

Gloucester Contributory Retirement System

Actuarial Valuation and Review as of
January 1, 2016





116 Huntington Ave., 8th Floor Boston, MA 02116
T 617.424.7300 www.segalco.com

July 21, 2016

*Gloucester Retirement Board
Gloucester Contributory Retirement System
127 Eastern Avenue
Level Two, Suite F
Gloucester, MA 01930*

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2016. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2017 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.


An actuarial valuation is a measurement at a specific date – it is not a prediction of a plan's future financial condition. We have not been retained to perform an analysis of the potential range of financial measurements, except where otherwise noted.

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,

Segal Consulting, a Member of The Segal Group, Inc.

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

8397906v1/13393.004

SECTION 1

VALUATION SUMMARY

| | |
|---|----|
| Purpose | i |
| Significant Issues in Valuation Year..... | i |
| Summary of Key Valuation Results..... | iv |
| Important Information About Actuarial Valuations | v |

SECTION 2

VALUATION RESULTS

| | |
|-------------------------------|----|
| A. Participant Data..... | 1 |
| B. Financial Information..... | 4 |
| C. Actuarial Experience..... | 7 |
| D. Recommended Contribution . | 13 |

SECTION 3

SUPPLEMENTAL INFORMATION

| | |
|--|----|
| EXHIBIT A Table of Plan Coverage..... | 15 |
| EXHIBIT B Participants in Active Service as of December 31, 2015 | 16 |
| EXHIBIT C Summary Statement of Income and Expenses on an Actuarial Value Basis..... | 17 |
| EXHIBIT D Development of the Fund Through December 31, 2015 | 18 |
| EXHIBIT E Table of Amortization Bases | 19 |
| EXHIBIT F Definitions of Pension Terms | 20 |

SECTION 4

REPORTING INFORMATION

| | |
|--|----|
| EXHIBIT I Summary of Actuarial Valuation Results..... | 22 |
| EXHIBIT II Funded Ratio..... | 23 |
| EXHIBIT III Actuarial Assumptions and Actuarial Cost Method..... | 24 |
| EXHIBIT IV Summary of Plan Provisions | 32 |

SECTION 1: Valuation Summary for the Gloucester Contributory Retirement System

Purpose

This report has been prepared by Segal Consulting to present a valuation of the Gloucester Contributory Retirement System as of January 1, 2016. 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 Massachusetts General Law Chapter 32;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries as of January 1, 2016;
- The assets of the System as of December 31, 2015;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

Certain disclosure information required by Governmental Accounting Standards Board Statements (GASB) Numbers 67 and 68 as of December 31, 2015 for the Gloucester Contributory Retirement System, a cost-sharing multiple-employer defined benefit pension plan, is provided in a separate report.

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, 2016 is based on financial information as of that date. Changes in the value of assets subsequent to that date, to the extent that they exist, are not reflected.
2. During the plan years ended 2014 and 2015, the market value rates of return were 7.50% and 0.62%, respectively. Because the actuarial value of assets gradually recognizes market value fluctuations, the actuarial rates of return for the plan years ended 2014 and 2015 were 8.68% and 8.38%, respectively. The actuarial value of assets as of December 31, 2015 was \$90.3 million, or 103.7% of the market value of assets of \$87.0 million (as reported in the Annual Statement). As of December 31, 2013 the actuarial value of assets was 95.3% of market value.

SECTION 1: Valuation Summary for the Gloucester Contributory Retirement System

3. As indicated in Section 2, Subsection B of this report, the total unrecognized investment loss as of December 31, 2015 was \$3,230,987. 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 (net of investment expenses) per year on a market value basis will result in investment losses on the actuarial value of assets in the next few years. The funding schedule shown in Chart 16 of Section 2 does not reflect the deferred investment losses.
4. This valuation reflects the following assumption changes:
 - The investment return assumption was lowered from 7.75% to 7.50%.
 - The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 20 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally from 2009 with Scale BB2D.
 - The healthy retiree mortality assumption was changed from the RP-2000 Healthy Annuitant Mortality Table projected 15 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2009 with Scale BB2D.
 - The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward three years projected five years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 with Scale BB2D.
 - The salary increase assumption was changed from 4.50% per year to 4.00% for 2016 and 4.50% per year thereafter.

Changing these assumptions resulted in a net increase in the unfunded actuarial accrued liability of \$9.9 million and a net increase in the employer normal cost of \$335,000.

5. As of January 1, 2014 the System had an unfunded liability of \$97.5 million. The unfunded liability was expected to increase to \$101.2 million as of January 1, 2016. The actual unfunded liability of \$108.9 million is \$7.7 million higher than expected due to the change in assumptions of \$9.9 million described above, partially offset by a net experience gain of \$2.2 million, which is detailed in Section 2 of this report.

SECTION 1: Valuation Summary for the Gloucester Contributory Retirement System

6. The recommended contribution for fiscal 2017 is equal to the previously budgeted amount of \$8,358,411. The results of this valuation will first be reflected in the fiscal 2018 appropriation. The funding schedule in Section 2, Chart 16 fully funds the Retirement System by June 30, 2034 with appropriations that increase 6.75% per year. The prior funding schedule fully funded the System by June 30, 2034 with appropriations that increased 6.15% per year.
7. The funded ratio has increased from 44.62% as of January 1, 2014 to 45.33% as of January 1, 2016 on an actuarial value basis. On a market value basis, the funded ratio has decreased from 46.82% to 43.70%.

SECTION 1: Valuation Summary for the Gloucester Contributory Retirement System

Summary of Key Valuation Results

| | 2016 | 2014 |
|--|--------------|--------------|
| Contributions for fiscal year beginning July 1: | | |
| Recommended for fiscal 2017 and 2015 | \$8,358,411 | \$7,418,285 |
| Recommended for fiscal 2018 and 2016 | 8,922,604 | 7,874,330 |
| Recommended for fiscal 2019 and 2017 | 9,524,879 | 8,358,411 |
| Funding elements for plan year beginning January 1: | | |
| Total normal cost, including administrative expenses | \$4,865,625 | \$4,331,764 |
| Market value of assets (MVA) | 87,033,411 | 82,469,785 |
| Actuarial value of assets (AVA) | 90,264,398 | 78,582,536 |
| Actuarial accrued liability | 199,142,701 | 176,129,856 |
| Unfunded actuarial accrued liability | 108,878,303 | 97,547,320 |
| Funded ratio based on market value of assets | 43.70% | 46.82% |
| Funded ratio based on actuarial value of assets | 45.33% | 44.62% |
| Demographic data for plan year beginning January 1: | | |
| Number of retired participants and beneficiaries | 463 | 454 |
| Number of inactive participants entitled to a return of their employee contributions | 53 | 52 |
| Number of inactive participants with a vested right to a deferred or immediate benefit | 12 | 12 |
| Number of active participants | 534 | 517 |
| Total payroll | \$27,956,875 | \$24,881,703 |
| Average payroll | 52,354 | 48,127 |

SECTION 1: Valuation Summary for the Gloucester Contributory Retirement System

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by the Gloucester Contributory Retirement System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the market value of assets as of the valuation date, as provided by the Gloucester Contributory Retirement System. The Gloucester Contributory Retirement System uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

SECTION 1: Valuation Summary for the Gloucester Contributory Retirement System

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Gloucester Contributory Retirement System. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Sections of this report may include actuarial results that are not rounded, but that does not imply precision.
- If the Gloucester Contributory Retirement System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Gloucester Contributory Retirement System should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

SECTION 2: Valuation Results for the Gloucester Contributory 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 six valuations can be seen in this chart.

CHART 1
Participant Population: 2005 – 2015

| Year Ended December 31 | Active Participants | Inactive Participants | Retired Participants and Beneficiaries | Ratio of Non-Actives to Actives |
|-------------------------------|----------------------------|------------------------------|---|--|
| 2005 | 539 | 94 | 411 | 0.94 |
| 2007 | 547 | 97 | 408 | 0.92 |
| 2009 | 515 | 83 | 437 | 1.01 |
| 2011 | 506 | 65 | 433 | 0.98 |
| 2013 | 517 | 64 | 454 | 1.00 |
| 2015 | 534 | 65 | 463 | 0.99 |

SECTION 2: Valuation Results for the Gloucester Contributory 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 534 active participants with an average age of 50.5, average years of service of 12.5 years and average payroll of \$52,534. The 517 active participants in the prior valuation had an average age of 50.4, average service of 12.9 years and average payroll of \$48,127.

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

Inactive Participants

In this year's valuation, there were 12 participants with a vested right to a deferred or immediate vested benefit and 53 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, 2015

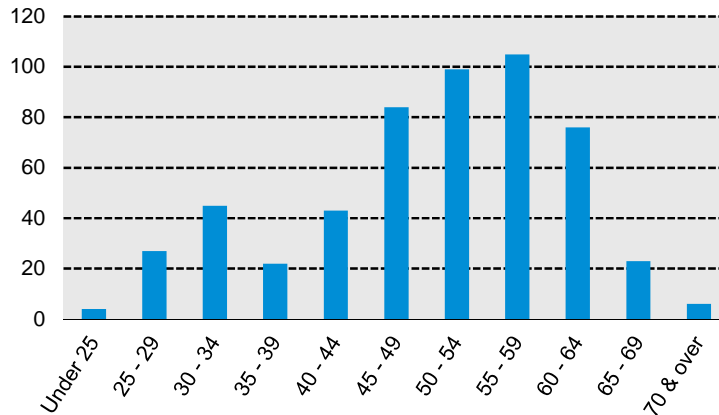
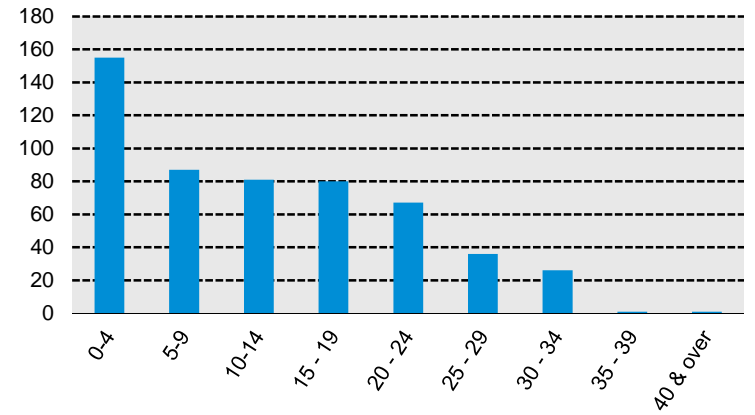


CHART 3
Distribution of Active Participants by Years of Service as of December 31, 2015



SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

Retired Participants and Beneficiaries

As of December 31, 2015, 382 retired participants and 81 beneficiaries were receiving total monthly benefits of \$929,619, excluding COLAs reimbursed by the Commonwealth. For comparison, in the previous valuation, there were 381 retired participants and 73 beneficiaries receiving monthly benefits of \$852,556, excluding COLAs reimbursed by the Commonwealth.

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

- Beneficiaries
- Accidental Disability
- Ordinary Disability
- Superannuation

CHART 4

Distribution of Retired Participants and Beneficiaries by Type and by Monthly Amount as of December 31, 2015

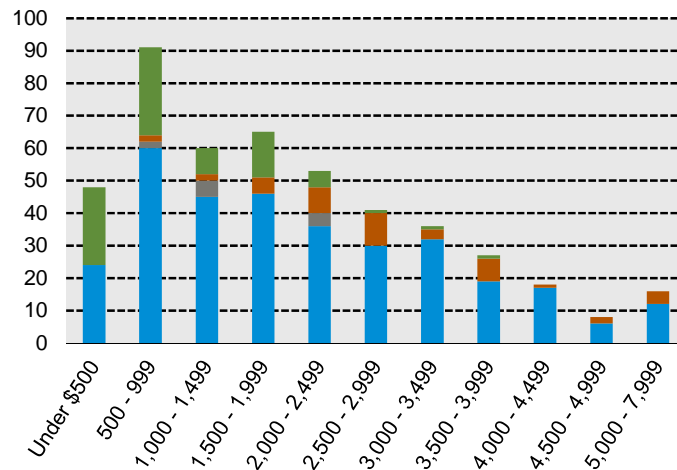
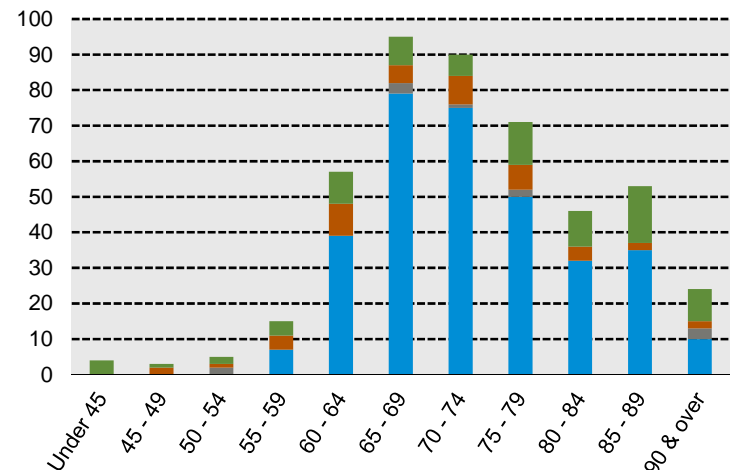


CHART 5

Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2015



SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

B. FINANCIAL INFORMATION

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

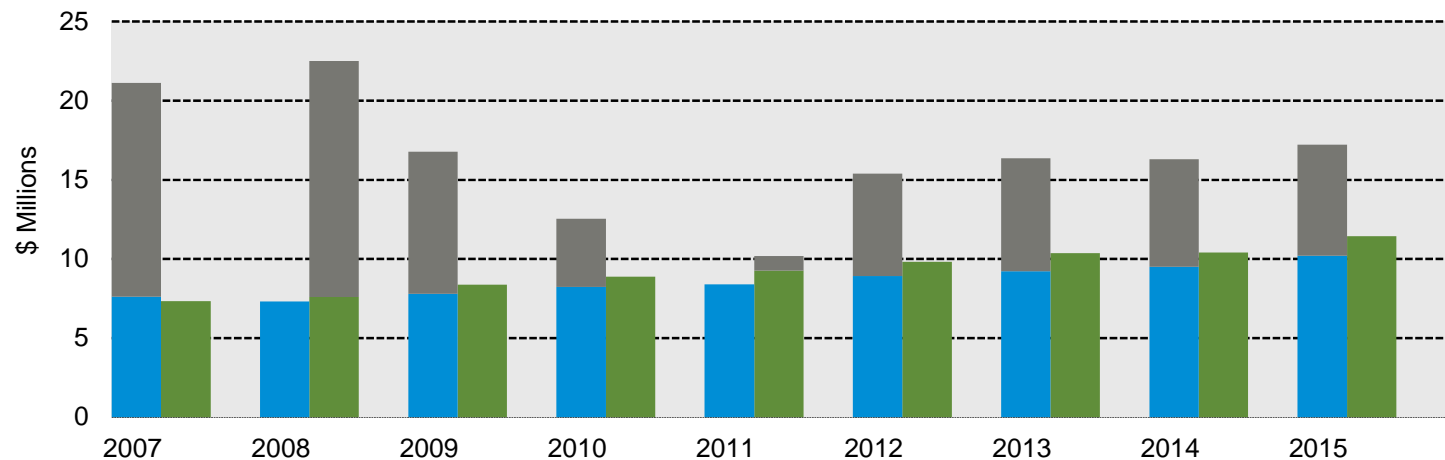
Retirement plan assets change as a result of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits C and D.

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

- Net investment income
- Net contributions
- Benefits paid

CHART 6

Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 2007 – 2015



SECTION 2: Valuation Results for the Gloucester Contributory 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

| | Year Ended | | | |
|---|--------------------|------------------------|---------------------|------------------------|
| | December 31, 2015 | | December 31, 2014 | |
| 1. Market value of assets, December 31, 2015 | | | \$87,033,411 | \$87,718,080 |
| 2. Calculation of unrecognized return* | Original Amount | Unrecognized Return | | Unrecognized Return |
| (a) Year ended December 31, 2015 | -\$5,957,934 | -\$4,468,451 | | N/A |
| (b) Year ended December 31, 2014 | 96,942 | 48,471 | | \$72,707 |
| (c) Year ended December 31, 2013 | 4,755,972 | 1,188,993 | | 2,377,986 |
| (d) Year ended December 31, 2012 | 3,217,384 | 0 | | 804,346 |
| (e) Year ended December 31, 2011 | -5,153,688 | N/A | | 0 |
| (f) Total unrecognized return | | | -3,230,987 | 3,255,039 |
| 3. Preliminary actuarial value: (1) - (2f) | | | 90,264,398 | 84,463,041 |
| 4. Adjustment to be within 10% corridor | | | 0 | 0 |
| 5. Final actuarial value of assets as of December 31, 2015: (3) + (4) | | | <u>\$90,264,398</u> | <u>\$84,463,041</u> |
| 6. Actuarial value as a percentage of market value: (5) ÷ (1) | | | 103.7% | 96.3% |
| 7. Amount deferred for future recognition: (1) - (5) | | | -\$3,230,987 | \$3,255,039 |

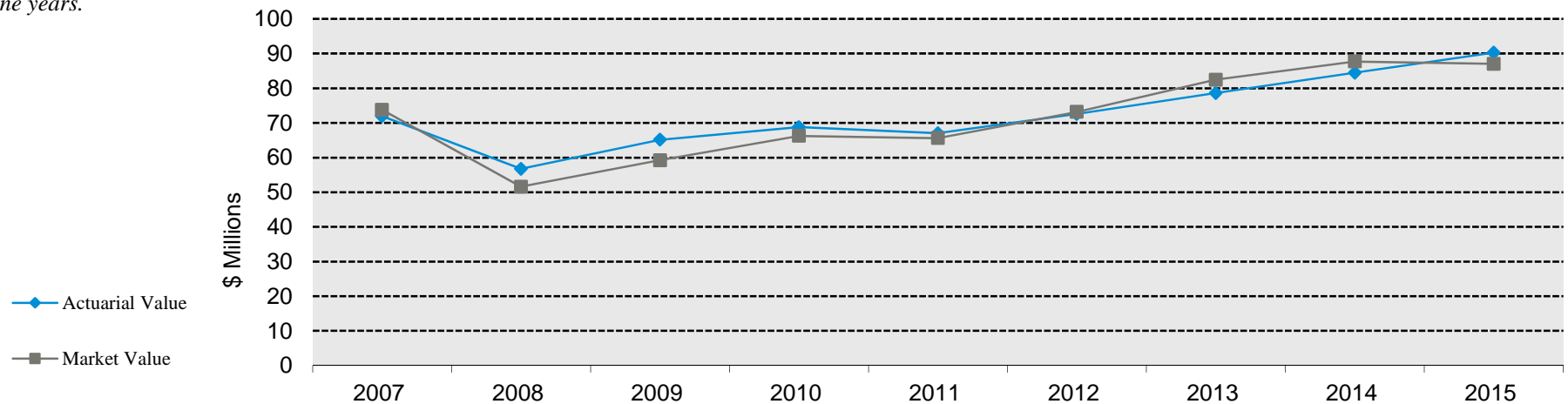
* Unrecognized return is the difference between the actual market return and the expected return on an actuarial basis and is recognized over a four-year period.

SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

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 nine years.

CHART 8
Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2007 – 2015



SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

C. ACTUARIAL EXPERIENCE

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

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

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

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

The net experience gain over the two-year period ending December 31, 2015 is \$2,159,771. 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, 2015

| | |
|--|----------------|
| 1. Net gain from investments* | \$1,313,752 |
| 2. Net gain from administrative expenses | 83,919 |
| 3. Net gain from other experience** | <u>762,100</u> |
| 4. Net experience gain: (1) + (2) + (3) | \$2,159,771 |

* Details in Chart 10

** Details in Chart 13

SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Gloucester Contributory Retirement System’s investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets was 7.75%. The actual rates of return on an actuarial basis for the 2015 and 2014 plan years were 8.38% and 8.68%, respectively.

Since the actual return for each year was greater than the assumed return, the Gloucester Contributory Retirement System experienced an actuarial gain of \$1,313,752 during the two-year period ending December 31, 2015 with regard to its investments, including an adjustment for interest.

This chart shows the gain due to investment experience.

**CHART 10
Actuarial Value Investment Experience**

| | Year Ended | |
|-------------------------------------|-------------------|-------------------|
| | December 31, 2015 | December 31, 2014 |
| 1. Actual return | \$7,026,502 | \$6,784,277 |
| 2. Average value of assets | 83,850,468 | 78,130,650 |
| 3. Actual rate of return: (1) ÷ (2) | 8.38% | 8.68% |
| 4. Assumed rate of return | 7.75% | 7.75% |
| 5. Expected return: (2) x (4) | \$6,498,411 | \$6,055,125 |
| 6. Actuarial gain/(loss): (1) – (5) | <u>528,091</u> | <u>729,152</u> |

SECTION 2: Valuation Results for the Gloucester Contributory 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 nine years, including five-year and nine-year averages.

Based upon this experience and future expectations, we have lowered the assumed rate of return from 7.75% to 7.50%.

CHART 11

Investment Return – Actuarial Value vs. Market Value: 2007 - 2015

| Year Ended December 31 | Actuarial Value Investment Return | | Market Value Investment Return | |
|---------------------------|-----------------------------------|---------|--------------------------------|---------|
| | 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 |
| 2012 | 6,161,831 | 9.21 | 8,459,305 | 12.98 |
| 2013 | 7,138,008 | 9.91 | 10,426,981 | 14.36 |
| 2014 | 6,784,277 | 8.68 | 6,152,067 | 7.50 |
| 2015 | <u>7,026,502</u> | 8.38 | <u>540,477</u> | 0.62 |
| Total | \$38,358,042 | | \$25,324,134 | |
| | Five-year average return | 7.17% | | 6.92% |
| | Nine-year average return | 6.18% | | 4.05% |

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

SECTION 2: Valuation Results for the Gloucester Contributory 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.

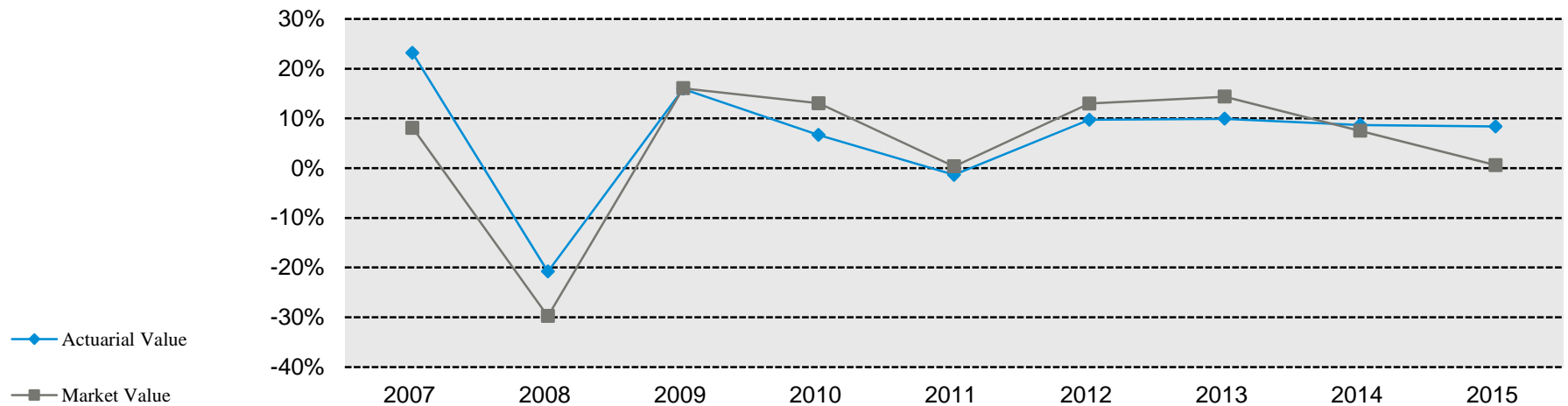
Administrative Expenses

Administrative expenses for the years ended December 31, 2014 and 2015 were \$357,923 and \$345,755, respectively, compared to the assumption of \$385,000 for calendar year 2014 and \$396,550 for calendar year 2015. This resulted in a gain of \$83,919 for the two-year period. Based on past experience, we have reset the administrative assumption to \$385,000 for 2016.

This chart illustrates how this leveling effect has actually worked over the years 2007 - 2015.

CHART 12

Market and Actuarial Rates of Return for Years Ended December 31, 2007 - 2015



SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

Other Experience

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

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements, and
- salary increases different than assumed.

The net gain from this other experience for the two-year period ending December 31, 2015 amounted to \$762,100, which is 0.4% of the actuarial accrued liability.

A brief summary of the demographic gain/(loss) experience of the Gloucester Contributory Retirement System for the two-year period ending December 31, 2015 is shown in the chart below.

This valuation reflects the following changes in actuarial assumptions:

- The investment return assumption was lowered from 7.75% to 7.50%.

- The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 20 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally from 2009 with Scale BB2D.
- The healthy retiree mortality assumption was changed from the RP-2000 Healthy Annuitant Mortality Table projected 15 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2009 with Scale BB2D.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward three years projected five years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 with Scale BB2D.
- The salary increase assumption was changed from 4.50% per year to 4.00% for 2016 and 4.50% per year thereafter.

Changing these assumptions resulted in a net increase in the unfunded actuarial accrued liability of \$9.9 million and a net increase in the employer normal cost of \$335,000.

CHART 13

Experience Due to Changes in Demographics for Two-Year Period Ended December 31, 2015

| | |
|---|-----------------|
| 1. Salary increases less than expected for continuing actives | \$2,068,654 |
| 2. Fewer deaths than expected amongst retired members and beneficiaries | -646,197 |
| 3. Miscellaneous | <u>-660,357</u> |
| 4. Total | \$762,100 |

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

SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

The unfunded liability was expected to increase from \$97.5 million as of January 1, 2014 to \$101.2 million as of January 1, 2016. The actual unfunded liability as of January 1, 2016 of \$108.9 million is \$7.7 million higher than expected as detailed in Chart 14 below.

CHART 14

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

| | Year Ended | |
|--|----------------------|-------------------|
| | December 31, 2015 | December 31, 2015 |
| 1. Unfunded actuarial accrued liability at beginning of year | \$99,558,587 | \$97,547,320 |
| 2. Normal cost at beginning of year, including administrative expenses | 4,461,717 | 4,331,764 |
| 3. Total contributions | -10,549,257 | -9,870,251 |
| 4. Interest | | |
| (a) For whole year on (1) + (2) | \$8,061,574 | \$7,895,629 |
| (b) For half year on (3) | <u>-369,669</u> | <u>-345,875</u> |
| (c) Total interest | <u>7,691,905</u> | <u>7,549,754</u> |
| 5. Expected unfunded actuarial accrued liability | \$101,162,952 | \$99,558,587 |
| 6. Changes due to: | | |
| (a) Net experience gain | -\$2,159,771 | -- |
| (b) Assumption changes | <u>9,875,122</u> | -- |
| (c) Total changes | <u>7,715,351</u> | -- |
| 7. Unfunded actuarial accrued liability at end of year | <u>\$108,878,303</u> | -- |

SECTION 2: Valuation Results for the Gloucester Contributory 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 2017 is equal to the previously budgeted amount of \$8,358,411. The results of this valuation will first be reflected in the fiscal 2018 appropriation. The funding schedule in Chart 16 fully funds the Retirement System by June 30, 2034 with appropriations that increase 6.75% per year. The prior funding schedule fully funded the System by June 30, 2034 with appropriations that increased 6.15% per year.

CHART 15
Recommended Contribution

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

| | Year Beginning January 1 | | | |
|--|--------------------------|---------------|--------------------|---------------|
| | 2016 | | 2014 | |
| | Amount | % of Payroll | Amount | % of Payroll |
| 1. Total normal cost | \$4,480,625 | 15.44% | \$3,946,764 | 14.82% |
| 2. Administrative expenses | 385,000 | 1.33% | 385,000 | 1.45% |
| 3. Expected employee contributions | <u>-2,812,143</u> | <u>-9.69%</u> | <u>-2,537,904</u> | <u>-9.53%</u> |
| 4. Employer normal cost: (1) + (2) + (3) | \$2,053,482 | 7.08% | \$1,793,860 | 6.74% |
| 5. Actuarial accrued liability | 199,142,701 | | 176,129,856 | |
| 6. Actuarial value of assets | <u>90,264,398</u> | | <u>78,582,536</u> | |
| 7. Unfunded actuarial accrued liability: (5) - (6) | \$108,878,303 | | \$97,547,320 | |
| 8. Employer normal cost projected to July 1, 2016 and 2014, adjusted for timing | 2,089,109 | 7.08% | 1,854,861 | 6.86% |
| 9. Projected unfunded actuarial accrued liability | 112,887,428 | | 101,256,750 | |
| 10. Payment on projected unfunded actuarial accrued liability, adjusted for timing | 6,269,302 | 21.24% | 5,563,424 | 20.59% |
| 11. Total recommended contribution: (8) + (10) | <u>\$8,358,411</u> | <u>28.32%</u> | <u>\$7,418,285</u> | <u>27.45%</u> |
| 12. Projected payroll | \$29,515,721 | | \$27,025,587 | |

Notes: Recommended contributions are assumed to be paid on September 30 for 2014 and July 1 for 2016.
Recommended contributions are set equal to the budgeted amount determined with the previous valuation.

SECTION 2: Valuation Results for the Gloucester Contributory Retirement System

CHART 16

Funding Schedule – Fully funded by 2034, with increase in appropriation of 6.75% per year

| (1) Fiscal Year Ended June 30 | (2) Employer Normal Cost | (3) Amortization of 2002 Housing Authority ERI Liability | (4) Amortization of 2003 Housing Authority ERI Liability | (5) Amortization of 2003 City ERI Liability | (6) Amortization of Remaining Unfunded 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 |
|---|--------------------------------|---|---|--|---|--|---|---|
| 2017 | \$2,089,109 | \$3,734 | \$6,397 | \$47,505 | \$6,211,666 | \$8,358,411 | \$112,887,428 | -- |
| 2018 | 2,169,305 | 3,733 | 6,396 | 47,505 | 6,695,665 | 8,922,604 | 114,556,850 | 6.75% |
| 2019 | 2,252,566 | -- | -- | -- | 7,272,313 | 9,524,879 | 115,950,774 | 6.75% |
| 2020 | 2,339,009 | -- | -- | -- | 7,828,800 | 10,167,809 | 116,829,345 | 6.75% |
| 2021 | 2,428,756 | -- | -- | -- | 8,425,380 | 10,854,136 | 117,175,586 | 6.75% |
| 2022 | 2,521,932 | -- | -- | -- | 9,064,858 | 11,586,790 | 116,906,471 | 6.75% |
| 2023 | 2,618,668 | -- | -- | -- | 9,750,230 | 12,368,898 | 115,929,734 | 6.75% |
| 2024 | 2,719,099 | -- | -- | -- | 10,484,700 | 13,203,799 | 114,142,966 | 6.75% |
| 2025 | 2,823,367 | -- | -- | -- | 11,271,689 | 14,095,056 | 111,432,636 | 6.75% |
| 2026 | 2,931,616 | -- | -- | -- | 12,114,856 | 15,046,472 | 107,673,019 | 6.75% |
| 2027 | 3,043,998 | -- | -- | -- | 13,018,111 | 16,062,109 | 102,725,025 | 6.75% |
| 2028 | 3,160,672 | -- | -- | -- | 13,985,629 | 17,146,301 | 96,434,933 | 6.75% |
| 2029 | 3,281,799 | -- | -- | -- | 15,021,877 | 18,303,676 | 88,633,002 | 6.75% |
| 2030 | 3,407,550 | -- | -- | -- | 16,131,624 | 19,539,174 | 79,131,959 | 6.75% |
| 2031 | 3,538,099 | -- | -- | -- | 17,319,970 | 20,858,069 | 67,725,360 | 6.75% |
| 2032 | 3,673,631 | -- | -- | -- | 18,592,357 | 22,265,988 | 54,185,795 | 6.75% |
| 2033 | 3,814,334 | -- | -- | -- | 19,954,609 | 23,768,943 | 38,262,945 | 6.75% |
| 2034 | 3,960,405 | -- | -- | -- | 19,681,462 | 23,641,867 | 19,681,462 | -0.53% |
| 2035 | 4,112,047 | -- | -- | -- | -- | 4,112,047 | -- | -82.61% |

Notes: Fiscal 2017 contribution set at budgeted amount.

Recommended contributions are assumed to be paid on July 1.

Item (2) reflects 3.5% growth in payroll, as well as a 0.15% adjustment to total normal cost to reflect the effects of mortality improvements due to the generational mortality assumption.

Projected normal cost does not reflect the future impact of pension reform for future hires.

Projected unfunded actuarial accrued liability does not reflect deferred investment losses.

SECTION 3: Supplemental Information for the Gloucester Contributory Retirement System

EXHIBIT A

Table of Plan Coverage

| Category | Year Ended December 31 | | Change From Prior Year |
|---|-------------------------------|--------------|-------------------------------|
| | 2015 | 2013 | |
| Active participants in valuation: | | | |
| Number | 534 | 517 | 3.3% |
| Average age | 50.5 | 50.4 | N/A |
| Average years of service | 12.5 | 12.9 | N/A |
| Total payroll | \$27,956,875 | \$24,881,703 | 12.4% |
| Average payroll | 52,354 | 48,127 | 8.8% |
| Member contributions | 25,909,033 | 23,910,939 | 8.4% |
| Total active vested participants | 330 | 333 | -0.9% |
| Inactive participants entitled to a return of their employee contributions | | | |
| | 53 | 52 | 1.9% |
| Inactive participants with a vested right to a deferred or immediate benefit | | | |
| | 12 | 12 | 0.0% |
| Retired participants: | | | |
| Number in pay status | 327 | 321 | 1.9% |
| Average age | 73.3 | 73.0 | N/A |
| Average monthly benefit | \$2,138 | \$1,996 | 7.1% |
| Disabled participants: | | | |
| Number in pay status | 55 | 60 | -8.3% |
| Average age | 70.5 | 69.6 | N/A |
| Average monthly benefit | \$2,697 | \$2,343 | 15.1% |
| Beneficiaries in pay status: | | | |
| Number in pay status | 81 | 73 | 11.0% |
| Average age | 74.5 | 74.0 | N/A |
| Average monthly benefit | \$1,016 | \$978 | 3.9% |

SECTION 3: Supplemental Information for the Gloucester Contributory Retirement System

EXHIBIT B

**Participants in Active Service as of December 31, 2015
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 | 4 | 4 | -- | -- | -- | -- | -- | -- | -- | -- |
| | \$48,759 | \$48,759 | -- | -- | -- | -- | -- | -- | -- | -- |
| 25 - 29 | 27 | 23 | 4 | -- | -- | -- | -- | -- | -- | -- |
| | \$55,842 | \$55,031 | \$60,504 | -- | -- | -- | -- | -- | -- | -- |
| 30 - 34 | 45 | 26 | 12 | 7 | -- | -- | -- | -- | -- | -- |
| | \$58,589 | \$56,408 | \$58,222 | \$67,319 | -- | -- | -- | -- | -- | -- |
| 35 - 39 | 22 | 10 | 3 | 6 | 3 | -- | -- | -- | -- | -- |
| | \$62,024 | \$50,811 | \$65,907 | \$73,084 | \$73,399 | -- | -- | -- | -- | -- |
| 40 - 44 | 43 | 14 | 8 | 7 | 7 | 7 | -- | -- | -- | -- |
| | \$56,234 | \$34,377 | \$58,947 | \$55,507 | \$71,116 | \$82,695 | -- | -- | -- | -- |
| 45 - 49 | 84 | 21 | 22 | 5 | 16 | 17 | 3 | -- | -- | -- |
| | \$52,994 | \$37,780 | \$40,819 | \$37,840 | \$58,073 | \$78,451 | \$102,693 | -- | -- | -- |
| 50 - 54 | 99 | 24 | 15 | 20 | 9 | 13 | 12 | 6 | -- | -- |
| | \$55,742 | \$37,583 | \$44,956 | \$44,279 | \$51,543 | \$87,442 | \$73,870 | \$94,905 | -- | -- |
| 55 - 59 | 105 | 20 | 11 | 20 | 20 | 14 | 9 | 10 | 1 | -- |
| | \$49,778 | \$32,983 | \$31,197 | \$45,667 | \$54,490 | \$47,911 | \$77,278 | \$80,635 | \$48,130 | -- |
| 60 - 64 | 76 | 10 | 8 | 14 | 18 | 9 | 8 | 8 | -- | 1 |
| | \$43,544 | \$23,130 | \$36,149 | \$41,535 | \$47,268 | \$31,328 | \$53,280 | \$72,128 | -- | \$71,345 |
| 65 - 69 | 23 | 2 | 4 | 2 | 6 | 6 | 2 | 1 | -- | -- |
| | \$47,249 | \$43,753 | \$43,705 | \$37,800 | \$50,422 | \$51,580 | \$56,411 | \$423,958 | -- | -- |
| 70 & over | 6 | 1 | -- | -- | 1 | 1 | 2 | 1 | -- | -- |
| | \$40,385 | \$11,500 | -- | -- | \$39,903 | \$40,998 | \$44,008 | \$61,893 | -- | -- |
| Total | 534 | 155 | 87 | 81 | 80 | 67 | 36 | 26 | 1 | 1 |
| | \$52,354 | \$42,594 | \$45,857 | \$48,685 | \$54,926 | \$64,962 | \$69,920 | \$78,410 | \$48,130 | \$71,345 |

SECTION 3: Supplemental Information for the Gloucester Contributory Retirement System

EXHIBIT C

Summary Statement of Income and Expenses on an Actuarial Value Basis

| | Year Ended December 31, 2015 | Year Ended December 31, 2014 |
|---|------------------------------|------------------------------|
| Net assets at actuarial value at the beginning of the year | \$84,463,041 | \$78,582,536 |
| Contribution income: | | |
| Employer contributions | \$7,736,730 | \$7,331,948 |
| Employee contributions | 2,800,037 | 2,510,408 |
| Federal grant reimbursement | 12,490 | 27,895 |
| Less administrative expenses | <u>-345,744</u> | <u>-357,923</u> |
| Net contribution income | 10,203,513 | 9,512,328 |
| Net investment income: | <u>7,026,502</u> | <u>6,784,277</u> |
| Total income available for benefits | \$17,230,015 | \$16,296,605 |
| Less benefit payments: | | |
| Pensions and net transfers | -\$9,369,232 | -\$8,541,001 |
| Net 3(8)(c) reimbursements | -48,015 | -46,190 |
| Refunds, annuities, & Option B refunds | <u>-2,011,411</u> | <u>-1,828,909</u> |
| Net benefit payments | -\$11,428,658 | -\$10,416,100 |
| Change in reserve for future benefits | \$5,801,357 | \$5,880,505 |
| Net assets at actuarial value at the end of the year | \$90,264,398 | \$84,463,041 |

SECTION 3: Supplemental Information for the Gloucester Contributory Retirement System

EXHIBIT D

Development of the Fund Through December 31, 2015

| 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 | 4,312,600 | 282,917 | 8,887,311 | 68,795,694 |
| 2011 | 6,543,097 | 2,100,878 | 14,490 | -933,855 | 253,431 | 9,253,139 | 67,013,734 |
| 2012 | 6,793,146 | 2,407,524 | 42,526 | 6,161,832 | 318,689 | 9,823,825 | 72,581,081 |
| 2013 | 7,098,838 | 2,424,594 | 30,327 | 7,138,008 | 328,980 | 10,361,332 | 78,582,536 |
| 2014 | 7,331,948 | 2,510,408 | 27,895 | 6,784,277 | 357,923 | 10,416,099 | 84,463,041 |
| 2015 | 7,736,730 | 2,800,037 | 12,490 | 7,026,502 | 345,744 | 11,428,659 | 90,264,398 |

* Net of investment fees

SECTION 3: Supplemental Information for the Gloucester Contributory Retirement System

EXHIBIT E

Table of Amortization Bases

| Type | Annual Payment | Years Remaining | Outstanding Balance |
|------------------------------|-----------------------|------------------------|----------------------------|
| 2002 ERI – HA | \$3,734 | 2 | \$7,207 |
| 2003 ERI – HA | 6,397 | 2 | 12,347 |
| 2003 ERI - City | 47,505 | 2 | 91,696 |
| Remaining unfunded liability | <u>6,211,666</u> | 18 | <u>112,776,178</u> |
| Total | \$6,269,302 | | \$112,887,428 |

Notes: Payments assumed to be made on July 1.

Payment on remaining unfunded liability reflects adjustment to set fiscal 2017 appropriation to budgeted amount.

SECTION 3: Supplemental Information for the Gloucester Contributory Retirement System

EXHIBIT F

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) Withdrawal 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 value of all projected benefit payments for current members less the portion that will be paid by future normal costs.

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 Gloucester Contributory Retirement System

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 Gloucester Contributory Retirement System

EXHIBIT I

Summary of Actuarial Valuation Results

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

| | |
|--|-----|
| 1. Retired participants as of the valuation date (including 81 beneficiaries in pay status) | 463 |
| 2. Participants active during the year ended December 31, 2015 with total accumulated contributions of \$25,909,033 and projected 2016 payroll of \$29,012,371 | 534 |
| 3. Inactive participants with vested rights to a return of their contributions as of December 31, 2015 | 53 |
| 4. Inactive participants with vested rights to a deferred or immediate benefit as of December 31, 2015 | 12 |

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

| | |
|---|-------------------|
| 1. Normal cost, including administrative expenses | \$4,865,625 |
| 2. Expected employee contributions | <u>-2,812,143</u> |
| 3. Employer normal cost: (1) + (2) | \$2,053,482 |
| 4. Actuarial accrued liability | 199,142,701 |
| Retired participants and beneficiaries | \$108,310,362 |
| Active participants | 87,535,735 |
| Inactive participants | 3,296,604 |
| 5. Actuarial value of assets (\$87,033,411 at market value as reported in the Annual Statement) | <u>90,264,398</u> |
| 6. Unfunded actuarial accrued liability: (4) – (5) | \$108,878,303 |

The actuarial factors projected to July 1, 2016 are as follows:

| | |
|---|--------------------|
| 1. Projected employer normal cost | \$2,089,109 |
| 2. Projected unfunded actuarial accrued liability | 112,887,428 |
| 3. Payment on projected unfunded actuarial accrued liability | 6,269,302 |
| 4. Recommended contribution: (1) + (3) | <u>\$8,358,411</u> |
| 5. Projected payroll | \$29,515,721 |
| 6. Total recommended contribution as a percentage of payroll: (4) ÷ (5) | 28.32% |

Notes: Recommended contributions are assumed to be paid on July 1.

Recommended contributions are set equal to budgeted amount determined with the previous valuation.

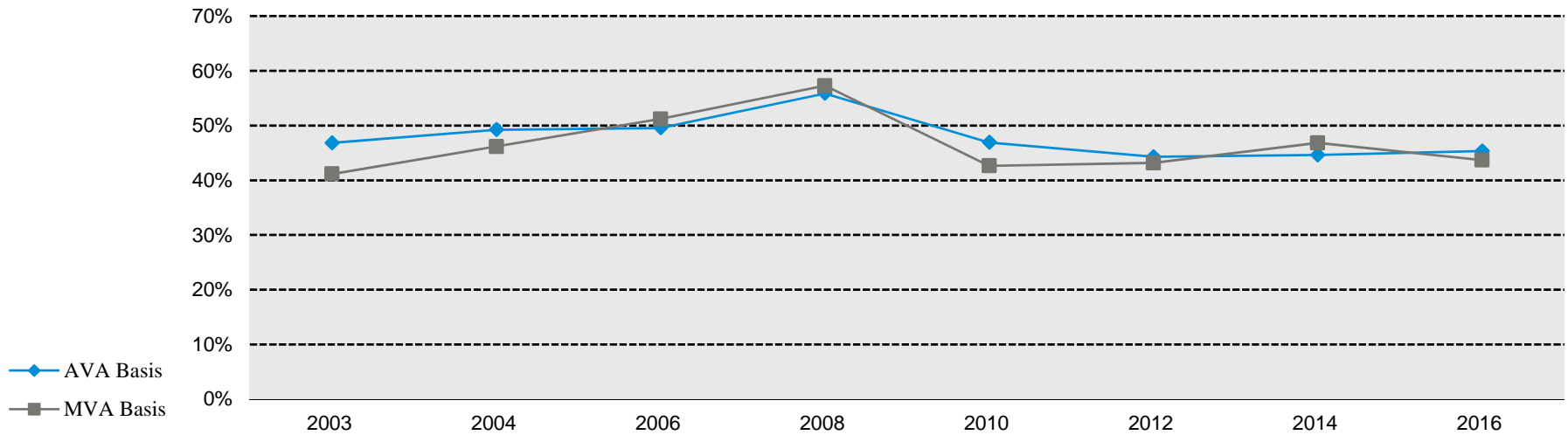
SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

**EXHIBIT II
Funded Ratio**

A 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. 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.

These measurements are not necessarily appropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.

The chart below depicts a history of the funded ratios for this plan. On a market value basis, the funded ratio has decreased from 46.82% as of January 1, 2014 to 43.70% as of January 1, 2016. On an actuarial value basis, the funded ratio has increased from 44.62% as of January 1, 2014 to 45.33% as of January 1, 2016.



SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

EXHIBIT III

Actuarial Assumptions and Actuarial Cost Method

Mortality Rates:

| | |
|--------------------------|---|
| <i>Pre-Retirement:</i> | RP-2000 Employee Mortality Table projected generationally from 2009 with Scale BB2D (Previously, RP-2000 Employee Mortality Table projected 20 years with Scale AA) |
| <i>Healthy Retiree:</i> | RP-2000 Healthy Annuitant Mortality Table projected generationally from 2009 with Scale BB2D (Previously, RP-2000 Healthy Annuitant Mortality Table projected 15 years with Scale AA) |
| <i>Disabled Retiree:</i> | RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 with Scale BB2D (Previously, RP-2000 Healthy Annuitant Mortality Table set forward three years projected five years with Scale AA) |

The underlying tables with generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience of the Plan as of the measurement date based on historical and current demographic data. As part of the analysis, a comparison was made between the actual number of retiree deaths and the projected number based on the prior years' assumptions over the past five years. The mortality tables were then adjusted to future years using the generational projection under Scale BB2D to reflect future mortality improvement between the measurement date and those years.

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

| Termination Rates before Retirement: | Groups 1 and 2 - Rate (%) | | | | | Disability |
|--------------------------------------|---------------------------|----------|---------|----------|------|------------|
| | Mortality | | | | | |
| | Age | Male | | Female | | |
| | Current | Previous | Current | Previous | | |
| 20 | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | |
| 25 | 0.04 | 0.03 | 0.02 | 0.02 | 0.02 | |
| 30 | 0.04 | 0.04 | 0.03 | 0.02 | 0.03 | |
| 35 | 0.08 | 0.07 | 0.05 | 0.04 | 0.06 | |
| 40 | 0.11 | 0.09 | 0.07 | 0.05 | 0.10 | |
| 45 | 0.15 | 0.12 | 0.11 | 0.08 | 0.15 | |
| 50 | 0.21 | 0.15 | 0.17 | 0.12 | 0.19 | |
| 55 | 0.30 | 0.21 | 0.25 | 0.22 | 0.24 | |
| 60 | 0.49 | 0.35 | 0.39 | 0.36 | 0.28 | |

*Notes: Mortality rates do not reflect generational projection.
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.*

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

| Termination Rates before Retirement: | Group 4 - Rate (%) | | | | | Disability |
|--------------------------------------|--------------------|----------|---------|----------|------|------------|
| | Mortality | | | | | |
| | Age | Male | | Female | | |
| | Current | Previous | Current | Previous | | |
| 20 | 0.03 | 0.02 | 0.02 | 0.01 | 0.10 | |
| 25 | 0.04 | 0.03 | 0.02 | 0.02 | 0.20 | |
| 30 | 0.04 | 0.04 | 0.03 | 0.02 | 0.30 | |
| 35 | 0.08 | 0.07 | 0.05 | 0.04 | 0.30 | |
| 40 | 0.11 | 0.09 | 0.07 | 0.05 | 0.30 | |
| 45 | 0.15 | 0.12 | 0.11 | 0.08 | 1.00 | |
| 50 | 0.21 | 0.15 | 0.17 | 0.12 | 1.25 | |
| 55 | 0.30 | 0.21 | 0.25 | 0.22 | 1.20 | |
| 60 | 0.49 | 0.35 | 0.39 | 0.36 | 0.85 | |

*Notes: Mortality rates do not reflect generational projection.
 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 Gloucester Contributory Retirement System

Withdrawal Rates:

| Years of Service | Rate per year (%) | | |
|-------------------------|--------------------------|-------------------------|----------------|
| | Groups 1 and 2 | Years of Service | Group 4 |
| 0 | 15.0 | 0 – 10 | 1.5 |
| 1 | 12.0 | 11+ | 0.0 |
| 2 | 10.0 | | |
| 3 | 9.0 | | |
| 4 | 8.0 | | |
| 5 – 9 | 7.6 | | |
| 10 – 14 | 5.4 | | |
| 15 – 19 | 3.3 | | |
| 20 – 24 | 2.0 | | |
| 25 - 29 | 1.0 | | |
| 30+ | 0.0 | | |

The termination rates and disability rates were based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of terminations and disability retirements and the projected number based on the prior years' assumption over the past five years.

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

| Retirement Rates: | Age | Rate per year (%) | | Group 4 |
|-------------------|---------|-------------------|--------|---------|
| | | Groups 1 and 2 | | |
| | | Male | Female | |
| | 45 – 49 | -- | -- | 1.0 |
| | 50 – 51 | 1.0 | 1.5 | 2.0 |
| | 52 | 1.0 | 2.0 | 2.0 |
| | 53 | 1.0 | 2.5 | 5.0 |
| | 54 | 2.0 | 2.5 | 7.5 |
| | 55 | 2.0 | 5.5 | 15.0 |
| | 56 – 57 | 2.5 | 6.5 | 10.0 |
| | 58 | 5.0 | 6.5 | 10.0 |
| | 59 | 6.5 | 6.5 | 15.0 |
| | 60 | 12.0 | 5.0 | 20.0 |
| | 61 | 20.0 | 13.0 | 20.0 |
| | 62 | 30.0 | 15.0 | 25.0 |
| | 63 | 25.0 | 12.5 | 25.0 |
| | 64 | 22.0 | 18.0 | 30.0 |
| | 65 | 40.0 | 15.0 | 100.0 |
| | 66 - 67 | 25.0 | 20.0 | -- |
| | 68 | 30.0 | 25.0 | -- |
| | 69 | 30.0 | 20.0 | -- |
| | 70 | 100.0 | 100.0 | -- |

The retirement rates were based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior years' assumption over the past five years.

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

| | |
|---|--|
| Retirement Age for Inactive Vested Participants: | <p>55 for participants hired prior to April 2, 2012. For participants hired April 2, 2012 or later, 60 for Group 1, 55 for Group 2 and 50 for Group 4.</p> <p>The retirement age for inactive vested participants was based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment.</p> |
| Unknown Data for Participants: | <p>Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.</p> |
| Family Composition: | <p>75% of participants are assumed to be married. None are assumed to have dependent children. Females are assumed to be three years younger than their spouses.</p> |
| Benefit Election: | <p>All participants are assumed to elect Option A. The benefit election reflects the fact that all benefit options are actuarially equivalent.</p> |
| Net Investment Return: | <p>7.50% (Previously, 7.75%)</p> <p>The net investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.</p> |
| Interest on Employee Contributions: | <p>3.5%</p> |
| Salary Increases: | <p>4.00% for 2016 and 4.50% for 2017 and later, including an allowance for inflation of 3.50% in 2016 and later. (Previously, 4.00% for 2014 and 4.50% for 2015 and later, including an allowance for inflation of 3.00% in 2014 and 3.50% in 2015 and later.)</p> <p>The salary scale assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment.</p> |
| 2015 Salary: | <p>Salary reported in the data, except for employees hired in 2015 for whom salaries were annualized.</p> |
| Net 3(8)(c) Liability: | <p>No liability is valued for benefits paid to or received from other municipal retirement systems.</p> |

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

| | |
|-----------------------------------|---|
| Total Service: | Total creditable service reported in the data. |
| Administrative Expenses: | <p>\$385,000 for calendar 2016 increasing by 3.50% per year (previously, \$385,000 for calendar 2014 increasing by 3.00% in 2014 and 3.50% per year thereafter)</p> <p>The annual administrative expenses were reset to the prior valuation level based on a review of recent experience and anticipated increases.</p> |
| Actuarial Value of Assets: | Market value of assets 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. Market value of assets as reported in the Annual Statement. |
| Actuarial Cost Method: | Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant less total creditable service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. Normal Cost is determined by using the plan of benefits applicable to each participant. |
| Changes in Assumptions: | <p>Based on past experience and future expectations, the following actuarial assumptions were changed:</p> <ul style="list-style-type: none">➤ The investment return assumption was lowered from 7.75% to 7.50%.➤ The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 20 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally from 2009 with Scale BB2D.➤ The healthy retiree mortality assumption was changed from the RP-2000 Healthy Annuitant Mortality Table projected 15 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2009 with Scale BB2D.➤ The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward three years projected five years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 with Scale BB2D. |

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

- The salary increase assumption was changed from 4.50% per year to 4.00% for 2016 and 4.50% per year thereafter.
- The administrative expense assumption was reset to \$385,000 for the 2016 calendar year, increasing by the inflation assumption thereafter.

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

EXHIBIT IV

Summary of Plan Provisions

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

Plan Year: January 1 through 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.)

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:

| 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 |

SECTION 4: Reporting Information for the Gloucester Contributory Retirement System

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

| Percent | Group 1 | Group 2 | Group 4 |
|---------|------------|------------|------------|
| 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

| Percent | Group 1 | Group 2 | Group 4 |
|---------|------------|------------|------------|
| 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 Gloucester Contributory Retirement System

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.

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 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%.

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 Gloucester Contributory Retirement System

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.

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.

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 Gloucester Contributory Retirement System

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.

"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 Gloucester Contributory Retirement System

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 \$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:

None.