

# City of Worcester Retirement System

Actuarial Valuation and Review as of  
January 1, 2013

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*May 8, 2013*

*City of Worcester Retirement System  
City Hall, Room 103, 455 Main Street  
Worcester, MA 01608*

*Dear Board Members:*

*We are pleased to submit this Actuarial Valuation and Review as of January 1, 2013. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2014 and later years and analyzes the preceding year's 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 Worcester 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 for the City of Worcester Retirement System

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### Purpose

This report has been prepared by The Segal Company to present a valuation of the City of Worcester Retirement System as of January 1, 2013. 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, 2013;
- The assets of the Plan as of December 31, 2012;
- 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, 2013 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 year ended 2012, the market value rate of return was 14.10%, compared to the assumed rate of return of 8.00%. Because the actuarial value of assets gradually recognizes market value fluctuations over a five-year period, the actuarial rate of return was 1.80%. The actuarial value of assets as of December 31, 2012 was \$707.0 million, or 96.9% of the market value of assets of \$729.5 million reported in the Annual Statement. As of December 31, 2011, the actuarial value of assets was 108.6% of the market value.
3. As indicated in Section 2, Subsection B of this report, the total unrecognized investment gain as of December 31, 2012 is \$22,516,641. This investment gain 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 losses derived from future experience. This implies that earning the assumed rate of return on a **market value** basis will result in investment gains on the actuarial value of assets in the next few years. A projection of the market value and actuarial value of assets indicates that gains will be recognized for three of the next four years. These gains are reflected in the projected unfunded actuarial accrued liability (UAAL) shown in the funding schedule in Section 3, Exhibit G.

## SECTION 1: Valuation Summary for the City of Worcester Retirement System

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4. The unfunded liability has increased from \$339.1 million as of January 1, 2012 to \$410.5 million as of January 1, 2013. The unfunded liability was expected to increase to \$339.9 million. The greater than expected increase of \$70.6 million is primarily due to an investment loss on an actuarial basis of \$43.6 million. Other sources of gains and losses are discussed in Section 2C. There were also changes in liability due to the assumption and plan provision changes described below.
5. This valuation reflects the following changes in assumptions:
  - The investment return assumption was decreased from 8.00% to 7.75%.
  - The salary scale assumption was lowered from 4.75% to 4.50%.
  - The administrative expense assumption was lowered from \$600,000 for calendar 2012 to \$575,000 for calendar 2013, based on the projected 2013 budget.
  - The pre-retirement mortality assumption was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA to the RP-2000 Employee Mortality Table projected 20 years using Scale AA.
  - The mortality assumption for non-disabled retirees was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 15 years using Scale AA.
  - The mortality assumption for disabled retirees was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA with a 5-year set forward to the RP-2000 Healthy Annuitant Mortality Table projected 5 years using Scale AA with a 3-year set forward for males.

Changing these assumptions resulted in a net increase in the unfunded liability of \$27,020,760 and a net increase in the employer normal cost of \$364,177.

6. Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

## SECTION 1: Valuation Summary for the City of Worcester Retirement System

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7. The recommended contribution for fiscal 2014 is the previously budgeted amount of \$38,148,683. The fiscal 2015 contribution is equal to the fiscal 2014 appropriation increased by 8%, or \$41,200,578. The funding schedule amortizes the 2002 ERI in level dollar amounts through fiscal 2018 (five payments remaining), the 2010 ERI in level dollar amounts through fiscal 2021 (eight payments remaining), and the Section 90 ACD liability in level dollar amounts through fiscal 2014 (one payment remaining). Beginning in fiscal 2016, the payment on the remaining unfunded liability is 4% greater than the prior year's payment. This results in a funding schedule that fully funds the System by June 30, 2032 (19 payments remaining). In the prior funding schedule, the System was fully funded by June 30, 2035.
8. The funded ratio has decreased from 67.74% as of January 1, 2012 to 63.27% as of January 1, 2013 on an actuarial value basis. On a market value basis, the funded ratio has increased from 62.41% to 65.28%.

**SECTION 1: Valuation Summary for the City of Worcester Retirement System**

**Summary of Key Valuation Results**

	<b>2013</b>	<b>2012</b>
<b>Contributions for fiscal year beginning July 1:</b>		
Recommended for fiscal 2014 and fiscal 2013	\$38,148,683	\$35,322,855
Recommended for fiscal 2015 and fiscal 2014	41,200,578	38,148,683
<b>Funding elements for plan year beginning January 1:</b>		
Normal cost, including administrative expenses	\$24,481,163	\$23,720,313
Market value of assets	729,467,335	656,001,767
Actuarial value of assets	706,950,694	712,110,360
Actuarial accrued liability	1,117,438,564	1,051,190,790
Unfunded actuarial accrued liability	410,487,870	339,080,430
<b>GASB 25/27:</b>		
Annual required contributions (ARC)	\$38,148,683	\$35,409,140
Actual contributions	--	35,409,140
Percentage of ARC contributed	--	100.00%
Funded ratio (using actuarial value of assets)	63.27%	67.74%
Funded ratio (using market value of assets)	65.28%	62.41%
<b>Demographic data for plan year beginning January 1:</b>		
Number of retired participants and beneficiaries	2,754	2,776
Number of inactive participants entitled to a return of their employee contributions	654	692
Number of inactive participants with a vested right to a deferred or immediate benefit	66	67
Number of active participants	3,260	3,178
Total payroll*	\$159,328,270	\$152,705,056
Average payroll*	48,874	48,051

\* Payroll figures are for the prior calendar year and reflect annualized salaries for participants hired during the year.

**SECTION 2: Valuation Results for the City of Worcester 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 ten valuations can be seen in this chart.*

**CHART 1**  
**Participant Population: 2003 – 2012**

<b>Year Ended December 31</b>	<b>Active Participants</b>	<b>Inactive Participants</b>	<b>Retired Participants and Beneficiaries</b>	<b>Ratio of Non-Actives to Actives</b>
2003	3,409	1,102	2,996	1.20
2004	3,498	1,017	2,964	1.14
2005	3,430	1,007	2,919	1.14
2006	3,397	1,072	2,864	1.16
2007	3,299	898	2,849	1.14
2008	3,352	910	2,792	1.10
2009	3,262	770	2,774	1.09
2010	3,208	753	2,798	1.11
2011	3,178	759	2,776	1.11
2012	3,260	720	2,754	1.07

**SECTION 2: Valuation Results for the City of Worcester 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 3,260 active participants with an average age of 47.1, average years of service of 14.0 years and average payroll of \$48,874. The 3,178 active participants in the prior valuation had an average age of 47.3, average service of 14.2 years and average payroll of \$48,051.

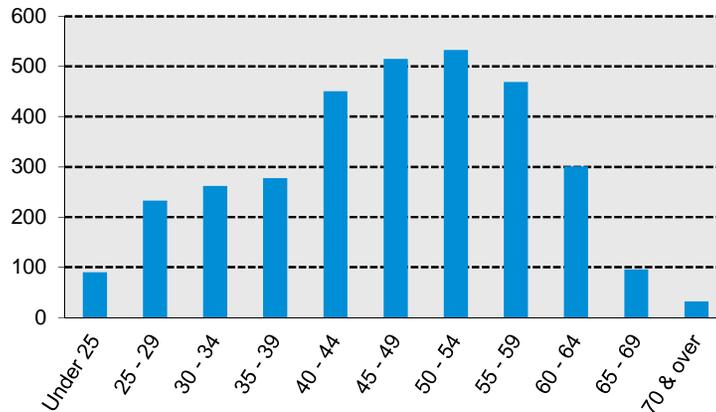
Among the active participants, there were none with unknown age and/or service information.

**Inactive Participants**

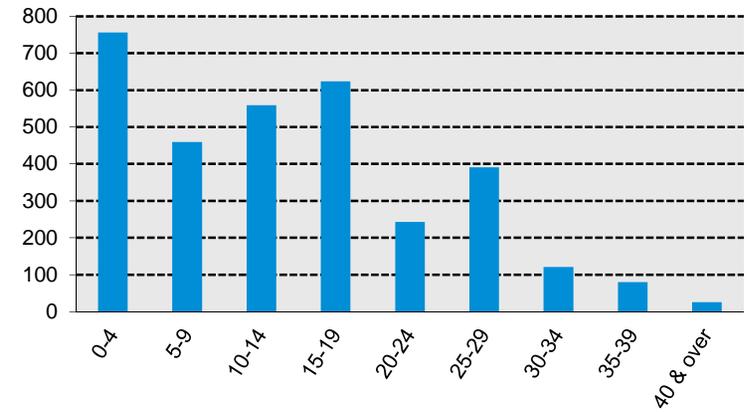
In this year's valuation, there were 66 participants with a vested right to a deferred or immediate vested benefit and 654 participants entitled to a return of their employee contributions.

*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, 2012**



**CHART 3**  
**Distribution of Active Participants by Years of Service as of December 31, 2012**



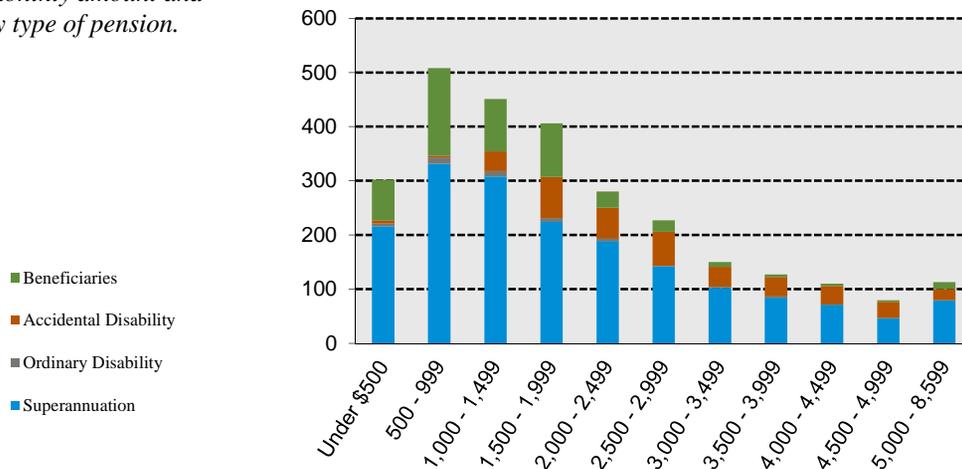
**SECTION 2: Valuation Results for the City of Worcester Retirement System**

**Retired Participants and Beneficiaries**

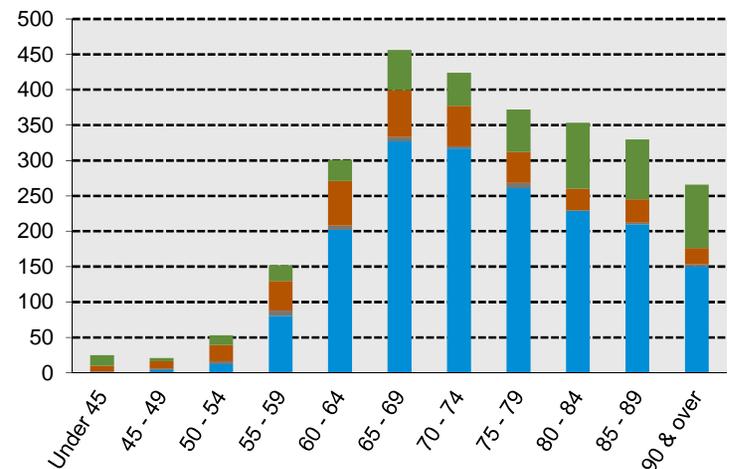
As of December 31, 2012, 2,235 retired participants and 518 beneficiaries were receiving total monthly benefits of \$5,467,200, excluding COLAs reimbursed by the Commonwealth. For comparison, in the previous valuation, there were 2,267 retired participants and 509 beneficiaries receiving monthly benefits of \$5,265,945, excluding COLAs reimbursed by the Commonwealth. There was one retired participant in suspended status this year and in the prior valuation.

*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, 2012**



**CHART 5**  
**Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2012**



**SECTION 2: Valuation Results for the City of Worcester Retirement System**

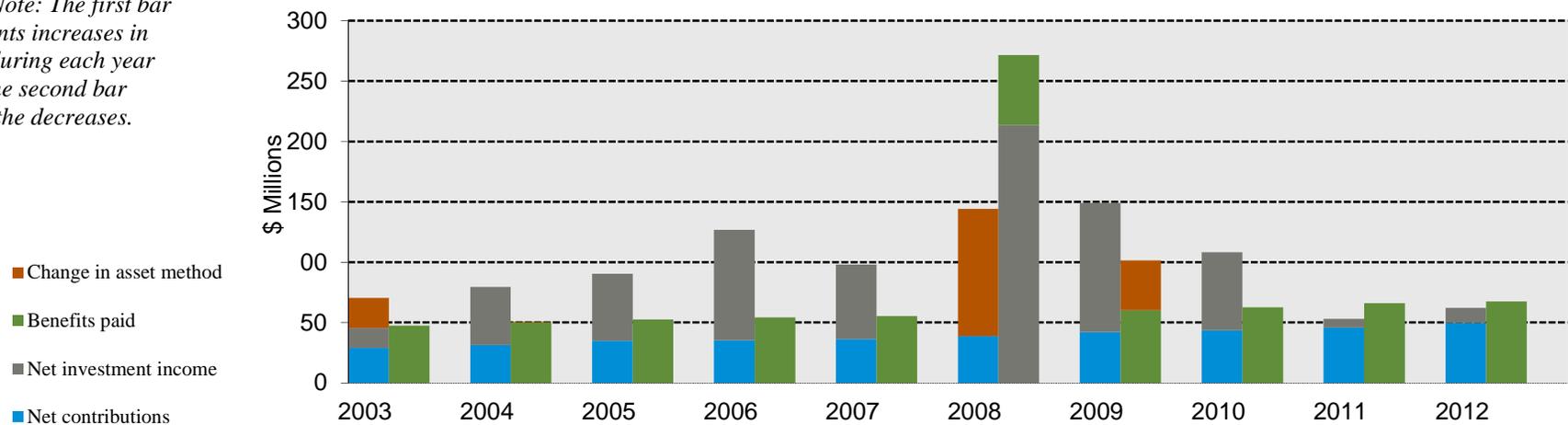
**B. FINANCIAL INFORMATION**

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 ten 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, 2003 – 2012**



**SECTION 2: Valuation Results for the City of Worcester Retirement System**

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 for Year Ended December 31, 2012**

1. Market value of assets, December 31, 2012			\$729,467,335
2. Calculation of unrecognized return*	<u>Original</u> <u>Amount</u>	<u>Unrecognized</u> <u>Return</u>	
(a) Year ended December 31, 2012	\$39,483,589	\$31,586,871	
(b) Year ended December 31, 2011	-59,381,998	-35,629,199	
(c) Year ended December 31, 2010	33,090,580	13,236,232	
(d) Year ended December 31, 2009	66,613,685	13,322,737	
(e) Year ended December 31, 2008	-275,514,085	<u>0</u>	
(f) Total unrecognized return			22,516,641
3. Preliminary actuarial value: (1) - (2f)			706,950,694
4. Adjustment to be within 10% corridor			0
5. Final actuarial value of assets as of December 31, 2012: (3) + (4)			<u>\$706,950,694</u>
6. Actuarial value as a percentage of market value: (5) ÷ (1)			96.9%

\* Unrecognized return is the difference between the total return and the expected return on a market value basis and is recognized over a five-year period.

**SECTION 2: Valuation Results for the City of Worcester Retirement System**

In 2001, the Board approved an asset valuation method that gradually adjusts to market value. A smoothing method was used through 2004.

From 2005 through 2008, the actuarial value of assets was set equal to market value.

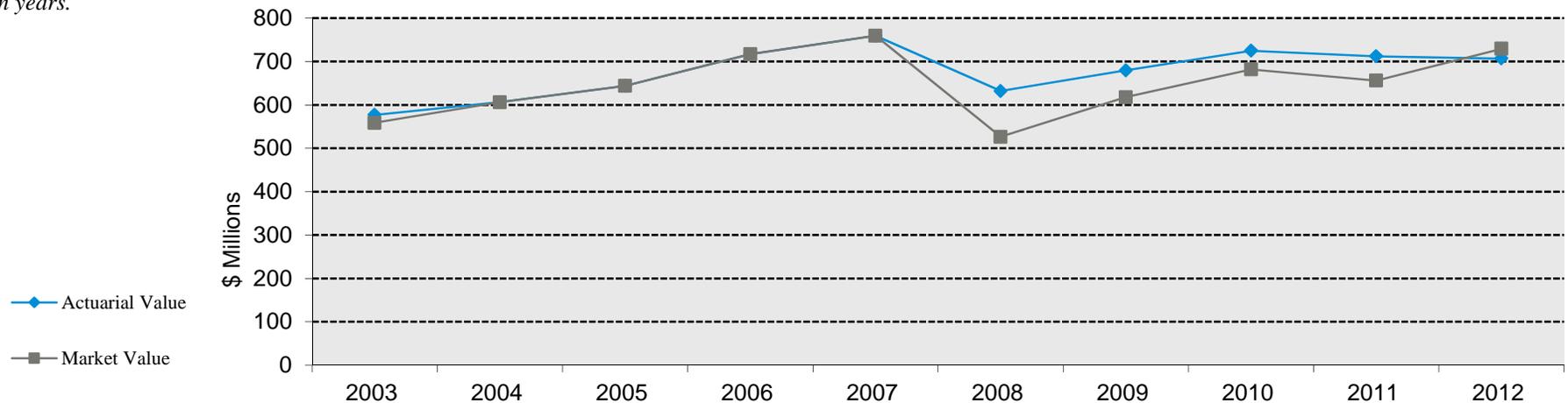
In 2009, the Board approved an asset valuation method that gradually adjusts to market value.

Effective with the 2010 valuation, the corridor around market value was reduced from 20% to 10%.

The actuarial asset value is significant because the Worcester 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 ten years.*

**CHART 8**  
**Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2003 – 2012**



## SECTION 2: Valuation Results for the City of Worcester Retirement System

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### 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 for the year ended December 31, 2012 is \$43,584,470 as shown in Chart 9. A discussion of the major components of the actuarial experience is on the following pages.

*This chart provides a summary of the actuarial experience during the past year.*

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### CHART 9 Actuarial Experience for Year Ended December 31, 2012

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1. Net loss from investments*	-\$43,630,333
2. Net gain from administrative expenses	76,847
3. Net loss from other experience**	<u>-30,984</u>
4. Net experience loss: (1) + (2) + (3)	-\$43,584,470

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\* Details in Chart 10

\*\* Details in Chart 13

**SECTION 2: Valuation Results for the City of Worcester Retirement System**

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**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 Worcester Retirement System’s investment policy. For valuation purposes, the assumed rate of return for 2012 was 8.00%. The actual rate of return on an actuarial basis for the 2012 plan year was 1.80%.

Since the actual return for the year was less than the assumed return, the Worcester Retirement System experienced an actuarial loss during the year ended December 31, 2012 with regard to its investments.

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

**CHART 10**  
**Actuarial Value Investment Experience for Year Ended December 31, 2012**

1. Actual return	\$12,627,028
2. Average value of assets	703,217,013
3. Actual rate of return: (1) ÷ (2)	1.80%
4. Assumed rate of return	8.00%
5. Expected return: (2) x (4)	\$56,257,361
6. Actuarial gain/(loss): (1) – (5)	<u>-\$43,630,333</u>

## SECTION 2: Valuation Results for the City of Worcester 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 14 years, including five-year, ten-year and 14-year averages.

Based upon this experience and future expectations, we have decreased the assumed rate of return from 8.00% to 7.75%.

### CHART 11

#### Investment Return – Actuarial Value vs. Market Value: 1999 - 2012

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
1999	\$101,149,011	19.38%	\$101,149,011	19.38%
2000	35,128,309	5.80	2,494,022	0.41
2001	8,897,926	1.43	-29,978,425	-5.09
2002	-46,582,424	-7.63	-67,436,801	-12.50
2003	41,670,173	7.65	115,476,574	25.52
2004	47,848,351	8.43	66,406,965	12.09
2005	55,470,778	9.29	55,470,778	9.29
2006	91,535,234	14.42	91,535,234	14.42
2007	61,690,401	8.72	61,690,401	8.72
2008	-108,338,166	-14.45	-213,653,832	-28.49
2009	65,765,691	10.56	109,307,722	21.12
2010	64,588,917	9.64	83,265,908	13.69
2011	7,371,682	1.03	-5,640,269	-0.84
2012	<u>12,627,028</u>	1.80	<u>91,252,263</u>	14.10
Total	\$438,822,910		\$461,339,851	
	Five-year average return	1.21%		2.02%
	Ten-year average return	5.22%		7.42%
	14-year average return	4.95%		5.50%

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

2000, 2003, 2004, 2008 and 2009 actuarial value investment returns include a change in asset method.

**SECTION 2: Valuation Results for the City of Worcester Retirement System**

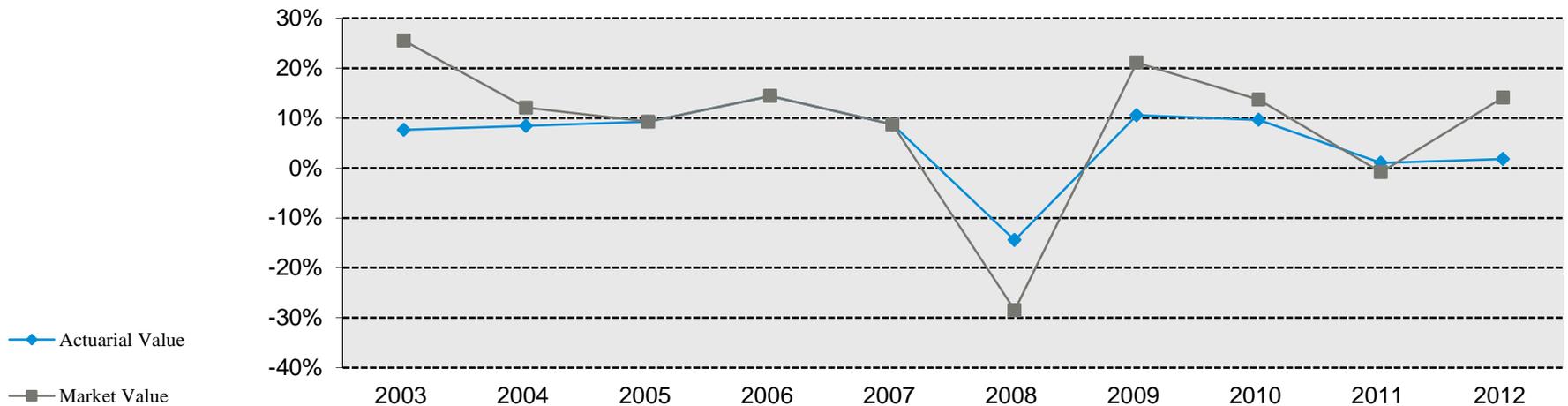
Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

**Administrative Expenses**

Administrative expenses for the year ended December 31, 2012 totaled \$528,845 compared to the assumption of \$600,000, payable at the beginning of the year. This resulted in a gain of \$76,847 for the year. We have changed the assumption to \$575,000 for calendar 2013.

*This chart illustrates how this leveling effect has actually worked over the years 2003 - 2012.*

**CHART 12**  
**Market and Actuarial Rates of Return for Years Ended December 31, 2003 - 2012**



**SECTION 2: Valuation Results for the City of Worcester Retirement System**

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**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 year ended December 31, 2012 amounted to \$30,984.

A brief summary of the demographic gain/(loss) experience of the Worcester Retirement System for the year ended December 31, 2012 is shown in the chart below.

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

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**CHART 13**

**Experience Due to Changes in Demographics for Year Ended December 31, 2012**

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1. Salary increases for continuing actives less than expected	\$7,653,569
2. Change in retiree benefit amounts provided in the data	-3,948,890
3. Fewer deaths than expected amongst retired members and beneficiaries	-834,473
4. Miscellaneous experience loss	<u>-2,901,190</u>
5. Total	<u>-\$30,984</u>

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## SECTION 2: Valuation Results for the City of Worcester Retirement System

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This valuation reflects the following changes in assumptions:

- The investment return assumption was decreased from 8.00% to 7.75%.
- The salary scale assumption was lowered from 4.75% to 4.50%.
- The administrative expense assumption was lowered from \$600,000 for calendar 2012 to \$575,000 for calendar 2013, based on the projected 2013 budget.
- The pre-retirement mortality assumption was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA to the RP-2000 Employee Mortality Table projected 20 years using Scale AA.
- The mortality assumption for non-disabled retirees was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 15 years using Scale AA.
- The mortality assumption for disabled retirees was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA with a 5-year set forward to the RP-2000 Healthy Annuitant Mortality Table projected 5 years using Scale AA with a 3-year set forward for males.

Changing these assumptions resulted in a net increase in the unfunded liability of \$27,020,760 and a net increase in the employer normal cost of \$364,177.

Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

**SECTION 2: Valuation Results for the City of Worcester 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 actuarial accrued liability.

The recommended contribution for fiscal 2014 is the previously budgeted amount of \$38,148,683. The fiscal 2015 contribution is equal to the fiscal 2014 appropriation increased by 8%, or \$41,200,578. The funding schedule amortizes the 2002 ERI in level dollar amounts through fiscal 2018 (five payments remaining), the 2010 ERI in level dollar amounts through fiscal 2021 (eight payments remaining), and the Section 90 ACD liability in level dollar amounts through fiscal 2014 (one payment remaining). Beginning in fiscal 2016, the payment on the remaining

unfunded liability is 4% greater than the prior year's payment. This results in a funding schedule that fully funds the System by June 30, 2032 (19 payments remaining). In the prior funding schedule, the System was fully funded by June 30, 2035.

Exhibit G in Section 3 shows the recommended contributions through fiscal 2032 based on this funding schedule.

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

**CHART 14  
Recommended Contribution**

	Year Beginning January 1			
	2013	% of Payroll	2012	% of Payroll
1. Total normal cost	\$23,906,163	14.39%	\$23,120,313	14.48%
2. Administrative expenses	575,000	0.35%	600,000	0.38%
3. Expected employee contributions	<u>-15,299,200</u>	<u>-9.21%</u>	<u>-14,582,635</u>	<u>-9.13%</u>
4. Employer normal cost: (1) + (2) + (3)	\$9,181,963	5.53%	\$9,137,678	5.72%
5. Actuarial accrued liability	1,117,438,564		1,051,190,790	
6. Actuarial value of assets	<u>706,950,694</u>		<u>712,110,360</u>	
7. Unfunded actuarial accrued liability: (5) - (6)	\$410,487,870		\$339,080,430	
8. Employer normal cost projected to July 1, 2013 and 2012	9,341,265	5.53%	9,307,433	5.72%
9. Projected unfunded actuarial accrued liability	426,097,482		352,382,720	
10. Payment on projected unfunded actuarial accrued liability	28,807,418	17.05%	26,015,422	16.00%
11. Recommended contribution: (8) + (10)	<u>\$38,148,683</u>	<u>22.58%</u>	<u>\$35,322,855</u>	<u>21.72%</u>
12. Projected payroll as of July 1	\$168,976,569		\$162,636,116	

*Note: Recommended contributions are assumed to be paid at the beginning of the fiscal year.*

**SECTION 2: Valuation Results for the City of Worcester 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 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

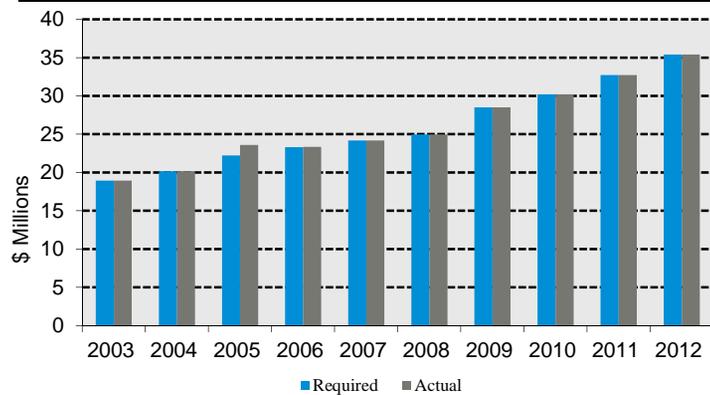
actuarial value of assets to the actuarial accrued liabilities of the Plan as calculated under the GASB Standards. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding 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 (63.27%) and the market value of assets (65.28%).

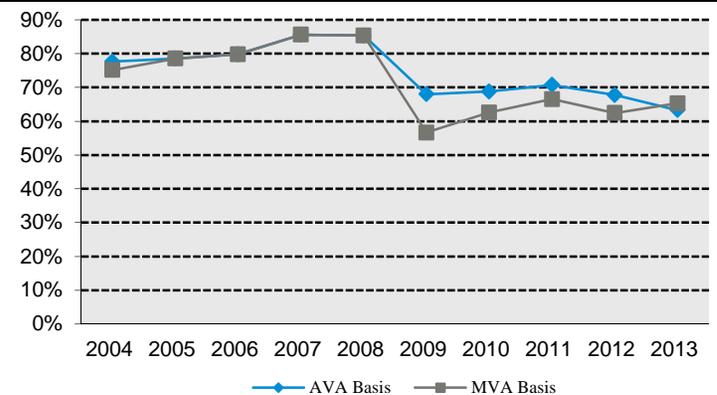
The details regarding the calculations of these values and other GASB numbers may be found in Section 4, Exhibits II, III, and IV.

*These graphs show key GASB factors.*

**CHART 15**  
**Required Versus Actual Contributions**



**CHART 16**  
**Funded Ratio**



**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

**EXHIBIT A**

**Table of Plan Coverage**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2012</b>	<b>2011</b>	
<b>Active participants in valuation:</b>			
Number	3,260	3,178	2.6%
Average age	47.1	47.3	N/A
Average years of service	14.0	14.2	N/A
Total payroll*	\$159,328,270	\$152,705,056	4.3%
Average payroll*	48,874	48,051	1.7%
Member contributions	166,265,474	159,541,719	4.2%
<b>Inactive participants entitled to a return of their employee contributions</b>			
	654	692	-5.5%
<b>Inactive participants with a vested right to deferred or immediate benefit</b>			
	66	67	-1.5%
<b>Retired participants:</b>			
Number in pay status	1,792	1,805	-0.7%
Average age	74.6	74.7	N/A
Average monthly benefit	\$1,975	\$1,882	4.9%
Number in suspended status	1	1	0.0%
<b>Disabled participants:</b>			
Number in pay status	443	462	-4.1%
Average age	69.0	69.0	N/A
Average monthly benefit	\$2,728	\$2,653	2.8%
<b>Beneficiaries in pay status:</b>			
Number in pay status	518	509	1.8%
Average age	77.2	77.2	N/A
Average monthly benefit	\$1,390	\$1,263	10.1%

\* Payroll figures are for the prior calendar year and reflect annualized salaries for participants hired during the year.

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

**EXHIBIT B**

**Participants in Active Service as of December 31, 2012  
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	90	89	1	--	--	--	--	--	--	--
	\$27,447	\$27,184	\$50,894	--	--	--	--	--	--	--
25 - 29	233	191	38	4	--	--	--	--	--	--
	39,619	37,076	52,271	40,882	--	--	--	--	--	--
30 - 34	262	129	98	31	4	--	--	--	--	--
	46,456	39,028	54,876	48,865	61,023	--	--	--	--	--
35 - 39	278	90	72	76	39	1	--	--	--	--
	49,403	31,139	60,072	54,930	61,490	33,606	--	--	--	--
40 - 44	451	79	78	105	145	36	8	--	--	--
	53,422	33,933	46,286	50,454	68,493	59,947	51,874	--	--	--
45 - 49	515	74	57	103	137	62	78	4	--	--
	52,317	33,370	40,874	38,045	62,232	65,821	68,050	77,719	--	--
50 - 54	533	48	46	95	125	53	136	27	3	--
	50,769	34,153	34,349	34,410	45,555	55,737	72,856	67,354	65,472	--
55 - 59	469	38	37	77	94	41	89	63	30	--
	49,572	31,309	40,037	35,908	43,700	41,561	60,931	70,973	70,240	--
60 - 64	301	14	23	49	49	29	61	24	38	14
	50,537	32,901	42,098	35,383	45,526	41,176	51,039	67,207	75,309	74,004
65 - 69	96	4	8	14	24	15	12	2	8	9
	42,948	43,947	49,710	35,119	40,391	41,281	33,908	32,924	53,143	63,487
70 & over	32	--	2	6	6	6	7	1	1	3
	32,521	--	32,328	28,119	39,986	26,449	32,321	53,751	44,963	27,913
Total	3,260	756	460	560	623	243	391	121	80	26
	\$48,874	\$34,330	\$48,201	\$41,960	\$55,123	\$53,097	\$63,429	\$68,870	\$70,443	\$65,045

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

**EXHIBIT C**

**Summary Statement of Income and Expenses on an Actuarial Value Basis**

	Year Ended December 31, 2012	Year Ended December 31, 2011
<b>Net assets at actuarial value at the beginning of the year</b>	\$712,110,360	\$724,997,822
<b>Contribution income:</b>		
Employer contributions	\$35,409,140	\$32,706,347
Employee contributions	14,720,475	13,602,407
Less administrative expenses	<u>-528,845</u>	<u>-569,245</u>
Net contribution income	\$49,600,770	\$45,739,509
<b>Net investment income</b>	<u>12,627,028</u>	<u>7,371,682</u>
<b>Total income available for benefits</b>	\$62,227,798	\$53,111,191
<b>Less benefit payments:</b>		
Pensions	-\$57,227,645	-\$55,937,057
Net 3(8)(c) reimbursements	-1,684,413	-1,639,758
Refunds, annuities, & Option B refunds	-10,106,787	-10,027,040
State reimbursements	1,529,381	1,596,702
Workers' Compensation Settlement	<u>102,000</u>	<u>8,500</u>
Net benefit payments	-\$67,387,464	-\$65,998,653
<b>Change in reserve for future benefits</b>	-\$5,159,666	-\$12,887,462
<b>Net assets at actuarial value at the end of the year</b>	\$706,950,694	\$712,110,360

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

**EXHIBIT D**

**Development of the Fund Through December 31, 2012**

<b>Year Ended December 31</b>	<b>Employer Contributions</b>	<b>Employee Contributions</b>	<b>Net Investment Return*</b>	<b>Administrative Expenses</b>	<b>Benefit Payments</b>	<b>Actuarial Value of Assets at End of Year</b>
2003	\$18,928,252	\$10,333,125	\$41,670,173	\$440,295	\$47,558,278	\$577,123,067
2004	20,150,377	11,692,796	47,848,351	518,078	50,196,897	606,099,616
2005	23,579,478	11,905,078	55,470,778	556,781	52,481,665	644,016,504
2006	23,354,603	12,607,303	91,535,234	621,648	54,095,226	716,796,770
2007	24,166,318	12,829,448	61,690,401	555,774	55,516,831	759,410,332
2008	24,947,158	14,428,460	-108,338,166	554,276	57,999,513	631,893,995
2009	28,505,066	14,190,598	65,765,691	538,983	60,306,394	679,509,973
2010	30,196,905	13,960,465	64,588,917	557,170	62,701,268	724,997,822
2011	32,706,347	13,602,407	7,371,682	569,245	65,998,653	712,110,360
2012	35,409,140	14,720,475	12,627,028	528,845	67,387,464	706,950,694

\* Net of investment expenses. Reflects changes in asset method in 2003, 2004, 2008 and 2009.

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

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**EXHIBIT E**

**Development of Unfunded Actuarial Accrued Liability and (Gain)/Loss for Year Ended December 31, 2012**

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1. Unfunded actuarial accrued liability at beginning of year		\$339,080,430
2. Normal cost at beginning of year		23,720,313
3. Total contributions		-50,129,615
4. Interest		
(a) For whole year on (1) + (2)	\$29,024,059	
(b) For half year on (3)	<u>-1,812,547</u>	
(c) Total interest		<u>27,211,512</u>
5. Expected unfunded actuarial accrued liability		\$339,882,640
6. Changes due to:		
(a) Investment loss	\$43,630,333	
(b) Assumption changes	27,020,760	
(c) Net gain from other experience	<u>-45,863</u>	
(d) Total changes		<u>70,605,230</u>
7. Unfunded actuarial accrued liability at end of year		<u>\$410,487,870</u>

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**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

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**EXHIBIT F**

**Table of Amortization Bases as of July 1, 2013**

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<b>Type</b>	<b>Annual Payment</b>	<b>Rate of Increase</b>	<b>Years Remaining</b>	<b>Outstanding Balance</b>
2002 ERI	\$1,539,574	0.0%	5	\$6,667,344
2010 ERI	551,719	0.0%	8	3,448,894
Section 90 ACD liability	1,113,246	0.0%	1	1,113,246
Remaining unfunded liability	<u>25,602,879</u>	4.0%	19	<u>414,867,998</u>
Total	\$28,807,418			\$426,097,482

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*Notes: Recommended contributions are assumed to be paid at the beginning of the fiscal year.*

*Payment on remaining unfunded liability is \$29,441,076 in fiscal 2015 and will increase 4% per year thereafter.*

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

**EXHIBIT G**

**Funding Schedule**

(1) Fiscal Year Ended June 30	(2) Employer Normal Cost	(3) Amortization of 2002 ERI Liability	(4) Amortization of 2010 ERI Liability	(5) Amortization of Section 90 ACD Liability	(6) Amortization of Remaining Unfunded Liability	(7) Total Plan Cost: (2) + (3) + (4) + (5) + (6)	(8) Total UAAL at the Beginning of the Fiscal Year	(9) Total Plan Cost % Increase
2014	\$9,341,265	\$1,539,574	\$551,719	\$1,113,246	\$25,602,879	\$38,148,683	\$426,097,482	--
2015	9,668,209	1,539,574	551,719	-	29,441,076	41,200,578	410,523,374	8.00%
2016	10,006,596	1,539,574	551,719	-	30,618,719	42,716,608	405,950,242	3.68%
2017	10,356,827	1,539,574	551,719	-	31,843,468	44,291,588	406,868,762	3.69%
2018	10,719,316	1,539,574	551,719	-	33,117,207	45,927,816	393,924,526	3.69%
2019	11,094,492	-	551,719	-	34,441,895	46,088,106	386,516,518	0.35%
2020	11,482,799	-	551,719	-	35,819,571	47,854,089	378,765,929	3.83%
2021	11,884,697	-	551,719	-	37,252,354	49,688,770	368,930,223	3.83%
2022	12,300,661	-	-	-	38,742,448	51,043,109	356,788,432	2.73%
2023	12,731,184	-	-	-	40,292,146	53,023,330	342,694,548	3.88%
2024	13,176,775	-	-	-	41,903,832	55,080,607	325,838,588	3.88%
2025	13,637,962	-	-	-	43,579,985	57,217,947	305,939,700	3.88%
2026	14,115,291	-	-	-	45,323,184	59,438,475	282,692,593	3.88%
2027	14,609,326	-	-	-	47,136,111	61,745,437	255,765,538	3.88%
2028	15,120,652	-	-	-	49,021,555	64,142,207	224,798,208	3.88%
2029	15,649,875	-	-	-	50,982,417	66,632,292	189,399,344	3.88%
2030	16,197,621	-	-	-	53,021,714	69,219,335	149,144,239	3.88%
2031	16,764,538	-	-	-	55,142,583	71,907,121	103,572,021	3.88%
2032	17,351,297	-	-	-	52,182,719	69,534,016	52,182,719	-3.30%

Notes: Assumes payment at beginning of fiscal year.

Normal cost and expenses are assumed to increase at 3.50% per year.

Projected normal cost does not include the future impact of pension reform.

Fiscal 2014 contribution is the budgeted contribution of \$38,148,683.

Fiscal 2015 contribution is the fiscal 2014 contribution increased by 8%.

Item 6 increases 4% per year beginning in fiscal 2016.

Projected unfunded actuarial accrued liability reflects deferred investment gains and losses.

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

**EXHIBIT H**

**Department Allocations of 2002 and 2010 ERI Amortization Payments and Section 90 ACD Amortization Payments**

The total recommended employer contribution for fiscal 2014, excluding the ERI and Section 90 ACD amortizations, is \$34,944,144. This amount will be allocated to each department based on September 30 payroll. The ERI and Section 90 ACD amortizations

are allocated to each department based on actual ERI and Section 90 ACD participants, as shown below.

**Department Allocation of ERI Amortizations**

Department	Allocation of 2002 ERI Amortization	Allocation of 2010 ERI Amortization	Allocation of Section 90 ACD Amortization
Airport	--	\$20,755	--
Auditing	--	20,291	--
Clerk	--	5,476	--
DPW – Other	--	123,205	\$20,747
DPW - Parks	--	11,617	--
DPW – Sewer	\$73,740	32,713	11,320
DPW – Water	97,905	125,042	25,777
Fire	293,661	--	425,551
Health	--	6,621	--
Housing Authority	146,870	--	--
Inspectional Services	--	31,372	--
Library	--	51,200	--
Police	111,651	13,390	365,349
Public Schools	352,181	105,649	49,501
Treasury	--	4,388	--
Other	<u>463,566</u>	<u>--</u>	<u>215,001</u>
Total Fiscal Year 2013 Payment	\$1,539,574	\$551,719	\$1,113,246

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

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**EXHIBIT I**

**Definitions of Pension Terms**

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**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.

**SECTION 3: Supplemental Information for the City of Worcester Retirement System**

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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 City of Worcester Retirement System

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### EXHIBIT I

#### Summary of Actuarial Valuation Results

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

1. Retired participants as of the valuation date (including 518 beneficiaries in pay status and one retired participant in suspended status)	2,754
2. Participants active during the year ended December 31, 2012 with total accumulated contributions of \$166,265,474 and projected 2013 payroll of \$166,094,906	3,260
3. Inactive participants with a vested right to a return of their employee contributions as of December 31, 2012	654
4. Inactive participants with a vested right to a deferred or immediate benefit as of December 31, 2012	66

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The actuarial factors as of January 1, 2013 are as follows:

1. Normal cost, including administrative expenses	\$24,481,163
2. Expected employer contributions	<u>-15,299,200</u>
3. Employer normal cost: (1) + (2)	\$9,181,963
4. Actuarial accrued liability	1,117,438,564
Retired participants and beneficiaries	\$620,756,055
Active participants	487,390,911
Inactive participants	9,291,598
5. Actuarial value of assets (\$729,467,335 at market value as reported in the draft Annual Statement)	706,950,694
6. Unfunded actuarial accrued liability: (4) – (5)	410,487,870

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The determination of the recommended contribution is as follows:

1. Employer normal cost projected to July 1, 2013	\$9,341,265
2. Projected unfunded actuarial accrued liability as of July 1, 2013	426,097,482
3. Payment on projected unfunded actuarial accrued liability (final payment in fiscal 2032) as of July 1, 2013	28,807,418
4. Recommended fiscal 2014 contribution: (1) + (3)	38,148,683
5. Projected payroll as of July 1, 2013	168,976,569
6. Total recommended contribution as a percentage of projected payroll: (4) ÷ (5)	22.58%

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*Note: Recommended contributions are assumed to be paid at the beginning of the fiscal year.*

**SECTION 4: Reporting Information for the City of Worcester Retirement System**

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**EXHIBIT II**

**Supplementary Information Required by the GASB – Schedule of Employer Contributions**

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<b>Plan Year Ended December 31</b>	<b>Annual Required Contributions</b>	<b>Actual Contributions</b>	<b>Percentage Contributed</b>
2003	\$18,928,252	\$18,928,252	100.0%
2004	20,150,377	20,150,377	100.0%
2005	22,228,892	23,579,478	106.1%
2006	23,316,836	23,354,603	100.2%
2007	24,166,318	24,166,318	100.0%
2008	24,947,158	24,947,158	100.0%
2009	28,505,066	28,505,066	100.0%
2010	30,196,905	30,196,905	100.0%
2011	32,706,347	32,706,347	100.0%
2012	35,409,140	35,409,140	100.0%

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**SECTION 4: Reporting Information for the City of Worcester Retirement System**

**EXHIBIT III**

**Supplementary Information Required by the GASB – Schedule of Funding Progress**

<b>Actuarial Valuation Date</b>	<b>Actuarial Value of Assets (a)</b>	<b>Actuarial Accrued Liability (AAL) (b)</b>	<b>Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)</b>	<b>Funded Ratio (a) / (b)</b>	<b>Projected Payroll as of January 1 (c)</b>	<b>UAAL as a Percentage of Projected Payroll [(b) - (a)] / (c)</b>
01/01/2004	\$577,123,067	\$743,570,440	\$166,447,373	77.62%	\$138,796,895	119.92%
01/01/2005	606,099,616	771,948,311	165,848,695	78.52%	147,126,606	112.73%
01/01/2006	644,016,504	806,957,464	162,940,960	79.81%	145,830,593	111.73%
01/01/2007	716,796,770	837,608,233	120,811,463	85.58%	152,838,201	79.05%
01/01/2008	759,410,332	889,924,310	130,513,978	85.33%	156,585,326	83.35%
01/01/2009	631,893,995	929,569,464	297,675,469	67.98%	166,050,095	179.27%
01/01/2010	679,509,973	987,692,295	308,182,322	68.80%	166,392,075	185.21%
01/01/2011	724,997,822	1,025,075,423	300,077,601	70.73%	157,720,871	190.26%
01/01/2012	712,110,360	1,051,190,790	339,080,430	67.74%	159,669,859	212.36%
01/01/2013	706,950,694	1,117,438,564	410,487,870	63.27%	166,094,906	247.14%

## SECTION 4: Reporting Information for the City of Worcester Retirement System

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### EXHIBIT IV

#### Supplementary Information Required by the GASB

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<b>Valuation date</b>	January 1, 2013
<b>Actuarial cost method</b>	Entry Age Normal Cost Method
<b>Amortization method</b>	Level payments on the 2002 and 2010 ERI liability and the Section 90 ACD liability; payment on the remaining unfunded liability increases 4% per year beginning with fiscal 2016 payment. Prior to fiscal 2016, the appropriations for fiscal 2014 and 2015 are 8% higher than the prior fiscal year; the payment on the remaining unfunded liability for fiscal 2015 is 14.99% higher than the prior year.
<b>Remaining amortization period</b>	5 years for the 2002 ERI liability 8 years for the 2010 ERI liability 1 year for the Section 90 ACD liability and 19 years for the remaining unfunded liability
<b>Asset valuation method</b>	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual and expected return on a market value basis, and is recognized over a five-year period, further adjusted, if necessary, to be within 10% of the market value.
<b>Actuarial assumptions:</b>	
Investment rate of return	7.75% (previously, 8.00%)
Projected salary increases	4.50% (previously, 4.75%)
Cost of living adjustments	3.00% of first \$13,000 of retirement income
<b>Plan membership:</b>	
Retired participants and beneficiaries receiving benefits	2,754
Inactive participants entitled to a return of their employee contributions	654
Inactive participants with a vested right to a deferred or immediate benefit	66
Active participants	<u>3,260</u>
Total	6,734

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## SECTION 4: Reporting Information for the City of Worcester Retirement System

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### EXHIBIT V

#### Actuarial Assumptions and Actuarial Cost Method

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##### **Mortality Rates:**

<i>Pre-retirement:</i>	RP-2000 Employee Mortality Table projected 20 years using Scale AA (previously, RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA)
<i>Healthy Retiree:</i>	RP-2000 Healthy Annuitant Mortality Table projected 15 years using Scale AA (previously, RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA)
<i>Disabled Retiree:</i>	RP-2000 Healthy Annuitant Mortality Table projected 5 years using Scale AA, set forward 3 years for males (previously, RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA, set forward 5 years)

The RP-2000 Employee Mortality Table projected 20 years using Scale AA and the RP-2000 Healthy Annuitant Mortality Table projected 15 years using Scale AA were determined to contain provision appropriate to reasonably reflect future mortality improvement, based on a review of mortality experience as of the measurement date.

**SECTION 4: Reporting Information for the City of Worcester Retirement System**

**Termination Rates before Retirement:**

Age	Rate (%)			
	Mortality		Groups 1 and 2	
	Male	Female	Disability	Withdrawal
20	0.02	0.01	0.01	12.00
25	0.03	0.02	0.03	8.78
30	0.04	0.02	0.04	5.55
35	0.07	0.04	0.07	3.93
40	0.09	0.05	0.13	2.31
45	0.12	0.08	0.18	1.89
50	0.15	0.12	0.24	1.46
55	0.21	0.22	0.30	0.00
60	0.35	0.36	0.35	0.00

*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.*

Age	Mortality		Group 4	
	Male	Female	Disability	Withdrawal
20	0.02	0.01	0.13	2.10
25	0.03	0.02	0.25	1.88
30	0.04	0.02	0.38	1.65
35	0.07	0.04	0.38	1.11
40	0.09	0.05	0.38	0.56
45	0.12	0.08	1.25	0.28
50	0.15	0.12	1.56	0.00
55	0.21	0.22	1.50	0.00
60	0.35	0.36	1.06	0.00

*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.*

**SECTION 4: Reporting Information for the City of Worcester Retirement System**

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**Retirement Rates:**

Age	Rate (%)	
	Groups 1 and 2	Group 4
50	3.0	5.0
51-54	1.0	1.0
55	2.0	16.0
56	2.0	9.0
57	3.0	9.0
58	3.0	12.0
59	3.0	11.0
60	8.0	24.0
61	7.0	14.0
62	15.0	20.0
63	11.0	13.0
64	10.0	19.0
65	36.0	100.00
66	22.0	
67	22.0	
68	22.0	
69	25.0	
70	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:** 80%

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

**SECTION 4: Reporting Information for the City of Worcester Retirement System**

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<b>Net Investment Return:</b>	7.75% (previously, 8.00%)
<b>Salary Increases:</b>	4.50% with allowance for inflation of 3.50% (previously, 4.75% with allowance for inflation of 3.75%)
<b>Interest on Employee Contributions:</b>	3.50%
<b>Administrative Expenses:</b>	\$575,000 for calendar 2013, increasing 3.50% per year (previously, \$600,000 for calendar 2012 increasing 3.75% per year)
<b>2012 Salary:</b>	2012 salary equal to salaries provided in the data, except for new hires where salaries were calculated from annualized contributions divided by the contribution rate(s) reported.
<b>Total Service:</b>	Total creditable service based on adjusted date of hire.
<b>Net 3(8)(c) Liability:</b>	Estimated liability of \$15.0 million based on the average annual net 3(8)(c) benefits of the prior two years. (Previously, estimated liability of \$15.3 million)
<b>Actuarial Value of Assets:</b>	Market value of assets as reported in the System's Annual Statement 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.
<b>Actuarial Cost Method:</b>	Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant less Total Service as defined above. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. Normal Cost is determined using the plan of benefits applicable to each participant. (Previously, Normal Cost determined as if the current plan of benefits had always been in effect.)

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## SECTION 4: Reporting Information for the City of Worcester Retirement System

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### Changes in Assumptions:

This valuation reflects the following changes in assumptions:

- The investment return assumption was decreased from 8.00% to 7.75%.
- The salary scale assumption was lowered from 4.75% to 4.50%.
- The administrative expense assumption was lowered from \$600,000 for calendar 2012 to \$575,000 for calendar 2013, based on the projected 2013 budget.
- The pre-retirement mortality assumption was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA to the RP-2000 Employee Mortality Table projected 20 years using Scale AA.
- The mortality assumption for non-disabled retirees was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 15 years using Scale AA.
- The mortality assumption for disabled retirees was changed from the RP-2000 Combined Healthy Mortality Table projected 12 years using Scale AA with a 5-year set forward to the RP-2000 Healthy Annuitant Mortality Table projected 5 years using Scale AA with a 3-year set forward for males.

**SECTION 4: Reporting Information for the City of Worcester Retirement System**

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**EXHIBIT VI**

**Summary of Plan Provisions**

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

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**Plan Year:** January 1 – December 31

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**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.)

For employees hired prior to April 2, 2012, 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:

<b>Age Last Birthday at Date of Retirement</b>			
<b>Percent</b>	<b>Group 1</b>	<b>Group 2</b>	<b>Group 4</b>
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

**SECTION 4: Reporting Information for the City of Worcester Retirement System**

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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.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member’s final five-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 tables based on the age and years of creditable service of the member at retirement:

**For members with less than 30 years of creditable service:**

**Age Last Birthday at Date of Retirement**

<b>Percent</b>	<b>Group 1</b>	<b>Group 2</b>	<b>Group 4</b>
2.50	67 or over	62 or over	57 or over
2.35	66	61	56
2.20	65	60	55
2.05	64	59	54
1.90	63	58	53
1.75	62	57	52
1.60	61	56	51
1.45	60	55	50

**For members with 30 years of creditable service or greater:**

**Age Last Birthday at Date of Retirement**

<b>Percent</b>	<b>Group 1</b>	<b>Group 2</b>	<b>Group 4</b>
2.500	67 or over	62 or over	57 or over
2.375	66	61	56
2.250	65	60	55
2.125	64	59	54
2.000	63	58	53
1.875	62	57	52
1.750	61	56	51
1.625	60	55	50

**SECTION 4: Reporting Information for the City of Worcester Retirement System**

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A member’s final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a)(17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit “spiking” of a member’s salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80 percent of the member’s final 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.

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**Employee Contributions**

<u>Date of Hire</u>	<u>Contribution Rate</u>
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 voluntarily withdraw their contributions with less than 10 ten years of credited service receive 3% interest on their contributions.

Employees in Group 1 hired on or after April 2, 2012 with 30 years of creditable service or greater will pay a base contribution rate of 6%.

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**Retirement Benefits (Superannuation)**

Members of Group 1, 2 or 4 hired prior to April 2, 2012 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

## **SECTION 4: Reporting Information for the City of Worcester Retirement System**

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Members hired prior to April 2, 2012 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).

Members of Group 1 hired April 2, 2012 or later may retire upon the attainment of age 60. Members of Group 2 or 4 hired April 2, 2012 or later may retire upon the attainment of age 55. Members of Group 4 may retire upon attainment of age 50 with ten years of creditable service.

Members hired April 2, 2012 or later who terminate before age 55 (60 for members of Group 1) with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (60 for members of Group 1) provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System.

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### **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 (age 60 for Group 1 members hired on or after April 2, 2012), 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.

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### **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.

## SECTION 4: Reporting Information for the City of Worcester Retirement System

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### 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 by the member at the time of death.

Upon the death of a job-connected disability retiree who retired prior to November 7, 1996 and could not elect an Option C benefit, a surviving spouse will receive an allowance of \$9,000 per year if the member dies for a reason unrelated to cause of disability.

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### "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.

## SECTION 4: Reporting Information for the City of Worcester Retirement System

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### 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 of 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 \$13,000 of a retirement allowance. 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

Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.