13 - 0313

Milliman

Minnesota Legislative Commission on Pensions and Retirement

Replication of the Actuarial Valuation of the St. Paul Teachers' Retirement Fund Association as of July 1, 2012

Prepared by:

Milliman, Inc.

William V. Hogan, FSA, EA, MAAA
Principal and Consulting Actuary

Timothy J. Herman, FSA, EA, MAAA
Principal and Consulting Actuary

January 7, 2013

15800 Bluemound Road, Suite 100
Brookfield, WI 53005-6043
TEL +1 262 784 2250
FAX +1 262 923 3687
milliman.com

Milliman

15800 Bluemound Road
Suite 100
Brookfield, WI 53005-6043
USA

Tel +1 262 784 2250
Fax +1 262 923 3687

milliman.com

January 7, 2013

Minnesota Legislative Commission
on Pensions and Retirement
State Office Building, Room 55
100 Rev. Dr. Martin Luther King Jr. Boulevard
St. Paul, Minnesota 55155

Attention: Mr. Lawrence A. Martin, Executive Director

Ladies and Gentlemen:

The enclosed report presents the findings and comments resulting from a review and replication of the July 1, 2012 actuarial valuation of the St. Paul Teachers' Retirement Fund Association (SPTRFA). An overview of our major findings is included in the Executive Summary section of the report. More detailed commentary and information is provided in the sections that follow.

We pursued this analysis and review with a constructive mindset. We looked to identify any possible suggestions that might improve understanding of or confidence in the actuarial services being provided. Naturally, some of the comments may be viewed as personal preference or nit-picky in nature. While we are not trying to impose our own preferences or biases on the Fund or the retained actuary, neither did we hesitate to make such comments if we believed that some change, however minor, would improve the actuarial functions.

This report has been prepared for use by the Minnesota Legislative Commission on Pensions and Retirement (LCPR) in their oversight role with regard to the Fund. It has been prepared using Milliman valuation systems in a manner that would be used by Milliman to prepare a full actuarial valuation of the Fund. We recognize that there are hundreds of thousands of complex calculations performed by the actuarial valuation system. For this reason, even the smallest differences between valuation systems can produce noticeable differences in the valuation results between two different actuaries.

In preparing this report, we have relied without audit on the employee data, plan provisions, value of the plan assets and other plan financial information as provided by various involved entities including your office, SPTRFA, Gabriel Roeder Smith & Company, and others. We have reviewed this data for reasonableness and for consistency with previously supplied information. If any of this information as summarized in this report is inaccurate or incomplete, the results shown could be materially affected and this report may need to be revised.

On the basis of the foregoing we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

Any distribution of the enclosed report must be in its entirety including this cover letter, unless prior written consent is obtained from Milliman, Inc. This report has been prepared in accordance with the terms and provisions of the Consulting Services Agreement effective September 26, 2011. We, William V. Hogan, FSA, and Timothy J. Herman, FSA, are actuaries for Milliman, Inc. We are members of the American Academy of Actuaries and Fellows of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We look forward to making a personal presentation of our findings in briefings to the Minnesota Legislative Commission on Pensions and Retirement and to relevant staff members.

Respectfully submitted,

Milliman, Inc.

William V. Hogan

William V. Hogan, FSA, EA, MAAA
Principal and Consulting Actuary

Timothy J. Herman, FSA, EA, MAAA
Principal and Consulting Actuary

WVH/TJH/kf

Table of Contents

Executive Summary

Purpose and Scope of the Actuarial Replication Audit

In accordance with Minnesota Statutes, Section 356.214, Subdivision 4, the LCPR has engaged Milliman, Inc. to perform a replication of the July 1, 2012 actuarial valuation of the Fund administered by SPTRFA.

In performing the replication of the actuarial valuation, we follow several well defined steps. These steps involve a review and cleansing of the data used in the actuarial valuation, an assessment of the plan provisions to be valued, an analysis of the actuarial assumptions to be applied, a review of the reported value of plan assets as of the valuation date, and preparation of the actuarial calculations using appropriate computer programming and summarizing the results. All of the above steps are to be applied in accordance with the requirements of Minnesota statutes and the Actuarial Standards For Actuarial Work adopted by the LCPR.

In conducting our work, we initially prepared the above steps independently from the work of the Fund Actuary. After completing that work, we conducted a review of some individual benefit trace information in order to identify any key differences in programming or technique. We then prepared a summary of the key valuation results, showing a comparative of our results to those of the Fund Actuary.

It is important to recognize that the actuarial valuation process, while very sophisticated in its calculation methodology, is still an estimate of the financial value of benefits payable on contingent events, most of which occur many years into the future. As such, a considerable amount of uncertainty and variability surrounds those estimates. As actuaries we recognize this fact and are comfortable that small differences (in percentages) in the results do not change the overall financial results portrayed in the valuation. Furthermore, the actuarial software used by different firms has implicit differences that create differences in the valuation numbers. For this reason, we believe the comparison of valuation results should be evaluated in terms of percentage differences. To provide some context to our comments, in a replication audit, where the differences that are identified can also be quantified, we generally expect to be within 1%-2% on the calculation of the present value of future benefits and within 4%-5% on the calculation of the actuarial accrued liability and normal cost. The wider range on the latter items is because there tends to be more variability in how different actuarial software programs allocate the total liability (present value of future benefits) to past and future years of service.

Statement of Findings

In general, we found the actuarial calculations by the Fund Actuary to be reasonably consistent with our own separate calculations to within a reasonable degree of tolerance. Where we saw differences, we attempted to identify the reasons. Overall, we are satisfied that the July 1, 2012 actuarial valuation results for the Fund as prepared by the Fund Actuary present a fair and reasonable representation of the present value of future benefits, actuarial liabilities and contribution requirements for the Fund.

The following commentary provides our main conclusions on the various areas of our review:

- Plan Provisions: We started with the summary of plan provisions for the Fund that Milliman reviewed last year. After reviewing the actuarial report prepared by the Fund Actuary, we believe that their summary of plan provisions is consistent with our understanding of the current plan provisions.

- Membership Data: Our raw data counts match in total with the counts as summarized by SPTRFA. After applying our own cleansing methods, our valuation data count was the same in total and only modestly different in the groupings from the count as reported by the Fund Actuary. Our inactive data is 10 lives higher for service retirements and 10 lives lower for Survivors.

  We note that there appears to be a difference in the processing of valuation payroll for active members with less than 1 year of service. Our processing of valuation payroll is to use an annualized payroll amount of $31,550 for such members. It is our understanding that the Fund Actuary uses the reported payroll for active members with less than 1 year of service. We believe that this difference in data processing is also the source for the difference in projected payroll that is discussed further below in the section on actuarial assumptions.

  For terminated members, it is our understanding that the Fund Actuary supplements the data reported by the fund with salary history information that the Fund Actuary maintains. The Fund Actuary shared this information for deferred retirements with future augmentation with us. When we used this supplemental information, our aggregate valuation results are more than 5% different from the Fund Actuary's results. Our valuation systems appear to produce similar difference for the sample life we reviewed.

  Our conclusion is that the Fund Actuary is reasonably reflecting the data received from SPTRFA to within a reasonable degree of tolerance with our own determinations.

- Actuarial Assumptions and Methods: In general, we believe that the assumptions and methods employed by the Fund Actuary are reasonable and consistent with statutes and the Standards for Actuarial Work. We note there appears to be a substantial difference between the Fund Actuary's results and our results for active Member benefits for deferred retirement and refund of contributions. This apparent difference is due to the approaches used in the valuation system when an active Member is assumed to leave the System by withdrawal. In the actuarial assumptions, Members who withdraw from the System after becoming eligible for a deferred benefit are assumed to take the larger of their return of contributions, or their deferred annuity benefit. In the Fund Actuary's results, the benefits are included in the deferred retirement component if the member is projected to be vested at the time of withdrawal. Otherwise, the benefits are included in the refund of contributions component. In the Milliman results, the deferred retirement component includes the value of annuity benefits for vested Members who withdraw from the System. The refund of contributions component includes both the refund of contributions for members who are not vested at the date of assumed withdrawal plus the value of the return of contributions for Members who are assumed to elect a refund of contributions in lieu of future annuity benefits. Because the Fund Actuary's present value of future benefits for the withdrawal decrement (sum of deferred retirement component plus refund of contributions component) is within 5.2% of the Milliman results, we believe the Fund Actuary is reasonably reflecting the withdrawal decrement.

We further note there is a substantial difference between the Fund Actuary's results and our results for terminated members. For deferred retirements with future augmentation, we believe this difference is due to different application of the actuarial standards for terminations that are expected following the member's vesting date. According to the actuarial standards, the proper technique is to assume that the member selects the benefit with the greater value. Thus, for each year after the member's vesting date, the actuarial present value of Projected Benefits is based on the larger of the member's contributions accumulated with interest or the present value of the member's vested deferred benefit (augmented, if appropriate). In our valuation, we determine the greater value as of the former member's assumed retirement date, and then discounting the greater value from the member's assumed retirement date to the valuation date. In the Fund Actuary's valuation, it is our understanding that the greater value is determined by comparing the present value of the deferred benefit as of the valuation date to the member's contributions accumulated with interest at the valuation date. Because the interest on accumulated contributions is 4% and the interest discount factor is 8% for the first 5 years and 8.5% thereafter, the Fund Actuary's method produces a higher present value.

For former members without vested rights, we believe the difference between the Fund Actuary's results and our results are primarily due to the differences in data processing discussed above. In both our and the Fund Actuary's valuation for these members, the present value is determined as the return of employee contributions with interest as of the valuation date. Because we match exactly on the headcounts for these members, we would produce exactly the same results as the Fund Actuary if we were using the same data.

The Fund actuary determined the Supplemental Contribution Amortization of the Unfunded Actuarial Accrued Liability using a 25-year rolling amortization period as described in Minnesota Statutes Section 356.215 Subd. 11(j). We question whether 356.215 Subd. 11(c) should be applied due to the change in assumptions.

- Actuarial Value of Assets: We believe that the Fund Actuary has fairly and correctly presented the actuarial value of assets.

- Valuation System Results: Based upon our own valuation system results, we were able to match the Fund Actuary valuation results within 0.8% on the present value of future benefits and within 0.8% on the actuarial liabilities. We are about 0.22 percentage points lower on the Normal Cost rate. All of these values track very well to the Fund Actuary calculations in total. However, we note some differences in how those totals are split by decrement and group. Given how close the overall totals match, we are comfortable that the valuation results are reasonable.

- Valuation Report: We believe the actuarial valuation report prepared by the Fund Actuary provides all of the information required by the Standards for Actuarial Work. Overall, the work by the Fund Actuary is comprehensive and thorough.

- COLA: As part of legislation enacted in 2011, the annual Cost of Living Adjustment (COLA) applied to the pensions of retired Members was changed to 1.0% if the Accrued Liability Funded Ratio is less than 80%. However, if the Fund achieves at least 80%, but less than 90% funded ratio on the actuarial value of assets to actuarial liability, the COLA will increase to 2.0%. The valuation by the Fund Actuary assumes that the lower 1.0% COLA will remain in place for all years. As stated in the Fund Actuary's report, this assumption is based on the current market value funded ratio of 60% and projections that indicate a steadily declining funding level in the future given the current statutory contribution schedule. We believe this assumption is reasonable.

Principal Valuation Results

This section provides a summary of the key measurements from the July 1, 2012 Actuarial Valuation. As the numbers show, we were able to reasonably match the primary data totals with those shown by the Fund Actuary in almost all cases.

Principal Valuation Results

(dollars in thousands)

	Actuarial Valuation as of	
	July 1, 2012 (Fund Actuary)	July 1, 2012 (Milliman)
Contributions (% of Payroll)		
Normal Cost Rate	8.39%	8.17%
UAAL Amortization Payment	14.17%	13.53%
Expenses	0.31%	0.31%
Total Required Contributions (Chapter 356)	22.87%	22.01%
Statutory Contributions (Chapter 354A)	16.47%	16.43%
Contribution (Deficiency)/Sufficiency	(6.40)%	(5.58)%
Unfunded Actuarial Accrued Liability		
Based upon AVA	$ 559,286	$ 547,011
Based upon MVA	589,290	577,015
Funding Ratios (dollars in thousands)		
Accrued Benefit Funding Ratio		
Current Assets (AVA)	$ 911,930	$ 911,930
Current Benefit Obligations	1,417,861	1,391,811
Funding Ratio	64.32%	65.52%
Accrued Liability Funding Ratio		
Current Assets (AVA)	$ 911,930	$ 911,930
Current Assets (MVA)	881,926	881,926
Actuarial Accrued Liability	1,471,216	1,458,941
Funding Ratio (AVA)	61.98%	62.51%
Funding Ratio (MVA)	59.95%	60.45%
Projected Benefit Funding Ratio		
Current and Expected Future Assets	$ 1,461,167	$ 1,439,252
Current and Expected Future Benefit Obligations	1,677,829	1,664,747
Funding Ratio	87.09%	86.45%
Participant Data		
Active Members		
Number	3,828	3,828
Projected Annual Earnings	$ 256,509	$ 263,288
Average Projected Annual Earnings	65,691	68,780
Average Age	45.0	45.0
Average Service	11.8	12.5
Additional Members of Leave of Absence	52	52
Service Retirements	2,942	2,952
Survivors	321	311
Disability Retirements	29	29
Deferred Retirements	1,833	1,833
Terminated Other Non-vested	1,427	1,427
TOTAL	10,432	10,432

Plan Assets

Statement of Plan Net Assets for Year Ended June 30, 2012
(dollars in thousands)

We received asset information from SPTRFA which provided assets by class as of June 30, 2012. We have reviewed these assets and summarized them below. Our summary exactly matches the summary provided by the Fund Actuary in their Actuarial Valuation Report.

	Market Value	
	Fund Actuary	**Milliman**
Cash and Short-term Investments	$ 10,862	$ 10,862
Other Assets*	5,161	5,161
Investments (at fair value)		
Fixed Income	168,941	168,941
Equity	596,107	596,107
Real Estate	91,605	91,605
Alternative	10,841	10,841
Total Investments	867,494	867,494
Payables	(1,591)	(1,591)
TOTAL ASSETS	**$881,926**	**$881,926**

* DERIVATION OF OTHER ASSETS	Market Value
Accounts Receivable	
Employer Contribution	$ 2,511
Employee Contribution	-
Service Purchases Receivable	84
Pensions Receivable	15
State Contributions	-
Real Estate Income Receivable	59
Commission Recapture Receivable	1
Interest Receivable	1
Dividend Receivable	194
Misc. Receivable	3
Security Purchases Receivable	609
Sale of Securities	1,657
Total Accounts Receivable	$ 5,134
Fixed Assets	26
Total Other Assets	$ 5,160**

**This amount is different from the amount shown above due to rounding.

Plan Assets

Reconciliation of Plan Assets

(dollars in thousands)

The following exhibit shows the revenue, expenses and resulting assets of the Fund as reported by SPTRFA for the Plan's Fiscal year July 1, 2011 to June 30, 2012.

We received this information directly from SPTRFA and summarized it below. Our summary matches the summary provided by the Fund Actuary.

	Market Value	
	Fund Actuary	**Milliman**
1. Fund Balance at Market Value at July 1, 2011*	**$950,121**	**$950,121**
2. Contributions		
a. Member	14,117	14,117
b. Employer	21,452	21,452
c. Direct Aid (State/City/County)	3,658	3,658
d. Total Contributions	39,227	39,227
3. Investment Income		
a. Investment Income/(loss)	105	105
b. Investment Expenses	(4,080)	(4,080)
c. Total Investment Income/(Loss)	(3,975)	(3,975)
4. Other	15	15
5. Total Income (2.d. + 3.c. + 4.)	**$ 35,267**	**$ 35,267**
6. Benefits Paid		
a. Annuity Benefits	(101,788)	(101,788)
b. Refunds	(938)	(938)
c. Total Benefits Paid	(102,726)	(102,726)
7. Administrative Expenses	(736)	(736)
8. Total Disbursements (6.c. + 7)	**(103,462)**	**(103,462)**
9. Fund Balance at Market Value at June 30, 2012 (1. + 5. + 8. + 9.)	**$881,926**	**$881,926**

*As reported by Fund Actuary.

Plan Assets

Actuarial Asset Value
(dollars in thousands)

Based upon the assets reported to us by SPTRFA and prior year actuarial valuation information regarding unrecognized asset returns, we have constructed the Actuarial Value of Assets for the July 1, 2012 Actuarial Valuation. Our calculation matches the Fund Actuary.

				June 30, 2012
1.	Market Value of Assets Available for Benefits			$881,926
2.	Determination of Average Balance			
	a. Total Assets Available at July 1, 2011			950,121
	b. Total Assets Available at June 30, 2012			881,926
	c. Net Investment Income for Fiscal Year Ending June 30, 2012			(3,975)
	d. Average Balance [a.+ b. – c.] / 2			918,011
3.	Expected Return [8.5% x 2.d.]			78,031
4.	Actual Return			(3,975)
5.	Current Year Asset Gain/(Loss) [4. – 3.]			(82,006)
6.	Unrecognized Asset Returns			
		Original Amount	**% Not Recognized**	
	a. Year Ended June 30, 2012	$ (82,006)	80%	$ (65,605)
	b. Year Ended June 30, 2011	128,185	60	76,911
	c. Year Ended June 30, 2010	36,792	40	14,717
	d. Year Ended June 30, 2009	(280,135)	20	(56,027)
	e. Total Unrecognized Return			(30,004)
7.	Actuarial Value at June 30, 2012 (1. – 6.e.)			$911,930

Development of Costs

Actuarial Valuation Balance Sheet
(dollars in thousands)

The actuarial balance sheet is based on the fundamental equation that at any given time the present value of benefits to be paid in the future must be equal to the assets on hand plus the present value of future contributions to be received. The total rate of contribution is determined as the amount which will make the total present and potential assets balance with the total present value of future benefits. The members' rate of contribution is fixed at the current schedule. The employer's rate of contribution is the balance required to cover the total rate of contribution.

The contributions made in excess of amounts required for current benefit payments are accumulated as a reserve to help meet benefit payments in later years. It is this reserve system which permits the establishment of a level rate of contribution each year.

	June 30, 2012 (Fund Actuary)	June 30, 2012 (Milliman)
A. Actuarial Value of Assets	$ 911,930	$ 911,930
B. Expected Future Assets		
1. Present Value of Expected Future Statutory Supplemental Contributions	342,624	321,515
2. Present Value of Future Normal Cost Contributions	206,613	205,807
3. Total Expected Future Assets (1. + 2.)	549,237	527,322
C. Total Current and Expected Future Costs	$ 1,461,167	$ 1,439,252
D. Current Benefit Obligations		
1. Benefit Recipients	979,866	982,588
2. Deferred Retirement with Augmentation	64,410	53,142
3. Former Members without Vested Rights	3,506	2,749
4. Active Members	370,079	353,332
5. Total Current Benefit Obligations	1,417,861	1,391,811
E. Expected Future Benefit Obligations	259,968	272,937
F. Total Current and Expected Future Benefit Obligations	1,677,829	1,664,747
G. Unfunded Current Benefit Obligations (D.5. – A.)	505,931	479,881
H. Unfunded Current and Future Benefit Obligations (F. – C.)	216,662	225,495

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate
(dollars in thousands)

In the tables that follow the Commentary in this section, we provide the calculations which ultimately determine the required supplemental contribution rate. From these tables, a critical calculation is the Actuarial Present Value of Projected Benefits. This calculation reflects the actuary's estimate of the total present value cost of all benefits yet to be paid by the Fund to the current members (active and inactive). In replication audits, we typically strive to be within 2% of the actuary's calculation. If that level cannot be achieved, then it is important to identify the differences in more detail. In general, our calculations are within the 2% threshold with the exception of Deferred Members and Former Members Without Vested Rights who are outside the range due to the return of contributions issue described earlier in the report. It is our intent to review this component further in an effort to identify any other differences we may have compared to the Fund Actuary. The table below shows, as a percentage, the ratio of the numbers calculated by Milliman to the numbers reported by the Fund Actuary.

	Actuarial Present Value of Projected Benefits
Active Members	99.40%
Deferred Members	82.51
Former Members without Vested Rights	78.41
Benefit Recipients	100.28
Total	99.22%

The tables that follow the Actuarial Present Value of Projected Benefits are designed to determine how much of the Actuarial Present Value of Projected Benefits is to be funded by the future "normal cost" contributions (Actuarial Present Value of Future Normal Cost) versus how much belongs to past contributions (Actuarial Accrued Liability). This allocation does not change the total costs determined in the Actuarial Present Value of Projected Benefits. It simply allocates cost to past versus future based upon the Entry Age Normal actuarial cost method. In replication audits, we typically look to be within 5% of the actuary's calculations for active member Actuarial Accrued Liability. The larger range recognizes that different valuation systems have different ways of rounding service and ages. In addition, the Entry Age Method requires projection of theoretical past amounts which can be handled somewhat differently between actuarial valuation systems. The table below shows, as a percentage, the ratio of the numbers calculated by Milliman to the numbers reported by the Fund Actuary.

	Actuarial Accrued Liability
Active Members	99.30%
Deferred Members	82.51
Former Members without Vested Rights	78.41
Benefit Recipients	100.28
Total	99.17%

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate

(dollars in thousands)

Once the Actuarial Accrued Liability is determined, it is compared to the Actuarial Value of Assets to determine the unfunded liability. The difference between these numbers is then amortized to the statutory amortization date of June 30, 2037 based upon the present value of future payrolls. Because this calculation is based upon the difference of two relatively close numbers, any change in one of the numbers can have a large impact when viewed as a percentage.

For example, if the Actuarial Accrued Liability is $1,000 and the Actuarial Value of Assets is $900, then unfunded liability is $100. If the Actuarial Accrued Liability is reduced by $25, the unfunded liability becomes $75. In this example, the reduction in the Actuarial Accrued Liability of 2.5% generates a reduction of 25% in both the unfunded liability and the supplemental contribution rate.

Based upon the above, it should be expected that small deviations in the amount of Actuarial Accrued Liability will have a larger impact on the supplemental contribution rate. It is evidenced here where our calculation of the Actuarial Accrued Liability is 0.8% lower than the Fund Actuary but our supplemental contribution percentage rate is 2.0% lower than the Fund Actuary if we use the Fund Actuary's projected payroll.

As noted in the Executive Summary, we believe the different data processing of payroll for active members with less than 1 year of service is the primary reason for the difference in projected payroll. Using our projected payroll results in our supplemental contribution percentage rate is 4.5% lower than the Fund Actuary.

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate
(dollars in thousands)

	Actuarial Present Value of Projected Benefits	
	Fund Actuary	Milliman
1. Active Members		
A. Retirement Annuities	$ 579,299	$ 573,776
B. Disability Benefits	11,675	11,790
C. Survivor's Benefits	8,258	8,296
D. Deferred Retirements	28,340	19,462
E. Refunds	2,475	12,945
F. Total	630,047	626,268
2. Deferred Retirements with Future Augmentation	64,410	53,142
3. Former Members without Vested Rights	3,506	2,749
4. Benefit Recipients	979,866	982,588
5. Total	$ 1,677,829	$ 1,664,747

	Actuarial Present Value of Future Normal Costs	
	Fund Actuary	Milliman
1. Active Members		
A. Retirement Annuities	$ 156,537	$ 164,843
B. Disability Benefits	4,671	4,971
C. Survivor's Benefits	3,022	3,367
D. Deferred Retirements	30,346	10,583
E. Refunds	12,037	22,043
F. Total	206,613	205,807
2. Deferred Retirements with Future Augmentation	0	0
3. Former Members without Vested Rights	0	0
4. Benefit Recipients	0	0
5. Total	$ 206,613	$ 205,807

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate
(dollars in thousands)

	Actuarial Accrued Liability	
	Fund Actuary	Milliman
A. Determination of Actuarial Accrued Liability (AAL)		
1. Active Members		
A. Retirement Annuities	$ 422,762	$ 408,933
B. Disability Benefits	7,004	6,819
C. Survivor's Benefits	5,236	4,929
D. Deferred Retirements	(2,006)	8,879
E. Refunds	(9,562)	(9,099)
F. Total	423,434	420,462
2. Deferred Retirements with Future Augmentation	64,410	53,142
3. Former Members without Vested Rights	3,506	2,749
4. Benefit Recipients	979,866	982,588
5. Total	1,471,216	1,458,941
B. Determination of Unfunded Actuarial Accrued Liability (UAAL)		
1. Actuarial Accrued Liability	$ 1,471,216	$ 1,458,941
2. Current Assets (AVA)	911,930	911,930
3. Unfunded Actuarial Accrued Liability (AVA)	559,286	547,011
4. Current Assets (MVA)	881,926	881,926
5. Unfunded Actuarial Accrued Liability (MVA)	589,290	577,015
C. Determination of Supplemental Contribution Rate*		
1. Present value of future payrolls through the amortization date of June 30, 2037	3,948,324	4,044,214
2. Supplemental Contribution Rate (AVA) (B.3. / C.1.)	14.17%	13.53%
3. Supplemental Contribution Rate (MVA) (B.5. / C.1.)	14.93%	14.27%

*The amortization of the unfunded actuarial accrued liability (UAAL) using the current amortization method results in initial payments less than the "interest only" payment on the UAAL. Payments less than the interest only amount will result in the UAAL increasing for an initial period of time.

Development of Costs

Determination of Contribution Sufficiency/(Deficiency)

(dollars in thousands)

In this section, we compare the statutory contributions provided under Chapter 354A of Minnesota statutes (354A contributions) to the required contributions under Chapter 356 of Minnesota statutes (356 contributions). The difference between these amounts results in a reported contribution sufficiency or deficiency.

With respect to the 354A contributions, the percentage is set by statute and we agree with the percentages reported by the Fund Actuary. The dollar amount is determined by applying the statutory percentage to the member compensation provided in the data file and projected (and annualized where necessary) with expected pay increases for the upcoming year. While reasonably close, our projection methodology was slightly different from the Fund Actuary resulting in a small dollar difference.

With respect to the 356 contributions, the total is equal to the sum of the Normal Cost (Entry Age Normal method) plus the supplemental contribution calculated earlier in this report plus an allowance for expected administrative expenses. Typically, in a replication audit, it is desirable to be within 5% of the actuary's Normal Cost. In this case, our Normal Cost percentage is 2.6% lower than the Fund Actuary. We do note that our components of Normal Cost are somewhat different from the Fund Actuary. This is not an uncommon result as the treatment of where to categorize certain costs on an "entry age" basis between actuarial valuation systems quite often results in these differences.

As mentioned earlier, the supplemental contributions are highly leveraged to the value of the Actuarial Accrued Liability and on the projected payroll. In this case, our supplemental contribution percentage is lower by 4.5% but this is based upon an Actuarial Accrued Liability that is lower by .8% and a projected payroll that is 2.6% higher.

Similar to the 354A contributions, we arrive at the same expense allowance percentage but our dollar contribution is different due to payroll projection methodology.

As a result of the above, our calculation of the Contribution Sufficiency/Deficiency is a deficiency of (5.58)%. This compares to a deficiency reported by the Fund Actuary of (6.40)%. The difference of 0.82% is primarily the result of the supplemental contribution and Normal Cost difference.

Development of Costs

Determination of Contribution Sufficiency/(Deficiency)

(dollars in thousands)

	Fund Actuary July 1, 2012		Milliman July 1, 2012	
	Percent of Payroll	Dollar Amount	Percent of Payroll	Dollar Amount
A. Statutory Contributions – Chapter 354A				
1. Employee Contributions	6.02%	$ 15,449	6.02%	$ 15,855
2. Employer Contributions	8.87	22,753	8.87	23,351
3. Supplemental Contributions				
a. 1993 Legislation	0.00	0	0.00	0
b. 1996 Legislation	0.48	1,230	0.47	1,230
c. 1997 Legislation	1.10	2,827	1.07	2,827
4. Total	16.47	42,259	16.43%	43,263
B. Required Contributions – Chapter 356				
1. Normal Cost				
A. Retirement Benefits	6.47	16,602	6.66	17,535
B. Disability Benefits	0.18	455	0.18	474
C. Survivors	0.12	296	0.12	316
D. Deferred Retirement Benefits	1.12	2,868	0.37	974
E. Refunds	0.50	1,282	0.84	2,212
F. Total	8.39	21,503	8.17	21,511
2. Supplemental Contribution Amortization by June 30, 2037 of Unfunded Actuarial Accrued Liability	14.17	36,347	13.53	35,623
3. Allowance for Expenses	0.31	795	0.31	816
4. Total	22.87	58,645	22.01	57,950
C. Contribution Sufficiency/(Deficiency) (A.4. – B.4.)	(6.40)%	$ (16,386)	(5.58)%	$ (14,687)

Note: Projected annual payroll for fiscal year beginning on the valuation date:
$256,509 for Fund Actuary and $263,288 for Milliman.

Actuarial Basis

Actuarial Cost Method

Liabilities and contributions in this report are computed using the Individual Entry Age Normal Cost Method. This method is prescribed by Minnesota Statutes.

The objective under this method is to fund each member's benefits under the Plan as payments which are level as a percentage of salary, starting at original participation date (or employment date), and continuing until the assumed date of retirement, termination, disability or death. For valuation purposes, entry age for each member is determined as the age at valuation minus years of service as of the valuation date.

At any given date, a liability is calculated equal to the contributions which would have been accumulated if this method of funding had always been used, the current plan provisions had always been in place, and all assumptions had been precisely accurate. The difference between this liability and the assets (if any) which are held in the fund is the unfunded liability. The unfunded liability is typically funded over a chosen period in accordance with the amortization schedule.

A detailed description of the calculation follows:

The normal cost for each active member under the assumed retirement age is determined by applying to earnings the level percentage of salary which, if contributed each year from date of entry into the Plan until the assumed retirement (termination, disability or death) date, is sufficient to provide the full value of the benefits expected to be payable.

- The present value of future normal costs is the total of the discounted values of all active members' normal cost, assuming these to be paid in each case from the valuation date until retirement (termination, disability or death) date.
- The present value of projected benefits is calculated as the value of all benefit payments expected to be paid to the Plan's current members, including active and retired members, beneficiaries, and terminated members with vested rights.
- The accrued liability is the excess of the present value of projected benefits over the present value of future normal costs.
- The unfunded liability is the excess of the accrued liability over the assets of the fund, and represents that part of the accrued liability which has not been funded by accumulated past contributions.

Actuarial Basis

Asset Valuation Method

The assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value) determined as follows:

At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year;

The investment gain or (loss) is taken as the excess of actual investment income over the expected investment income based on the average asset value as calculated above;

The investment gain or (loss) so determined is recognized over five years at 20% per year;

The asset value is, the sum of the market asset value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.

Summary of Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the plan. All assumptions are prescribed by Statutes, the LCPR, or the Board of Trustees.

Mortality Rates	
Healthy (Pre-Retirement)	Male: RP 2000 combined mortality table for males projected to 2020 using Scale AA set back one year. Female: RP 2000 combined mortality table for females projected to 2020 using Scale AA set back three years.
Healthy (Post-Retirement)	Male: RP 2000 combined mortality table for males projected to 2020 using Scale AA set back one year. Female: RP 2000 combined mortality table for females projected to 2020 using Scale AA set back three years.
Disabled	Male: RP 2000 disabled life mortality table for males. Female: RP 2000 disabled life mortality table for females.
Investment Rate Return	Pre-retirement - 8.00% per annum for the time period after June 30, 2012 through June 30, 2017, and 8.50% per annum thereafter. Post-retirement - 8.00% per annum for the time period after June 30, 2012 through June 30, 2017, and 8.50% per annum thereafter.
Cost of Living Increases	1.00% per annum.
Payroll Growth Rate	4.00% per annum.
Future Salary Increases	The select calculation is, during the first 10 years of employment select period, 0.2% multiplied by the result of 15 minus the number of completed years of service, added to the applicable future salary increase assumption. This is in addition to the age-based rates shown below.
Asset Value	The actuarial value of assets is smoothed by using a five-year average market value.
Marital Status	It is assumed that 75% of members have an eligible spouse. The male spouse is assumed two years older than the female spouse. Married members are assumed to have two dependent children.
Deferred Benefit Commencement	Basic Plan members who terminate vested are assumed to commence benefits at age 61. Coordinated Plan members are assumed to commence benefits at age 62. If the member is already past the assumed deferral age, the member is assumed to commence benefits one year from the valuation date.
Administrative Expenses	Prior year administrative expenses (excluding investment expenses) expressed as percentage of prior year payroll.
Allowance for Combined Service Annuity	7.00% load on liabilities for active members hired before July 1, 1989, 2.00% load on liabilities for active members hired after June 30, 1989 and 30.00% load on liabilities for former members.

Summary of Actuarial Assumptions (continued)

Missing Salary and Salary Minimums	Active members with less than one year of service and active members with reported salaries of $100 or less were assumed to have the average non-zero active salary of $31,550. Deferred vested members without salary information were valued using accumulated contributions. For members on leave of absence at valuation date who were not on leave at the prior valuation date, the prior year's valuation pay was used.
Projected Annual Payroll Calculation	The census data as of July 1, 2012 reflects retirements and terminations occurring during the months of May and June; however, it does not necessarily reflect the replacements hired to fill their positions who may have hire dates in August and September. We assumed that May and June retirements are replaced by members coming in at the B.A. Step 1 salary level of $34,674; and the Projected Annual Payroll for the fiscal year ending June 30, 2013 includes this replacement salary amount. An additional $2,601,000 was added to the projected payroll using this assumption.
Supplemental Contributions	According to 1996 legislation, the St. Paul School District and the State of Minnesota are scheduled to make a combined annual supplemental contribution of $1,230,000. According to 1997 legislation, annual supplemental contributions of $2,827,000 are scheduled to be paid on October 1.
Decrement Timing	Retirement and Termination: end of valuation year – consistent with retirements and terminations occurring at the end of the school year. Death and Disability: middle of valuation year.

Summary of Actuarial Assumptions (continued)

Summary of Rates

	Mortality Rates (%)					
	Pre-Retirement		Post-Retirement		Post-Disability	
Age	Male	Female	Male	Female	Male	Female
20	0.0226%	0.0133%	0.0226%	0.0133%	2.2571%	0.7450%
25	0.0308	0.0146	0.0308	0.0146	2.2571	0.7450
30	0.0373	0.0182	0.0373	0.0182	2.2571	0.7450
35	0.0635	0.0281	0.0635	0.0281	2.2571	0.7450
40	0.0869	0.0409	0.0869	0.0409	2.2571	0.7450
45	0.1075	0.0617	0.1075	0.0617	2.2571	0.7450
50	0.1387	0.0941	0.1387	0.0941	2.8975	1.1535
55	0.2178	0.1719	0.2178	0.1719	3.5442	1.6544
60	0.4306	0.3146	0.4306	0.3146	4.2042	2.1839
65	0.8508	0.6022	0.8508	0.6022	5.0174	2.8026
70	1.4636	1.1003	1.4636	1.1003	6.2583	3.7635
75	2.5570	1.7598	2.5570	1.7598	8.2067	5.2330

	Rate (%)	
	Withdrawal	
Years of Service	Male	Female
0	40.0%	40.0%
1	18.0	18.0
2	14.0	14.0
3	10.0	10.0
4	6.0	6.7
5	5.0	5.9
6	4.5	5.1
7	4.1	4.3
8	3.7	3.5
9	3.3	3.1
10	2.9	2.7
11	2.5	2.3
12	2.0	1.9
13	2.0	1.5
14	2.0	1.3
15 & Over	2.0	1.3

Summary of Actuarial Assumptions (continued)

Salary Scale (%)	
Age	Salary Increase
20	6.90%
25	6.75
30	6.50
35	6.25
40	6.00
45	5.75
50	5.50
55	5.25
60	5.00
65	5.00

Disability Rates (%)	
Age	Disability
20	0.02%
25	0.02
30	0.03
35	0.03
40	0.03
45	0.05
50	0.10
55	0.20
60	0.40
65	0.40

Summary of Actuarial Assumptions (continued)

Summary of Retirement Rates

Rate %

	Coordinated				Basic		
Age	Members Eligible for Rule of 90 Provision		Members Not Eligible for Rule of 90 Provision		Age	Members Eligible for Rule of 90 Provision	Members Not Eligible for Rule of 90 Provision
	Male	Female	Male	Female			
55	35	35	7	5	55	50	8
56	35	35	7	5	56	50	13
57	35	35	7	5	57	40	13
58	35	35	7	5	58	40	18
59	35	35	7	5	59	35	18
60	35	35	11	8	60	35	20
61	35	35	15	11	61	35	20
62	35	35	19	14	62	35	40
63	35	35	23	19	63	35	40
64	35	40	27	24	64	40	40
65	35	50	31	35	65	50	50
66	35	50	35	35	66	30	50
67	35	50	35	35	67	30	50
68	35	50	35	35	68	30	50
69	35	50	35	35	69	30	50
70 & Over	100	100	100	100	70 & Over	100	100

Summary of Plan Provisions – Basic Members

This summary of provisions reflects our interpretation of applicable Statutes for purposes of preparing this valuation. This interpretation is not intended to provide a basis for administering the Plan.

Statutory Contributions	The statutory contributions for members and the employer are 8.25% and 11.89% of salary respectively. The member rate will increase from 8.25% to 9.00%, and the employer rate will increase from 11.89% to 12.64%, by 0.25% increments over the next three years, with the next increase scheduled for July 1, 2012.
Participants	Professional Educators first employed prior to July 1, 1978 by schools in the City of St. Paul or St. Paul Technical College (including charter schools) whose position requires a license from the Minnesota Department of Education, who are not covered under the Social Security Act.
Accredited Service	Service which has been verified and accredited by the Association for the purpose of determining contributions and benefits. May include service earned while working outside of St. Paul Public Schools, previous St. Paul service, military service and governmental service.
Accredited St. Paul Service	Service earned as a licensed educator in the St. Paul Public Schools, in the St. Paul Technical College, or in certain charter schools, or as an employee of the Association. Also includes service credited after receipt of payment as required, for licensed educators on leave.
Salary	Total compensation earned during a school year (July 1 to June 30) excluding lump sum payments for unused leave at termination and employer-paid insurance coverage.
Average Salary	Average of the highest five years of Salary during the last 10 years of St. Paul service while making contributions or while disabled.
Normal Retirement Benefit	
Eligibility	Attainment of age 65 and 5 years of Accredited Service.
Benefit	2.50% of Average Salary for each year of Accredited Service.
Early Retirement Benefit	
Eligibility	Attainment of age 55 and 5 years of Accredited Service.
Benefit	The greater of the following benefits: • 2.00 percent of Average Salary per year of Accredited Service, subject to a maximum of 40 years with a 0.25% reduction for each month the member is under age 65. If the member has 25 years of Accredited Service, the reduction is taken from age 60, therefore no reduction is required if the member is age 60 or older. No reduction is taken if age plus years of Accredited Service totals at least 90. • 2.50 percent of Average Salary per year of Accredited Service, subject to a maximum of 40 years, augmented at 3.00 percent compounded annually from the age at retirement until age 65 and then actuarially reduced for each month the member is under age 65.

Summary of Plan Provisions – Basic Members (continued)

Disability Retirement Benefit	
Eligibility	Total and permanent disablement before attaining age 65 and 5 years of Accredited Service.
Benefit	If the member is under age 65, 75 percent of the member's annual contract salary less any Social Security and Workers' Compensation benefits payable until age 65. At age 65, a normal retirement benefit is calculated using the projected service and average salary as if the member had continued to teach in their position held at the time of disability. Members age 65 or older at time of disability receive a normal retirement benefit.
Deferred Retirement Benefit	
Eligibility	5 years of Accredited Service.
Benefit	Benefit computed under law in effect at termination and payable as a normal or early retirement benefit. For members hired on or before June 30, 2006, the benefit is augmented at 3.00 percent compounded annually from the 1st of the month following termination until the January 1st after turning age 55 and then augmented at 5.00 percent compounded annually from that date to July 1, 2012. For members hired after June 30, 2006, the benefit is augmented at 2.50 percent compounded annually from the 1st of the month following termination to July 1, 2012. Augmentation for all members, regardless of hire date, will change to 2.00 percent as of July 1, 2012 for the portion of benefit deferral which occurs after June 30, 2012.
Active Survivor Benefit (Family)	
Eligibility	Active member with three years of Accredited Service.
Benefit	• Children's Benefit: 25 percent of the maximum B.A. salary for the year in which the member died for each eligible child up to a maximum of two. Benefits are paid until the child attains age 18, or 22 for full-time students. • Spousal Benefit: 15 percent of the maximum B.A. salary for an eligible spouse who has legal custody of an eligible child. Spousal benefits cease when the spouse remarries, dies, or elects the regular survivor benefit. Electing the regular survivor benefit does not disqualify the child from receiving the family benefit.

Summary of Plan Provisions - Basic (continued)

Survivor Benefit (Active or Retired Member)	
Eligibility	Active member or retired member with five years of Accredited Service. A surviving spouse must have been married to the member for three years at the earlier of his death or retirement.
Benefit	Retirement benefit earned at the time of death or retirement, whichever is earlier, reduced by the use of one hundred percent joint survivorship tables, based on the ages of the member and survivor at the time of retirement.
Refund of Contributions	
Eligibility	Termination or death where no annuity is payable or prior to age 55, if a refund of contributions is chosen in lieu of an annuity.
Benefit	Member contributions with 6.00 percent interest (5.00 percent if terminated before May 16, 1989). Interest accruing after July 1, 2011, will become 4.00 percent. Interest accrues annually on July 1st, so the 4.00 percent rate will apply with refund payments made on or after July 1, 2012.
Normal Form of Retirement Benefits	Unreduced annuity payments made until the death of the member, with a 100 percent Joint & Survivor adjusted pension payable to the surviving beneficiary.
Benefit Increases	Effective July 1, 2011, for the next COLA payable January 1, 2012, the 2011 Omnibus Pension Bill modified statutes to provide a transitional change to the COLA. If the Accrued Liability Funding Ratio, based on Actuarial Value of Assets, as determined by the most recent actuarial valuation is: Less than 80 percent, the COLA: 1.00 percent At least 80 percent, but less than 90 percent: 2.00 percent If at least 90 percent, then the subdivisions for the 1.00 percent and 2.00 percent provisions above will expire and COLAs will be paid as follows: Increases will be equal to the Consumer Price Index urban wage earners and clerical workers all items index as reported by the Bureau of Labor Statistics within the United States Department of Labor each year as part of the determination of annual COLA to recipients of federal old age survivors, and disability insurance. The COLA is determined by dividing the most recent average of third quarter monthly index values by the same average third quarter index value from the previous year, subtracting the quantity one from the resulting quotient, and expressing the final result as a percentage amount, which must be rounded to the nearest one-tenth of one percent. The final amount may not be a negative number and may not exceed 5.0 percent. Partial increases are granted for new retirees in the calendar year immediately preceding the increase on the basis of whole calendar quarters that the benefit recipient has been in pay status, calculated to the third decimal place.

Summary of Plan Provisions - Coordinated

This summary of provisions reflects the interpretation of applicable Statutes for purposes of preparing this valuation. This interpretation is not intended to create a basis for administering the Plan.

Statutory Contributions	The statutory contributions for members and the employer are 5.75% and 8.59% respectively. The member rate will increase from 5.75% to 6.50%, and the employer rate will increase from 8.59% to 9.34%, by 0.25% increments over the next three years, with the next increase scheduled for July 1, 2012.
Participants	Professional educators in the public schools of the City of St. Paul, excluding charter schools, whose position requires a license from the Minnesota Department of Education, and who are covered under the Social Security Act and make contributions to the St. Paul Teachers' Retirement Fund Association, are covered under the Coordinated Plan.
Allowable Service	Service rendered while making employee contributions, or if credit is purchased during an authorized leave from St. Paul Schools. Service is granted on a proportional basis for part-time teachers.
Salary	Total compensation excluding lump sum payments for unused leave at termination and employer-paid insurance coverage.
Average Salary	Average of the highest five successive years of Salary while making contributions. In cases where the Allowable Service is less than five years, Average Salary is based on the Allowable Service years.
Normal Retirement Benefit	
Eligibility	Three years of Allowable Service. The eligibility age is 65 for those hired before July 1, 1989, and the earlier of eligibility for full Social Security retirement benefits to a maximum of age 66 for those hired on or after July 1, 1989. A Proportionate Retirement Annuity is available at Normal Retirement Age with one year of Allowable Service.
Benefit	1.70 percent of Average Salary for each year of Allowable Service.
Early Retirement Benefit	
Eligibility	Attainment of age 55 and 3 years of Allowable Service.
Benefit	Members hired before July 1, 1989, are eligible for the greater of the following benefits. Members hired after July 1, 1989, are eligible for the benefits shown in item (b): a) 1.20 percent of Average Salary for each of the first ten years of Allowable Service plus 1.70 percent of Average Salary for each subsequent year of Allowable Service. There is a reduction of 0.25 percent for each month the member is under age 65, or under age 62 with 30 years of Allowable Service. No reduction applies if the age plus years of service totals at least 90. b) 1.70 percent of Average Salary per year of Allowable Service augmented at 3.00 percent compounded annually from the age at retirement until age 65 and then actuarially reduced for each month the member is under the Normal Retirement Age.

Summary of Plan Provisions – Coordinated (continued)

Disability Retirement Benefit	
Eligibility	Total and permanent disablement and three years of Allowable Service with service earned within the current fiscal year and at least two years of Allowable Service since the last interruption in service.
Benefit	Calculated as a normal retirement benefit payable for life without reduction for early commencement. At normal retirement age, the benefit converts from a disability benefit to a retirement benefit. The disability benefit is reduced by any Workers' Compensation benefits payable.
Deferred Retirement Benefit	
Eligibility	Three years of Allowable Service.
Benefit	Benefit computed under law in effect at termination and payable as a normal or early retirement benefit. For members hired on or before June 30, 2006, the benefit is augmented at 3.00 percent compounded annually from the 1st of the month following termination until the January 1st after turning age 55 and then augmented at 5.00 percent compounded annually from that date to July 1, 2012. For members hired after June 30, 2006, the benefit is augmented at 2.50 percent compounded annually from the 1st of the month following termination to July 1, 2012. Augmentation for all members, regardless of hire date, will change to 2.00 percent as of July 1, 2012 for the portion of benefit deferral which occurs after June 30, 2012.
Survivor Benefit (Active Members)	
Eligibility	Active member with three years of Allowable service. A surviving spouse is defined as the person legally married to the member at the time of death. If none, a dependent child who is the legal child of the member, who is less than 20 years of age and unmarried.
Benefit	Retirement benefit earned at the time of death with choices for either a reduced for 100 percent joint survivorship, or 5-, 10-, 15-, or 20-year term certain. The benefit is available immediately upon application. Actuarial reductions for the calculation of the survivorship portion of a 100 percent joint and survivor benefit is determined based on the member's and survivor's ages at the death of the member. Early retirement reductions apply to the survivor benefit based on the member's age when deceased. If the deceased member had not yet attained age 55 at time of death, the additional early retirement reduction from age 55 to the age of the member at death applies at only one-half of the actuarial rate.

Summary of Plan Provisions – Coordinated (continued)

Refund of Contributions	
Eligibility	Termination or death where no annuity is payable or a refund of contributions is chosen in lieu of an annuity.
Benefit	Member contributions with 6.00 percent interest (5.00 percent if terminated before May 16, 1989). Interest accruing after July 1, 2011, will become 4.00 percent. Interest accrues annually on July 1st, so the 4.00 percent rate will apply with refund payments made on or after July 1, 2012.
Normal Form of Retirement Benefits	Straight life annuity. Actuarially equivalent options are available to provide post-retirement beneficiary or survivor benefits.
Benefit Increases	Effective July 1, 2011, for the next COLA payable January 1, 2012, the 2011 Omnibus Pension Bill modified statutes to provide a transitional change to the COLA. If the Accrued Liability Funding Ratio based on the Actuarial Value of Assets, as determined by the most recent actuarial valuation is: Less than 80 percent, the COLA: 1.00 percent At least 80 percent, but less than 90 percent: 2.00 percent If at least 90 percent, then the subdivisions for the 1 percent and 2 percent provisions above will expire and COLAs will be paid as follows: Increases will be equal to the Consumer Price Index urban wage earners and clerical workers all items index as reported by the Bureau of Labor Statistics within the United States Department of Labor each year as part of the determination of annual COLA to recipients of federal old age, survivors, and disability insurance. The COLA is determined by dividing the most recent average of third quarter monthly index values by the same average third quarter index value from the previous year, subtracting the quantity one from the resulting quotient, and expressing the result as a percentage amount, which must be rounded to the nearest one-tenth of one percent. The final amount may not be a negative number and may not exceed 5.00 percent. Partial increases are granted for new retirees in the calendar year immediately preceding the increase on the basis of whole calendar quarters that the benefit recipient has been in pay status, calculated to the third decimal place.

St. Paul Teachers' Retirement Fund Association

Active Members as of June 30, 2012

	Years of Service								
Age	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
<25	45	14	0	0	0	0	0	0	59
25-29	125	170	27	0	0	0	0	0	322
30-34	58	158	188	31	0	0	0	0	435
35-39	37	85	164	208	24	0	0	0	518
40-44	36	77	99	203	172	2	0	0	589
45-49	24	54	71	126	136	62	17	0	490
50-54	29	48	62	114	105	83	68	4	513
55-59	27	38	58	93	88	80	74	67	525
60-64	19	27	50	73	59	44	34	28	334
65+	15	23	15	9	16	9	3	5	95
ALL	415	694	734	857	600	280	196	104	3880

Average Annual Earnings

	Years of Service								
Age	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
<25	31550	44504	0	0	0	0	0	0	34624
25-29	31961	46209	51987	0	0	0	0	0	41162
30-34	32344	47177	58270	65118	0	0	0	0	51272
35-39	32256	48461	61426	68328	82230	0	0	0	60950
40-44	31954	49831	66581	72323	78338	71740	0	0	67705
45-49	33267	52342	65197	74356	77390	83814	90046	0	71174
50-54	32735	42167	64012	73698	77657	83778	86687	70242	71397
55-59	33021	36777	63952	71247	78076	81313	81220	85225	71848
60-64	31550	24499	47524	67621	77045	78417	82568	80009	64722
65+	31550	18135	51908	67930	80233	82163	94191	100275	53553
ALL	32161	44979	60607	71011	78045	82101	84315	83968	63138

St. Paul Teachers' Retirement Fund Association

Service Retirements as of June 30, 2012

	Years Retired							
Age	≤1	1-4	5-9	10-14	15-19	20-24	25+	ALL
<50	0	2	4	4	0	0	0	10
50-54	0	0	0	0	0	0	0	0
55-59	29	64	1	0	0	0	0	94
60-64	64	290	168	0	0	0	0	522
65-69	41	258	378	158	4	0	0	839
70-74	2	36	159	261	99	1	1	559
75-79	1	4	28	128	212	42	0	415
80-84	0	3	5	9	123	80	62	282
85+	0	0	2	3	11	57	158	231
ALL	137	657	745	563	449	180	221	2952

Average Annual Benefit

	Years Retired							
Age	≤1	1-4	5-9	10-14	15-19	20-24	25+	ALL
<50	0	7129	784	9119	0	0	0	5387
50-54	0	0	0	0	0	0	0	0
55-59	25754	22521	2400	0	0	0	0	23304
60-64	17711	29782	33780	0	0	0	0	29589
65-69	19501	24372	34246	29443	43659	0	0	29630
70-74	15628	19033	26087	32825	38421	64662	53702	31044
75-79	885	6205	21073	35635	40538	23700	0	35582
80-84	0	10812	7357	21647	48588	36275	34946	40103
85+	0	0	15644	26589	34908	36805	27475	30017
ALL	19796	26062	31452	32134	42166	33667	29689	31474

St. Paul Teachers' Retirement Fund Association

Survivors as of June 30, 2012

	Years Since Death							
Age	≤1	1-4	5-9	10-14	15-19	20-24	25+	ALL
<50	0	2	1	0	0	0	0	3
50-54	0	1	0	0	0	0	0	1
55-59	1	4	1	5	1	0	0	12
60-64	0	1	4	2	1	3	2	13
65-69	0	1	6	12	6	4	0	29
70-74	0	0	3	10	19	5	6	43
75-79	0	0	1	11	15	20	11	58
80-84	0	0	1	1	6	24	32	64
85+	0	0	0	0	3	9	76	88
ALL	1	9	17	41	51	65	127	311

Average Annual Benefit

	Years Since Death							
Age	≤1	1-4	5-9	10-14	15-19	20-24	25+	ALL
<50	0	10355	516	0	0	0	0	7075
50-54	0	281	0	0	0	0	0	281
55-59	5047	12908	18661	7847	47006	0	0	13465
60-64	0	18528	24484	49228	37622	35660	11467	29419
65-69	0	16603	32602	17561	36563	24093	0	25472
70-74	0	0	16310	35457	39884	29266	18976	33058
75-79	0	0	61996	38325	43696	34267	30428	37225
80-84	0	0	38712	33170	37156	39400	27429	33096
85+	0	0	0	0	22261	38817	27450	28435
ALL	5047	11973	27198	28238	39352	35846	27050	30563

St. Paul Teachers' Retirement Fund Association

Disability Retirements as of June 30, 2012

Age	Years Disabled <1	1-4	5-9	10-14	15-19	20-24	25+	ALL
<50	0	2	0	0	0	0	0	2
50-54	0	2	1	0	1	0	0	4
55-59	0	7	0	1	0	0	0	8
60-64	1	5	7	1	0	0	0	14
65-69	0	0	1	0	0	0	0	1
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	1	16	9	2	1	0	0	29

Average Annual Benefit

Age	Years Disabled <1	1-4	5-9	10-14	15-19	20-24	25+	ALL
<50	0	15495	0	0	0	0	0	15495
50-54	0	8503	23707	0	5417	0	0	11533
55-59	0	15587	0	26643	0	0	0	16969
60-64	20902	31486	30428	9390	0	0	0	28623
65-69	0	0	5039	0	0	0	0	5039
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	20902	19659	26860	18017	5417	0	0	21332

R:\CLIENT\51\MLC\REPORTS\2012\STPTRFA\STPTRFA 2012 ACTUARIAL VALUATION REPLICATION.DOCX