# REPORT ON THE RESULTS OF THE EXPERIENCE STUDY OF THE STATE TEACHERS' RETIREMENT SYSTEM OF VERMONT 

COVERING THE PERIOD JULY 1, 2002 THROUGH JUNE 30, 2007

December 31, 2007

Board of Trustees
State Teachers' Retirement System of Vermont
Montpelier, Vermont 05602

Dear Board Members:

Section 1942, subsection (m), of Title 16, Chapter 55, Vermont Statutes Annotated, provides that at least once in each five-year period the actuary is to make a study of the System's recent experience to assist in setting assumptions. In accordance with this provision, the results of our experience study covering the five-year period ending June 30, 2007, are described in this report, along with our recommendations for changes in the present assumptions.

The Table of Contents, which immediately follows, outlines the information contained in this report.
Respectfully submitted,

## Davie \$rinale

David L. Driscoll, FSA, EA
Principal, Consulting Actuary

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## I. INTRODUCTION

In order to accumulate funds to pay retirement benefits on a reasonable and relatively stable basis, the actuary prepares annual valuations of the System's assets and liabilities to measure the funded status and to ensure that funding is progressing at a rate that is adequate to meet the System's obligations.

The primary purposes of funding are to equitably allocate costs between generations of taxpayers and to provide security to members, who view the funds set aside as assurance that their benefits will be paid.

While the ultimate cost of the System is not determinable until all benefits are paid and expenses provided for, each actuarial valuation attempts to estimate costs based on assumptions selected to predict, as accurately as possible, future experience in order to produce stable contribution rates.

Overly conservative or aggressive assumptions will result in actuarial gains or losses each year. When translated into contributions, this will result in decreasing or increasing contribution rates and an inequitable allocation of costs.

The major actuarial assumptions are:
(a) Active service demographic assumptions,
(b) Compensation increase assumptions,
(c) Post-retirement mortality rates,
(d) Interest rate, and
(e) Cost-of-living adjustment rates.

Before presenting our analysis of the System's experience and discussion of the proposed assumptions, it is important to outline considerations that should govern the selection of actuarial assumptions. The recommendations of the American Academy of Actuaries are as follows:
(i) The actuarial assumptions selected should reflect the actuary's best judgement of future events. They should take into account actual experience to the extent possible, but they should also reflect long-term future trends rather than give undue weight to recent past experience.
(ii) The actuary should consider the impact of inflation in selecting the actuarial assumptions to be used.
(iii) The actuary should give consideration to the reasonableness of each actuarial assumption independently as well as the combined impact of all the assumptions.
(iv) The actuary should give careful attention to changes in plan design that may significantly alter expected future experience. For example, a liberalization of early retirement benefits may make advisable a revision in the retirement assumption.
(v) The actuary, in choosing assumptions, should take into account general or specific information available from other sources, including the plan sponsor, plan administrator, investment managers, accountants, economists, etc.

The purpose of this Report is to provide the information necessary to decide on the appropriate assumptions to be used in future valuations. It should be noted that these decisions cannot be made "in a vacuum" but must reflect the present and expected situation within the State and the System.

The balance of this Report deals in detail with the various assumptions. In each area we have made recommendations as to what we believe are appropriate assumptions. These recommendations reflect our "best estimate" of the likely future experience based on:
(a) the recent past experience,
(b) the general economic views prevailing at this time, and
(c) anticipated trends.

## II. ACTIVE SERVICE DEMOGRAPHIC ASSUMPTIONS

The active service demographic assumptions include rates of:
(a) Termination,
(b) Disability,
(c) Death before retirement, and
(d) Retirement.

Our review of active service demographic assumptions is based on the actuarial valuation data for Group C members of the System, since Group A is closed to new members and relatively few active Group A members remain.

The basis for analysis of the System's experience is a comparison of the actual number of separations from service under each category with those expected based on the assumptions currently in use.

The "expected" values are calculated by applying the various rates or probabilities to the individuals exposed to each respective event. For example, active members under age 55 with less than 30 years of
credited service would be exposed to the probabilities of withdrawal, death and disability. A member age 55 with five years of service would be exposed to disability, death and early retirement. A member who is age 62 or has 30 years of credited service would be exposed to disability, death and normal retirement.

Numerical summaries of the System's experience from July 1, 2002, through June 30, 2007, are presented in Appendix I. The tables show the ratios of the actual experience of the System as compared to that anticipated by the present actuarial assumptions. The results are shown separately by assumption and, where appropriate, by sex.

The ratios of actual to expected experience indicate the extent of deviation from the assumptions. A ratio of 1.0 would mean the experience has been exactly as anticipated.

As an aid to the Trustees in analyzing these results, we have also prepared a series of graphs, which present the statistical data summarized in Appendix I in visual form. Our comments will refer to these graphs, which immediately follow each of the following subsections.

## Termination

The graphs that follow present the withdrawal and vesting experience separately for male and female teachers.

In the preparation of each annual valuation, we noted a significant number of newly retired teachers were coded as inactive in the prior valuation, while in the valuation two years previous they were coded as actives. Upon closer examination of these retirees, we determined that they were eligible for
retirement upon termination. Their temporary movement into inactive status was apparently a consequence of a June termination date and the finalization of their retirement benefit after June $30^{\text {th }}$. For purposes of this study, we treated these participants as if they had passed directly from active status to retirement status. Therefore, the actual terminations and retirements recorded in the valuation reports prepared over the period covered by the experience study do not match those shown in this report. However, the adjustment proposed to various decrement tables that are proposed in the report reflect the actual observed pattern of movement of participants from one status to another.

Reviewing the withdrawal and vesting experience, it can be seen that there are more members than expected leaving before service retirement among both males and females at all ages.

Since the number of members withdrawing without a benefit and the number of vested retirements exceed those expected, we recommend that the assumed probabilities of withdrawal be increased.

We recommend the continued use of separate assumptions for males and females. The graphs presented on page 7 show the current rates, the actual rates and the proposed rates separately for males and females. The proposed rates are set forth in detail in Appendix II.

## Disability and Death

The graphs that follow show the incidence of disability and active service mortality. The financial impact on the funding of the System of this experience is relatively minor. It should be noted that the low incidence of actual deaths and disabilities makes this experience susceptible to rather large fluctuations from year to year.

As in the last experience study prepared for the system, the current assumed rates of disability produced expected disabilities that exceeded the actual number. However, we do not recommend any change in the assumed disability rates at this time, as the gap between the expected and actual numbers of participants becoming disabled is now rather small.

A review of the active service mortality experience indicates that the current assumption is forecasting larger numbers of deaths among active participants than are actually observed. We recommend a reduction in the assumed probabilities of active-service mortality of $60 \%$ of their present levels for men and $80 \%$ of their present levels for women. Because this decrement is already small, the impact of this change on the costs and liabilities of the system will be small as well.

## Active Service Experience - Terminations

July 1, 2002 through June 30, 2007



## Active Service Experience - Disability Retirements July 1, 2002 through June 30, 2007




## Active Service Experience - Deaths

July 1, 2002 through June 30, 2007



## Reduced Early Retirement

The experience with regard to reduced early retirement is shown on the following graphs. For all ages, the actual number of early retirements for males is greater than the expected number of early retirements. We recommend that the service retirement probabilities for males be set equal to those now used for females. We do not recommend any change in the assumed reduced early retirement rates for females at this time.

## Service Retirement

The graphs on page 12 show that service retirement peak at specific ages for both males and females. This phenomenon of peaks and valleys in service retirements was apparent in the previous experience study as well. As in the case of the assumed rates of reduced early retirement, we recommend that the assumed probabilities of service retirements for males be set equal to those now used females. For females, we do not recommend any changes in the assumed probabilities of service retirements. Appendix II shows the current and proposed tables of service retirement probabilities.

## Active Service Experience - Reduced Early

July 1, 2002 through June 30, 2007


## Active Service Experience - Service Retirements

July 1, 2002 through June 30, 2007



## III. POST-RETIREMENT MORTALITY RATES

A review of the statistics with regard to post-retirement mortality for both Group A and C retired members, which are summarized in Table 7 of Appendix I, reveals that retired individuals are living longer than expected. However, the ratio of actual to expected deaths among retirees varies significantly by gender and by category of retirement (i.e., service retirement, disability retirement, receipt of survivor benefits)

Overall, the existing table continues to incorporate a margin of conservatism that is consistent with a reasonable provision for future improvement in retiree longevity. Based on this experience, we recommend no changes be made to the post-retirement mortality tables used in the funding of the System.

## IV. MEMBERS IN INACTIVE STATUS

In the past, liabilities for members in inactive status have been maintained at $150 \%$ of their accumulated contributions with interest. An examination of the liability ultimately created by participants who ultimately move from inactive status to some other status leads us to recommend that the percentage of contributions with interest used to estimate the liability for these participants be raised from $150 \%$ to 300\%.

## V. ECONOMIC ASSUMPTIONS

Economic assumptions include:
(a) rates of compensation increase,
(b) investment income, and
(c) post-retirement adjustment in benefits on account of inflation.

## Inflation

The System provides annual cost-of-living adjustments (COLAs). For the Group A, the annual adjustment is equal to the increase in the CPI-U, but not more than $5 \%$. For Group C, the adjustment equals one-half the increase in the CPI-U, again limited to 5\%.

With regard to the inflation assumption for COLAs, the U.S. Consumer Price Index (CPI-U) indicates that the inflation rate has averaged slightly above 3\% annually since January 1, 2003.

Other economic data presently available (e.g., recent yields on inflation-indexed bonds) suggest that the financial markets anticipate a long-term average rate of inflation of $2.5 \%$ to $3.0 \%$. Current economic assumptions used in the valuation of the system are based on an inflation rate of approximately $3 \%$ per year. We recommend that this assumption be retained.

Currently, we assume a $3 \%$ annual adjustment in pensions for Group A and a $1.5 \%$ annual adjustment in pensions for Group C members. We recommend no changes in the assumed annual adjustment for COLAs.

## Merit-Promotion Salary Increases

Currently a single compensation scale is used for both male and female members. The overall pattern of compensation increases appears to be generally consistent between males and females. The average annual pay increase produced by the current scale is as follows:

| Age at <br> Entry | Average <br> Annual <br> Increase to <br> Age 62 |
| :---: | :---: |
| 25 | $8.9 \%$ |
| 35 | $7.3 \%$ |
| 45 | $6.1 \%$ |
| 55 | $5.1 \%$ |

The graph on page 15 sets forth the levels of total compensation increase during the five-year period. These results include both merit-promotion increases and inflationary increases. The graph shows that pay increases have been close to expected at most ages. We recommend no changes in the salary increase assumptions. The statistics are summarized in Table 6 of Appendix I.

## Active Service Experience - Salary Experience

July 1, 2002 through June 30, 2007


## Interest Rate

The total rates of return earned by the VSTRS assets are shown below.

| Year | Rate of Return <br> Ending <br> June 30 |
| :---: | :---: |
| 2003 | $6.34 \%$ |
| 2004 | $7.68 \%$ |
| 2005 | $8.05 \%$ |
| 2006 | $8.44 \%$ |
| 2007 | $10.53 \%$ |
| $2003-07$ | $8.20 \%$ |

The rate of return has been about $8.20 \%$ annually during the past five years. Due to the proximity to the current $8.25 \%$ assumption and our expectations for future returns (which are based in part on the introduction of VPIC during the period covered by this experience study), we are recommending no change.

## VI. EXPENSES AND NON-PENSION POST-RETIREMENT BENEFITS

In past valuations, no explicit provisions have been made for funding for expenses and post-retirement benefits other than pensions that are paid by the System. For three principal reasons, we recommend that the Board of the System consider the adoption of explicit funding assumptions to address these payments:

1. It is generally considered acceptable to reflect investment-related expenses by setting the investment assumption that is net of investment expenses. The same cannot be said of noninvestment expenses.
2. The statutes governing the operation of the System reinforce the commitment to pay a portion of the cost of health and medical benefits of retired members. The portion of such benefits paid by the System is apparently categorized as an "administrative expense."
3. Perhaps most importantly, the Governmental Accounting Standards Board (GASB) has released its long-awaited standard for accounting by governmental employers for post-retirement benefits other than pensions. This standard requires the recognition of an annual expense and liability in the financial statements of governmental employers who provide such benefits. Because the liabilities for these benefits are substantial, the desirability for pre-funding these benefits may be significantly heightened by the implementation of the anticipated accounting standards.

If the State does not establish a trust fund for the GASB 43/45 liabilities, we recommend that an explicit plan for the recognition of these benefits and other non-pension expenses of the System, as we expect considerable attention to be given to the question of how the required expenses and liabilities will be recognized.

If the State establishes a trust fund for the GASB 43/45 liabilities, we recommend that the Normal Cost include a load for the estimated non-investment related expenses of the trust.

## VII. COST ANALYSIS AND CONCLUSION

To assist the Board in selecting and approving the final package of valuation assumptions to be used prospectively from June 30, 2007, we have prepared a valuation of the System as of June 30, 2007, to reflect the potential impact of the revised assumptions.

Based on the revised valuation the normal contribution rate as of June 30, 2007, would have decreased from $5.16 \%$ to $3.57 \%$, and the FYE08 appropriation would have decreased from $\$ 41,204,051$ to $\$ 35,416,600$. These results are summarized in Appendix III.

We look forward to discussing the results of this experience investigation with the Board of Trustees prior to the preparation of the June 30, 2008, valuation of the System.

## APPENDIX I

## ACTUAL AND EXPECTED EXPERIENCE

TABLE 1

## COMPARISON OF ACTUAL AND EXPECTED SEPARATIONS FROM ACTIVE SERVICE

TERMINATIONS

| Central <br> Age of <br> Group | Men Teachers |  |  | Women Teachers |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Actual | Expected | Ratio of Actual To Expected | Actual | Expected | Ratio of Actual To Expected |
| Under 25 | 19 | 3.83 | 4.961 | 82 | 24.04 | 3.411 |
| 25-29 | 100 | 39.74 | 2.516 | 376 | 152.79 | 2.461 |
| 30-34 | 120 | 73.80 | 1.626 | 421 | 175.16 | 2.404 |
| 35-39 | 125 | 77.47 | 1.614 | 316 | 152.58 | 2.071 |
| 40-44 | 122 | 57.20 | 2.133 | 272 | 152.34 | 1.785 |
| 45-49 | 119 | 73.80 | 1.612 | 355 | 182.45 | 1.946 |
| 50-54 | 147 | 97.16 | 1.513 | 421 | 217.40 | 1.937 |
| 55 and over | 33 | 7.78 | 4.242 | 67 | 14.31 | 4.682 |
| Total | 785 | 431 | 1.822 | 2,310 | 1,071 | 2.157 |

TABLE 2

## COMPARISON OF ACTUAL AND EXPECTED SEPARATIONS FROM ACTIVE SERVICE <br> DISABILITY RETIREMENTS

| Central <br> Age of <br> Group | Men Teachers |  |  | Women Teachers |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Actual | Expected | Ratio of Actual To Expected | Actual | Expected | Ratio of Actual To Expected |
| Under 25 | 0 | 0 | 0.000 | 0 | 0 | 0.000 |
| 25-29 | 0 | 0 | 0.000 | 0 | 0 | 0.000 |
| 30-34 | 0 | 0 | 0.000 | 0 | 0 | 0.000 |
| 35-39 | 0 | 0 | 0.000 | 0 | 0.01 | 0.000 |
| 40-44 | 0 | 0 | 0.000 | 0 | 0.04 | 0.000 |
| 45-49 | 1 | 0.13 | 7.692 | 0 | 0.11 | 0.000 |
| 50-54 | 1 | 0.44 | 2.273 | 0 | 0.83 | 0.000 |
| 55 and over | 3 | 6.45 | 0.465 | 9 | 5.32 | 1.692 |
| Total | 5 | 7.02 | 0.712 | 9 | 6.31 | 1.426 |

TABLE 3

## COMPARISON OF ACTUAL AND EXPECTED SEPARATIONS FROM ACTIVE SERVICE

DEATHS

| Central Age of Group | Men Teachers |  |  | Women Teachers |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Actual | Expected | Ratio of Actual To Expected | Actual | Expected | Ratio of <br> Actual To <br> Expected |
| Under 25 | 0 | 0.03 | 0.000 | 0 | 0.09 | 0.000 |
| 25-29 | 0 | 0.29 | 0.000 | 0 | 0.64 | 0.000 |
| 30-34 | 0 | 0.57 | 0.000 | 0 | 0.88 | 0.000 |
| 35-39 | 0 | 0.85 | 0.000 | 0 | 0.88 | 0.000 |
| 40-44 | 0 | 1.11 | 0.000 | 1 | 1.72 | 0.581 |
| 45-49 | 3 | 1.9 | 1.579 | 0 | 3.44 | 0.000 |
| 50-54 | 1 | 3.5 | 0.286 | 10 | 7.83 | 1.277 |
| 55-59 | 5 | 3.5 | 1.429 | 8 | 8.95 | 0.894 |
| 60-64 | 1 | 5.55 |  | 5 | 4.41 | 1.134 |
| 65 and over | 0 | 1.65 | 0.000 | 1 | 0.82 | 1.220 |
| Total | 10 | 18.95 | 0.528 | 25 | 29.66 | 0.843 |

TABLE 4

## COMPARISON OF ACTUAL AND EXPECTED SEPARATIONS FROM ACTIVE SERVICE <br> REDUCED EARLY RETIREMENTS

| Central <br> Age of <br> Group | Men Teachers |  |  | Women Teachers |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Actual | Expected | Ratio of <br> Actual To <br> Expected | Actual | Expected | Ratio of Actual To Expected |
| 55 | 36 | 24.5 | 1.469 | 102 | 117.33 | 0.869 |
| 56 | 27 | 16.84 | 1.603 | 88 | 71.82 | 1.225 |
| 57 | 34 | 10.5 | 3.238 | 62 | 61.01 | 1.016 |
| 58 | 20 | 16.92 | 1.182 | 66 | 53.57 | 1.232 |
| 59 | 21 | 13.44 | 1.563 | 82 | 44.7 | 1.834 |
| 60 | 21 | 10.74 | 1.955 | 48 | 67.39 | 0.712 |
| 61 | 30 | 27.4 | 1.095 | 98 | 52.64 | 1.862 |
| Total | 189 | 120.34 | 1.571 | 546 | 468.46 | 1.166 |

## COMPARISON OF ACTUAL AND EXPECTED SEPARATIONS

 FROM ACTIVE SERVICESERVICE RETIREMENTS

| Central <br> Age of <br> Group | Men Teachers |  |  | Women Teachers |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Actual | Expected | Ratio of Actual To Expected | Actual | Expected | Ratio of Actual To Expected |
| 50 | 2 | 0 | 0.000 | 1 | 0 | 0.000 |
| 51 | 4 | 0.44 | 9.091 | 5 | 0.6 | 8.333 |
| 52 | 6 | 3.96 | 1.515 | 13 | 10 | 1.300 |
| 53 | 18 | 15.84 | 1.136 | 19 | 21.8 | 0.872 |
| 54 | 19 | 22.22 | 0.855 | 25 | 31.8 | 0.786 |
| 55 | 17 | 40.66 | 0.418 | 23 | 35.8 | 0.642 |
| 56 | 24 | 29.04 | 0.826 | 18 | 18.9 | 0.952 |
| 57 | 20 | 30.53 | 0.655 | 18 | 17.9 | 1.006 |
| 58 | 32 | 28.37 | 1.128 | 23 | 15.6 | 1.474 |
| 59 | 35 | 34.07 | 1.027 | 35 | 13.4 | 2.612 |
| 60 | 27 | 54.03 | 0.500 | 20 | 30 | 0.667 |
| 61 | 36 | 22.44 | 1.604 | 22 | 12.58 | 1.749 |
| 62 | 38 | 56.68 | 0.670 | 101 | 93.5 | 1.080 |
| 63 | 20 | 28.52 | 0.701 | 45 | 43.6 | 1.032 |
| 64 | 15 | 21.17 | 0.709 | 40 | 31.4 | 1.274 |
| 65 | 18 | 22.58 | 0.797 | 28 | 27 | 1.037 |
| 66 | 9 | 11.22 | 0.802 | 11 | 16.8 | 0.655 |
| 67 | 4 | 8.33 | 0.480 | 6 | 12.3 | 0.488 |
| 68 | 2 | 3.16 | 0.633 | 14 | 6.4 | 2.188 |
| 69 | 3 | 3.63 | 0.826 | 5 | 4.2 | 1.190 |
| 70 and over | 10 | 28 | 0.357 | 11 | 35 | 0.314 |
| Total | 359 | 464.89 | 0.772 | 483 | 478.58 | 1.009 |

TABLE 6

## COMPARISON OF ACTUAL AND EXPECTED

ANNUAL SALARIES OF MEMBERS

| Central <br> Age of <br> Group | Men Teachers |  |  | Women Teachers |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Annual Salaries (Salaries shown in 1,000s) |  |  | Annual Salaries (Salaries shown in 1,000s) |  |  |
|  | Actual | Expected | Ratio of Actual To Expected | Actual | Expected | Ratio of <br> Actual To <br> Expected |
| Under 25 | 1,688 | 1,716 | 0.984 | 9,014 | 9,448 | 0.954 |
| 25-29 | 22,558 | 22,893 | 0.985 | 75,872 | 77,100 | 0.984 |
| 30-34 | 53,284 | 53,166 | 1.002 | 122,329 | 123,205 | 0.993 |
| 35-39 | 67,579 | 67,614 | 0.999 | 138,668 | 139,310 | 0.995 |
| 40-44 | 67,695 | 67,569 | 1.002 | 192,628 | 192,311 | 1.002 |
| 45-49 | 99,419 | 99,376 | 1.000 | 278,710 | 278,897 | 0.999 |
| 50-54 | 157,367 | 157,235 | 1.001 | 409,621 | 409,764 | 1.000 |
| 55-59 | 141,566 | 141,608 | 1.000 | 303,321 | 303,699 | 0.999 |
| 60-64 | 42,463 | 42,512 | 0.999 | 84,695 | 84,784 | 0.999 |
| 65 and over | 6,642 | 6,680 | 0.994 | 10,219 | 10,215 | 1.000 |
| Total | 660,261 | 660,369 | 1.000 | 1,625,077 | 1,628,733 | 0.998 |

TABLE 7

## SUMMARY OF MORTALITY EXPERIENCE <br> OF PENSIONERS

| Group | Men Teachers |  |  | Women Teachers |  |  | Total |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Actual | Expected | Ratio of Actual To Expected | Actual | Expected | Ratio of Actual To Expected | Actual | Expected | Ratio of Actual To Expected |
| Service Retirees | 169 | 193.06 | 0.875 | 400 | 343.02 | 1.166 | 569 | 536.08 | 1.061 |
| Disability Retirees | 7 | 12.81 | 0.546 | 11 | 12.11 | 0.908 | 18 | 24.92 | 0.722 |
| Dependants of Deceased Members | 34 | 12.59 | 2.701 | 52 | 19.81 | 2.625 | 86 | 32.40 | 2.654 |
| Total | 210 | 218.46 | 0.961 | 463 | 374.94 | 1.235 | 673 | 593.4 | 1.134 |

## APPENDIX II

## RECOMMENDED ACTIVE SERVICE TABLES

TABLE 1

## COMPARISON OF CURRENT AND RECOMMENDED SEPARATIONS FROM ACTIVE SERVICE

## TERMINATIONS

| Central Age <br> of Group | Men Teachers |  | Women Teachers |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Current | Recommended | Current | Recommended |
| 25 |  |  |  |  |
| 26 | $5.40 \%$ | $20.00 \%$ | $6.48 \%$ | $20.00 \%$ |
| 27 | $5.40 \%$ | $18.06 \%$ | $6.26 \%$ | $18.62 \%$ |
| 28 | $5.40 \%$ | $16.30 \%$ | $6.05 \%$ | $17.34 \%$ |
| 29 | $5.40 \%$ | $14.72 \%$ | $5.83 \%$ | $16.15 \%$ |
| 30 | $5.40 \%$ | $13.29 \%$ | $5.62 \%$ | $15.04 \%$ |
| 31 | $5.40 \%$ | $12.00 \%$ | $5.40 \%$ | $14.00 \%$ |
| 32 | $5.29 \%$ | $11.07 \%$ | $5.18 \%$ | $13.41 \%$ |
| 33 | $5.18 \%$ | $10.20 \%$ | $4.97 \%$ | $12.85 \%$ |
| 34 | $5.08 \%$ | $9.41 \%$ | $4.75 \%$ | $12.31 \%$ |
| 35 | $4.97 \%$ | $8.68 \%$ | $4.54 \%$ | $11.79 \%$ |
| 36 | $4.86 \%$ | $8.00 \%$ | $4.32 \%$ | $11.30 \%$ |
| 37 | $4.86 \%$ | $7.67 \%$ | $4.32 \%$ | $10.70 \%$ |
| 38 | $4.86 \%$ | $7.36 \%$ | $4.32 \%$ | $10.13 \%$ |
| 39 | $4.86 \%$ | $7.06 \%$ | $4.32 \%$ | $9.59 \%$ |
| 40 | $4.86 \%$ | $6.78 \%$ | $4.32 \%$ | $9.08 \%$ |
| 41 | $4.05 \%$ | $6.50 \%$ | $3.60 \%$ | $8.60 \%$ |
| 42 | $3.96 \%$ | $6.35 \%$ | $3.51 \%$ | $8.00 \%$ |
| 43 | $3.87 \%$ | $6.21 \%$ | $3.42 \%$ | $7.45 \%$ |
| 44 | $3.78 \%$ | $6.07 \%$ | $3.33 \%$ | $6.93 \%$ |
| 45 | $3.69 \%$ | $5.93 \%$ | $3.24 \%$ | $6.45 \%$ |
| 46 | $3.60 \%$ | $5.80 \%$ | $3.15 \%$ | $6.00 \%$ |
| 47 | $3.60 \%$ | $5.72 \%$ | $3.06 \%$ | $5.79 \%$ |
| 48 | $3.60 \%$ | $5.64 \%$ | $2.97 \%$ | $5.58 \%$ |
| 49 | $3.60 \%$ | $5.56 \%$ | $2.88 \%$ | $5.38 \%$ |
| 50 | $3.60 \%$ | $5.48 \%$ | $2.79 \%$ | $5.19 \%$ |
| 51 | $3.60 \%$ | $5.40 \%$ | $2.70 \%$ | $5.00 \%$ |
| 52 | $3.60 \%$ | $5.40 \%$ | $2.70 \%$ | $4.96 \%$ |
| 53 | $3.60 \%$ | $5.40 \%$ | $2.70 \%$ | $4.92 \%$ |
| 54 | $3.60 \%$ | $5.40 \%$ | $2.70 \%$ | $4.88 \%$ |
|  | $3.60 \%$ | $5.40 \%$ | $2.70 \%$ | $4.84 \%$ |
|  |  |  |  |  |

TABLE 2

## COMPARISON OF CURRENT AND RECOMMENDED SEPARATIONS FROM ACTIVE SERVICE

## DEATHS

| Central Age <br> of Group | Men Teachers |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Current | Recommended | Current | Recommended |
| 25 |  |  |  |  |
| 26 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 27 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 28 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 29 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 30 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 31 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 32 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 33 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 34 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 35 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 36 | $0.04 \%$ | $0.02 \%$ | $0.03 \%$ | $0.02 \%$ |
| 37 | $0.05 \%$ | $0.03 \%$ | $0.03 \%$ | $0.02 \%$ |
| 38 | $0.06 \%$ | $0.03 \%$ | $0.03 \%$ | $0.02 \%$ |
| 39 | $0.06 \%$ | $0.04 \%$ | $0.03 \%$ | $0.02 \%$ |
| 40 | $0.07 \%$ | $0.04 \%$ | $0.03 \%$ | $0.02 \%$ |
| 41 | $0.08 \%$ | $0.05 \%$ | $0.03 \%$ | $0.02 \%$ |
| 42 | $0.08 \%$ | $0.05 \%$ | $0.04 \%$ | $0.03 \%$ |
| 43 | $0.08 \%$ | $0.05 \%$ | $0.04 \%$ | $0.03 \%$ |
| 44 | $0.08 \%$ | $0.05 \%$ | $0.04 \%$ | $0.03 \%$ |
| 45 | $0.08 \%$ | $0.05 \%$ | $0.05 \%$ | $0.04 \%$ |
| 46 | $0.08 \%$ | $0.05 \%$ | $0.05 \%$ | $0.04 \%$ |
| 47 | $0.09 \%$ | $0.05 \%$ | $0.05 \%$ | $0.04 \%$ |
| 48 | $0.09 \%$ | $0.05 \%$ | $0.06 \%$ | $0.04 \%$ |
| 49 | $0.10 \%$ | $0.06 \%$ | $0.06 \%$ | $0.05 \%$ |
| 50 | $0.11 \%$ | $0.06 \%$ | $0.07 \%$ | $0.05 \%$ |
| 51 | $0.12 \%$ | $0.07 \%$ | $0.08 \%$ | $0.06 \%$ |
| 52 | $0.12 \%$ | $0.07 \%$ | $0.08 \%$ | $0.06 \%$ |
| 53 | $0.12 \%$ | $0.07 \%$ | $0.09 \%$ | $0.07 \%$ |
| 54 | $0.12 \%$ | $0.07 \%$ | $0.10 \%$ | $0.08 \%$ |
|  | $0.12 \%$ | $0.07 \%$ | $0.11 \%$ | $0.09 \%$ |
|  |  |  |  |  |
|  |  |  |  |  |

TABLE 3

## COMPARISON OF CURRENT AND RECOMMENDED SEPARATIONS FROM ACTIVE SERVICE

## EARLY RETIREMENTS

| Central Age <br> of Group | Men Teachers |  | Women Teachers |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Current | Recommended | Current | Recommended |
|  |  |  |  |  |
| 55 | $5.00 \%$ | $8.75 \%$ | $8.75 \%$ | $8.75 \%$ |
| 56 | $4.00 \%$ | $6.25 \%$ | $6.25 \%$ | $6.25 \%$ |
| 57 | $3.00 \%$ | $6.25 \%$ | $6.25 \%$ | $6.25 \%$ |
| 58 | $6.00 \%$ | $6.25 \%$ | $6.25 \%$ | $6.25 \%$ |
| 59 | $6.00 \%$ | $6.25 \%$ | $6.25 \%$ | $6.25 \%$ |
| 60 | $6.00 \%$ | $12.50 \%$ | $12.50 \%$ | $12.50 \%$ |
| 61 | $20.00 \%$ | $12.50 \%$ | $12.50 \%$ | $12.50 \%$ |
|  |  |  |  |  |

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TABLE 4

## COMPARISON OF CURRENT AND RECOMMENDED SEPARATIONS FROM ACTIVE SERVICE

## SERVICE RETIREMENTS

| Central Age <br> of Group | Men Teachers |  | Women Teachers |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Current | Recommended | Current | Recommended |
|  |  |  |  |  |
| 50 | $44.00 \%$ | $40.00 \%$ | $40.00 \%$ | $40.00 \%$ |
| 51 | $22.00 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 52 | $22.00 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 53 | $22.00 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 54 | $22.00 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 55 | $30.80 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 56 | $17.60 \%$ | $10.00 \%$ | $10.00 \%$ | $10.00 \%$ |
| 57 | $16.50 \%$ | $10.00 \%$ | $10.00 \%$ | $10.00 \%$ |
| 58 | $16.50 \%$ | $10.00 \%$ | $10.00 \%$ | $10.00 \%$ |
| 59 | $20.90 \%$ | $10.00 \%$ | $10.00 \%$ | $10.00 \%$ |
| 60 | $41.25 \%$ | $30.00 \%$ | $30.00 \%$ | $30.00 \%$ |
| 61 | $22.00 \%$ | $17.00 \%$ | $17.00 \%$ | $17.00 \%$ |
| 62 | $35.20 \%$ | $25.00 \%$ | $25.00 \%$ | $25.00 \%$ |
| 63 | $26.40 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 64 | $27.50 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 65 | $41.80 \%$ | $30.00 \%$ | $30.00 \%$ | $30.00 \%$ |
| 66 | $33.00 \%$ | $30.00 \%$ | $30.00 \%$ | $30.00 \%$ |
| 67 | $39.60 \%$ | $30.00 \%$ | $30.00 \%$ | $30.00 \%$ |
| 68 | $26.40 \%$ | $20.00 \%$ | $20.00 \%$ | $20.00 \%$ |
| 69 | $33.00 \%$ | $30.00 \%$ | $30.00 \%$ | $30.00 \%$ |
| 70 | $100.00 \%$ | $100.00 \%$ | $100.00 \%$ | $100.00 \%$ |
|  |  |  |  |  |

## APPENDIX III

## COMPARATIVE VALUATION RESULTS

RESULTS FOR THE ACTUARIAL VALUATION<br>PREPARED AS OF JUNE 30, 2007, ON<br>CURRENT AND RECOMMENDED ASSUMPTIONS

| Item | Current Assumptions |  | Recommended Assumptions* |  |
| :---: | :---: | :---: | :---: | :---: |
| 1. Accrued Liabilities: |  |  |  |  |
| Active and Inactive Members | \$ | 1,020,837,543 | \$ | 1,064,348,355 |
| Retired Members | \$ | 795,812,367 | \$ | 795,812,367 |
| Total | \$ | 1,816,649,910 | \$ | 1,860,160,722 |
| 2. Assets | \$ | 1,541,859,577 | \$ | 1,541,859,577 |
| 3. Funded Ratio |  | 84.9\% |  | 82.9\% |
| 4. Unfunded Accrued Liability | \$ | 274,790,333 | \$ | 318,301,145 |
| 5. Normal Contribution | \$ | 26,578,087 | \$ | 18,474,733 |
| 6. Accrued Liability Contribution | \$ | 14,625,964 | \$ | 16,941,867 |
| 7. Total Contribution $=(5)+(6)$ | \$ | 41,204,051 | \$ | 35,416,600 |

* Does not include provisions for expenses.

