State of Rhode Island

Employees' Retirement System
Municipal Employees' Retirement System

Actuarial Audit
as of June 30, 2012

Produced by Cheiron

September 2013

Table of Contents

September 9, 2013

Retirement Board
50 Service Avenue, 2nd Floor
Warwick, Rhode Island 02886-1021

Dear Members of the Retirement Board:

Cheiron is pleased to present the results of our actuarial audit of the June 30, 2012 actuarial valuations and June 30, 2010 experience studies for both the Employees' Retirement System (ERS) and the Municipal Employees' Retirement System (MERS). We direct your attention to the summary section of our report which highlights the key findings of our review of the actuarial valuations. The balance of the report provides details in support of these findings along with supplemental data, background information, and discussion of the process taken in the evaluation of the work performed by the System's actuary.

In performing this audit, Cheiron used actuarial assumptions and methods recommended by the actuary and adopted by the Retirement Board (the Board) based upon the most recent review of the experience of the retirement plans as of June 30, 2010 as well as the assumption changes adopted for the June 30, 2012 valuations.

The results of this audit report reflect a full replication of the June 30, 2012 actuarial valuations, which is dependent upon future experience conforming to these assumptions. It is certain that actual experience will not conform exactly to these assumptions. Actual amounts will differ from projected amounts to the extent actual experience differs from expected experience.

In preparing our report, we relied on information (some oral and some written) supplied by ERSRI and the System's actuary. This information includes, but is not limited to, plan provisions, employee census data, and financial information. A detailed description of all information provided for this audit is included in the body of our report.

While the data was not explicitly audited, we did review the census data for reasonableness and for consistency by performing an informal examination of the obvious characteristics of the data in accordance with Actuarial Standard of Practice No. 23.

We would like to take this opportunity to thank the members of ERSRI and Gabriel, Roeder, Smith & Company (GRS) for their assistance in providing the data and addressing our questions during this audit process.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

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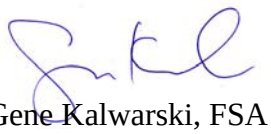
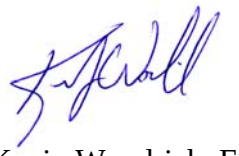
This actuarial audit report was prepared solely for ERSRI for the purposes described herein and is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron



Gene Kalwarski, FSA
Principal Consulting Actuary



Kevin Woodrich, FSA
Principal Consulting Actuary

cc: Frank Karpinski

SECTION I
EXECUTIVE SUMMARY

KEY FINDINGS

The key conclusions regarding our audit of the June 30, 2012 valuations for ERS and MERS were as follows:

- The Board may rely on the results found in the June 30, 2012 actuarial reports for both ERS and MERS. Our liability replication for both ERS and MERS were within acceptable tolerance levels.

- The valuation results have been based on reasonable actuarial methods.

- We identified various technical issues in performing our audit which can be found in detail in Section II. While none of these issues are material by themselves, or collectively, we recommend corrections be made to improve the accuracy of the valuation results.

- The description of actuarial assumptions and plan provisions found in the valuation report were not always complete and for some items incorrect. Had we based our valuation replications on the descriptions stated in the valuation report, our calculations would have been different.

- Our calculated employer contribution rates were very comparable for ERS and within 10% (relative) for 78 of the 113 units of MERS. The reason for the discrepancies for the remaining 35 units is due in part to the leveraging effect. Whereas the difference between the actuarial liabilities calculated by GRS and us may be relatively close to one another as a percentage, the unfunded actuarial liabilities will differ by a greater percentage since the amount of the difference is the same but the denominator is lower. An example of this is shown in the table below:

($ in millions)	Actuary 1	Actuary 2	% Diff
a) Actuarial Liabilities	$102.4	$100.0	2.4%
b) Actuarial Value of Assets	80.0	80.0	0.0%
c) Unfunded Actuarial Liabilities [a. – b.]	$ 22.4	$ 20.0	12.0%

In regards to the Experience Study, our key conclusions were as follows:

- The experience studies performed by GRS and the resulting assumptions adopted by the Board conform to the applicable ASOPs.

- We have found that most of the assumptions suggested by GRS and adopted by the Board are reasonable, but we encourage GRS to revise the demographic assumptions to be more reflective of the changes in the provisions brought about by the Rhode Island Retirement Security Act (RIRSA.)

SECTION I
EXECUTIVE SUMMARY

- We recommend that the Board consider lowering the discount rate further given GRS's long-term investment return expectation

SCOPE OF THE REPORT

Cheiron performed an Actuarial Audit of the State of Rhode Island Employees' Retirement System (ERS) and the Municipal Employees' Retirement System (MERS) that included the following components:

1. Audit of the ERS Actuarial Valuation as of June 30, 2012
2. Audit of the MERS Actuarial Valuation as of June 30, 2012
3. Audit of the ERS Experience Study as of June 30, 2010
4. Audit of the MERS Experience Study as of June 30, 2010

The basic objectives of our review were to answer the following questions:

1. Given the assumptions applied, are the valuation results (benefit flows, liabilities, and actuarial costs) accurate?

2. Are the valuation results based upon reasonable actuarial assumptions and methods, and are they in full compliance with Actuarial Standards of Practice (ASOPs)?

3. Is the actuarial information being provided to ERS and MERS comprehensive? Does the Board have the information required to assess the present and future financial status of the System?

In order to answer these questions, our review included an analysis of the following:

- We collected both the raw member data from ERS and MERS and the processed data GRS used in preparing the June 30, 2012 actuarial valuations. We performed an independent analysis on the raw data to confirm the member information used in the actuarial valuations by GRS was reasonable.

- We reviewed and evaluated the actuarial methods and assumptions displayed in the valuation reports, and reviewed the results and recommendations made in the most recent experience studies for ERS and MERS. Our analysis of the experience studies was based on the provisions in effect at the time they were completed.

- We independently determined the System's liabilities, assets, and costs, and compared them to those presented in the valuation reports by GRS.

- In addition to the assets, liabilities, and costs shown in the valuation reports, we also reviewed the content of the reports for completeness and compliance with the Actuarial Standards of Practice.

SECTION I
EXECUTIVE SUMMARY

RETIREMENT PLAN AUDIT

Cheiron has conducted an independent actuarial audit of GRS's June 30, 2012 actuarial valuations of ERS and MERS. The purpose of this audit was to determine if the actuarial work is correct, reasonable, and comprehensive.

To answer these questions, Cheiron replicated the results from the valuation, assessed the reasonableness of the assumptions and methods, reviewed the information provided in the valuation reports, and developed an interactive projection model to assess the sensitivity of the current and projected results to certain chosen assumptions.

Replication of Valuation Results

This is the most straightforward part of the review process. The actuarial calculations were checked using an independent valuation system to establish that the calculations of liabilities and costs are substantially correct. We can confirm that the liabilities and costs computed in the valuation as of June 30, 2012 are reasonably accurate and were computed in accordance with generally accepted actuarial principles. With respect to member data, we independently collected the data from ERSRI. Although the data we used in our parallel valuation was similar to that used by GRS in their report, there are some minor differences that are described later in this report. We do not believe that these discrepancies have a material impact on the valuation results.

Review of Assumptions and Methods / Experience Study Review

Economic Assumptions

Discount Rate: There has been a significant trend by public sector pension plans to lower their discount rates, consistent with actions taken by ERSRI. The Board lowered the discount rate for ERS and MERS from 8.25% to 7.50% concurrent with the July 1, 2010 actuarial valuations. While this 7.50% discount rate is still in the mainstream of other public plans' discount rates, the Board may want to consider lowering the rate further since GRS's analysis in their Experience Study indicated that there was a 60% chance that the investment return would not achieve 7.50% or higher over a 20-year period.

CPI: The inflation assumption was reduced from 3.00% down to 2.75% as a result of the last Experience Study based on GRS's assessment of recent historical trends and their long-term expectation. This 2.75% is on the low end when compared to the assumption used by its peers.

Salary Increases (excluding merit increases): The assumed total annual growth in payroll is 4.00% for ERS and MERS, with the exception of MERS Police and Fire which assumes 4.25%. These rates include an inflation component of 2.75% and a real pay growth of 1.25% for ERS State Employees, ERS Teachers, and MERS General Employees, and 1.50% for MERS Police and Fire. While we do not find these assumptions to be unreasonable, given the current

significant downward pressure on government costs, we recommend that GRS give more consideration in the future for the expectations for real wage growth.

COLA: As of June 30, 2012, GRS anticipates that the COLA for ERS will be suspended until 2028 due to the current funding level of the plans. Our projection model (State Employees and Teachers only) showed this expectation, and thus the assumption, to be reasonable.

For MERS, GRS currently assumes a COLA of 2%, per annum, for each unit regardless of its funded status. While this is inconsistent with the assumption used in ERS, it is not unreasonable. However, assuming COLAs for all years is a more conservative funding approach, as more COLAs are assumed to be granted than would otherwise be the case if COLAs were only assumed for those years that 80% funding were achieved by the unit. We recommend that GRS explicitly disclose this assumption in the valuation report and the Board should be given the opportunity to provide input on all of the assumptions and methods related to valuing the COLA.

Demographic Assumptions

With respect to the non-economic assumptions (turnover, retirement, mortality, etc.) the assumptions proposed in GRS's experience studies represent a reasonable set of assumptions given the plan provisions in effect at that time and satisfy the requirements of ASOP 35. However, there are some areas where we wish to offer additional comments. Those comments can be found in Section III, Experience Study Review.

We also strongly recommend GRS review the decrement assumptions to make them more reflective of the provisions that are currently in effect as a result of the legislative changes enacted by the RIRSA.

Actuarial Methods

With respect to actuarial methods employed in this valuation, we find that the Entry Age Normal (EAN) is reasonable and produces a stable and predictable contribution pattern, and is by far the most prevalent method used in the public sector. Under GASB Nos. 67 and 68, plans will be required to use EAN for their accounting disclosures.

Five-year asset smoothing is common in the public sector. However, the offsetting of unrecognized gains and losses is not typical. Our analysis shows that this method resulted in a superior smoothed asset value in the wake of market volatility and thus is a reasonable approach.

The funding policy calls for the unfunded actuarial liability to be amortized over a closed 25-year period as of June 30, 2010 as a level percent of pay, with payments increasing by an assumed 3.75% per year. Furthermore, any future gains or losses established on or after June 30, 2015 are to be amortized over a 20-year period. This funding policy seems reasonable since it is aimed at paying down the current unfunded by 2035 rather than shifting too much toward future generations of taxpayers. However, this funding policy needs to be better documented in the valuation reports. The language in the reports currently only discusses the amortization period

applicable to the current unfunded and does not describe the treatment of future unfunded liabilities realized for periods after 2015. This additional description is necessary so that the Board and its participants are aware of the System's long-term funding goals.

Review of Valuation Report

Did the valuation report adequately address and communicate the essential information needed by the Trustees, mandated by GASB, and required by actuaries under the Actuarial Standards of Practice (ASOPs)?

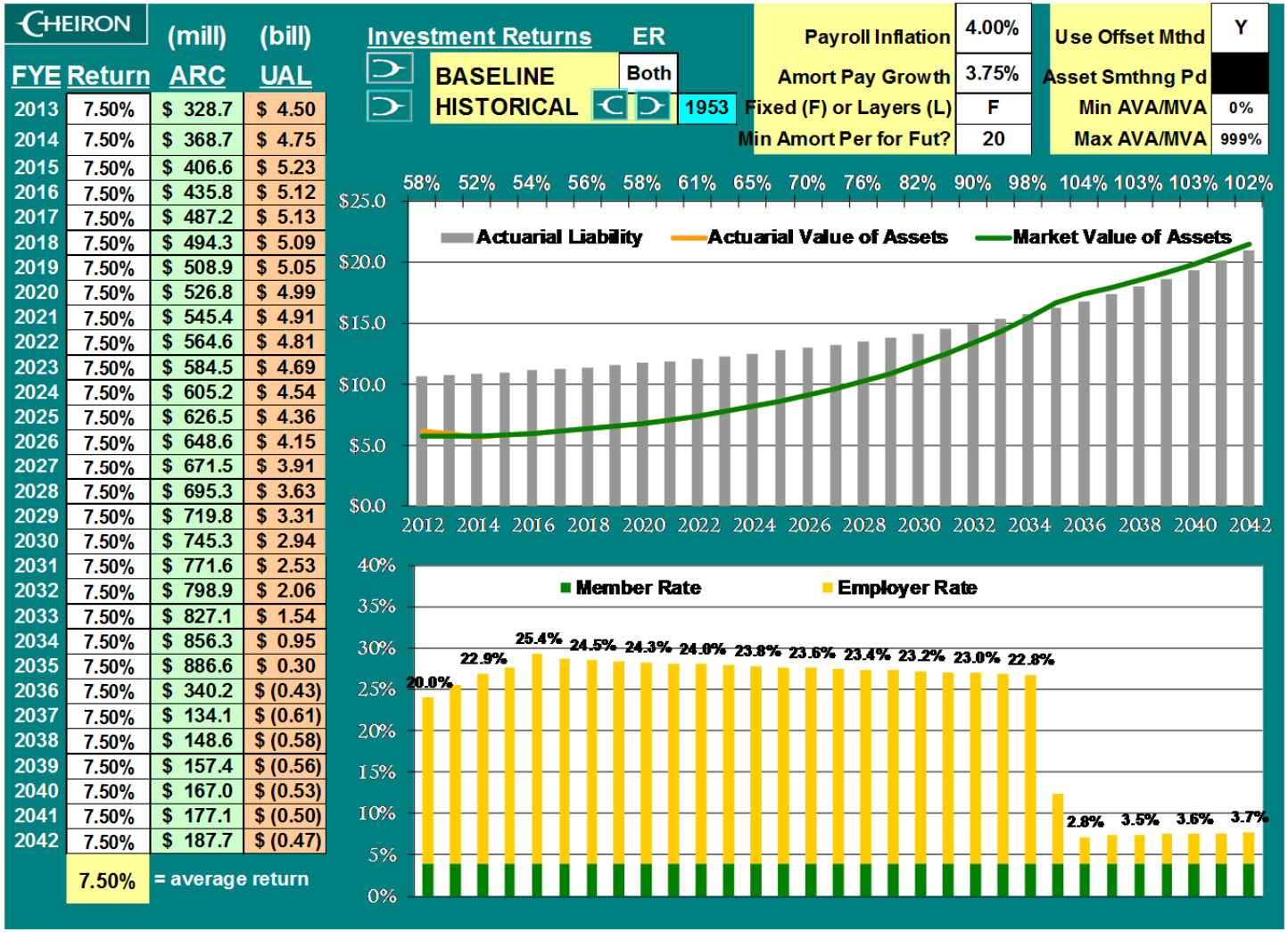
While the valuation report contained most of the essential information required by GASB and the ASOPs, some assumptions were omitted from the valuation reports. We recommend that GRS add this additional information to satisfy ASOP requirements and prevent any issues from arising in the future. A detailed list of these can be found in Section II.

Furthermore, we believe that the interests of the Board, Members, and the Plan Sponsor would be much better served if GRS were to include liability and cost projections in its reports and presentations to the Board. While we understand that GRS has provided projections in a separate PowerPoint, we recommend GRS consider including them in the valuation reports and also feel it would be helpful to supplement these projections with stress testing projections that show the liabilities, cost and funded ratios if the actuarial assumptions are not realized. In addition to the typical testing, we particularly recommend stress testing projections under a range of possible decrement behavior that could occur as a result of the recent reforms under RIRSA.

For instance, on the following pages we show projections of the ERS's assets, liabilities and contributions over the next 30 years; first assuming the Plan will earn the assumed 7.50% annual investment return, and then assuming that the Plan will varying returns that average slightly more than 7.50% over the 30-year period. The dramatic difference in the two sets of projections illustrates the kind of volatility that can be expected in the System's financial results, even if assumptions are met in the long-term.

Note that both sets of projections are intended to be illustrative, rather than prediction of future outcomes.

SECTION I
EXECUTIVE SUMMARY



FYE	Return	(mill) ARC	(bill) UAL
2013	7.50%	$ 328.7	$ 4.50
2014	7.50%	$ 368.7	$ 4.75
2015	7.50%	$ 406.6	$ 5.23
2016	7.50%	$ 435.8	$ 5.12
2017	7.50%	$ 487.2	$ 5.13
2018	7.50%	$ 494.3	$ 5.09
2019	7.50%	$ 508.9	$ 5.05
2020	7.50%	$ 526.8	$ 4.99
2021	7.50%	$ 545.4	$ 4.91
2022	7.50%	$ 564.6	$ 4.81
2023	7.50%	$ 584.5	$ 4.69
2024	7.50%	$ 605.2	$ 4.54
2025	7.50%	$ 626.5	$ 4.36
2026	7.50%	$ 648.6	$ 4.15
2027	7.50%	$ 671.5	$ 3.91
2028	7.50%	$ 695.3	$ 3.63
2029	7.50%	$ 719.8	$ 3.31
2030	7.50%	$ 745.3	$ 2.94
2031	7.50%	$ 771.6	$ 2.53
2032	7.50%	$ 798.9	$ 2.06
2033	7.50%	$ 827.1	$ 1.54
2034	7.50%	$ 856.3	$ 0.95
2035	7.50%	$ 886.6	$ 0.30
2036	7.50%	$ 340.2	$ (0.43)
2037	7.50%	$ 134.1	$ (0.61)
2038	7.50%	$ 148.6	$ (0.58)
2039	7.50%	$ 157.4	$ (0.56)
2040	7.50%	$ 167.0	$ (0.53)
2041	7.50%	$ 177.1	$ (0.50)
2042	7.50%	$ 187.7	$ (0.47)
	7.50%	= average return	

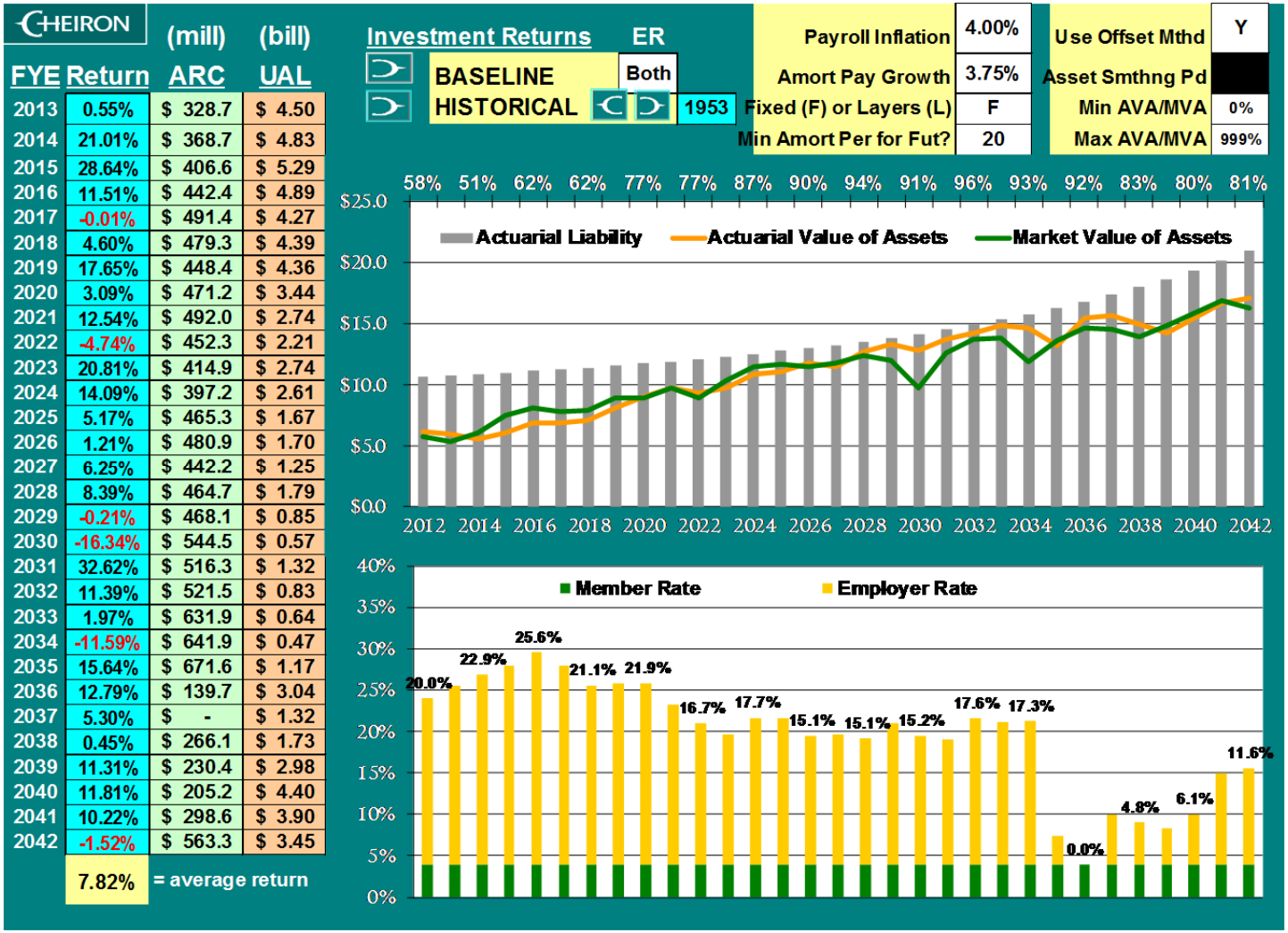
Results are intended to be illustrative and not a prediction of future outcomes. Based on actuarial assumptions in the June 30, 2012 valuation. Future results may differ to the extent that the assumptions are not realized.

SECTION I
EXECUTIVE SUMMARY

FYE	Return	(mill) ARC	(bill) UAL
2013	0.55%	$ 328.7	$ 4.50
2014	21.01%	$ 368.7	$ 4.83
2015	28.64%	$ 406.6	$ 5.29
2016	11.51%	$ 442.4	$ 4.89
2017	-0.01%	$ 491.4	$ 4.27
2018	4.60%	$ 479.3	$ 4.39
2019	17.65%	$ 448.4	$ 4.36
2020	3.09%	$ 471.2	$ 3.44
2021	12.54%	$ 492.0	$ 2.74
2022	-4.74%	$ 452.3	$ 2.21
2023	20.81%	$ 414.9	$ 2.74
2024	14.09%	$ 397.2	$ 2.61
2025	5.17%	$ 465.3	$ 1.67
2026	1.21%	$ 480.9	$ 1.70
2027	6.25%	$ 442.2	$ 1.25
2028	8.39%	$ 464.7	$ 1.79
2029	-0.21%	$ 468.1	$ 0.85
2030	-16.34%	$ 544.5	$ 0.57
2031	32.62%	$ 516.3	$ 1.32
2032	11.39%	$ 521.5	$ 0.83
2033	1.97%	$ 631.9	$ 0.64
2034	-11.59%	$ 641.9	$ 0.47
2035	15.64%	$ 671.6	$ 1.17
2036	12.79%	$ 139.7	$ 3.04
2037	5.30%	$ -	$ 1.32
2038	0.45%	$ 266.1	$ 1.73
2039	11.31%	$ 230.4	$ 2.98
2040	11.81%	$ 205.2	$ 4.40
2041	10.22%	$ 298.6	$ 3.90
2042	-1.52%	$ 563.3	$ 3.45
	7.82%	= average return	

Investment Returns: ER
BASELINE: Both
HISTORICAL: 1953

Payroll Inflation	4.00%
Amort Pay Growth	3.75%
Fixed (F) or Layers (L)	F
Min Amort Per for Fut?	20
Use Offset Mthd	Y
Asset Smthng Pd	
Min AVA/MVA	0%
Max AVA/MVA	999%



Results are intended to be illustrative and not a prediction of future outcomes. Based on actuarial assumptions in the June 30, 2012 valuation. Future results may differ to the extent that the assumptions are not realized.

SECTION II
VALUATION RECONCILIATION

In this section we present detailed results of the replication of the June 30, 2012 actuarial valuations of the Employees' Retirement System of Rhode Island (ERS) and the Municipal Employees' Retirement System of Rhode Island (MERS.) A review of the assumptions and methods used in the valuation can be found in Section III of this report.

Data Review

We first compared the data used in the valuation by taking the raw data from ERSRI and attempting to independently match the processed data that GRS used in its valuation. We found the raw census data from ERSRI to be relatively clean and easy to understand. Although our independent processing resulted in data comparable to what GRS used, we have identified a few issues that should be addressed in future valuations regarding proper documentation:

1. GRS should disclose in their reports that they used prior data to fill in missing data. For example, for those participants which the raw census data provided by ERSRI was missing the frozen service as of September 30, 2009, GRS used data from previous valuations to determine the frozen service as of June 30, 2009 which they then used as a proxy for the frozen service as of September 30, 2009. Similarly, GRS used historical service fields from prior data files to fill in service for members who had no service reported in the ERSRI data. For purposes of replicating liabilities, we relied on these additional fields that GRS developed.

2. In describing how the compensation from the raw census data was adjusted to reflect the fact that some participants received 27 pay periods in the prior fiscal year, the MERS report should be clear that this was only done for those with a last contribution date of June 29 or June 30, 2012. Furthermore, GRS applies a load to the salaries provided for the Cranston Police and Fire units to reflect longevity and holiday pay. It is our understanding that these elements are not to be considered post-RIRSA. We recommend that GRS look into modifying the report to properly document this adjustment or remove this adjustment should they agree that such elements are to be excluded based on the post-RIRSA provisions. Our replication reflected these higher salaries for Cranston Police and Fire and would be different if based on salaries without such adjustments.

3. We recommend that GRS specify in the actuarial assumptions that only those participants with a last contribution date in the final quarter immediately preceding the valuation date are included as an active participant for valuation purposes.

4. The total annual benefits amounts in Tables 12A and 12B of the ERS valuation report include the future offset amount. Since these amounts are not applicable as of the valuation date, we recommend that they be excluded from the current annual benefits shown on this report, or separately identified as benefits currently payable versus future payouts. Regardless, these amounts were properly accounted for by GRS as future offset amounts in calculating the liabilities.

SECTION II
VALUATION RECONCILIATION

5. We recommend that GRS disclose in the valuation reports that the RIRSA retirement age used for each participant was the earlier age between what ERSRI provided and what GRS calculated based on the provisions.

The exhibits on pages 14 through 17 show the comparison of our independent analysis to the valuation data used by GRS.

Replication of Valuation Results

Using the same actuarial assumptions and methods from the 2012 valuation reports, along with additional assumptions and methods provided to us by GRS, we have attempted to replicate GRS's valuation results, including the following:

- Present Value of Future Benefits
- Actuarial Liability
- Unfunded Actuarial Liability (UAL)
- Normal Cost
- Contribution rates as a percentage of payroll

When independently replicating an actuarial valuation, there is a generally acceptable tolerance level of plus/minus 5.0%. The larger the plan, the smaller the expected difference. Given the size of the ERS plan, we anticipated our results would be much closer than 5.0%. Conversely, given the smaller size of the MERS plan, and particularly the size of the individual units, we anticipated our results for MERS to be less close to GRS's results than our results for ERS given the differences in our valuation systems.

ERS Plan

The results for the ERS plan fell well within generally acceptable tolerances. Cheiron's calculated liabilities were within 0.5% of GRS's calculations for both State Employees and Teachers. Our calculated employer contribution rate for Fiscal Year ending June 30, 2015 was 23.53% for State Employees compared to 23.33% calculated by GRS. For Teachers, our calculated employer contribution rate was 22.61% compared to 22.60% by GRS. The exhibits on pages 18 and 19 show a more detailed comparison of our results.

MERS Plan

In aggregate, the liability results of the MERS plan fall within generally accepted tolerances. The exhibits on pages 20 and 21 show a more detailed comparison of these aggregate results.

Since contribution rates are calculated individually for each unit, we compared our valuation results on a unit basis as well. Of the 113 units, four units (two General Employees units, two Police and Fire units) had a present value of future benefits that was more than 5% different than what GRS calculated. Eight (six General Employees units, two Police and Fire units) had an

actuarial liability that was more than 5% different from what GRS calculated. The exhibit on pages 22 through 24 shows the comparison of these two liability measurements for each unit. When we compared our calculated employer contribution rates for each unit to the valuation results, we found our rate to be more than 10% different (relatively) on 27 of the 68 General Employees units and on 8 of the 45 Police and Fire units. The exhibit on pages 25 through 27 shows the comparison of the calculated employer contribution rates. The exhibit on page 28 and 29 shows this graphically for General Employees and Police and Fire. The reason for these discrepancies is largely due to the different valuation systems between GRS and Cheiron, as well as the leveraging impact described in Section I. Although the contribution rate differences for these 35 units are larger than normal tolerances, MERS total liabilities fall within generally acceptable tolerances for both General Employees and Police and Fire.

Technical Valuation Issues

There were instances where we believe the valuation could either be calculated in a different manner than done by GRS, or additional documentation within the report is warranted. For our analysis, we made most of these changes, when possible, and are recommending that GRS make similar revisions to their upcoming valuations to be consistent with the benefits mandated by the Rhode Island General Laws. For those changes that we were able to incorporate, none had a material impact on the aggregate liabilities.

1. The liabilities for inactives, both vested and non-vested former participants, are currently calculated as a multiple of their member contribution balance. GRS should consider explicitly valuing the deferred annuity amounts for former participants who are vested.

2. As highlighted in Section I, the valuation report should include the rationale for assuming a 2% COLA in the MERS liabilities regardless of whether the individual unit is more than 80% funded. We recommend that GRS engage the Board on this topic, along with the other assumptions related to the COLA, so that they have the opportunity to provide input.

3. The COLA cap amount is not being indexed while the COLA is currently suspended for some members of ERS. It is our understanding of the statute that this cap amount is indexed even when it is expected that the COLA will be suspended due to the funded status of the plan. This change will impact liabilities for both active and in-pay participants. In replicating liabilities, we included this change. However, the cap amount was appropriately not increased for 2012 and 2013 due to the known returns at that time.

4. For Police and Fire participants in the MERS plan, the early retirement provision is not being valued despite the statutes providing for this benefit and the retirement assumptions from the report suggesting that it is being valued. GRS should either alter Appendix A to indicate that this provision is not being valued for Police and Fire or change their liability program to include this provision. We did not make this change in our replication.
5. For the State Employees in the ERS plan, the early retirement provisions are being valued for Nurses and Correctional Officers as well, but the statutes do not provide for this benefit.

SECTION II
VALUATION RECONCILIATION

6. For Police and Fire participants in the MERS plan, the vested annuity benefits for participants assumed to terminate is being deferred to age 55 instead of Social Security Normal Retirement Age. This should be modified to agree with the plan provisions set out in the statutes as they are only eligible to begin receipt at age 55 if they have at least 25 years of service. In replicating liabilities, we made this change.

7. The valuation reports do not provide any information about the 7.5% load on death benefits that is assumed by GRS for duty-related benefits. We recommend that the accidental death benefit be explicitly valued or this load assumption at least be properly disclosed in the report and examined at the next experience study.

8. For the ERS plan, the annuity death benefit for an active or inactive member should be actuarially reduced from the age the participant would have been eligible for a retirement benefit had he or she remained in service. GRS is currently using a 6% per year reduction assumption for ERS and 9% for year for MERS. They indicated to us by email that it should be 9% for both funds. The reduction amount used should be disclosed for both ERS and MERS.

9. The early retirement factors for the ordinary death spousal benefit in ERS were based on pre-RIRSA retirement ages instead of the RIRSA retirement ages, resulting in reductions that are too small.

10. In calculating the service-related death lump sum for State Employees (ERS plan), GRS uses the service earned as of the valuation date instead of the projected service at decrement. GRS should change this for the State Employees and look into whether a similar change is necessary for the Teachers. The correct projected service was used for MERS.

11. For General Employee participants in the MERS plan eligible for early reduced retirement, GRS is not assuming any further probability of disability. We believe that the probability of disability for such members should continue until they are eligible for unreduced retirement. Furthermore, there is no assumption of ordinary disability for General Employees with less than five years of service as of June 30, 2012 once they attain the old retirement eligibility provision of 30 years of service, but the ordinary disability assumptions turn back on when this group reaches unreduced retirement eligibility. GRS should disclose over what periods the different member groups are assumed to be exposed to both ordinary and accidental disability.

12. For General Employee participants in the MERS plan, no accidental disabilities are being assumed when the participant is eligible for early retirement prior to age 62. This is not consistent with GRS's stated assumption that disability exposure ceases at age 62. This assumption should also be evaluated to determine appropriateness for the revised retirement ages post-RIRSA for both ERS and MERS.
13. For Nurses in the ERS plan, the multiplier for the accidental disability benefit should be 58% instead of the 25% currently valued. The 58% is based on GRS's stated assumption that 50%

of those becoming accidentally disabled are entitled to 66.67% of pay (those not able to return to work) and the remaining 50% entitled to 50% of pay (those able to return to work.) This assumption that 50% of disabilities in ERS will be found not to be permanently and totally disabled should be disclosed.

14. For the ERS plan, vesting was not updated in item #14 in Appendix B to reflect five years instead of the 10 currently shown. GRS should also confirm that their liabilities properly account for this change.

15. The spousal annuity death benefit for vested married participants in ERS uses a static optional form conversion factor of 0.84 and 0.78 for males and females respectively in lieu of a table of factors used by the System that varies based on age. For MERS, a unisex table varying by age is being used. The assumption for converting the benefit for the standard spousal annuity death benefit should be disclosed in Appendix A for both ERS and MERS.

16. For Police and Fire participants in the MERS plan, two additional retirement assumptions are being reflected in addition to those disclosed in the report. For those eligible to retire at June 30, 2012, 100% are assumed to retire at 35 years of service; otherwise, 100% are assumed to retire no later than SSNRA. The assumptions in Appendix A should be updated accordingly.

17. Similarly, 100% of ERS participants eligible to retire as of June 30, 2012 are assumed to retire at the later of SSNRA or five years of service. Appendix A should be updated to reflect this additional retirement assumption. GRS also told us that they assume additional retirement assumptions for members in Schedule A from previous reforms. This should be disclosed as well within the report.

18. The valuation report for the ERS plan does not reflect the 2.0% accrual rate for Correctional Officers nor does it document the correct maximum benefit. The one sample life we were provided did appear to use the correct 2.0% accrual rate, but GRS should confirm that the correct accrual rate is being used for all Correctional Officers as well as correct Appendix A.

19. GRS should disclose the retirement rates it uses for Nurses since they differ from those currently listed in Appendix A for State Employees.

20. MERS report should be clarified to reflect that the benefits for General Employees eligible to retire as of June 30, 2012 are based on the highest consecutive three year compensation average, but that all Police and Fire participants switch to highest consecutive five year compensation average on July 1, 2012 regardless of retirement eligibility.

SECTION II
VALUATION RECONCILIATION

Additional Disclosures

There are a few additional disclosures that we recommend GRS include in future valuation reports. These will help the readers better understand the assumptions and methods used in the valuation:

1. We recommend that the valuation results be broken out for Correctional Officers and Nurses in the report since these employees have different plan provisions from other State Employees. This is the same logic behind why the System's actuary breaks out information on State Employees and Teachers. Correctional Officers and Nurses should also be considered when performing future experience studies.

2. The MERS report indicates that the "benefit provisions in this valuation are those which were in effect as of June 30, 2011". Since the valuation reflects RIRSA, we believe the correct date is July 1, 2012.

3. The valuation reports do not completely document the State's funding policy as referenced in 36-10-2.1 of the statutes which calls for all future gains or losses established on or after June 30, 2015 to be amortized over 20 years.

4. As mentioned in Section I, we believe that the interests of the Board, Members, and the Plan Sponsor would be much better served if GRS were to include liability and cost projections in its valuation reports including stress testing projections if the actuarial assumptions are not realized. In particular, examination of the range of retirement, disability, and termination behavior in response to the RIRSA changes would serve the interests of the Board, Members, and the Plan Sponsor. Another area that might be found valuable would be examination of the liability and cost projections as a result of the different COLAs that would emerge based on different patterns of returns.

SECTION II
VALUATION RECONCILIATION

Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Data Reconciliation (ERS State Employees)
($ in thousands)

	GRS	Cheiron	Difference	Ratio
Actives				
Count	11,166	11,204	38	100.3%
Adjusted Annual Compensation	$ 643,909	$ 645,638	$ 1,729	100.3%
Average Age	49.1	49.1	0.0	100.0%
Average Service	14.2	14.0	(0.2)	98.6%
Inactive Member Count	2,675	2,674	(1)	100.0%
Service Retirees				
Count	9,285	9,307	22	100.2%
Total Annual Benefits	$ 262,797	$ 263,089	$ 292	100.1%
Disabled Retirees				
Count	715	717	2	100.3%
Total Annual Benefits	$ 14,905	$ 14,920	$ 15	100.1%
Beneficiaries				
Count	1,200	1,201	1	100.1%
Total Annual Benefits	$ 21,074	$ 21,064	$ (10)	100.0%

Adjusted annual compensation based on fiscal year earnings for June 30, 2012 and expected annual pay for new hires as reported by ERSRI but adjusted for 27 pay periods when applicable.

SECTION II
VALUATION RECONCILIATION

Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Data Reconciliation (ERS Teachers)
($ in thousands)

	GRS	Cheiron	Difference	Ratio
Actives				
Count	13,212	13,238	26	100.2%
Adjusted Annual Compensation	$ 961,959	$ 963,550	$ 1,591	100.2%
Average Age	45.3	45.3	(0.0)	99.9%
Average Service	13.4	13.1	(0.3)	98.0%
Inactive Member Count	2,808	2,808	0	100.0%
Service Retirees				
Count	9,824	9,840	16	100.2%
Total Annual Benefits	$ 435,692	$ 436,082	$ 390	100.1%
Disabled Retirees				
Count	286	287	1	100.3%
Total Annual Benefits	$ 8,463	$ 8,481	$ 18	100.2%
Beneficiaries				
Count	512	511	(1)	99.8%
Total Annual Benefits	$ 12,496	$ 12,406	$ (90)	99.3%

Adjusted annual compensation based on larger of fiscal year earnings for June 30, 2011 and June 30, 2012 as reported by ERSRI and expected annual pay for new hires.

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Data Reconciliation (MERS General Employees)
($ in thousands)

	GRS	Cheiron	Difference	Ratio
Actives				
Count	6,012	6,035	23	100.4%
Adjusted Annual Compensation	$ 223,066	$ 223,827	$ 761	100.3%
Average Age	51.3	51.3	0.0	100.0%
Average Service	12.1	11.9	(0.2)	98.6%
Inactive Member Count	2,506	2,507	1	100.0%
Service Retirees				
Count	3,611	3,615	4	100.1%
Total Annual Benefits	$ 54,308	$ 54,359	$ 51	100.1%
Disabled Retirees				
Count	255	255	0	100.0%
Total Annual Benefits	$ 3,505	$ 3,505	$ 0.0	100.0%
Beneficiaries				
Count	411	411	0	100.0%
Total Annual Benefits	$ 3,553	$ 3,553	$ 0.0	100.0%

Adjusted annual compensation based on fiscal year earnings for June 30, 2012 and expected annual pay for new hires as reported by ERSRI but adjusted for 27 pay periods when applicable.

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Data Reconciliation (MERS Police & Fire)
($ in thousands)

	GRS	Cheiron	Difference	Ratio
Actives				
Count	1,410	1,413	3	100.2%
Adjusted Annual Compensation*	$ 83,164	$ 83,281	$ 117	100.1%
Average Age	39.2	39.2	0.0	100.1%
Average Service	11.3	10.9	(0.4)	96.4%
Inactive Member Count	129	129	0	100.0%
Service Retirees				
Count	471	471	0	100.0%
Total Annual Benefits	$ 15,262	$ 15,262	$ 0.0	100.0%
Disabled Retirees				
Count	121	121	0	100.0%
Total Annual Benefits	$ 3,982	$ 3,982	$ 0.0	100.0%
Beneficiaries				
Count	62	62	0	100.0%
Total Annual Benefits	$ 826	$ 826	$ 0.0	100.0%

* Includes GRS adjustment to Cranston Police and Fire to reflect expected longevity and holiday pay.

Adjusted annual compensation based on fiscal year earnings for June 30, 2012 and expected annual pay for new hires as reported by ERSRI but adjusted for 27 pay periods when applicable.

SECTION II
VALUATION RECONCILIATION

Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Summary of Pension Audit Results (ERS State Employees)
($ in millions)

	GRS	Cheiron	Difference	Ratio
Present Value of Future Benefits				
a. Actives				
- Retirement	$1,731.1	$1,744.6	$13.5	100.8%
- Termination and Refunds	65.8	62.6	(3.2)	95.2%
- Death	41.5	39.5	(2.0)	95.1%
- Disability	77.9	80.0	2.0	102.6%
- Total	$1,916.4	$1,926.8	$10.4	100.5%
b. Inactives	90.7	90.7	0.0	100.0%
c. In Pay Participants	2,775.0	2,788.7	13.7	100.5%
d. Total	$4,782.1	$4,806.2	$24.0	100.5%
Employer Normal Cost Rate (as a % of Pay)	5.02%	4.99%	-0.03%	99.4%
Actuarial Liability	$4,297.3	$4,318.6	$21.4	100.5%
Actuarial Value of Assets	2,421.2	2,421.2	0.0	100.0%
Unfunded Actuarial Liability (UAL)	$1,876.1	$1,897.4	$21.4	101.1%
Projected UAL as of June 30, 2014	$1,917.6	$1,941.8	$24.2	101.3%
Projected FYE 2015 Payroll	$720.6	$720.6	$0.0	100.0%
Amortization Rate (as % of Projected FYE 2015 Pay)	18.31%	18.54%	0.23%	101.3%
FYE 2015 Calculated Contribution Rate (as a % of Pay)	23.33%	23.53%	0.20%	100.8%
Estimated FYE 2015 Employer Contribution	$168.1	$169.5	$1.4	100.8%

SECTION II
VALUATION RECONCILIATION

Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Summary of Pension Audit Results (ERS Teachers)
($ in millions)

	GRS	Cheiron	Difference	Ratio
Present Value of Future Benefits				
a. Actives				
- Retirement	$2,391.1	$2,397.1	$6.0	100.2%
- Termination and Refunds	76.5	72.4	(4.1)	94.6%
- Death	41.6	36.4	(5.2)	87.5%
- Disability	74.7	66.0	(8.7)	88.4%
- Total	$2,583.9	$2,571.9	($12.0)	99.5%
b. Inactives	99.2	99.2	0.0	100.0%
c. In Pay Participants	4,535.6	4,561.7	26.0	100.6%
d. Total	$7,218.7	$7,232.7	$14.0	100.2%
Employer Normal Cost Rate (as a % of Pay)	4.77%	4.98%	0.21%	104.3%
Actuarial Liability	$6,373.1	$6,342.3	($30.7)	99.5%
Actuarial Value of Assets	3,746.3	3,746.3	0.0	100.0%
Unfunded Actuarial Liability (UAL)	$2,626.8	$2,596.0	($30.7)	98.8%
Projected UAL as of June 30, 2014	$2,711.9	$2,680.8	($31.1)	98.9%
Projected FYE 2015 Payroll	$1,046.2	$1,046.2	$0.0	100.0%
Amortization Rate (as % of Projected FYE 2015 Pay)	17.83%	17.63%	-0.20%	98.9%
FYE 2015 Calculated Contribution Rate (as a % of Pay)	22.60%	22.61%	0.01%	100.0%
Estimated FYE 2015 Employer Contribution	$236.4	$236.5	$0.1	100.0%

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Summary of Pension Audit Results (MERS General Employees)
($ in millions)

	GRS	Cheiron	Difference	Ratio
Present Value of Future Benefits				
a. Actives				
- Retirement	$529.0	$536.2	$7.2	101.4%
- Termination and Refunds	18.5	18.5	0.0	99.7%
- Death	13.7	10.8	(2.9)	79.1%
- Disability	20.8	20.4	(0.5)	97.7%
- Total	$582.0	$585.9	$3.9	100.7%
b. Inactives	37.7	37.7	0.0	100.0%
c. In Pay Participants	567.3	576.0	8.7	101.5%
d. Total	$1,186.9	$1,199.5	$12.6	101.1%
Employer Normal Cost Rate (as a % of Pay)	7.94%	8.20%	0.26%	103.3%
Actuarial Liability	$1,023.6	$1,047.7	$24.1	102.4%
Actuarial Value of Assets	859.5	859.5	0.0	100.0%
Unfunded Actuarial Liability (UAL)	$164.1	$188.2	$24.1	114.7%
Projected UAL as of June 30, 2014	$171.6	$200.0	$28.4	116.6%
Projected FYE 2015 Payroll	$250.1	$257.1	$7.0	102.8%
Amortization Rate (as a % of Pay)	4.69%	5.35%	0.66%	114.1%
FYE2015 Calculated Contribution Rate (as a % of Pay)*	12.63%	13.55%	0.92%	107.3%
Estimated FYE 2015 Employer Contribution	$31.7	$34.9	$3.2	110.1%

* Similar to GRS report, weighted on adjusted annual compensation

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Summary of Pension Audit Results (MERS Police & Fire)
($ in millions)

	GRS	Cheiron	Difference	Ratio
Present Value of Future Benefits				
a. Actives				
- Retirement	$300.9	$306.8	$5.8	101.9%
- Termination and Refunds	5.9	6.5	0.6	110.1%
- Death	3.8	3.7	(0.1)	98.2%
- Disability	57.0	57.6	0.6	101.0%
- Total	$367.7	$374.6	$7.0	101.9%
b. Inactives	4.1	4.1	0.0	100.0%
c. In Pay Participants	250.8	253.9	3.1	101.2%
d. Total	$622.6	$632.6	$10.1	101.6%
Employer Normal Cost Rate (as a % of Pay)	9.35%	9.93%	0.58%	106.2%
Actuarial Liability	$476.9	$480.4	$3.5	100.7%
Actuarial Value of Assets	378.7	378.7	0.0	100.0%
Unfunded Actuarial Liability (UAL)	$98.2	$101.7	$3.5	103.5%
Projected UAL as of June 30, 2014	$107.1	$112.3	$5.1	104.8%
Projected FYE 2015 Payroll	$92.7	$92.7	$0.0	100.0%
Amortization Rate (as a % of Pay)	7.91%	8.33%	0.42%	105.3%
FYE2015 Calculated Contribution Rate (as a % of Pay)*	17.26%	18.26%	1.00%	105.8%
Estimated FYE 2015 Employer Contribution	$16.1	$16.9	$0.8	105.0%

* Similar to GRS report, weighted on adjusted annual compensation

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
($ in thousands)

		Present Value of Future Benefits			Actuarial Liabilty		
Unit #	Name	GRS	Cheiron	% Diff	GRS	Cheiron	% Diff
General							
3002	Bristol	$ 24,135	$ 24,347	0.9%	$ 20,807	$ 21,209	1.9%
3003	Burrillville	28,003	28,248	0.9%	23,889	24,433	2.3%
3004	Central Falls	8,120	8,231	1.4%	6,979	7,125	2.1%
3005	Charlestown	7,528	7,571	0.6%	6,135	6,230	1.5%
3007	Cranston	147,143	148,573	1.0%	130,449	133,018	2.0%
3008	Cumberland	33,322	33,820	1.5%	27,952	28,834	3.2%
3009	East Greenwich	7,374	7,154	(3.0%)	6,500	6,369	(2.0%)
3010	East Providence	112,152	113,251	1.0%	99,419	101,575	2.2%
3011	Exeter/West Greenwich	11,025	11,134	1.0%	9,066	9,417	3.9%
3012	Foster	4,203	4,306	2.5%	3,521	3,643	3.5%
3013	Glocester	9,790	9,971	1.8%	8,003	8,340	4.2%
3014	Hopkinton	4,956	5,026	1.4%	3,856	3,981	3.2%
3015	Jamestown	14,758	14,904	1.0%	12,311	12,550	1.9%
3016	Johnston	44,827	45,456	1.4%	38,711	39,775	2.7%
3017	Lincoln	2,574	2,572	(0.1%)	1,931	1,964	1.7%
3019	Middletown	22,426	22,444	0.1%	18,170	18,495	1.8%
3021	Newport	75,071	76,354	1.7%	67,348	69,338	3.0%
3022	New Shoreham	6,889	6,983	1.4%	5,460	5,597	2.5%
3023	North Kingstown	63,889	64,637	1.2%	55,565	56,990	2.6%
3024	North Providence	30,207	30,649	1.5%	25,511	26,123	2.4%
3025	North Smith field	14,332	14,516	1.3%	11,879	12,139	2.2%
3026	Pawtucket	127,074	128,724	1.3%	112,750	115,388	2.3%
3027	Union Fire District	696	713	2.4%	536	565	5.4%
3029	Richmond	2,501	2,547	1.8%	2,010	2,072	3.1%
3030	Scituate	14,208	14,406	1.4%	12,346	12,668	2.6%
3031	Smithfield	13,900	14,066	1.2%	11,534	11,902	3.2%
3032	South Kingstown	59,607	60,228	1.0%	51,041	52,534	2.9%
3033	Tiverton	11,820	11,900	0.7%	9,707	9,847	1.4%
3034	Warren	7,538	7,423	(1.5%)	6,171	6,104	(1.1%)
3036	Westerly	987	990	0.3%	966	968	0.2%
3037	West Greenwich	3,979	4,073	2.4%	3,422	3,532	3.2%
3039	Woonsocket	70,280	71,115	1.2%	61,981	63,438	2.4%
3040	Chariho School District	21,429	21,755	1.5%	17,200	17,912	4.1%
3041	Foster/Glocester	7,577	7,707	1.7%	6,326	6,546	3.5%
3042	Tiogue Fire & Lighting	5	5	0.0%	5	5	0.0%
3043	Narragansett Housing	525	528	0.6%	372	386	3.8%
3045	Coventry Lighting District	845	845	0.0%	836	835	(0.1%)
3046	Hope Valley Fire	452	448	(0.9%)	385	401	4.2%
3050	East Greenwich Housing	1,476	1,484	0.5%	1,132	1,129	(0.3%)

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
($ in thousands)

		Present Value of Future Benefits			Actuarial Liabilty		
Unit #	Name	GRS	Cheiron	% Diff	GRS	Cheiron	% Diff
3051	Cranston Housing	$ 4,363	$ 4,364	0.0%	$ 3,773	$ 3,792	0.5%
3052	East Providence Housing	3,342	3,377	1.0%	2,883	2,926	1.5%
3053	Pawtucket Housing	10,403	10,465	0.6%	8,525	8,625	1.2%
3056	Cumberland Housing	1,602	1,607	0.3%	1,185	1,197	1.0%
3057	Lincoln Housing	1,755	1,785	1.7%	1,453	1,480	1.9%
3059	Bristol Housing	1,530	1,542	0.8%	1,304	1,338	2.6%
3065	Burrillville Housing	1,018	1,045	2.7%	889	941	5.8%
3066	North Providence Housing	1,664	1,699	2.1%	1,495	1,551	3.7%
3067	East Smithfield Water	913	918	0.5%	779	782	0.4%
3068	Greenville Water	1,002	995	(0.7%)	803	818	1.9%
3069	Newport Housing	9,437	9,475	0.4%	8,421	8,495	0.9%
3071	Warren Housing	1,186	1,192	0.5%	1,036	1,056	1.9%
3072	Johnston Housing	1,523	1,534	0.7%	1,257	1,281	1.9%
3077	Tiverton Local 2670A	4,433	4,461	0.6%	3,714	3,780	1.8%
3078	Barrington COlA	35,169	35,241	0.2%	29,819	30,362	1.8%
3079	Coventry Housing	1,295	1,324	2.2%	900	934	3.8%
3080	South Kingstown Housing	272	283	4.0%	155	167	7.7%
3081	N. RI Collaborative Adm. Services	3,482	3,507	0.7%	2,748	2,816	2.5%
3083	West Warwick Housing	1,855	1,848	(0.4%)	1,568	1,563	(0.3%)
3084	Smithfield Housing	357	372	4.2%	255	273	7.1%
3094	Smithfield COLA	16,266	16,384	0.7%	13,572	13,858	2.1%
3096	Central Falls Housing	3,253	3,268	0.5%	2,526	2,550	1.0%
3098	Lime Rock Administrative Services	359	378	5.3%	312	336	7.7%
3099	Central Falls Schools	16,982	17,216	1.4%	13,547	14,006	3.4%
3100	Bristol/Warren Schools	22,735	22,940	0.9%	19,608	20,138	2.7%
3101	Town of E. Greenwich-COLA-NCE	22,031	22,170	0.6%	18,037	18,495	2.5%
3102	Harrisville Fire District (ADMIN)	652	635	(2.6%)	465	463	(0.4%)
3103	Albion Fire District (ADMIN)	99	33	(66.7%)	99	33	(66.7%)
3150	East Geenwich Fire (ADMIN)	328	330	0.6%	262	263	0.4%
	Total General Employee Units	$1,186,926	$1,199,489	1.1%	$1,023,569	$1,047,697	2.4%
Police & Fire							
4016	Johnston Fire	$ 8,961	$ 9,251	3.2%	$ 3,801	$ 3,823	0.6%
4029	Richmond Police	2,613	2,669	2.1%	1,377	1,399	1.6%
4031	Smithfield Police	14,023	14,223	1.4%	9,504	9,441	(0.7%)
4042	Valley Falls Fire	5,383	5,470	1.6%	4,024	4,041	0.4%
4047	North Smithfield Voluntary Fire	8,358	8,396	0.5%	6,749	6,553	(2.9%)
4050	East Greenwich Fire	20,535	20,969	2.1%	16,029	16,229	1.2%
4054	East Greenwich Police	20,206	20,541	1.7%	17,185	17,388	1.2%

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
($ in thousands)

		Present Value of Future Benefits			Actuarial Liabilty		
Unit #	Name	GRS	Cheiron	% Diff	GRS	Cheiron	% Diff
4055	North Kingstown Fire	$ 41,520	$ 41,991	1.1%	$ 36,306	$ 36,564	0.7%
4056	North Kingstown Police	30,172	30,661	1.6%	25,115	25,378	1.0%
4058	North Providence Fire	45,037	45,230	0.4%	38,110	37,872	(0.6%)
4059	Barrington Fire (25)	3,667	3,790	3.4%	1,759	1,799	2.3%
4060	Barrington Police	14,311	14,548	1.7%	11,880	12,004	1.0%
4061	Barrington Fire (20)	10,010	10,055	0.4%	9,842	9,861	0.2%
4062	Warren Police & Fire	14,537	14,640	0.7%	12,528	12,540	0.1%
4063	South Kingstown Police	30,787	31,048	0.8%	25,813	25,804	(0.0%)
4073	Scituate Police	23	23	0.0%	23	23	0.0%
4076	North Smithfield Police	12,219	12,424	1.7%	10,008	10,079	0.7%
4077	Tiverton Fire	13,659	13,997	2.5%	10,432	10,617	1.8%
4082	Foster Police	4,537	4,664	2.8%	3,691	3,754	1.7%
4085	Woonsocket Police	52,915	53,718	1.5%	43,234	43,551	0.7%
4086	Charlestown Police	11,485	11,575	0.8%	9,579	9,630	0.5%
4087	Hopkinton Police	8,401	8,546	1.7%	6,592	6,630	0.6%
4088	Glocester Police	7,546	7,685	1.8%	6,008	6,073	1.1%
4089	West Greenwich Police/Rescue	5,427	5,497	1.3%	4,260	4,267	0.2%
4090	Burrillville Police	11,990	12,134	1.2%	10,281	10,347	0.6%
4091	Cumberland Rescue	6,347	6,412	1.0%	4,594	4,576	(0.4%)
4093	Woonsocket Fire	45,131	45,640	1.1%	35,115	35,283	0.5%
4094	Bristol Fire	349	359	2.9%	306	286	(6.5%)
4095	Cumberland Hill Fire	6,685	6,786	1.5%	5,431	5,460	0.5%
4096	Bristol Police	7,574	7,771	2.6%	3,479	3,482	0.1%
4098	Coventry Fire	6,413	6,482	1.1%	4,612	4,563	(1.1%)
4099	South Kingstown EMT	4,059	4,169	2.7%	2,508	2,534	1.0%
4101	North Cumberland	5,626	5,489	(2.4%)	4,729	4,549	(3.8%)
4102	Central Coventry Fire	15,183	15,546	2.4%	10,544	10,595	0.5%
4103	Hopkins Hill Fire	2,603	2,649	1.8%	1,667	1,600	(4.0%)
4104	Cranston Police	42,897	43,971	2.5%	26,092	26,749	2.5%
4105	Cranston Fire	56,426	57,932	2.7%	39,419	40,694	3.2%
4106	Cumberland Fire	5,422	5,558	2.5%	4,300	4,370	1.6%
4107	Lincoln Rescue	5,446	5,490	0.8%	3,958	3,962	0.1%
4108	New Shoreham Police	1,947	1,991	2.3%	1,489	1,513	1.6%
4109	Middletown Police & Fire	8,291	8,716	5.1%	2,276	2,298	1.0%
4110	Harrisville Fire District	1,287	1,293	0.5%	823	803	(2.4%)
4111	Albion Fire District	1,122	1,117	(0.4%)	839	814	(3.0%)
1284	Johnston Police	529	582	10.0%	44	47	6.8%
1465	Smithfield Fire	911	935	2.6%	550	539	(2.0%)
	Total Police & Fire Units	$ 622,570	$ 632,630	1.6%	$ 476,906	$ 480,383	0.7%

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
Comparison of FYE 2015 Contribution Rates

		GRS			Cheiron			Difference	
Unit #	Name	NC %	UAL %	Total	NC %	UAL %	Total	Absolute	Relative
General									
3002	Bristol	7.34%	8.01%	15.35%	7.49%	8.67%	16.16%	0.81%	5.30%
3003	Burrillville	8.24%	0.03%	8.27%	8.43%	0.75%	9.18%	0.91%	10.95%
3004	Central Falls	6.44%	8.09%	14.53%	6.78%	8.75%	15.53%	1.00%	6.91%
3005	Charlestown	7.34%	2.78%	10.12%	7.32%	3.14%	10.46%	0.34%	3.36%
3007	Cranston	8.40%	1.86%	10.26%	8.63%	2.66%	11.29%	1.03%	10.02%
3008	Cumberland	8.17%	6.17%	14.34%	8.59%	7.02%	15.61%	1.27%	8.83%
3009	East Greenwich	7.77%	(0.91%)	6.86%	8.19%	(0.48%)	7.71%	0.85%	12.35%
3010	East Providence	7.85%	14.27%	22.12%	8.16%	15.19%	23.35%	1.23%	5.58%
3011	Exeter/West Greenwich	8.37%	3.97%	12.34%	8.67%	4.99%	13.66%	1.32%	10.68%
3012	Foster	8.17%	2.25%	10.42%	7.88%	2.96%	10.84%	0.42%	4.01%
3013	Glocester	7.71%	2.26%	9.97%	8.06%	3.33%	11.39%	1.42%	14.22%
3014	Hopkinton	7.95%	(2.06%)	5.89%	8.48%	(1.42%)	7.06%	1.17%	19.91%
3015	Jamestown	7.62%	3.72%	11.34%	7.67%	4.22%	11.89%	0.55%	4.85%
3016	Johnston	7.83%	7.89%	15.72%	8.25%	8.90%	17.15%	1.43%	9.10%
3017	Lincoln	8.14%	4.86%	13.00%	8.58%	5.20%	13.78%	0.78%	6.01%
3019	Middletown	7.24%	4.15%	11.39%	7.38%	4.61%	11.99%	0.60%	5.26%
3021	Newport	7.60%	13.90%	21.50%	7.85%	15.28%	23.13%	1.63%	7.58%
3022	New Shoreham	8.07%	0.00%	8.07%	8.54%	0.54%	9.08%	1.01%	12.46%
3023	North Kingstown	8.08%	7.07%	15.15%	8.29%	7.94%	16.23%	1.08%	7.12%
3024	North Providence	8.03%	(0.47%)	7.56%	8.30%	0.19%	8.49%	0.93%	12.24%
3025	North Smith field	8.03%	(1.85%)	6.18%	8.27%	(1.25%)	7.02%	0.84%	13.60%
3026	Pawtucket	7.70%	8.69%	16.39%	7.96%	9.72%	17.68%	1.29%	7.85%
3027	Union Fire District	7.18%	1.09%	8.27%	7.32%	1.91%	9.23%	0.96%	11.61%
3029	Richmond	8.01%	2.40%	10.41%	8.17%	2.95%	11.12%	0.71%	6.82%
3030	Scituate	8.15%	6.80%	14.95%	8.18%	7.68%	15.86%	0.91%	6.10%
3031	Smithfield	8.22%	0.31%	8.53%	8.62%	1.22%	9.84%	1.31%	15.32%
3032	South Kingstown	8.30%	3.27%	11.57%	8.52%	4.19%	12.71%	1.14%	9.84%
3033	Tiverton	8.07%	(3.67%)	4.40%	8.22%	(3.31%)	4.91%	0.51%	11.53%
3034	Warren	6.68%	6.09%	12.77%	6.68%	5.81%	12.49%	(0.28%)	(2.16%)
3036	Westerly	8.92%	71.44%	80.36%	8.19%	71.63%	79.82%	(0.54%)	(0.68%)
3037	West Greenwich	7.46%	8.73%	16.19%	7.24%	9.66%	16.90%	0.71%	4.40%
3039	Woonsocket	8.10%	1.92%	10.02%	8.52%	2.92%	11.44%	1.42%	14.21%
3040	Chariho School District	7.69%	3.35%	11.04%	8.04%	4.36%	12.40%	1.36%	12.32%
3041	Foster/Glocester	8.46%	3.99%	12.45%	8.85%	5.05%	13.90%	1.45%	11.63%
3042	Tiogue Fire & Lighting	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	#N/A
3043	Narragansett Housing	7.24%	(1.23%)	6.01%	7.60%	(0.59%)	7.01%	1.00%	16.66%
3045	Coventry Lighting District	10.39%	(10.39%)	0.00%	9.62%	(9.62%)	0.00%	0.00%	#N/A
3046	Hope Valley Fire	8.56%	(3.92%)	4.64%	7.58%	(3.19%)	4.39%	(0.25%)	(5.43%)
3050	East Greenwich Housing	8.56%	0.68%	9.24%	8.78%	0.68%	9.46%	0.22%	2.33%

SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
Comparison of FYE 2015 Contribution Rates

		GRS			Cheiron			Difference	
Unit #	Name	NC %	UAL %	Total	NC %	UAL %	Total	Absolute	Relative
3051	Cranston Housing	9.72%	(2.03%)	7.69%	9.41%	(1.95%)	7.46%	(0.23%)	(2.93%)
3052	East Providence Housing	8.44%	3.19%	11.63%	8.55%	3.71%	12.26%	0.63%	5.41%
3053	Pawtucket Housing	7.67%	(7.67%)	0.00%	7.61%	(7.61%)	0.00%	0.00%	#N/A
3056	Cumberland Housing	6.81%	0.45%	7.26%	6.88%	0.62%	7.50%	0.24%	3.35%
3057	Lincoln Housing	8.84%	(0.61%)	8.23%	9.23%	(0.14%)	9.09%	0.86%	10.46%
3059	Bristol Housing	7.98%	(7.98%)	0.00%	8.01%	(8.01%)	0.00%	0.00%	#N/A
3065	Burrillville Housing	6.63%	0.80%	7.43%	7.11%	3.06%	10.17%	2.74%	36.85%
3066	North Providence Housing	7.99%	18.08%	26.07%	8.51%	19.77%	28.28%	2.21%	8.47%
3067	East Smithfield Water	6.31%	(3.38%)	2.93%	5.82%	(3.34%)	2.48%	(0.45%)	(15.26%)
3068	Greenville Water	7.71%	(6.42%)	1.29%	7.56%	(5.98%)	1.58%	0.29%	22.80%
3069	Newport Housing	7.99%	10.94%	18.93%	8.38%	11.38%	19.76%	0.83%	4.37%
3071	Warren Housing	10.22%	(4.13%)	6.09%	10.67%	(3.54%)	7.13%	1.04%	17.03%
3072	Johnston Housing	8.33%	3.53%	11.86%	8.77%	4.02%	12.79%	0.93%	7.85%
3077	Tiverton Local 2670A	7.75%	1.69%	9.44%	7.96%	2.20%	10.16%	0.72%	7.67%
3078	Barrington COlA	8.01%	0.39%	8.40%	8.26%	0.95%	9.21%	0.81%	9.66%
3079	Coventry Housing	7.50%	0.16%	7.66%	7.87%	0.68%	8.55%	0.89%	11.64%
3080	South Kingstown Housing	8.60%	(4.77%)	3.83%	8.04%	(4.34%)	3.70%	(0.13%)	(3.31%)
3081	N. RI Collaborative Adm. Services	7.37%	0.98%	8.35%	7.86%	1.56%	9.42%	1.07%	12.78%
3083	West Warwick Housing	8.15%	1.20%	9.35%	8.21%	1.13%	9.34%	(0.01%)	(0.16%)
3084	Smithfield Housing	6.97%	(4.73%)	2.24%	7.49%	(3.65%)	3.84%	1.60%	71.28%
3094	Smithfield COLA	7.57%	2.48%	10.05%	7.81%	3.13%	10.94%	0.89%	8.81%
3096	Central Falls Housing	6.10%	5.32%	11.42%	6.19%	5.53%	11.72%	0.30%	2.66%
3098	Lime Rock Administrative Services	6.70%	6.36%	13.06%	7.43%	8.82%	16.25%	3.19%	24.39%
3099	Central Falls Schools	7.51%	1.12%	8.63%	7.87%	1.92%	9.79%	1.16%	13.41%
3100	Bristol/Warren Schools	8.68%	7.26%	15.94%	9.00%	8.19%	17.19%	1.25%	7.87%
3101	Town of E. Greenwich-COLA-NCE	7.77%	(0.91%)	6.86%	8.19%	(0.48%)	7.71%	0.85%	12.35%
3102	Harrisville Fire District (ADMIN)	7.30%	(0.98%)	6.32%	7.58%	(0.99%)	6.59%	0.27%	4.33%
3103	Albion Fire District (ADMIN)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	#N/A
3150	East Geenwich Fire (ADMIN)	9.09%	6.96%	16.05%	9.20%	6.63%	15.83%	(0.22%)	(1.39%)
	Total General Employee Units	7.94%	4.69%	12.63%	8.20%	5.35%	13.55%	0.92%	7.29%
Police & Fire									
4016	Johnston Fire	8.81%	0.84%	9.65%	9.47%	0.99%	10.46%	0.81%	8.39%
4029	Richmond Police	8.31%	3.88%	12.19%	9.03%	4.22%	13.25%	1.06%	8.71%
4031	Smithfield Police	8.34%	(1.25%)	7.09%	9.00%	(1.33%)	7.67%	0.58%	8.11%
4042	Valley Falls Fire	8.64%	9.40%	18.04%	9.13%	9.63%	18.76%	0.72%	3.99%
4047	North Smithfield Voluntary Fire	10.07%	7.92%	17.99%	10.34%	6.63%	16.97%	(1.02%)	(5.68%)
4050	East Greenwich Fire	8.95%	17.17%	26.12%	9.71%	17.91%	27.62%	1.50%	5.76%
4054	East Greenwich Police	10.02%	16.03%	26.05%	10.87%	16.90%	27.77%	1.72%	6.59%

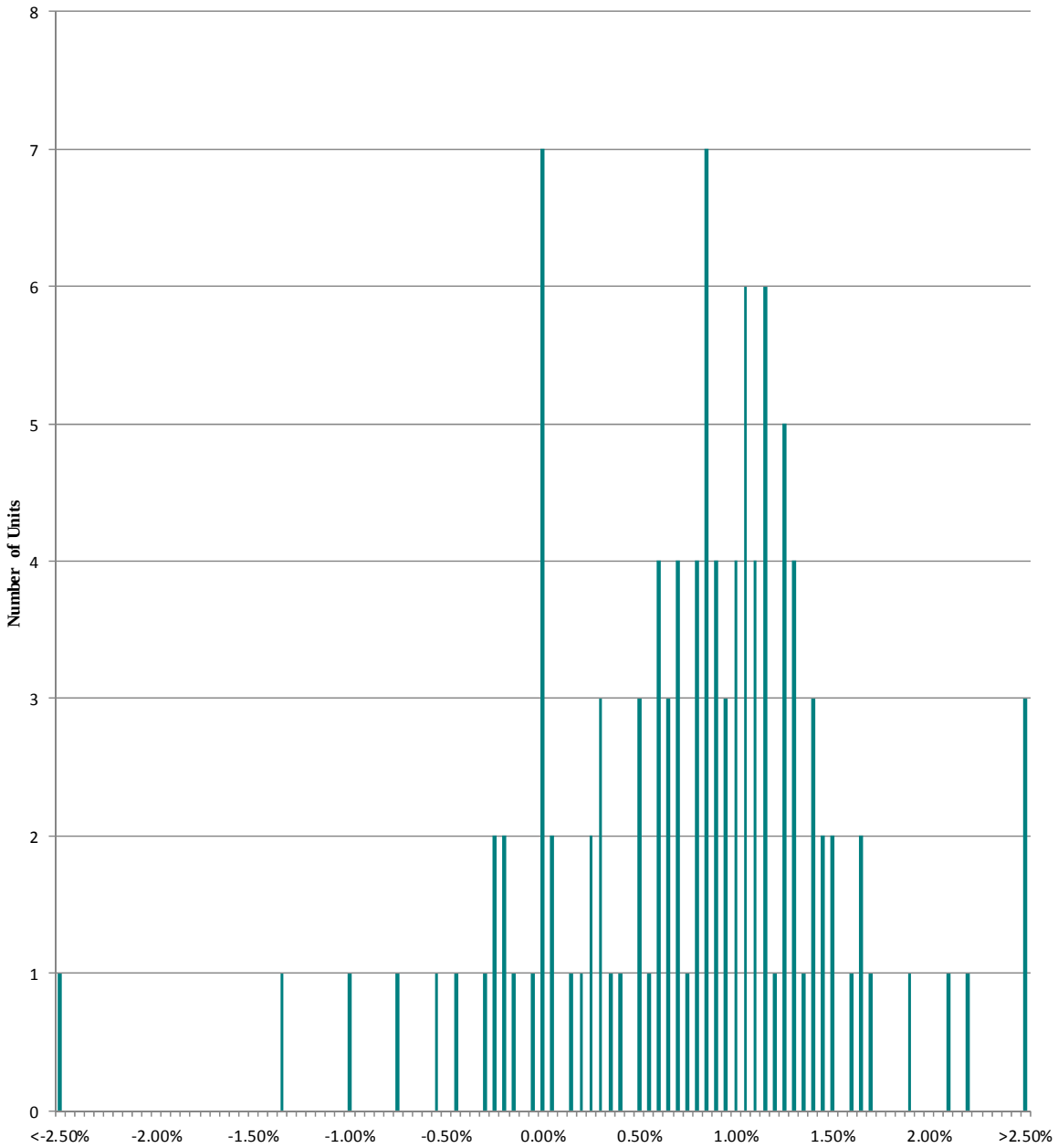
SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
Comparison of FYE 2015 Contribution Rates

		GRS			Cheiron			Difference	
Unit #	Name	NC %	UAL %	Total	NC %	UAL %	Total	Absolute	Relative
4055	North Kingstown Fire	9.52%	18.61%	28.13%	10.01%	19.20%	29.21%	1.08%	3.84%
4056	North Kingstown Police	8.77%	18.85%	27.62%	9.27%	19.59%	28.86%	1.24%	4.49%
4058	North Providence Fire	9.70%	15.36%	25.06%	10.07%	15.05%	25.12%	0.06%	0.25%
4059	Barrington Fire (25)	7.74%	1.63%	9.37%	8.55%	2.05%	10.60%	1.23%	13.14%
4060	Barrington Police	8.60%	20.86%	29.46%	9.12%	21.55%	30.67%	1.21%	4.10%
4061	Barrington Fire (20)	11.95%	53.80%	65.75%	12.03%	54.24%	66.27%	0.52%	0.79%
4062	Warren Police & Fire	9.48%	21.03%	30.51%	9.70%	21.13%	30.83%	0.32%	1.03%
4063	South Kingstown Police	9.76%	13.03%	22.79%	10.23%	13.07%	23.30%	0.51%	2.24%
4073	Scituate Police	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	#N/A
4076	North Smithfield Police	8.80%	10.96%	19.76%	9.44%	11.47%	20.91%	1.15%	5.83%
4077	Tiverton Fire	8.52%	6.81%	15.33%	9.15%	7.67%	16.82%	1.49%	9.70%
4082	Foster Police	11.07%	21.83%	32.90%	12.43%	23.16%	35.59%	2.69%	8.17%
4085	Woonsocket Police	8.77%	14.67%	23.44%	9.33%	15.16%	24.49%	1.05%	4.47%
4086	Charlestown Police	8.97%	15.44%	24.41%	9.65%	15.81%	25.46%	1.05%	4.31%
4087	Hopkinton Police	10.20%	13.96%	24.16%	10.83%	14.34%	25.17%	1.01%	4.20%
4088	Glocester Police	9.70%	8.46%	18.16%	10.52%	9.06%	19.58%	1.42%	7.84%
4089	West Greenwich Police/Rescue	11.08%	12.55%	23.63%	11.75%	12.72%	24.47%	0.84%	3.54%
4090	Burrillville Police	11.26%	13.64%	24.90%	11.86%	14.13%	25.99%	1.09%	4.38%
4091	Cumberland Rescue	9.75%	1.18%	10.93%	10.45%	1.14%	11.59%	0.66%	6.08%
4093	Woonsocket Fire	9.22%	1.72%	10.94%	9.81%	1.98%	11.79%	0.85%	7.73%
4094	Bristol Fire	14.65%	10.27%	24.92%	13.07%	7.12%	20.19%	(4.73%)	(19.00%)
4095	Cumberland Hill Fire	8.84%	17.87%	26.71%	9.55%	18.29%	27.84%	1.13%	4.22%
4096	Bristol Police	8.24%	(2.51%)	5.73%	8.78%	(2.43%)	6.35%	0.62%	10.88%
4098	Coventry Fire	9.54%	12.42%	21.96%	9.88%	12.11%	21.99%	0.03%	0.14%
4099	South Kingstown EMT	9.27%	(3.31%)	5.96%	10.04%	(2.97%)	7.07%	1.11%	18.66%
4101	North Cumberland	10.93%	10.25%	21.18%	11.32%	8.50%	19.82%	(1.36%)	(6.40%)
4102	Central Coventry Fire	9.39%	8.25%	17.64%	9.85%	8.46%	18.31%	0.67%	3.79%
4103	Hopkins Hill Fire	11.46%	1.94%	13.40%	11.54%	1.12%	12.66%	(0.74%)	(5.49%)
4104	Cranston Police	9.07%	1.62%	10.69%	9.71%	2.27%	11.98%	1.29%	12.04%
4105	Cranston Fire	10.24%	0.20%	10.44%	10.89%	1.18%	12.07%	1.63%	15.59%
4106	Cumberland Fire	11.13%	10.87%	22.00%	12.31%	11.78%	24.09%	2.09%	9.51%
4107	Lincoln Rescue	8.30%	11.89%	20.19%	8.80%	12.00%	20.80%	0.61%	3.00%
4108	New Shoreham Police	9.89%	15.35%	25.24%	10.92%	16.24%	27.16%	1.92%	7.62%
4109	Middletown Police & Fire	8.22%	(1.74%)	6.48%	8.82%	(1.59%)	7.23%	0.75%	11.59%
4110	Harrisville Fire District	9.80%	(1.64%)	8.16%	10.43%	(2.10%)	8.33%	0.17%	2.14%
4111	Albion Fire District	9.63%	11.02%	20.65%	10.29%	10.15%	20.44%	(0.21%)	(1.02%)
1284	Johnston Police	8.25%	1.03%	9.28%	9.17%	1.26%	10.43%	1.15%	12.43%
1465	Smithfield Fire	9.77%	(0.10%)	9.67%	10.02%	(0.42%)	9.60%	(0.07%)	(0.78%)
	Total Police & Fire Units	9.35%	7.91%	17.26%	9.93%	8.33%	18.26%	1.00%	5.77%

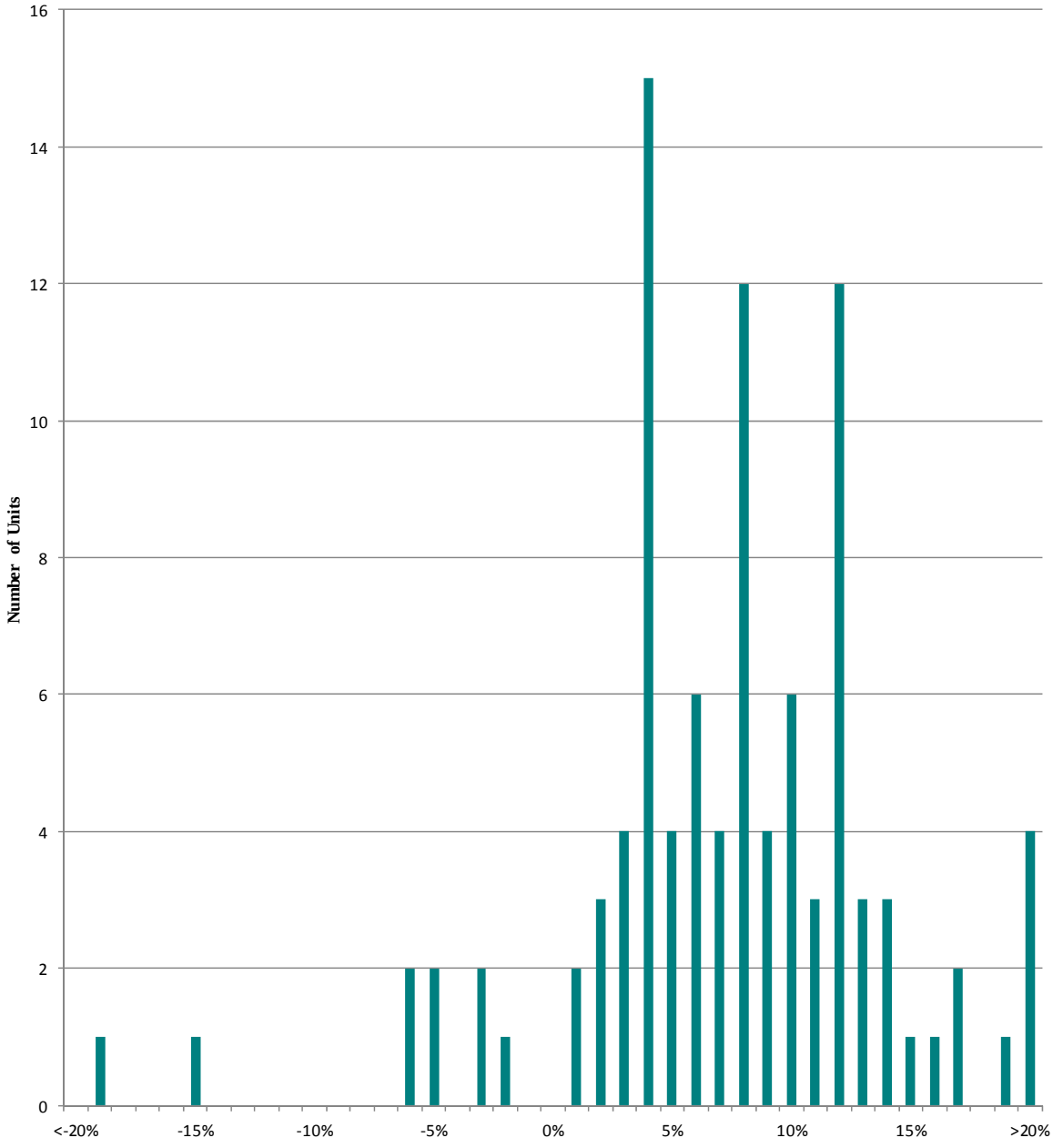
SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
Comparison of FYE 2015 Contribution Rates (Absolute Difference)



SECTION II
VALUATION RECONCILIATION

Municipal Employees' Retirement System of Rhode Island
Actuarial Valuation as of June 30, 2012
Pension Audit Results by Unit
Comparison of FYE 2015 Contribution Rates (Relative Difference)



SECTION III
EXPERIENCE STUDY REVIEW

The overall assumption set used by GRS is in our opinion reasonable. Our review of the actuarial assumptions has drawn heavily from the analysis performed by GRS for the Six-Year Experience Study, July 1, 2004 through June 30, 2010. It should be noted that the setting of actuarial assumptions involves a great deal of professional judgment and that setting such assumptions is both art and science. Two actuaries reviewing the same experience may reach somewhat different conclusions with respect to recommendations of actuarial assumptions. It is not our intent to substitute our judgment for the judgment of the System's consulting actuary, but rather to determine whether the actuarial assumptions are reasonable based upon all of the data available.

It is important to recognize that GRS's Experience Study and our review of it were based on the plan provisions in place prior to RIRSA and do not reflect the impact of any of the revised plan provisions.

A replication of the experience study results was beyond the scope of this assignment which consisted of a general review and analysis of the 2010 experience study reports along with the actuarial assumptions contained within the June 30, 2012 valuations.

An actuarial valuation is designed to assess the ability of the system to meet its obligations. The validity of this assessment is only as good as the assumptions and methods it is based upon. The purpose of an experience study is thus to determine actuarial assumptions that are reasonable to predict future experience. In this case, the purpose was to determine assumptions reasonable to predict future experience based on the provisions at that date. The assumptions underlying an actuarial valuation can be divided into two types: economic and demographic, which deal with the characteristics and behavior of the system's members.

In general, assumptions should be recommended based on the actuary's professional judgment combined with the System's experience during the study period, the System's earlier experience, national experience, and future trends. We found that the process used by GRS to prepare the experience studies and to recommend the valuation assumptions was appropriate and that the assumptions developed generally comply with the guidance provided by the Actuarial Standards of Practice (ASOPs) applicable.

Specific comments regarding each assumption follow.

ECONOMIC ASSUMPTIONS

The questions guiding our review of the economic assumptions were the following:

1) Are the economic assumptions individually reasonable and reasonable as a set?
2) Are the economic assumptions reasonable given the System's experience?

We reviewed the valuation economic assumptions as well as their development in GRS's 2010 experience study reports and found them reasonable and appropriate overall to the plan provisions in effect at that time.

SECTION III
EXPERIENCE STUDY REVIEW

The primary basis of our economic assumption review was Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, which provides guidance on the process for selecting and evaluating economic assumptions for measuring obligations under defined benefit plans. Since the future is uncertain, there is no right answer for these assumptions and the actuary is instead to come up with their best estimates of the future economic conditions. Estimates should be based on a combination of past experience of both the system and the greater economy, future expectations of both the system and the economy as a whole and professional judgment. The actuary should develop a best-estimate range for each assumption and then recommend a specific point within that range. The selected assumptions should be appropriate to the purpose and nature of the measurement and all of the assumptions together need to be consistent as a set. We found GRS's process and results to satisfy this ASOP.

Discount Rate

The discount rate assumption is a key assumption to developing the expected cost of the System as it determines the impact of the time value of money in discounting expected benefit payments. It is comprised of two pieces, the inflation assumption previously discussed and the assumed net real rate of return. We concur with GRS's "building block" approach in developing this assumption and find that their recommendation of 7.50% is not unreasonable. *However, given GRS's conclusion that there is a 60% chance that the 7.50% assumption will not be realized over a 20-year period, we would recommend that the Board consider decreasing it further.*

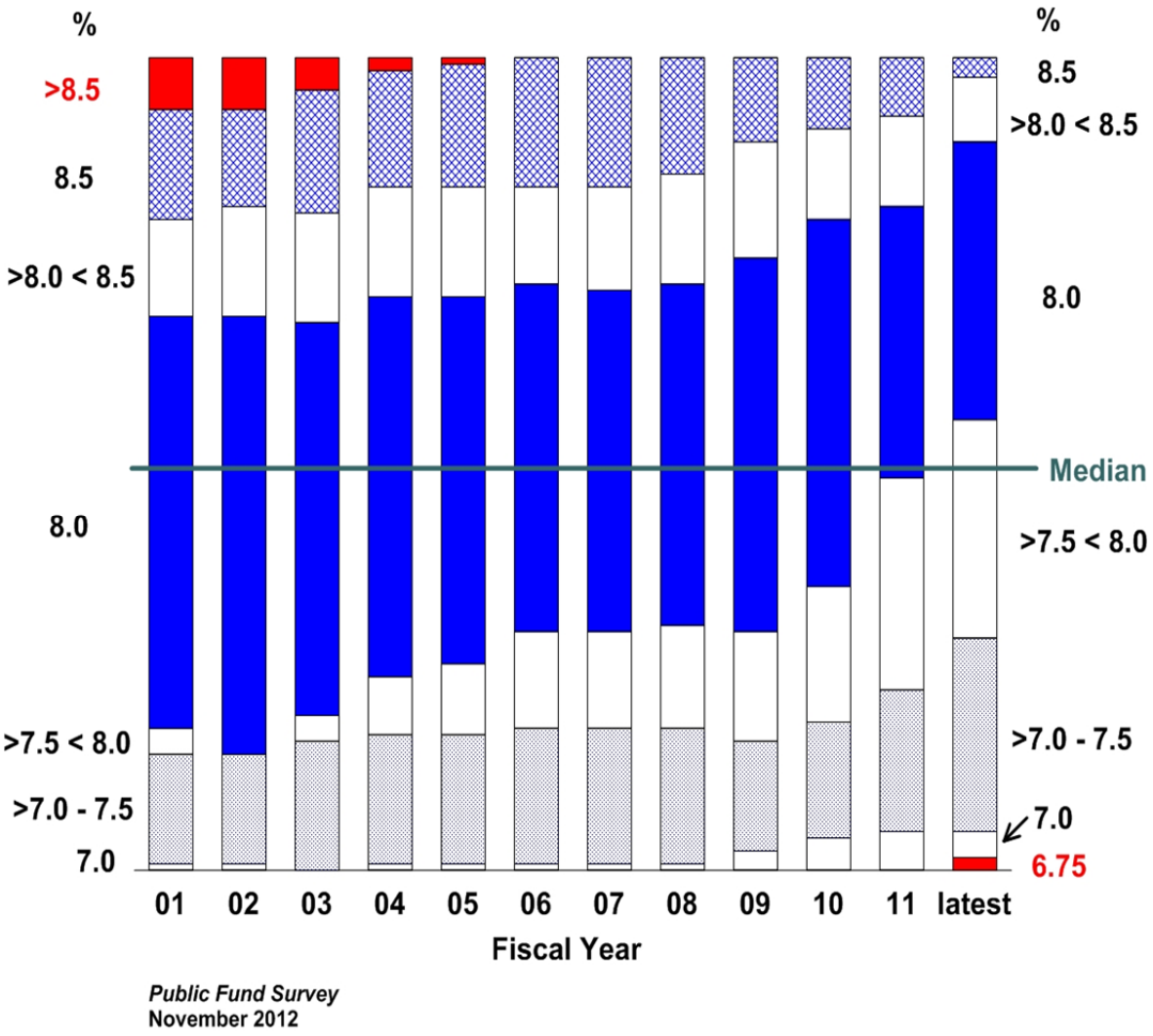
Historical asset returns have averaged 9.21% per year for the period 1984 through 2009; however, past experience is not always indicative of future performance. As GRS has pointed out, changes in actual asset allocation of the trust fund will significantly impact the overall performance, so assets returns achieved under a different asset allocation are not meaningful.

The System's asset allocation seems reasonable compared with the asset allocation used by other large public retirement systems. Based on their asset allocation, the expected investment rate of return using PCA's (the System's investment consultant) capital market assumptions is 7.41%. GRS also determined that the expected rate of return based on an average of the capital market assumptions used by seven investment consultants was 7.88%. After adjusting the 7.88% asset return for the difference between the investment consultants' inflation assumption of 2.64% and GRS's inflation assumption of 2.75%, as well as assumed investment expenses of 0.40%, the resulting expected asset return is 7.59%.

In developing a discount rate, GRS included an analysis of the likelihood that the investment return could be achieved in the long run instead of just within a single year as calculated above. The conclusion was that there was a 60% chance that the fund would not achieve a 7.50% or higher return over the next 20 years. Reducing the investment return assumption will increase plan liabilities and required contributions. This would, however, also increase the probability that the actual investment return will exceed the assumed discount rate, and it would decrease the size of the investment losses that would be expected to occur in the future when the actual investment

returns are less than assumed. Therefore, consideration should be given as to whether the System can tolerate 60% chance that the assets will not achieve the assumed return.

In addition to these considerations specific to the System, we would like to point out that there has been a significant trend by public sector pension plans to lower their discount rates. The following graph is based upon the Public Fund Survey and shows the results of the most recent survey (for fiscal year 2012) compared to the results for several earlier surveys. The graph shows the percentage of systems reporting each level of investment return rate assumption.



Since 2009, there has been a clear trend of systems adopting lower rates. The median assumption is now 7.8%.

Inflation

Inflation is also a key assumption as it is a component of several other assumptions: investment return, general wage increase and payroll increase. GRS's recommended rate of 2.75% is

somewhat higher than what is expected by most investment professionals and economists, but is well within the average range used by other large public sector pension plans. Also, as noted by GRS, the time horizon for ERS and MERS is longer than these individuals are typically considering. In addition, while inflation has averaged slightly over 3.00% over the past 30 years, it has averaged 2.34% over the past 10 years, and 2.18% over the past five years, a downward trend.

As noted by GRS, the expected increase in the CPI given in the 2011 Trustees Report for the Social Security Administration was 2.8% using the intermediate cost. In this report, the low cost assumption was 1.8% and the high cost assumption was 3.8%.

We further note that while ERS and MERS should not base their assumptions on what other systems are doing, it is informative to consider what they are doing and in the case of inflation, many systems have recently decreased their inflation assumption to 3.00% or lower. Similarly, data available from the Public Plans Survey of large public funds for FY2011 has an average inflation rate of 3.31% and a median rate of 3.25% and shows a downward trend from prior years.

Overall, we believe GRS's inflation assumption of 2.75% is on the low end relative to its peers, but is reasonable.

General Wage Growth

In addition to determining the rate of payroll growth for contribution payments, this is also a component of the individual salary increase assumption. We will discuss this general wage growth, the combination of price inflation plus real pay growth, here while the service related component of the individual salary increase assumption will be discussed in the demographic assumptions section.

The first component of the general wage growth assumption, price inflation, has already been discussed. The remaining piece, real pay growth, is the amount by which it is expected that wages will grow more rapidly than general price levels.

In determining real pay growth, GRS looked at the average salary increase over the last ten years for long serviced employees and adjusted the results for inflation. While not entirely clear, it appears that long serviced employees consisted of those with over 25, 12, 15 and 10 years of service for ERS State Employees, ERS Teachers, MERS General Employees, and MERS Police and Fire, respectively. GRS's recommendation is for real pay growth of 1.25% for ERS State Employees, ERS Teachers, and General Employees participants in MERS and 1.50% for Police and Fire in MERS. After reflecting inflation, this results in a total wage inflation assumption of 4.00% for ERS State Employees, ERS Teachers, and MERS General Employees and 4.25% for MERS Police and Fire. We do note that caution should be exercised in drawing any conclusions on the basis of ERS and MERS's own experience of average increases as shown in GRS's reports because wage growth is typically reasonably homogenous across the nation rather than varied by individual employers. In addition, given the current significant downward pressure on

government costs, it may not be reasonable to give considerable weight to the last ten years of salary history. We recommend that GRS give more consideration for the expectations for real wage growth for the entire nation in setting this assumption. However, based on the experience studied, we find these assumptions to be reasonable.

Active Member Payroll

GRS uses a separate payroll growth assumption in determining the annual payment needed to amortize the unfunded actuarial liability. The amortization payments are calculated as a level percentage of payroll; therefore, as payroll increases over time, these amortization payments will also increase. In determining this assumption, GRS projected the payroll for current members based on the assumed salary increases for the individuals and their assumed termination or retirement rates. They then added in enough new employees each year to replace them based on the characteristics of the new members. Based on this analysis, GRS found that payroll over the next thirty years was projected to increase less than 4.00% for ERS State Employees and Teachers. Based on this analysis, GRS recommended the assumption be set at 3.75% for ERS and MERS. We find this assumption to be reasonable.

COLA

For ERS, COLAs are assumed to be 2%, per annum, for years that the aggregate of ERS, the Judicial Retirement Benefits Trust, and the State Police Retirement Benefits Trust has a funded ratio of at least 80%. In the years that the aggregate funded ratio is less than 80%, an interim COLA will be granted in five-year intervals, based on the investment returns at those times. The first such interim COLA will be applicable in Calendar Year 2018. These interim COLAs are only provided in the statute for the initial period beginning June 30, 2012 and are not provided if the aggregate funded ratio drops below 80% after having reached that level. For ERS, as of June 30, 2012, it is assumed that the COLAs will be suspended for 15 years due to the current funding level of the plans aggregated in determining the funded ratio. The actual COLA will be determined based on the plan's five-year average investment rate of return minus 5.5% and will range from zero to 4.0%. Our projection model, based only on ERS as we did not study the other plans, showed that this expectation and thus, the assumption, is reasonable.

Similarly, the COLAs for MERS are suspended on a unit basis whenever the funded ratio for that particular unit is less than 80%. Despite whether a unit's current funded status meets this criterion, GRS currently assumes a COLA of 2%, per annum, for each unit. However, we do not find this to be unreasonable because it adds some level of conservatism to the funding of the plans. For a unit that has a funded status below 80%, if one assumes annual COLAs in determining its liabilities, contributions will be increased hastening the day that the plan is 80% funded. While we do not find GRS's approach to be unreasonable, it is inconsistent with their approach used in the ERS plans. We believe their rationale for the COLA assumptions should be properly disclosed in the valuation report, and the Board should be given the opportunity to provide input. The Board should also note that similar to ERS, the statutes providing the interim COLAs for MERS provide them only in those specific years at the set five year intervals and do not make any provision for interim COLAs for units that were above 80% funded at June 30,

2012 but may drop below this threshold level in the future or for a unit that was under 80% funded at June 30, 2012, goes above that threshold, and then dips back down.

Based on our understanding of the statutes, we also recommend that GRS index the dollar cap on the COLA regardless of the funded ratio. Further, we recommend that when the investment return metric indicates a zero COLA, the dollar cap be indexed to reflect the appropriate years of zero.

DEMOGRAPHIC ASSUMPTIONS

Mortality Assumptions

The valuations currently use the following post-retirement mortality tables:

- Healthy male ERS State Employees and MERS: 115% of RP-2000 Combined Healthy for Males with White Collar adjustments, projected with Scale AA from 2000.
- Healthy female ERS State Employees and MERS: 95% of RP-2000 Combined Healthy for Females with White Collar adjustments, projected with Scale AA from 2000.
- Healthy male ERS Teachers: 97% of rates in a GRS table based on male teacher experience, projected with Scale AA from 2000.
- Healthy female ERS Teachers: 92% of rates in a GRS table based on female teacher experience, projected with Scale AA from 2000.
- Disabled males: 60% of the PBGC Table Va for disabled males eligible for Social Security disability benefits.
- Disabled females: 60% of the PBGC Table VIa for disabled females eligible for Social Security disability benefits.

Preretirement mortality is assumed to be the RP-2000 Combined Healthy tables with White Collar adjustments with a 75% adjustment factor for ERS State employees and a 50% adjustment factor for ERS Teachers.

Actuarial Standard of Practice No. 35 (ASOP 35) was revised for valuations occurring on or after June 30, 2011. As revised, an actuary is required to consider the effect of future mortality improvement in selection of the mortality assumption. Since ASOP 35 requires a disclosure of the specific assumption made with regard to future mortality improvement, we believe that the description of the mortality assumption in GRS's valuation reports should be expanded to include such disclosure. While GRS discloses the assumption regarding future mortality improvement for post-retirement nondisabled lives; it should also explicitly disclose that assumption for disabled mortality and pre-retirement mortality.

GRS assumes the same post-retirement and pre-retirement mortality for MERS Police and Fire as they do for ERS State Employees. GRS should review this assumption based on actual experience to determine whether separate assumptions are needed.

There is a specific benefit paid for employees whose death is accidental duty related. In addition, there are specific special death benefits available to MERS Police and Fire members. However, GRS does not have separate decrements for these benefits and applies 100% of the pre-retirement mortality to the ordinary death benefits. GRS does apply a 7.5% load to these ordinary death benefits to represent the extra benefits of accidental duty related deaths. However, this load is not disclosed in the valuation report nor examined in the experience study. We believe that this assumption should be reviewed based upon actual experience to determine whether separate decrements are needed.

Withdrawal Assumptions

The withdrawal assumptions vary by service. Separate rates are used for ERS State Employees, ERS Teachers, MERS General Employees and MERS Police and Fire. Separate rates are also used for males and females, except for police and fire. We believe the assumptions are reasonable based on the experience shown in the most recent study for the plan provisions in effect as of that date, but should be re-examined for valuing the System post-RIRSA.

Disability Assumptions

The disability assumptions vary by age with the rates increasing as employees get older. Separate rates are used for ERS State Employees, ERS Teachers, MERS General Employees, and MERS Police and Fire. Separate rates are also used for ordinary disability and duty disability. Separate rates are used for males and females, except for police and fire where unisex rates are used. We believe these assumptions are reasonable based on the experience shown in the most recent study for the plan provisions in effect as of that date. However, as these rates were developed based on pre-RIRSA retirement eligibility and end at age 62 for all except MERS Police and Fire, these assumptions should be re-examined for valuing the System post-RIRSA.

Rates of Retirement

For ERS, for members who reach 28 years of service prior to age 60, retirement rates vary by service, and for members who reach age 60 before 28 years of service, retirement rates vary by age. Separate rates are used for males and females and for State Employees and Teachers. Separate rates are also used for Correctional Officers as well as shifted rates for Nurses. The retirement rates which vary by service seem reasonable. The retirement rates which vary by age seem high given actual experience. However, GRS noted that due to the passage of several Articles over the past few years which impacted the benefit provisions of the retirement system and the retiree medical benefits, the experience from this analysis period is likely to not represent a reasonable comparison for future retirement patterns; therefore, they recommended rates not be changed. These assumptions are reasonable given the plan provisions in effect at the time of the experience study. The division based on entry age of 32 into the two tables, age-based and

service-based, is itself a product of the eligibilities under the previous provisions as are the patterns of the decrements. GRS should develop assumptions appropriate to the plan provisions that became effective July 1, 2012 as a result of RIRSA. GRS should further consider providing analysis of the range of valuation outcomes produced by possible retirement and disability behaviors post-RIRSA given the lack of experience to evaluate these assumptions. We would further recommend that this stress testing include a range of election of the early retirement provisions as evidence from Social Security claiming ages suggests that there may be a much higher rate of utilization than predicted by GRS's current assumptions. We know that it is difficult to predict how the behavior of members will be impacted by these provisions, which is why we are recommending that GRS perform stress testing to allow the Board to be aware of the range of outcomes based on the possible behaviors seen.

For MERS General Employees, for members who reach 30 years of service prior to age 58, rates vary by service and for members who reach age 58 prior to having 30 years of service, rates vary based on age. Separate rates are used for males and females. For MERS Police and Fire, rates vary by service for all members and are unisex. Separate rates are used for those Police and Fire units that had the optional 20-year retirement election that existed under the provisions prior to RIRSA. We believe the retirement rates are reasonable based on past experience, but need to be reevaluated as a result of RIRSA. Similar to ERS, we recommend that GRS develop retirement rates based on the plan provisions in effect and stress test the valuation results based on deviations from these expectations.

In addition, because of the enactment of Article 7 in 2009 and RIRSA in 2011, GRS modified the retirement assumptions for ERS and MERS members whose retirement ages were delayed. The retirement assumptions should be carefully reviewed in the next experience study.

In addition to those retirement assumptions listed above, GRS applies additional retirement rates and assumed ages and/or service amounts with 100% retirement assumed that should be disclosed in the valuation report. These were discussed in Section II.

We also recommend considering a maximum retirement age of 70 instead of the current age 75 to be more consistent with the mandatory retirement ages for some positions as spelled out in the Rhode Island General Laws.

Salary Increases

The salary increase rates are based upon service. Separate rates are used for ERS State Employees, ERS Teachers, MERS General Employees and MERS Police and Fire. In each instance, the total salary increase rate is the sum of the wage inflation rate and a service related component that decreases by service. We believe that the service related component is reasonable. We recommend GRS provide additional information on how the ultimate service amounts for this component are evaluated for each group in the next experience study.

SECTION III
EXPERIENCE STUDY REVIEW

Other Demographic Assumptions

The following additional assumptions were made:

- **Marriage assumption –** It is assumed that 85% of ERS members and 80% of MERS members are married at death, and that there are no children or other beneficiaries who will receive benefits. GRS does not receive information on marital status and therefore examined general census statistics. This assumption seems reasonable. GRS revised the assumption for MERS to 80% in the 2012 valuation report "to reflect the expected percentage of members that will be eligible for survivor benefits upon their death". They did not state the source of this expectation, so we were not able to evaluate it. Additionally, MERS Police and Fire has total death benefits which are greater when there are eligible children, so GRS should consider examining the experience of this group.

- **Spousal age difference –** It is assumed that male members are three years older than their spouses and female members are three years younger than their spouses. GRS relied on general census statistics. This assumption seems reasonable.

- **Refund of contributions -** It is assumed that members who are vested and terminate in the future will choose the more valuable of a refund or a deferred annuity. This assumption seems reasonable. With the exception of some ERS members who were inadvertently valued as always taking the refund of contributions, GRS is currently assuming that the surviving spouse of a vested member will take the more valuable of the death benefit annuity and a refund of contributions in their calculations despite the assumptions in the valuation report indicating that all vested, married surviving spouses are assumed to take the annuity. GRS has indicated that they are correcting the group that was not valued with the more valuable of the annuity and the refund of contributions, and so should update their assumptions to reflect this methodology.

- **Inactive members -** Liabilities for inactive members are approximated as a multiple of their member contribution account balances. For nonvested inactive members, the multiple is 1.0. For vested inactive members, the multiple is 8.0 for members with 25 or more years of service, 3.0 for vested inactive members age 45 or older with less than 25 years of service, and 1.0 for other vested inactive members younger than age 45. This assumption was not addressed in the experience studies, so we have no grounds on which to review the validity of this assumption. GRS should consider including evaluating this approximation in the next experience study as well as explore the possibility of valuing the deferred annuity amount for vested inactive members.

- **IRC Sections 401(a)(17) and 415** – GRS did not take these IRC sections into account when preparing the valuation. GRS should consider reflecting the compensation and benefit limits in the valuation and assume these limits increase accordingly.

SECTION III
EXPERIENCE STUDY REVIEW

ACTUARIAL METHODS

Actuarial Asset Method

The market value of assets represents a "snap-shot" value as of the last day of the fiscal year that provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. Because these fluctuations would cause volatility in employer contributions, an actuarial value of assets is developed.

The actuarial value of assets typically represents an asset value based on averaging or smoothing year-to-year market value returns for purposes of reducing the resulting volatility on contributions.

The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continuing to be recognized on their original timeframe. Expected investment income is determined using the assumed discount rate and the market value of assets from the previous year (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses.

Five-year asset smoothing is common in the public sector. However, the offsetting of unrecognized gains and losses is not as typical. Our analysis shows that this method results in a superior smoothed asset value in the wake of market volatility and thus find it to be a reasonable approach as long as the process is applied uniformly during both favorable and unfavorable investment years such that it is not biased to produce numbers either higher or lower than the market value of assets.

Funding Method

The individual Entry Age Normal (EAN) actuarial funding method is used. This method produces a stable and predictable contribution pattern, and is by far the most prevalent method used in the public sector. Under GASB Nos. 67 and 68, plans will be required to use EAN for their accounting disclosures.

Funding Policy Including Amortization Method

The amortization contribution rate is the level percentage of payroll required to reduce the unfunded accrued liability (UAL) to zero over the remaining amortization period. The UAL was initially being amortized over the remainder of a closed 30-year period from June 30, 1999. In conjunction with The Rhode Island Retirement Security Act of 2011, the amortization period was reset to 25 years as of June 30, 2010. Future gains or losses established on or after June 30, 2015 will be amortized over 20 years.

SECTION III
EXPERIENCE STUDY REVIEW

We believe that the funding policy, including the amortization method, is reasonable in that it is expected to result in steadily increasing funded ratios. This is shown by the projection on page 6 of Section I which estimates that the funded status will increase from 58% as of June 30, 2012 to over 100% in the next 30 years. This projection assumes that all assumptions, including the 7.5% annual discount rate, are realized. To the extent that future experience deviates from this assumption, these projections will differ.

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

In our audit process we applied the following assumptions which are based on those applied in the June 30, 2012 valuations by GRS including additional assumptions disclosed to us by GRS during the auditing process.

A. Actuarial Assumptions

1. Discount Rate Assumption

7.50% compounded annually, net of expenses

2. Inflation

Wage inflation: 4.00% compounded annually for ERS State Employees, ERS Teachers, and MERS General Employees and 4.25% for MERS Police and Fire

Consumer Price Inflation: 2.75% compounded annually

3. Cost-of-Living Increase in Benefits

For ERS, COLAs are assumed to be 2% per annum for years that the aggregate of ERS, the Judicial Retirement Benefits Trust, and the State Police Retirement Benefits Trust has a funded ratio of at least 80%. In the years that the aggregate funded ratio is less than 80%, an interim COLA will be granted in five-year intervals, based on the investment returns at those times. The first such interim COLA will be applicable in Calendar Year 2018. These interim COLAs are only provided in the statute for the initial period beginning June 30, 2012, and are not provided if the aggregate funded ratio drops below 80% after having reached that level. For ERS, as of June 30, 2012, it is assumed that the COLAs will be suspended for 15 years due to the current funding level of the plans aggregated in determining the funded ratio. The actual COLA will be determined based on the plan's five-year average investment rate of return minus 5.5%, limited to a minimum value of 0% and a maximum value of 4.0%. The COLA, whether standard or interim, is limited to the first $25,000 of the member or beneficiary's annual pension benefit. This limit will be indexed annually to increase in the same manner as COLAs. However, since there is no suspension of the indexing of the limit, it was assumed that this amount would increase at 2%, per annum, except for 2012 and 2013 where the indexation is 0% based on the System's investment returns.

While the COLAs for MERS will actually be suspended on a unit basis whenever the funded ratio for that particular unit is less than 80%, COLAs are assumed to be 2% per annum, for all years after 2013 for each unit. The actual COLA amount will be determined based on the plan's five-year average investment rate of return minus 5.5%, limited to a minimum value of 0% and a maximum value of 4.0%. It is known that the COLA for calendar years 2012 and 2013 will be zero and this has been reflected in the valuation. The COLA is limited to the first $25,000 of the member or beneficiary's

annual pension benefit. This limit will be indexed annually to increase in the same manner as COLAs. Therefore, it is assumed that the COLA cap will be indexed at 0% for 2012 and 2013 and then will increase at 2% per annum.

It is assumed that once a funded ratio of 80% is reached either by the aggregated group for ERS, or the individual unit for MERS, the funded ratio will not drop below 80% at any future date.

4. Payroll Growth Rate

In the amortization of the unfunded accrued liability, payroll is assumed to increase 3.75% per year.

5. Family Composition

85% of ERS members and 80% of MERS members are assumed to be married for purposes of survivor benefits. Spouses of male members are assumed to be three years younger than the member and spouses of female members are assumed to be three years older than the member.

6. Salary Increase Rate

Wage inflation component: ERS State employees, Teachers, and MERS General Employees, 4.00%; MERS Police and Fire, 4.25%. In addition to the wage inflation component above, the additional service based components are as follows:

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

6. Salary Increase Rate (contd.)

	ERS		MERS	
Service	State Employees	Teachers	General Employees	Police and Fire
0	3.00%	8.75%	4.00%	10.00%
1	3.00%	7.50%	3.00%	9.00%
2	3.00%	6.25%	2.75%	6.00%
3	2.75%	5.50%	2.50%	3.00%
4	2.75%	5.00%	2.25%	2.50%
5	2.75%	4.75%	2.00%	2.00%
6	1.50%	4.50%	1.25%	0.50%
7	1.50%	4.25%	0.75%	0.50%
8	1.25%	4.00%	0.50%	0.25%
9	1.25%	3.75%	0.50%	0.25%
10	1.25%	1.50%	0.25%	0.00%
11	1.25%	0.00%	0.25%	0.00%
12	1.25%	0.00%	0.25%	0.00%
13	1.00%	0.00%	0.25%	0.00%
14	1.00%	0.00%	0.25%	0.00%
15	1.00%	0.00%	0.00%	0.00%
16	0.75%	0.00%	0.00%	0.00%
17	0.75%	0.00%	0.00%	0.00%
18	0.50%	0.00%	0.00%	0.00%
19	0.50%	0.00%	0.00%	0.00%
20	0.50%	0.00%	0.00%	0.00%
21+	0.00%	0.00%	0.00%	0.00%

Following GRS's methodology, these service-based amounts are added to the inflation-based component rather than compounded.

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

7. Rates of Termination

Termination rates are not applied to members eligible for unreduced retirement. Rates are shown as follows:

ERS State Employees and Teachers:

	State Employees		Teachers	
Service	Male	Female	Male	Female
0	24.00%	12.00%	17.00%	8.90%
1	8.82%	10.00%	9.00%	7.78%
2	7.61%	7.78%	5.62%	6.81%
3	6.56%	6.82%	4.55%	5.95%
4	5.65%	5.99%	3.64%	5.21%
5	4.87%	5.26%	2.89%	4.55%
6	4.21%	4.63%	2.29%	3.98%
7	3.66%	4.09%	1.81%	3.48%
8	3.21%	3.63%	1.45%	3.05%
9	2.85%	3.25%	1.20%	2.66%
10	2.57%	2.93%	1.20%	2.33%
11	2.35%	2.67%	1.20%	2.04%
12	2.19%	2.46%	1.20%	1.78%
13	2.08%	2.28%	1.20%	1.56%
14	1.99%	2.14%	1.20%	1.36%
15	1.94%	2.02%	1.20%	1.19%
16	1.89%	1.91%	1.20%	1.04%
17	1.85%	1.81%	1.20%	0.91%
18	1.79%	1.70%	1.20%	0.80%
19	1.72%	1.58%	1.20%	0.70%
20	1.62%	1.44%	0.94%	0.61%
21	1.47%	1.28%	0.94%	0.53%
22	1.27%	1.07%	0.94%	0.47%
23	1.01%	0.82%	0.94%	0.41%
24	0.68%	0.51%	0.94%	0.36%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

7. Rates of Termination (contd.)

MERS General and Police/Fire Employees:

	General		Police & Fire
Service	Male	Female	Unisex
0	17.50%	18.00%	10.00%
1	10.87%	11.43%	5.28%
2	9.22%	9.73%	4.81%
3	7.78%	8.24%	4.36%
4	6.55%	6.95%	3.94%
5	5.52%	5.84%	3.54%
6	4.65%	4.91%	3.16%
7	3.94%	4.12%	2.81%
8	3.37%	3.48%	2.49%
9	2.93%	2.96%	2.19%
10	2.60%	2.55%	1.91%
11	2.36%	2.23%	1.66%
12	2.20%	1.99%	1.43%
13	2.09%	1.81%	1.23%
14	2.04%	1.69%	1.05%
15	2.01%	1.59%	0.90%
16	2.00%	1.52%	0.77%
17	1.98%	1.45%	0.67%
18	1.95%	1.37%	0.59%
19	1.87%	1.27%	0.00%
20	1.75%	1.12%	0.00%
21	1.56%	0.92%	0.00%
22	1.29%	0.65%	0.00%
23	0.92%	0.30%	0.00%
24	0.44%	0.00%	0.00%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Disability

No disability of any type is assumed once the assumption of 100% retirement is achieved for all members.

No ordinary disability is assumed at the earlier of unreduced retirement eligibility or age 62 for all ERS members. For MERS GE, no ordinary disability is assumed at the earlier of **reduced** (to more closely match GRS) retirement eligibility or age 62. For MERS Police and Fire, no ordinary disability is assumed at the earlier of unreduced retirement eligibility and age 65.

No accidental disability is assumed after age 62 for all ERS members and for MERS General Employees. For MERS Police and Fire, the only limit on accidental disability is 100% retirement.

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Disability (contd.)

	ERS State Employees				ERS Teachers	
	Male		Female		Unisex	
Age	Ordinary	Accidental	Ordinary	Accidental	Ordinary	Accidental
20	0.02400%	0.01080%	0.03000%	0.00600%	0.01500%	0.00240%
21	0.02640%	0.01188%	0.03300%	0.00660%	0.01650%	0.00264%
22	0.02880%	0.01296%	0.03600%	0.00720%	0.01800%	0.00288%
23	0.03120%	0.01404%	0.03900%	0.00780%	0.01950%	0.00312%
24	0.03360%	0.01512%	0.04200%	0.00840%	0.02100%	0.00336%
25	0.03600%	0.01620%	0.04500%	0.00900%	0.02250%	0.00360%
26	0.03760%	0.01692%	0.04700%	0.00940%	0.02350%	0.00376%
27	0.03920%	0.01764%	0.04900%	0.00980%	0.02450%	0.00392%
28	0.04080%	0.01836%	0.05100%	0.01020%	0.02550%	0.00408%
29	0.04240%	0.01908%	0.05300%	0.01060%	0.02650%	0.00424%
30	0.04400%	0.01980%	0.05500%	0.01100%	0.02750%	0.00440%
31	0.04720%	0.02124%	0.05900%	0.01180%	0.02950%	0.00472%
32	0.05040%	0.02268%	0.06300%	0.01260%	0.03150%	0.00504%
33	0.05360%	0.02412%	0.06700%	0.01340%	0.03350%	0.00536%
34	0.05680%	0.02556%	0.07100%	0.01420%	0.03550%	0.00568%
35	0.06000%	0.02700%	0.07500%	0.01500%	0.03750%	0.00600%
36	0.06560%	0.02952%	0.08200%	0.01640%	0.04100%	0.00656%
37	0.07120%	0.03204%	0.08900%	0.01780%	0.04450%	0.00712%
38	0.07680%	0.03456%	0.09600%	0.01920%	0.04800%	0.00768%
39	0.08240%	0.03708%	0.10300%	0.02060%	0.05150%	0.00824%
40	0.08800%	0.03960%	0.11000%	0.02200%	0.05500%	0.00880%
41	0.09920%	0.04464%	0.12400%	0.02480%	0.06200%	0.00992%
42	0.11040%	0.04968%	0.13800%	0.02760%	0.06900%	0.01104%
43	0.12160%	0.05472%	0.15200%	0.03040%	0.07600%	0.01216%
44	0.13280%	0.05976%	0.16600%	0.03320%	0.08300%	0.01328%
45	0.14400%	0.06480%	0.18000%	0.03600%	0.09000%	0.01440%
46	0.16400%	0.07380%	0.20500%	0.04100%	0.10250%	0.01640%
47	0.18400%	0.08280%	0.23000%	0.04600%	0.11500%	0.01840%
48	0.20400%	0.09180%	0.25500%	0.05100%	0.12750%	0.02040%
49	0.22400%	0.10080%	0.28000%	0.05600%	0.14000%	0.02240%
50	0.24400%	0.10980%	0.30500%	0.06100%	0.15250%	0.02440%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Disability (contd.)

	ERS State Employees				ERS Teachers	
	Male		Female		Male and Female	
Age	Ordinary	Accidental	Ordinary	Accidental	Ordinary	Accidental
51	0.27600%	0.12420%	0.34500%	0.06900%	0.17250%	0.02760%
52	0.30800%	0.13860%	0.38500%	0.07700%	0.19250%	0.03080%
53	0.34000%	0.15300%	0.42500%	0.08500%	0.21250%	0.03400%
54	0.37200%	0.16740%	0.46500%	0.09300%	0.23250%	0.03720%
55	0.40400%	0.18180%	0.50500%	0.10100%	0.25250%	0.04040%
56	0.43600%	0.19620%	0.54500%	0.10900%	0.27250%	0.04360%
57	0.46800%	0.21060%	0.58500%	0.11700%	0.29250%	0.04680%
58	0.50000%	0.22500%	0.62500%	0.12500%	0.31250%	0.05000%
59	0.53200%	0.23940%	0.66500%	0.13300%	0.33250%	0.05320%
60	0.56400%	0.25380%	0.70500%	0.14100%	0.35250%	0.05640%
61	0.63600%	0.28620%	0.79500%	0.15900%	0.39750%	0.06360%
62	0.63600%	0.28620%	0.79500%	0.15900%	0.39750%	0.06360%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Disability (contd.)

	MERS General Employees				MERS Police and Fire	
	Male		Female		Unisex	
Age	Ordinary	Accidental	Ordinary	Accidental	Ordinary	Accidental
20	0.04200%	0.01500%	0.01800%	0.00480%	0.03000%	0.12000%
21	0.04620%	0.01650%	0.01980%	0.00528%	0.03250%	0.13000%
22	0.05040%	0.01800%	0.02160%	0.00576%	0.03500%	0.14000%
23	0.05460%	0.01950%	0.02340%	0.00624%	0.03750%	0.15000%
24	0.05880%	0.02100%	0.02520%	0.00672%	0.04000%	0.16000%
25	0.06300%	0.02250%	0.02700%	0.00720%	0.04250%	0.17000%
26	0.06580%	0.02350%	0.02820%	0.00752%	0.04500%	0.18000%
27	0.06860%	0.02450%	0.02940%	0.00784%	0.04750%	0.19000%
28	0.07140%	0.02550%	0.03060%	0.00816%	0.05000%	0.20000%
29	0.07420%	0.02650%	0.03180%	0.00848%	0.05250%	0.21000%
30	0.07700%	0.02750%	0.03300%	0.00880%	0.05500%	0.22000%
31	0.08260%	0.02950%	0.03540%	0.00944%	0.05850%	0.23400%
32	0.08820%	0.03150%	0.03780%	0.01008%	0.06200%	0.24800%
33	0.09380%	0.03350%	0.04020%	0.01072%	0.06550%	0.26200%
34	0.09940%	0.03550%	0.04260%	0.01136%	0.06900%	0.27600%
35	0.10500%	0.03750%	0.04500%	0.01200%	0.07250%	0.29000%
36	0.11480%	0.04100%	0.04920%	0.01312%	0.08000%	0.32000%
37	0.12460%	0.04450%	0.05340%	0.01424%	0.08750%	0.35000%
38	0.13440%	0.04800%	0.05760%	0.01536%	0.09500%	0.38000%
39	0.14420%	0.05150%	0.06180%	0.01648%	0.10250%	0.41000%
40	0.15400%	0.05500%	0.06600%	0.01760%	0.11000%	0.44000%
41	0.17360%	0.06200%	0.07440%	0.01984%	0.12400%	0.49600%
42	0.19320%	0.06900%	0.08280%	0.02208%	0.13800%	0.55200%
43	0.21280%	0.07600%	0.09120%	0.02432%	0.15200%	0.60800%
44	0.23240%	0.08300%	0.09960%	0.02656%	0.16600%	0.66400%
45	0.25200%	0.09000%	0.10800%	0.02880%	0.18000%	0.72000%
46	0.28700%	0.10250%	0.12300%	0.03280%	0.20450%	0.81800%
47	0.32200%	0.11500%	0.13800%	0.03680%	0.22900%	0.91600%
48	0.35700%	0.12750%	0.15300%	0.04080%	0.25350%	1.01400%
49	0.39200%	0.14000%	0.16800%	0.04480%	0.27800%	1.11200%
50	0.42700%	0.15250%	0.18300%	0.04880%	0.30250%	1.21000%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Disability (contd.)

	MERS General Employees				MERS Police and Fire	
	Male		Female		Male and Female	
Age	Ordinary	Accidental	Ordinary	Accidental	Ordinary	Accidental
51	0.48300%	0.17250%	0.20700%	0.05520%	0.30250%	1.21000%
52	0.53900%	0.19250%	0.23100%	0.06160%	0.30250%	1.21000%
53	0.59500%	0.21250%	0.25500%	0.06800%	0.30250%	1.21000%
54	0.65100%	0.23250%	0.27900%	0.07440%	0.30250%	1.21000%
55	0.70700%	0.25250%	0.30300%	0.08080%	0.30250%	1.21000%
56	0.76300%	0.27250%	0.32700%	0.08720%	0.30250%	1.21000%
57	0.81900%	0.29250%	0.35100%	0.09360%	0.30250%	1.21000%
58	0.87500%	0.31250%	0.37500%	0.10000%	0.30250%	1.21000%
59	0.93100%	0.33250%	0.39900%	0.10640%	0.30250%	1.21000%
60	0.98700%	0.35250%	0.42300%	0.11280%	0.30250%	1.21000%
61	1.11300%	0.39750%	0.47700%	0.12720%	0.30250%	1.21000%
62	1.11300%	0.39750%	0.47700%	0.12720%	0.30250%	1.21000%
63	0.00000%	0.00000%	0.00000%	0.00000%	0.30250%	1.21000%
64	0.00000%	0.00000%	0.00000%	0.00000%	0.30250%	1.21000%
65	0.00000%	0.00000%	0.00000%	0.00000%	0.30250%	1.21000%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

9. Rates of Mortality for Healthy Lives

Postretirement mortality rates are as follows:

Healthy male ERS State employees and MERS: 115% of RP-2000 Combined Healthy for Males with White Collar adjustments, projected with Scale AA from 2000.

Healthy female ERS State employees and MERS: 95% of RP-2000 Combined Healthy for Females with White Collar adjustments, projected with Scale AA from 2000.

Healthy male ERS Teachers: 97% of rates in a GRS table based on male teacher experience, projected with Scale AA from 2000.

Healthy female ERS Teachers: 92% of rates in a GRS table based on female teacher experience, projected with Scale AA from 2000.

Preretirement mortality is assumed to be the RP-2000 Combined Healthy tables with White Collar adjustments with a 75% adjustment factor for ERS State employees and a 50% adjustment factor for ERS Teachers.

Provided below is the table of the rates used for the healthy Teachers mentioned above:

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

9. Rates of Mortality for Healthy ERS Teachers Lives (contd.)

Age	Male	Female	Age	Male	Female
15	0.0286%	0.0177%	67	0.6265%	0.4748%
16	0.0324%	0.0200%	68	0.7804%	0.5569%
17	0.0357%	0.0218%	69	0.9929%	0.6620%
18	0.0381%	0.0228%	70	1.2119%	0.7765%
19	0.0401%	0.0231%	71	1.4365%	0.8778%
20	0.0420%	0.0231%	72	1.6283%	0.9753%
21	0.0445%	0.0231%	73	1.7688%	1.0392%
22	0.0472%	0.0233%	74	1.8853%	1.1108%
23	0.0512%	0.0237%	75	2.0407%	1.1882%
24	0.0556%	0.0240%	76	2.2290%	1.3246%
25	0.0611%	0.0243%	77	2.5459%	1.5513%
26	0.0676%	0.0252%	78	2.9929%	1.8461%
27	0.0714%	0.0258%	79	3.5627%	2.2234%
28	0.0741%	0.0269%	80	4.2403%	2.6833%
29	0.0765%	0.0283%	81	5.0129%	3.2267%
30	0.0787%	0.0307%	82	5.8642%	3.8524%
31	0.0807%	0.0335%	83	6.7071%	4.5649%
32	0.0824%	0.0357%	84	7.7165%	5.3700%
33	0.0833%	0.0375%	85	8.7217%	6.3303%
34	0.0834%	0.0393%	86	9.8168%	7.3869%
35	0.0836%	0.0414%	87	11.1466%	8.5342%
36	0.0847%	0.0438%	88	12.6205%	9.6587%
37	0.0875%	0.0466%	89	14.0830%	10.9996%
38	0.0911%	0.0499%	90	15.8331%	12.2984%
39	0.0958%	0.0538%	91	17.4167%	13.5385%
40	0.1016%	0.0586%	92	19.2620%	14.8232%
41	0.1082%	0.0634%	93	20.8721%	16.2905%
42	0.1157%	0.0681%	94	22.5338%	17.6154%
43	0.1235%	0.0724%	95	24.5978%	19.0450%
44	0.1316%	0.0761%	96	26.4823%	20.5998%
45	0.1407%	0.0793%	97	28.3517%	22.5094%
46	0.1517%	0.0832%	98	30.4224%	24.1907%
47	0.1652%	0.0885%	99	31.7914%	25.7323%
48	0.1806%	0.0960%	100	32.6934%	27.0191%
49	0.1975%	0.1042%	101	34.7803%	29.3440%
50	0.2163%	0.1150%	102	36.5398%	31.3683%
51	0.2379%	0.1412%	103	38.4977%	33.5419%
52	0.2630%	0.1736%	104	40.6289%	35.8796%
53	0.2934%	0.2124%	105	42.7367%	38.1966%
54	0.3256%	0.2596%	106	44.6242%	40.3076%
55	0.3666%	0.3148%	107	46.0944%	42.0278%
56	0.3846%	0.3730%	108	47.1100%	43.3774%
57	0.3946%	0.4194%	109	47.8023%	44.4795%
58	0.3961%	0.4399%	110	48.2273%	45.3041%
59	0.3834%	0.4357%	111	48.4412%	45.8210%
60	0.3578%	0.4086%	112	48.5000%	46.0000%
61	0.3921%	0.3751%	113	48.5000%	46.0000%
62	0.4169%	0.3534%	114	48.5000%	46.0000%
63	0.4351%	0.3472%	115	48.5000%	46.0000%
64	0.4448%	0.3547%	116	48.5000%	46.0000%
65	0.4677%	0.3777%	117	100.0000%	100.0000%
66	0.5269%	0.4176%			

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

10. Rates of Mortality for Disabled Lives

Disabled males: 60% of the PBGC Table Va for disabled males eligible for Social Security disability benefits.

Disabled females: 60% of the PBGC Table VIa for disabled females eligible for Social Security disability benefits.

Provided below is a table of these rates:

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

10. Rates of Mortality for Disabled Lives (contd.)

Age	Male	Female	Age	Male	Female
20	2.898%	1.578%	66	4.122%	2.268%
21	2.898%	1.578%	67	4.182%	2.316%
22	2.898%	1.578%	68	4.254%	2.364%
23	2.898%	1.578%	69	4.338%	2.412%
24	2.898%	1.578%	70	4.434%	2.466%
25	2.898%	1.578%	71	4.542%	2.526%
26	2.766%	1.542%	72	4.656%	2.598%
27	2.616%	1.518%	73	4.776%	2.682%
28	2.466%	1.482%	74	4.908%	2.790%
29	2.316%	1.452%	75	5.052%	2.952%
30	2.172%	1.422%	76	5.214%	3.174%
31	2.034%	1.392%	77	5.448%	3.468%
32	1.920%	1.362%	78	5.772%	3.786%
33	1.812%	1.332%	79	6.258%	4.116%
34	1.728%	1.308%	80	6.768%	4.476%
35	1.668%	1.284%	81	7.326%	4.878%
36	1.632%	1.272%	82	7.932%	5.310%
37	1.626%	1.260%	83	8.592%	5.772%
38	1.638%	1.248%	84	9.306%	6.258%
39	1.656%	1.248%	85	10.092%	6.768%
40	1.692%	1.254%	86	10.950%	7.326%
41	1.728%	1.260%	87	11.880%	7.932%
42	1.782%	1.278%	88	12.900%	8.592%
43	1.830%	1.296%	89	13.980%	9.306%
44	1.884%	1.314%	90	15.150%	10.092%
45	1.932%	1.344%	91	16.434%	10.950%
46	1.980%	1.374%	92	17.832%	11.880%
47	2.040%	1.410%	93	19.356%	12.900%
48	2.118%	1.452%	94	20.970%	13.980%
49	2.202%	1.494%	95	22.734%	15.150%
50	2.298%	1.542%	96	24.654%	16.434%
51	2.406%	1.584%	97	26.748%	17.832%
52	2.520%	1.632%	98	29.028%	19.356%
53	2.634%	1.686%	99	31.458%	20.970%
54	2.760%	1.728%	100	34.104%	22.734%
55	2.892%	1.770%	101	36.984%	24.654%
56	3.036%	1.806%	102	40.122%	26.748%
57	3.186%	1.842%	103	43.542%	29.028%
58	3.330%	1.890%	104	47.190%	31.458%
59	3.486%	1.938%	105	51.162%	34.104%
60	3.618%	1.986%	106	55.482%	36.984%
61	3.744%	2.034%	107	100.000%	40.122%
62	3.858%	2.082%	108	100.000%	43.542%
63	3.942%	2.130%	109	100.000%	47.190%
64	4.008%	2.172%	110	100.000%	100.000%
65	4.068%	2.220%			

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

11. Rates of Retirement (unreduced)

ERS State and Teachers: Separate male and female rates, based on schedule, age and service. For members who reach 28 years of service before age 60, service-based rates are used. For members who reach age 60 before reaching 28 years of service, age-based rates are used instead. The following tables show the probabilities of retirement.

Because of the enactment of Article 7 in 2009 and the RIRSA in 2011, the retirement assumption was modified for members whose retirement ages were delayed. Members whose retirement eligibility was deferred at least a year from the date under the rules in effect before the enactment of the provision changes are assumed to retire when first eligible for an unreduced benefit.

Schedule A State Employees:

State Employees Excluding Corrections – Schedule A

Male				Female			
Service (00/28)		Age (60/10)		Service (00/28)		Age (60/10)	
Service	Rate	Age	Rate	Service	Rate	Age	Rate
28	17.5%	60	10.0%	28	20.0%	60	15.0%
29	13.0%	61	5.0%	29	15.0%	61	10.0%
30	13.0%	62	17.5%	30	15.0%	62	20.0%
31	13.0%	63	15.0%	31	15.0%	63	15.0%
32	13.0%	64	15.0%	32	15.0%	64	15.0%
33	17.5%	65	20.0%	33	15.0%	65	20.0%
34	17.5%	66	17.5%	34	15.0%	66	25.0%
35	40.0%	67	17.5%	35	40.0%	67	20.0%
36	35.0%	68	17.5%	36	30.0%	68	20.0%
37	35.0%	69	17.5%	37	30.0%	69	20.0%
38	35.0%	70	17.5%	38	30.0%	70	20.0%
39	35.0%	71	17.5%	39	30.0%	71	20.0%
40	100.0%	72	17.5%	40	100.0%	72	20.0%
		73	17.5%			73	20.0%
		74	17.5%			74	20.0%
		75	100.0%			75	100.0%

Schedule B State Employees: 60% of members are assumed to retire when first eligible, either at age 59 with 29 years of service, or at age 65 with 10 years of service. The rates in the table above are applied after first eligibility.

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

11. Rates of Retirement (contd.)

Schedule A Teachers:

Teachers							
Male				Female			
Service (00/28)		Age (60/10)		Service (00/28)		Age (60/10)	
Service	Rate	Age	Rate	Service	Rate	Age	Rate
28	25.0%	60	20.0%	28	20.0%	60	20.0%
29	15.0%	61	15.0%	29	15.0%	61	15.0%
30	20.0%	62	30.0%	30	20.0%	62	25.0%
31	20.0%	63	25.0%	31	20.0%	63	20.0%
32	30.0%	64	10.0%	32	30.0%	64	20.0%
33	30.0%	65	25.0%	33	30.0%	65	35.0%
34	40.0%	66	25.0%	34	35.0%	66	25.0%
35	55.0%	67	25.0%	35	50.0%	67	25.0%
36	40.0%	68	25.0%	36	40.0%	68	25.0%
37	40.0%	69	25.0%	37	40.0%	69	25.0%
38	40.0%	70	25.0%	38	40.0%	70	25.0%
39	40.0%	71	25.0%	39	40.0%	71	25.0%
40	100.0%	72	25.0%	40	100.0%	72	25.0%
		73	25.0%			73	25.0%
		74	25.0%			74	25.0%
		75	100.0%			75	100.0%

Schedule B Teachers: 70% of members who reach age 59 with 29 years of service before age 65 are assumed to retire when first eligible, at age 59 with 29 years of service. 75% of other members are expected to retire when first eligible, at age 65 with 10 years of service. The rates in the table above are applied after first eligibility.

ERS Nurses: MHRH nurses have retirement rates similar to the service-based State Employees Schedule A rates with the rates shifted three years earlier, including 100% at 37 years of service, to reflect the earlier eligibility at 25 years of service.

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

11. Rates of Retirement (contd.)

ERS Correctional Officers: Unisex rates, indexed by service. All members still active are assumed to retire at age 65 with 10 years of service. Rates are shown below:

Correctional Officers			
Service	**Rate**	**Service**	**Rate**
20	5.0%	31	13.0%
21	5.0%	32	13.0%
22	5.0%	33	20.0%
23	5.0%	34	20.0%
24	5.0%	35	35.0%
25	5.0%	36	25.0%
26	5.0%	37	25.0%
27	5.0%	38	25.0%
28	5.0%	39	25.0%
29	5.0%	40	100.0%
30	13.0%		

MERS General Employees:

MERS General Employees							
Male				Female			
Service (00/30)		Age (58/10)		Service (00/30)		Age (58/10)	
Service	**Rate**	**Age**	**Rate**	**Service**	**Rate**	**Age**	**Rate**
30	30.0%	58	12.0%	30	30.0%	58	12.0%
31	30.0%	59	10.0%	31	25.0%	59	10.0%
32	25.0%	60	10.0%	32	10.0%	60	10.0%
33	25.0%	61	10.0%	33	10.0%	61	10.0%
34	25.0%	62	30.0%	34	10.0%	62	20.0%
35	25.0%	63	20.0%	35	15.0%	63	15.0%
36	25.0%	64	20.0%	36	20.0%	64	15.0%
37	25.0%	65	20.0%	37	25.0%	65	20.0%
38	35.0%	66	25.0%	38	25.0%	66	25.0%
39	50.0%	67	25.0%	39	25.0%	67	25.0%
40	100.0%	68	25.0%	40	100.0%	68	25.0%
		69	30.0%			69	25.0%
		70	30.0%			70	20.0%
		71	30.0%			71	20.0%
		72	30.0%			72	20.0%
		73	30.0%			73	20.0%
		74	30.0%			74	20.0%
		75	100.0%			75	100.0%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

11. Rates of Retirement (contd.)

MERS Police and Fire: Unisex rates, indexed by service. All members still active are assumed to retire at age 65 with 10 years of service or at age 70. Membership in the optional 20-year provision was determined by historical data provided by GRS. Rates are shown below:

	Police and Fire	
Service	Units with Optional 20-year election	Units without Optional 20-year election
20	12.0%	
21	10.0%	
22	10.0%	
23	10.0%	
24	12.0%	
25	14.0%	50.0%
26	16.0%	16.0%
27	18.0%	18.0%
28	20.0%	20.0%
29	20.0%	20.0%
30+	35.0%	35.0%

Reduced retirement: Schedule B members (ERS State Employees and Teachers excluding Correctional Officers and Nurses) and MERS General Employees members are eligible for a reduced retirement beginning when at least age 50 and within five years of eligibility for an unreduced retirement benefit. MERS Police and Fire members were not valued as having an early retirement benefit in order to more closely match GRS' valuation. Rates are based on years removed from Eligible Retirement Age, as shown below:

Reduced Retirement	
Years from Eligible Retirement Age	Rate
5	2%
4	2%
3	2%
2	3%
1	4%

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

12. Inactive Members

Liabilities for inactive members are approximated as a multiple of their member contribution account balances. For nonvested inactive members, the multiple is 1.0. For vested inactive members, the multiple is 8.0 for members with 25 or more years of service, 3.0 for vested inactive members age 45 or older with less than 25 years of service, and 1.0 for other vested inactive members younger than age 45.

13. Percent Electing Annuity on Death

Spouses of vested, married participants are assumed to elect the more valuable of a reduced annuity or a refund of the member's contributions at the time of death.

14. Actuarial Equivalence for Death Benefit

For the purposes of valuing the annuity benefit payable to an active member's surviving spouse, equivalence factors are used in valuing the 100% joint spouse payment form. For ERS, male members receive a factor of 0.78 for their female spouses, while female members receive a factor of 0.84 for their male spouses.

MERS members are valued using a table of unisex rates, shown below. These rates were determined through analyzing sample lives provided by GRS, and as such may not represent the full tables used by GRS.

Equivalence Factors

Age	Factor	Age	Factor
<52	0.95	63	0.90
52	0.94	64	0.89
53	0.94	65	0.89
54	0.93	66	0.88
55	0.93	67	0.88
56	0.93	68	0.87
57	0.92	69	0.87
58	0.92	70	0.86
59	0.91	71	0.86
60	0.91	72	0.85
61	0.91	73	0.84
62	0.90	74+	0.84

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

15. Accidental Death

The incidence of accidental death was accounted for by adding a 7.5% load onto all valued regular death benefits.

16. Salaries for members of Cranston Police and Fire

As indicated by GRS, the raw salaries for members of Cranston Police and Fire departments were increased to account for longevity and holiday pay. This is done to mirror GRS, but our understanding of the statutes is that this adjustment is not actually applicable after RIRSA.

17. MERS Special Post-Retirement Police and Fire Survivor Benefit

It is assumed that 80% of members will have a spouse at the time of retirement and 10% of those members will choose a joint spouse benefit, rendering them ineligible for the special police and fire survivor benefit.

18. Percent Electing Deferred Termination Benefit

Vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.

19. Minimum Disability Benefit

In calculating the minimum benefit payable in the event of disability, pre-RIRSA accrual rates are used. For ERS, expressed as a percentage of FAC, the minimum benefit is thus 20% for Correctional Officers, 17% for Schedule A members, and 16% for Schedule B members. For MERS, the minimum benefit is 25% for Police and Fire members that were subject to the 20-year retirement provision and 20% for other Police and Fire members as well as General Employees members.

20. Recovery From Disability

None are assumed to fully recover from disability. 50% of ERS members with accidental disability are assumed to be able to work other future jobs.

21. Assumed Age for Commencement of Deferred Benefits

Members electing to receive a deferred benefit are assumed to commence receipt at their Social Security Normal Retirement Age.

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

22. Decrement Timing

For all employees in ERS and MERS, decrements are assumed to occur at the middle of the year.

23. Reduction for Early Pension

Members of ERS and MERS have their early retirement benefit reduced 9% for each year prior to the age they become first eligible for an unreduced benefit.

In the event of an active member's death, the member's spouse can receive a benefit reduced by the number of years in which the member deceased prior to their expected Normal Retirement Age. The benefit is reduced 6% per year for ERS members and 9% per year for MERS members.

24. Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment from multiple decrement table effects.

25. Incidence of Contributions

Contributions are assumed to be received at the beginning of the year based on the computed percent of payroll shown in this report.

26. Benefit Service

All members are assumed to accrue one year of service each year.

27. Remarriage

It is assumed that no surviving spouse will remarry and there will be no children's benefit.

28. IRC Code Limitations

All calculations were performed without regard to the IRC Section 401(a)(17) compensation limit and the IRC Section 415 benefit limit.

APPENDIX A
ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Asset Valuation Method

The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses.

2. Actuarial Funding Method

The individual Entry Age Normal actuarial funding method is used for active employees, whereby the normal cost is computed as the level annual percentage of pay required to fund the retirement benefits between each member's date of hire and assumed retirement. The actuarial liability is the difference between the present value of future benefits and the present value of future normal cost. The unfunded actuarial liability is the difference between the actuarial liability and the actuarial value of assets.

The unfunded actuarial liability is being amortized over a closed 25-year period as of June 30, 2010 as a level percent of pay. Gains or losses established on or after June 30, 2015 are amortized over 20 years.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
ERS

The plan provisions for ERS are given in Chapters 8 to 10 of Title 36 and Chapters 15 to 17 of Title 16 of the Rhode Island General Laws.

1. Participation

Most state employees and certified public school teachers become members as of their date of employment. The primary exceptions are some employees at state colleges and university.

2. Final Compensation Used for Benefit Determination

Final Compensation (FAC) is the average annual compensation for the highest three consecutive years of salary for members eligible to retire as of September 30, 2009. For members not eligible to retire as of September 30, 2009, FAC is based on the highest five consecutive years of salary.

For members who are not eligible for retirement by June 30, 2012, the five year average is replaced by the average of the highest ten consecutive years of compensation if more than one-half of the member's total years of service at retirement/termination were based on service of less than thirty hours per week, but the member's highest five year average compensation contains at least three years in which they worked over thirty hours per week.

3. Normal Retirement Eligibility

a. Eligibility: As of July 1, 2012, retirement eligibility dates mirror Social Security Normal Retirement Age, not to exceed 67, with special provisions for those eligible prior to July 1, 2012 and those with at least five years of service as follows:

   (i) Members with less than five years of contributory service as of June 30, 2012 and members hired on or after that date are eligible for retirement on or after their Social Security Normal Retirement Age.

   (ii) Members who had at least five years of contributory service as of June 30, 2012 will be eligible for retirement at an individually determined age. This age is the result of interpolating between the member's Article 7 Retirement Date and the retirement age applicable to members hired after June 30, 2012 in (i) above. The interpolation is based on service as of June 30, 2012 divided by projected service at the member's Article 7 Retirement Date. The minimum retirement age is 59.

   (iii) Members with 10 or more years of contributory service on June 30, 2012 may choose to retire at their Article 7 Retirement Date if they continue to work and contribute until that date. If this option is elected, the retirement benefit will be calculated using the benefits you have accrued as of June 30, 2012, i.e., the member will accumulate no additional defined benefits after this date, but the benefit will be paid without any actuarial reduction.

   (iv) A member who is within five years of reaching their retirement eligibility date,

described in this section, and has 20 or more years of service, may elect to retire at any time with an actuarially reduced benefit.

(v) Nurses (RNs) employed by MHRH are eligible to retire when they are at least 55 years old and have a minimum of 25 years of contributing service. If their Article 7 Retirement Date was prior to June 30, 2012, they retain that eligibility date. The statutes provide no alternate eligibility for Nurses with less than 25 years of contributing service.

(vi) Correctional officers are eligible to retire when they are at least 55 years old and have a minimum of 25 years of contributing service. If the Article 7 Retirement Date was prior to June 30, 2012, they retain that eligibility date. Correctional officers who do not work for 25 years will not receive their pension benefit until they reach the later of Social Security Normal Retirement Age or 5 years of service.

b. Article 7 Retirement Date (member's retirement date as of September 30, 2009):

(i) Grandfathered Schedule A members—members with at least 10 years of contributory service at June 30, 2005 and eligible for retirement at September 30, 2009—are eligible to retire on or after age 60 if they have credit for 10 years of service, or at any age if they have credit for 28 years of service.

(ii) Correctional officers who have reached age 50 and have credit for 20 years of service as of September 30, 2009 are eligible to retire and are grandfathered.

(iii) Nurses (RNs) employed by MHRH who have reached age 50 with 25 years of service by September 30, 2009 are eligible to retire and are grandfathered.

(iv) Schedule B members—members with less than 10 years of contributory service as of June 30, 2005 and members hired on or after that date—are eligible for retirement on or after age 65 if they have credit for 10 years of service, or on or after age 62 if they have credit for 29 years of service. In addition, a member who attains age 62 with at least 20 years of service credit may retire with an actuarially reduced retirement benefit. The reduction is based on the difference between 65 and the member's age at retirement.

(v) Correctional officers who are hired after September 30, 2009 become eligible to retire when they have reach age 55 and have credit for 25 years of service.

(vi) Nurses (RNs) employed by MHRH who are hired after September 30, 2009 become eligible when they have reach age 55 and have credit for 25 years of service.

(vii) Schedule A members who are not grandfathered, i.e., members who had at least 10 years of creditable service at June 30, 2005 but who were not eligible to retire on September 30, 2009, will be eligible for retirement at an

individually determined age. This age is the result of interpolating between the retirement age under the rules applicable to grandfathered employees in (i) above and the retirement age applicable to members hired after September 30, 2009 in (iv) above. The interpolation is based on service as of September 30, 2009 divided by projected service at the retirement age under (i) above.

(viii) Correctional officers hired on or before September 30, 2009 who are not eligible for retirement at that date will have an individually determined retirement age. This age is the result of interpolating between the retirement age for grandfathered employees in (ii) above and the retirement age applicable to members hired after September 30, 2009 in (v) above.

(ix) Similarly, MHRH nurses (RNs) hired on or before September 30, 2009 who are not eligible to retire at that date will have an individually determined retirement age. This age is the result of interpolating between the retirement age for grandfathered employees in (iii) above and the retirement age applicable to members hired after September 30, 2009 in (vi) above.

4. Normal Retirement Benefit Amount

a. Monthly benefit: Upon retirement, members are eligible to commence a benefit determined as the sum of:

   i. Benefit accrual of 1.0% per year (2.0% for Correctional Officers through 30 years of service with individual rates for years of service 31-35) for all service after June 30, 2012, and
   ii. Benefit accruals earned as of June 30, 2012, described in (b) below.

   The total benefit cannot exceed a specified percentage of the member's monthly FAC. If the accrual was greater than the specified percentage as of June 30, 2012, that accrued value is preserved, but there is no additional accrual. For purposes of calculating benefit accruals for service after June 30, 2012, the FAC is determined through retirement. Additionally, Correctional Officers who have completed 25 years of service on or before June 30, 2012 will continue to receive the benefit accrual rate under previous law for years 31 through 35 of service for accruals earned after June 30, 2012.

b. Benefit accruals earned as of June 30, 2012: The retirement benefit is a percentage of the member's monthly FAC. This percentage is a function of the member's service as described below. For purposes of determining the benefit accruals earned as of June 30, 2012, the service is frozen as of June 30, 2012, but FAC is as of retirement.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
ERS

(i) For grandfathered Schedule A members (members with at least 10 years of contributory service at June 30, 2005 and eligible for retirement at September 30, 2009), benefits are based under this schedule (Schedule A):

For Service In:	Years	Benefit Percentage Earned
The first 10 years of service	1 – 10	1.7% per year
The next 10 years of service	11 – 20	1.9% per year
The next 14 years of service	21 – 34	3.0% per year
The next 1 year of service	35	2.0% per year

The maximum benefit is 80% of FAC.

(ii) For Schedule B members (members with less than 10 years of contributory service as of June 30, 2005) and for all future hires, benefits are based on the following schedule (Schedule B):

For Service In:	Years	Benefit Percentage Earned
The first 10 years of service	1 – 10	1.6% per year
The next 10 years of service	11 – 20	1.8% per year
The next 5 years of service	21 – 25	2.0% per year
The next 5 years of service	26 – 30	2.25% per year
The next 7 years of service	31 – 37	2.50% per year
The next 1 year of service	38	2.25% per year

The maximum benefit is 75% of FAC.

(iii) For Schedule A members who are not grandfathered, i.e., members who had at least 10 years of creditable service at June 30, 2005 but who were not eligible to retire on September 30, 2009, benefits are based on Schedule A (under (i) above) for service through September 30, 2009 and on Schedule B (under (ii) above) for service after September 30, 2009. The maximum benefit is 80% of FAC.

(iv) MHRH nurses receive a benefit determined under the appropriate formula above.

(v) Correctional Officers receive a benefit computed under a different formula:

For Service In:	Years	Benefit Percentage Earned
The first 30 years of service	1 – 30	2.0% per year
The next 1 year of service	31	6.0% per year
The next 1 year of service	32	5.0% per year
The next 1 year of service	33	4.0% per year
The next 1 year of service	34	3.0% per year
The next 14 years of service	35	2.0% per year

The maximum benefit for correctional officers is 75% of FAC.

5. Vested Deferred Benefits

Fully vested in accrued benefit if at least five years of service. The benefit will commence at the age the member is eligible for retirement benefits. A refund of contributions can be elected by a vested member in lieu of their deferred benefit.

6. Disability

Member is eligible if he has at least five years of service or if the disability is work related.

For ordinary disability, the benefit is equal to the benefit payable under the retirement formula using FAC and service at the time of disability, but not less than 10 years of service.

For accidental disability on or before September 30, 2009, the benefit is 66 2/3% of salary at the time of disability. For accidental disability after September 30, 2009 the benefit is 66 2/3% of salary if total and permanently disabled; otherwise, benefit is 50% of salary.

7. Death Prior to Retirement

If nonvested or unmarried, a refund of member contributions without interest is paid.

If vested and married, the spouse may elect either a refund of contributions without interest or an annuity equal to the benefit the member would have received if he retired at the time of death and elected a joint and 100% survivor option.

For a work-related death,, the spouse may elect to receive a refund of the member's contributions with interest and a life annuity equal to 50% of the member's salary at death in lieu of the above benefits. The annuity stops when the spouse remarries or dies, although it may be continued to any children under age 18 or to any dependent parents.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
ERS

In addition, a lump sum benefit of $800 per year of service, with a maximum of $16,000 and a minimum of $4,000, is paid.

Some teachers also are eligible for an additional survivor benefit from the Teachers Survivor Benefits Fund which is independent of ERS.

8. Death After Retirement

Benefits are paid based on the form of annuity elected. If no option is elected, i.e. if payments are made as a life annuity, there is a minimum death benefit equal to the amount of a member's contribution without interest in excess of any benefit payments made before the member's death. In addition, a lump sum is paid equal to a percentage of the lump sum death benefit that was available to the member at the time of retirement. The percentage is equal 100% in the first year of retirement, 75% in the second year, 50% in the third year and 25% in the fourth and subsequent years. The minimum lump sum death benefit is $4,000.

9. Postretirement Benefit Adjustments

Members are eligible for a COLA at the later of the member's third anniversary of retirement and the month following their SSNRA.

Effective July 1, 2012, the COLA will be suspended for all State Employees, Teachers, BHDDH Nurses, Correctional Officers, Judges and State Police until the aggregate funding level of their plans exceeds 80%; however, an interim COLA will be granted in five-year intervals while the COLA is suspended. The first interim COLA may begin January 1, 2018. The COLA will be determined based on the plan's five-year average investment rate of return minus 5.5% with a minimum value of 0% and a maximum value of 4%. The COLA will be limited to the first $25,000 of the member or beneficiary's annual pension benefit. This limit will be indexed annually to increase in the same manner as the COLA amounts are determined, except there is no suspension of the indexing of the limit.

10. Contributions

Members: Effective July 1, 2012, State Employees (excluding Correctional Officers) and Teachers contribute 3.75% of their salary per year. Correctional officers contribute 8.75% of their salary per year.

Employers: For Teachers, the state contributes 40% of the employer contribution rate and the city, town or other local employer contributes the remaining 60%. (This basic 40-60 split is further adjusted, since the state bears the cost of repaying certain amounts taken from the trust in the early 1990's.)

In fiscal years beginning after June 30, 2005, if the state's contribution on behalf of State Employees decreases, the state shall appropriate an additional amount to the retirement trust. Such amount shall be equal to 20% of any decrease in expected contributions.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
ERS

11. Service Purchases

Effective July 1, 2012, all service purchases are at full actuarial cost, determined with the System's assumed investment rate of return minus 1%.

12. Optional Benefit Forms

Option 1, a joint and 100% benefit, and option 2, a joint and 50% benefit, are available to be elected with service retirement, accidental disability, ordinary disability, and at the time of applying to receive vested deferred benefits. The options are to be actuarially equivalent at the time of calculation.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
MERS

1. Participation

General employees, police officers, and fire fighters employed by participating municipalities for a minimum of twenty hours a week beginning from later of the municipality's effective date of participation in MERS and the employee's date of employment.

2. Final Compensation (FAC) Used for Benefit Determination

Prior to July 1, 2012 and for general employee members eligible to retire as of June 30, 2012, the average is based on the member's highest three consecutive annual salaries. For all other members, effective July 1, 2012, the average is based on the member's highest five consecutive annual salaries. Once a member subject to the five year average retires or is terminated, the applicable FAC will be the greater of the member's highest three year FAC as of July 1, 2012 or the five year FAC as of the retirement/termination date.

For General Employee members who are not eligible for retirement by June 30, 2012, the five year average is replaced by the average of the highest ten consecutive years of compensation if more than one-half of the member's total years of service at retirement/termination were based on service of less than thirty hours per week, but the member's highest five year average compensation contains at least three years in which they worked over thirty hours per week. The minimum of the highest three year FAC as of July 1, 2012 applies for the FAC for these individuals as well.

There are a number of Police and Fire units which had special provisions prior to RIRSA related to FAC. They all have the standard provisions effective July 1, 2012, but their protected value for FAC is based on their provisions effective July 30, 2012.

3. Normal Retirement Eligibility

General Employees

a. Members eligible to retire by June 30, 2012, based on either being age 58 or older with 10 or more years of service or having 30 or more years of service regardless of age, retain their retirement eligibility and can retire at any time.

b. Members who did not satisfy the age 58 and 10 years of service or 30 years of service regardless of age criterion as of June 30, 2012, but who did have at least five years of contributory service as of June 30, 2012 are eligible for retirement at individually determined ages. These ages are determined by interpolating between the member's prior Retirement Date, based on the age 58 and 10 years of service or 30 years of service provisions, and their Social Security Normal Retirement Age based on the service amount as of June 30, 2012 divided by their projected service at their prior Retirement Date. The value used for the Social Security Normal Retirement Age has a maximum of 67. This calculated age is then adjusted if necessary to the minimum retirement age of 59.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
MERS

c. Members with less than five years of contributory service as of June 30, 2012 are eligible to retire at the later of their Social Security Normal Retirement Age and completion of five years of service. A maximum value of 67 is to be used for the Social Security Normal Retirement Age.

d. Members with 10 or more years of contributory service on June 30, 2012 are eligible to retire at their prior Retirement Date with their retirement benefit calculated using the accrued benefit as of June, 30, 2012, including FAC at this date rather than at their retirement, if they continue to work and contribute until that date. They will accumulate no additional defined benefits after June 30, 2012.

e. Members with 20 or more years of service may elect to retire at any time within five years of reaching their retirement eligibility with an actuarially reduced benefit.

Police and Fire

a. Members eligible to retire by June 30, 2012, based on either having at least 20 or 25 years of service, depending on if in a unit with the optional 20-year provision or a unit with the standard 25-year provision, regardless of age or attaining at least age 55 with a minimum of ten years of service, retain their retirement eligibility and can retire at any time. This includes members of units with the 20-year provision who had satisfied that provision by June 30, 2012 regardless of whether they have 25 years of service.

b. Members who did not satisfy the applicable years of service regardless of age criterion as of June 30, 2012, but were at least age 45 with a minimum of 10 years of service as of June 30, 2012 and had a prior Retirement Age, based on the age at which they were expected to have 20 or 25 years of service depending on the provisions elected by their unit, of 52 or under are eligible to retire at age 52.

c. Members not contained in the above groups as of June 30, 2012 are eligible to retire at the earlier of attaining at least age 55 with 25 years of service and attaining their Social Security Normal Retirement Age with completion of five years of service. A maximum value of 67 is to be used for the Social Security Normal Retirement Age.

d. Members with 10 or more years of contributory service on June 30, 2012 are eligible to retire at their prior Retirement Date with their retirement benefit calculated using the accrued benefit as of June, 30, 2012 if they continue to work and contribute until that date. They will accumulate no additional defined benefits after June 30, 2012.

e. Members with 20 or more years of service may elect to retire at any time within five years of reaching their retirement eligibility with an actuarially reduced benefit.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
MERS

4. Normal Retirement Benefit Amount

General Employees

2.00% of the member's monthly FAC for each year of service prior to July 1, 2012 and 1.00% of the member's monthly FAC for each year of service after July 1, 2012. The benefit cannot exceed 75% of the member's monthly FAC. If the accrual was greater than 75% as of June 30, 2012, that accrued value is preserved, but there is no additional accrual. FAC is determined as of the date of retirement.

Police and Fire

2.00% of the member's monthly FAC for each year of service, up to 37.5 years (75% of FAC maximum).

If the optional 20-year retirement provisions were adopted by the municipality prior to July 1, 2012: 2.50% of the member's monthly FAC for each year of service prior to July 1, 2012 and 2.00% of the member's monthly FAC for each year of service after July 1, 2012. The benefit cannot exceed 75% of the member's monthly FAC. If the accrual exceeded 75% as of June 30, 2012, that accrued value is preserved, but there is no additional accrual. FAC is determined as of the date of retirement.

In addition, there were a number of funds with special provisions prior to July 1, 2012. All of these provisions have been discontinued for service on or after July 1, 2012.

5. Vested Deferred Benefits

Effective July 1, 2012, members are fully vested in their accrued benefit if they have at least five years of service. The benefit will commence at the member's minimum retirement age provided the member has met the requirements for a retirement benefit. For Police and Fire, this age will be dependent on the amount of service attained at termination. A refund of contributions can be elected by a vested member in lieu of their deferred benefit.

6. Disability

Member is eligible if he has at least five years of service or from entry if the disability is work related.

For ordinary disability, the benefit is equal to the benefit payable under the retirement formula using FAC and service at the time of disability, but not less than 10 years of service.

For accidental disability the benefit is 66 2/3% of salary at the time of disability. Eligibility for accidental disability ends at age 65.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
MERS

7. Death Prior to Retirement

Basic Benefit: If nonvested or unmarried, a refund of member contributions without interest is paid. If vested and married, the spouse may elect either a refund of contributions without interest or an annuity equal to the benefit the member would have received if he retired at the time of death and elected Option 1, a joint and 100% survivor option. If the member was not eligible for retirement, the benefit is actuarially reduced from the date the member would have been eligible.

Accidental Duty-Related Benefit: If a member dies as a result of an accident, in lieu of the above basic benefit, the spouse may elect to receive a refund of the member's contributions with interest and a life annuity equal to 50% of the member's salary at death. The annuity stops when the spouse remarries or dies. For general employees, this benefit can be divided among any children under the age of 18 until they attain that age if there is no eligible spouse. For police and fire, an additional benefit of 10% of member's salary at death per child under the age of 18, subject to maximum family benefit of 66 2/3%. For police and fire, if there is no eligible spouse, a benefit of 15% of member's salary at death is paid per child under the age of 18, subject to a maximum of 50%.

Special Police/Fire Death Benefit: In lieu of the basic benefit, if a police or fire member dies while an active member, an annuity of 30% of salary is paid to the member's spouse until remarriage or death. An additional benefit of 10% of salary is paid per child under 18, subject to a maximum family benefit of 50%. If there is no eligible spouse, a benefit of 15% of member's salary at death is paid per child under the age of 18, subject to a maximum family benefit of 50%.

Lump Sum: In addition, a lump sum benefit of $800 per year of service, with a maximum of $16,000 and a minimum of $4,000, is paid. This benefit is not paid if accidental duty-related benefit is received.

8. Death After Retirement

Benefits are paid based on the form an annuity elected. If Option 1, Option 2, or the Social Security Supplemental Option were not elected, the excess, if any, of contributions over aggregate of retirement allowance payments received is paid.

In addition, a lump sum is paid equal to a percentage of the lump sum death benefit that was available to the member at the time of retirement. The percentage is equal 100% in the first year of retirement, 75% in the second year, 50% in the third year and 25% in the fourth and subsequent years. The minimum lump sum death benefit is $4,000.

Special Police/Fire Death Benefit: For a member that does not elect an optional form of payment at retirement, an annuity of 30% of the member's salary payable to the spouse until

remarriage. The 30% special benefit is not in lieu of the refund of any contributions over aggregate retirement allowances payments received through the member's death.

APPENDIX B
SUMMARY OF PLAN PROVISIONS
MERS

Deferred Vested Deaths: the beneficiary of a deferred vested member who dies can elect to receive either a refund of contributions without interest or their benefit under Option 1, beginning when the beneficiary has attained age 60 in lieu of the contribution refund.

9. Postretirement Benefit Adjustments

Members are eligible for a COLA at the later of the member's third anniversary of retirement and the month following their SSNRA (age 55 for police and fire). The age eligibility criterion is based on either SSNRA or 55 regardless of if the member had a different minimum retirement age. When a municipality elects coverage, it may either elect to cover only current and future active members or it can elect to cover current retirees as well.

Effective July 1, 2012, the COLA will be suspended for all units whose funding level is less than 80%; however, an interim COLA will be granted in five-year intervals while the COLA is suspended. The first interim COLA may begin January 1, 2018. The COLA will be determined based on the plan's five-year average investment rate of return minus 5.5% and will range from zero to 4.0%. The COLA will be limited to the first $25,000 of the member's annual pension benefit. This limit will be indexed annually to increase in the same manner as COLAs. There is no suspension of the indexing of the limit.

10. Contributions

Members: Effective July 1, 2012, General employees contribute 1.00% of their salary per year, and police officers and firefighters contribute 7.00%. In addition, if the municipality has elected one of the optional cost-of-living provisions, an additional member contribution of 1.00% of salary is required for both general employees and police and fire members.

Employers: Each participating unit's contribution rate is determined actuarially.

11. Service Purchases

Effective July 1, 2012, all service purchases are at full actuarial cost, determined with the System's assumed investment rate of return minus 1%.

12. Optional Benefit Forms

Option 1, a joint and 100% benefit, and Option 2, a joint and 50% benefit, are available to both general employees and police and fire members. In addition, general employees used to have a social security supplemental option which has been discontinued. These can be elected with service retirement, accidental disability, ordinary disability, and at the time of applying to receive vested deferred benefits. The options are to be actuarially equivalent at the time of calculation.

APPENDIX C
GLOSSARY OF TERMS

1. Actuarial Liability

The Actuarial Liability is the difference between the present value of all future system benefits and the present value of total future normal costs. This is also referred to by some actuaries as the "accrued liability" or "actuarial accrued liability".

2. Actuarial Assumptions

Estimates of future experience with respect to rates of mortality, disability, turnover, retirement rate or rates of investment income and salary increases. Demographic actuarial assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

3. Accrued Service

Service credited under the System which was rendered before the date of the actuarial valuation.

4. Actuarial Equivalent

A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.

5. Actuarial Funding Method

A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of a retirement system benefit between future service (i.e. normal costs) and past service (i.e. actuarial liability).

6. Actuarial Gain (Loss)

The difference between actual experience and actuarial assumption anticipated experience during the period between two actuarial valuation dates.

7. Actuarial Present Value

The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payment.

APPENDIX C
GLOSSARY OF DEFINITIONS

8. Amortization

Paying off an interest-discounted amount with periodic payments of interest and principal—as opposed to paying off with a lump sum payment.

9. Annual Required Contribution (ARC) under GASB 25

The Governmental Accounting Standards Board (GASB) Statement No. 25 defines the Plan Sponsor's "Annual Required Contribution" (ARC) that must be disclosed annually.

10. Normal Cost

The actuarial present value of retirement system benefits allocated to the current year by the actuarial funding method.

11. Set back/Set forward

Set back is a period of years that a standard published table (i.e. mortality) is referenced backwards in age. For instance, if the set back period is 2 years and the participant's age is currently 40, then the table value for age 38 is used from the standard published table. It is the opposite for set forward. A system would use set backs or set forwards to compensate for mortality experience in their work force.

12. Unfunded Actuarial Liability (UAL)

The unfunded actuarial liability represents the difference between actuarial liability and valuation assets. This value is sometimes referred to as "unfunded actuarial accrued liability".

Most retirement systems have unfunded actuarial liabilities. They typically arise each time new benefits are added and each time experience losses are realized.

The existence of unfunded actuarial liability is not in itself an indicator of poor funding, Also, unfunded actuarial liabilities do not represent a debt that is payable today. What is important is the ability of the plan sponsor to amortize the unfunded actuarial liability and the trend in its amount (after due allowance for devaluation of the dollar).