58%
9. Projected unfunded actuarial accrued liability	88,006,233		76,567,356	
10. Payment on projected unfunded actuarial accrued liability, adjusted for timing*	5,349,797	22.89%	4,447,765	18.73%
11. Total preliminary contribution: (8) + (10), adjusted for timing*	$6,918,159	29.60%	$6,248,378	26.31%
12. Budgeted appropriation, adjusted for timing*	$6,793,146	29.06%	$6,292,539	26.50%
13. Projected payroll	$23,372,964		$23,744,588	

**Recommended contributions are assumed to be paid on September 30.*

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 the GASB is the historical comparison of the GASB required contribution to the actual contributions. This comparison demonstrates whether a plan is being funded within the range of the GASB reporting requirements. Chart 15 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 the GASB Standards. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

Although the GASB requires that the actuarial value of assets be used to determine the funded ratio, Chart 16 shows the funded ratio calculated using both the actuarial value of assets (44.27%) and the market value of assets (43.16%).

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

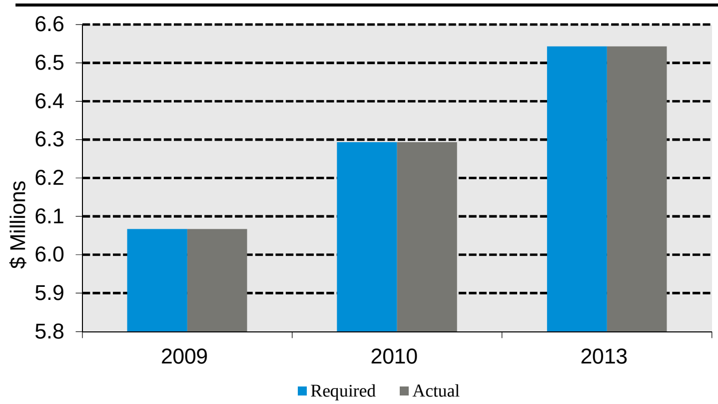


CHART 16

Funded Ratio

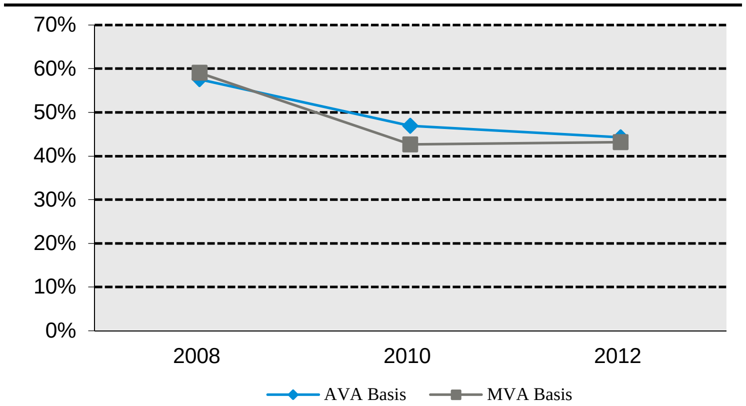


EXHIBIT A

Table of Plan Coverage

Category	Year Ended December 31		Change From Prior Year
	2011	2009	
Active participants in valuation:			
Number	506	515	-1.7%
Average age	50.3	49.8	N/A
Average years of service	13.1	12.0	N/A
Total payroll*	$22,490,770	$22,266,531	1.0%
Average payroll*	44,448	43,236	2.8%
Account balances	22,313,839	20,388,963	9.4%
Total active vested participants	302	279	8.2%
Inactive employees with vested rights to a return of their employee contributions	51	70	-27.1%
Inactive participants with a vested right to a deferred or immediate benefit	14	13	7.7%
Retired participants:			
Number in pay status	306	302	1.3%
Average age	72.6	72.4	N/A
Average monthly benefit	$1,884	$1,726	9.2%
Disabled participants:			
Number in pay status	63	66	-4.5%
Average age	68.2	67.7	N/A
Average monthly benefit	$2,321	$2,196	5.7%
Beneficiaries in pay status:			
Number in pay status	64	69	-7.2%
Average age	75.5	75.9	N/A
Average monthly benefit	$1,000	945	5.8%

** Reflects salary adjustments for retroactive payments and newly settled contracts as detailed in Exhibit V of Section 4.*

EXHIBIT B

Participants in Active Service as of December 31, 2011
By Age, Years of Service, and Average Payroll

		Years of Service								
Age	**Total**	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40 & over**
Under 25	3	3	- -	- -	- -	- -	- -	- -	- -	- -
	$39,680	$39,680	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	25	20	5	- -	- -	- -	- -	- -	- -	- -
	$38,643	$36,477	$47,310	- -	- -	- -	- -	- -	- -	- -
30 - 34	21	9	9	3	- -	- -	- -	- -	- -	- -
	$44,211	$34,672	$52,452	$48,105	- -	- -	- -	- -	- -	- -
35 - 39	26	6	10	6	4	- -	- -	- -	- -	- -
	$49,718	$39,245	$52,205	$53,191	$54,003	- -	- -	- -	- -	- -
40 - 44	62	21	6	17	16	2	- -	- -	- -	- -
	$46,498	$29,037	$32,684	$57,641	$60,099	$67,761	- -	- -	- -	- -
45 - 49	81	21	14	13	17	10	6	- -	- -	- -
	$47,437	$40,705	$34,789	$38,162	$62,768	$59,780	$56,602	- -	- -	- -
50 - 54	107	16	22	21	19	14	12	3	- -	- -
	$47,331	$39,139	$37,112	$43,540	$46,334	$63,206	$63,715	$59,212	- -	- -
55 - 59	94	11	12	27	15	11	14	3	1	- -
	$40,375	$35,108	$31,928	$38,862	$33,733	$35,401	$58,316	$72,421	$47,533	- -
60 - 64	66	4	10	16	15	8	3	3	6	1
	$42,710	$33,401	$30,171	$40,000	$44,104	$38,737	$61,143	$60,536	$57,304	$63,233
65 - 69	18	3	2	3	2	4	3	1	- -	- -
	$36,329	$35,928	$39,241	$33,248	$27,201	$33,860	$43,051	$48,914	- -	- -
70 & over	3	- -	- -	1	- -	1	1	- -	- -	- -
	$42,262	- -	- -	$41,040	- -	$39,818	$45,929	- -	- -	- -
Total	506	114	90	107	88	50	39	10	7	1
	$44,448	$36,092	$38,818	$43,774	$49,397	$49,855	$58,439	$62,542	$55,908	$63,233

** Reflects salary adjustments for retroactive payments and newly settled contracts as detailed in Exhibit V of Section 4.*

EXHIBIT C

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended December 31, 2011		Year Ended December 31, 2010	
Contribution income:				
Employer contributions	$6,543,097		$6,293,396	
Employee contributions	2,100,878		2,202,247	
Other contributions	14,490		18,176	
Less administrative expenses	-253,431		-282,917	
Net contribution income		$8,405,034		$8,230,902
Net investment income		-629,022		4,312,601
Total income available for benefits		$7,776,012		$12,543,503
Less benefit payments:				
Pensions	-$8,929,583		-$8,498,398	
Net 3(8)(c) reimbursements	-102,366		-99,678	
Refunds, annuities, & Option B refunds	-221,190		-289,234	
Net benefit payments		-$9,253,139		-$8,887,311
Change in reserve for future benefits		-$1,477,127		$3,656,192

EXHIBIT D

Development of the Fund Through December 31, 2011

Year Ended December 31	Employer Contributions	Employee Contributions	Other Contributions	Net Investment Return*	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
2007	$5,512,525	$2,266,409	$22,567	$13,501,091	$189,733	$7,339,467	$71,938,829
2008	5,808,066	1,743,136	14,946	-14,930,384	263,499	7,587,147	56,724,053
2009	6,067,057	1,962,848	22,974	8,993,139	262,720	8,367,849	65,139,502
2010	6,293,396	2,202,247	18,176	4,312,601	282,917	8,887,311	68,795,694
2011	6,543,097	2,100,878	14,490	-629,022	253,431	9,253,139	67,318,567

** Net of investment fees*

EXHIBIT E

Development of Unfunded Actuarial Accrued Liability

	Year Ended			
	December 31, 2011		December 31, 2010	
1. Unfunded actuarial accrued liability at beginning of year		$74,914,101		$73,719,646
2. Normal cost at beginning of year		4,074,355		3,898,904
3. Total contributions		-8,658,465		-8,513,819
4. Interest				
(a) For whole year on (1) + (2)	$6,220,340		$6,112,461	
(b) For half year on (3)	-308,240		-303,091	
(c) Total interest		5,912,100		5,809,370
5. Expected unfunded actuarial accrued liability		$76,242,091		$74,914,101
6. Changes due to:				
(a) Experience loss	$5,586,162			
(b) Assumption changes	2,904,834			
(c) Total changes		8,490,996		
7. Unfunded actuarial accrued liability at end of year		$84,733,087		

EXHIBIT F

Table of Amortization Bases

Type	Annual Payment	Years Remaining	Outstanding Balance
2002 ERI – HA	$3,816	6	$18,743
2003 ERI – HA	6,537	6	32,109
2003 ERI - City	48,547	6	238,461
Remaining unfunded liability	5,290,897	25	87,716,920
Total	$5,349,797		$88,006,233

Notes: Payments assumed to be made on September 30.
Does not reflect adjustment to set fiscal 2013 appropriation to budgeted amount.
Amortization payments increasing 4.0% per year.

EXHIBIT G
Funding Schedule

(1) Fiscal Year Ended June 30	(2) Employer Normal Cost	(3) Amortization of 2002 ERI Liability	(4) Amortization of 2003 ERI Liability	(5) Amortization of 2003 City ERI Liability	(6) Amortization of Remaining Liability	(7) Total Plan Cost: (2) + (3) + (4) + (5) + (6)	(8) Total Unfunded Actuarial Accrued Liability at Beginning of Fiscal Year	(9) Total Plan Cost: % Increase
2013	$1,568,362	$3,816	$6,537	$48,547	$5,165,884	$6,793,146	$88,006,233	- -
2014	1,607,571	3,816	6,537	48,547	5,432,367	7,098,838	89,406,292	4.50%
2015	1,655,798	3,816	6,537	48,547	5,703,587	7,418,285	90,634,536	4.50%
2016	1,713,751	3,816	6,537	48,547	5,979,457	7,752,108	91,672,417	4.50%
2017	1,773,732	3,816	6,537	48,547	6,268,321	8,100,953	92,500,022	4.50%
2018	1,835,813	3,816	6,537	48,547	6,563,433	8,458,146	93,087,037	4.41%
2019	1,900,066	-	-	-	6,825,970	8,726,036	93,407,907	3.17%
2020	1,966,568	-	-	-	7,099,009	9,065,577	93,538,494	3.89%
2021	2,035,398	-	-	-	7,382,969	9,418,367	93,390,354	3.89%
2022	2,106,637	-	-	-	7,678,288	9,784,925	92,929,976	3.89%
2023	2,180,369	-	-	-	7,985,420	10,165,789	92,120,748	3.89%
2024	2,256,682	-	-	-	8,304,837	10,561,519	90,922,695	3.89%
2025	2,335,666	-	-	-	8,637,030	10,972,696	89,292,193	3.89%
2026	2,417,414	-	-	-	8,982,511	11,399,925	87,181,662	3.89%
2027	2,502,023	-	-	-	9,341,812	11,843,835	84,539,235	3.89%
2028	2,589,594	-	-	-	9,715,484	12,305,078	81,308,397	3.89%
2029	2,680,230	-	-	-	10,104,104	12,784,334	77,427,599	3.89%
2030	2,774,038	-	-	-	10,508,267	13,282,305	72,829,834	3.90%
2031	2,871,129	-	-	-	10,928,599	13,799,728	67,442,189	3.90%
2032	2,971,619	-	-	-	11,365,742	14,337,361	61,185,346	3.90%
2033	3,075,626	-	-	-	11,820,373	14,895,999	53,973,061	3.90%
2034	3,183,273	-	-	-	12,293,186	15,476,459	45,711,582	3.90%
2035	3,294,688	-	-	-	12,784,914	16,079,602	36,299,039	3.90%
2036	3,410,002	-	-	-	13,296,311	16,706,313	25,624,765	3.90%
2037	3,529,352	-	-	-	13,828,165	17,357,517	13,568,578	3.90%

Notes: Recommended contributions are assumed to be paid on September 30.
Item (2) increases at 2.5%, 3.0% , then 3.5% thereafter per year..
Item (6) increases at 4.0% per year.
Assumes contribution of budgeted amount for fiscal 2013.

EXHIBIT H

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 are many approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

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.

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 64 beneficiaries in pay status)		433
2.	Participants active during the year ended December 31, 2011 with total accumulated contributions of $22,313,839 and projected payroll of $23,142,683		506
3.	Inactive employees with vested rights to a return of their contributions as of December 31, 2011		51
4.	Inactive employees with vested rights to a deferred or immediate benefit as of December 31, 2011		14

The actuarial factors as of the valuation date are as follows:

1.	Normal cost, including administrative expenses		$3,685,027
2.	Expected employer contributions		-2,161,269
3.	Employer normal cost: (1) + (2)		$1,523,758
4.	Actuarial accrued liability		152,051,654
	Retired participants and beneficiaries	$87,827,430	
	Inactive participants	986,190	
	Active participants	63,238,034	
5.	Actuarial value of assets ($65,619,370 at market value)		67,318,567
6.	Unfunded actuarial accrued liability		84,733,087

The determination of the recommended contribution projected to July 1, 2012 is as follows:

1.	Projected employer normal cost, adjusted for timing	$1,568,362
2.	Projected unfunded actuarial accrued liability	88,006,233
3.	Payment on projected unfunded actuarial accrued liability (25-year (4% increasing)), adjusted for timing	5,349,797
4.	Preliminary contribution: (1) + (3)	$6,918,159
5.	Budgeted appropriation based on 2010 actuarial valuation	$6,793,146
7.	Total budgeted appropriation as a percentage of payroll: (5) ÷ (6)	29.06%
6.	Projected payroll	$23,372,964

Note: Recommended contributions are assumed to be paid on September 30.

EXHIBIT II

Supplementary Information Required by the GASB – Schedule of Employer Contributions

Plan Year Ended December 31	Annual Required Contributions	Actual Contributions	Percentage Contributed
2007	$5,512,525	$5,512,525	100.0%
2008	5,808,066	5,808,066	100.0%
2009	6,067,057	6,067,057	100.0%
2010	6,292,539	6,292,539	100.0%
2011	6,543,097	6,534,097	100.0%

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)
01/01/2003	$46,649,000	$99,649,000	$52,977,000	46.82%	$20,985,000	252.45%
01/01/2004	52,051,000	105,752,000	53,701,000	49.22%	20,532,000	261.55%
01/01/2006	58,165,000	117,403,000	59,238,000	49.54%	20,903,000	283.39%
01/01/2008	71,938,829	128,811,115	56,872,286	55.84%	22,787,184	249.58%
01/01/2010	65,139,502	138,859,148	73,719,646	46.91%	23,227,715	317.38%
01/01/2012	67,318,567	152,051,654	84,733,087	44.27%	23,142,683	366.13%

** Not less than zero*

EXHIBIT IV

Supplementary Information Required by the GASB

Valuation date	January 1, 2012
Actuarial cost method	Entry Age Normal Cost Method
Amortization method	Level dollar for the 2002 and 2003 ERIs and increasing amortization for the remaining unfunded liability.
Remaining amortization period	As of July 1, 2012, 6 years remaining on 2002 and 2003 ERIs and 25 years for remaining unfunded liability
Asset valuation method	4-year smoothing of investment returns greater (less) than expected.
Actuarial assumptions:	
Investment rate of return	7.875%
Projected salary increases	3.0% in 2012, 3.5% in 2013, 4.0% in 2014 and 4.5% for 2015 and later
Cost of living adjustments	3.00% for the first $14,000 of retirement income
Plan membership:	
Retired participants and beneficiaries receiving benefits	433
Terminated participants entitled to a return of their employee contributions	51
Terminated participants with a vested right to a deferred or immediate benefit	14
Active participants	506
Total	1,004

EXHIBIT V

Actuarial Assumptions and Actuarial Cost Method

Mortality Rates:

Pre-Retirement — RP-2000 Employee Mortality Table projected 12 years using Scale AA (previously, RP-2000 Employee Mortality Table)

Healthy Retiree: — RP-2000 Healthy Annuitant Mortality Table projected 12 years using Scale AA (previously, RP-2000 Healthy Annuitant Mortality Table)

Disabled Retiree: — RP-2000 Healthy Annuitant Mortality Table set forward 5 years, projected 12 years using Scale AA (previously, RP-2000 Healthy Annuitant Mortality Table set forward 5 years)

These mortality tables were determined to contain provision appropriate to reasonably reflect future mortality improvement, based on a review of mortality experience as of the measurement date.

Termination Rates before Retirement:

Groups 1 and 2 - Rate (%)

	Mortality		Disability	Withdrawal
Age	Male	Female		
20	0.03	0.02	0.03	37.51
25	0.03	0.02	0.04	28.23
30	0.04	0.02	0.06	17.35
35	0.07	0.04	0.08	10.07
40	0.10	0.06	0.12	7.21
45	0.13	0.09	0.18	5.68
50	0.17	0.14	0.31	4.57
55	0.24	0.23	0.50	- -
60	0.40	0.37	0.61	- -

Notes: *55% of the disability rates shown represent accidental disability.*
20% of the accidental disabilities will die from the same cause as the disability.
55% of the death rates shown represent accidental death.

	Group 4 - Rate (%)			
	Mortality		Disability	Withdrawal
Age	Male	Female		
20	0.03	0.02	0.10	3.15
25	0.03	0.02	0.12	2.85
30	0.04	0.02	0.18	2.48
35	0.07	0.04	0.26	1.88
40	0.10	0.06	0.38	0.84
45	0.13	0.09	0.58	--
50	0.17	0.14	0.98	--
55	0.24	0.23	1.60	--
60	0.40	0.37	1.97	--

Notes: *90% of the disability rates shown represent accidental disability.*
60% of the accidental disabilities will die from the same cause as the disability.
90% of the death rates shown represent accidental death.

Retirement Rates:

	Rate per year (%)	
Age	Groups 1 and 2	Group 4
50 – 54	--	2.0
55	10.0	5.0
56 - 58	3.0	5.0
59	5.0	5.0
60 - 61	5.0	10.0
62 - 64	10.0	20.0
65	100.0	100.0

Unknown Data for Participants: Same as those exhibited by participants with similar known characteristics.

Age of Spouse: Females three years younger than their spouses

Percent Married: 75%

Benefit Election: All participants are assumed to elect Option A.

Net Investment Return: 7.875%

Salary Increases:

Year	Annual increase rate (%)	(Previously) Year	(Previously) Annual increase rate (%)
2012	3.00	2012	4.00
2013	3.50	2013 and later	4.50
2014	4.00		
2015 and later	4.50		

Includes allowance for inflation of 2.0% in 2012, 2.50% in 2013, 3.00% in 2014 and 3.50% in 2015 and later.

Interest on Employee Contributions: 2%

2011 Salary: 2011 salaries are equal to salaries provided in the data, except for employees hired in 2011, whose salaries were annualized. Salaries were also adjusted to reflect the following:

- The calendar year 2011 payroll was reduced by 0.75% for Police department to reflect retroactive pay amounts effective July 1, 2010 but paid in 2011.
- Calendar year 2011 payroll was increased by 2.5% for Fire department to reflect newly settled contracts.
- Calendar year 2011 payroll was increased 0.5% for School department to reflect newly settled contracts.
- Calendar year 2011 payroll was increased 1.0% for all other departments to reflect newly settled contracts.

Total Service: Total creditable service reported in the data.

Administrative Expenses: $275,000 for calendar year 2012 (previously, $275,000 for calendar year 2010).

Cost of Living Increases: 3.00% on first $14,000 of retirement allowance.

Actuarial Value of Assets: Market value of assets (adjusted by payables and receivables) adjusted to phase in investment gains or losses above or below the expected rate of investment return on an actuarial basis over a four-year rolling period. The phase-in is 25% for year one, 50% for year two, 75% for year three and 100% for year four. The actuarial value of assets may be no less than 90% or more than 110% of the market value of assets.

Actuarial Cost Method: Entry Age Normal Actuarial Cost Method. Entry Age is attained age of the participant less Total Service. Normal Cost and Actuarial Accrued Liability are calculated on an individual bases and are allocated by salary.

Changes in Assumptions: This valuation reflects the following changes in assumptions:

- The administrative expense assumption was reset to $275,000 for the 2012 calendar year, increasing by the inflation assumption thereafter.
- The salary scale assumption was changed from 4.0% in 2012 and 4.5% in 2013 and later to 3.0% in 2012, 3.5% in 2013, 4.0% in 2014 and 4.5% in 2015 and later.
- The pre-retirement mortality table was changed from the RP-2000 Employee Mortality Table to the RP-2000 Employee Mortality Table projected 12 years with Scale AA.
- The healthy retiree mortality table was changed from the RP-2000 Healthy Annuitant Mortality Table to the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA.
- The mortality table for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward 5 years to the RP-2000 Healthy Annuitant Mortality Table set forward 5 years projected 12 years using Scale AA.

EXHIBIT VI
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

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 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 $15 per year of creditable service, not exceeding $300. The veteran allowance is paid in addition to the 80 percent maximum.

Employee Contributions

Date of Hire	Contribution Rate
Prior to January 1, 1975	5%
January 1, 1975 – December 31, 1983	7%
January 1, 1984 – June 30, 1996	8%
July 1, 1996 onward	9%

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 or her job due to a non-occupational disability will receive a retirement allowance if he or she 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 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 or her 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 or her 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 death, a spouse's benefit will be paid equal to the amount the employee would have received under Option C. 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 $250 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 be 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, permanent member of a police department, or certain employees of a county correctional facility 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 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 the time of death any contributions not expended for annuity payments will be refunded to the beneficiary. Option C allows the member to take a lesser retirement allowance in exchange for providing a survivor with two-thirds of the lesser amount. Option C pensioners will have 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. The Board adopted an increase in the COLA base from $12,000 to $14,000 effective July 1, 2011, as per Section 19 of Chapter 188. Cost-of-living increases granted prior to July 1, 1998 are reimbursed by the Commonwealth and not reflected in this report.
Changes in Plan Provisions	There have been no changes since the prior valuation.