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Teachers Retirement Association of Minnesota

**Actuarial Valuation Report
For Funding Purposes
As of July 1, 2015**



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Cavanaugh Macdonald

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The experience and dedication you deserve

December 4, 2015

Board of Trustees
Teachers Retirement Association of Minnesota
60 Empire Drive, Suite 400
St. Paul, MN 55103

Dear Board Members:

At your request, we have performed the annual actuarial valuation of the Teachers Retirement Association of Minnesota (TRA or System) as of July 1, 2015. The major findings of the actuarial valuation are contained in this report, which reflects the benefit provisions in place on July 1, 2015. There was no change to the actuarial methods or assumptions from the prior valuation. However, the merger of the Duluth Teachers Retirement Fund Association into TRA, effective June 30, 2015, is first reflected in this valuation.

Due to some difficulties in obtaining complete payroll data from the Minneapolis School District, the total pay for some members in this group was not accurately reported in the census data. Based on discussions with TRA staff, the understatement of pay which was estimated to be \$40 million was allocated to Minneapolis members who worked substantially full time for the year and did not withdraw their member contributions. We believe this is a reasonable estimation given the available information.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by TRA staff. This information includes, but is not limited to, statutory provisions, member data and financial information. We found this information to be reasonable and comparable to information used in prior valuations. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

The statutory benefits of the System are reflected in the actuarially calculated contribution rates which are developed using the Entry Age Normal (EAN) cost method. An asset smoothing method is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded actuarial accrued liability and are amortized as a level percent of payroll over a closed period set in state statutes. Actuarial assumptions, including investment return, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Trustees. These parties are responsible for selecting the plan's funding policy, actuarial methods, asset valuation method, and actuarial assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in Appendix C of this report.

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Board of Trustees
December 4, 2015
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Future actuarial results may differ significantly from the current results presented in this report due to factors such as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of potential results is not presented herein.

The actuarial computations presented in this report are for purposes of determining the required contribution rates for funding the System. Actuarial computations for purposes of fulfilling financial accounting requirements for the System under the Governmental Accounting Standards Board (GASB) Statement Number 67 will be presented in a separate report. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals and the plan provisions described in Appendix B of this report. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

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 that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the System. In addition, to the best of our knowledge and belief the valuation was performed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement (LCPR). We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. Also, we meet the requirements of "approved actuary" under Minnesota Statutes, Section 356.215, Subdivision 1, Paragraph (c).

Respectfully submitted,

A handwritten signature in blue ink that reads "Patrice Beckham".

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink that reads "Brent A. Banister".

Brent A. Banister PhD, FSA, EA, FCA, MAAA
Chief Pension Actuary



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SECTION 1 – EXECUTIVE SUMMARY

The Teachers Retirement Association of Minnesota (TRA or System) provides retirement, disability, and death benefits to Minnesota public school teachers, administrators, and college faculty. This report presents the results of the July 1, 2015 actuarial funding valuation of the System. The primary purposes of performing the actuarial funding valuation are to:

- determine the Required Contribution Rate as set forth in Chapter 356 of the Minnesota statutes;
- determine the sufficiency of the Statutory Contribution Rate as set forth in Chapter 354 of the Minnesota statutes;
- determine the experience of the System since the last valuation date;
- disclose asset and liability measures as of the valuation date; and
- analyze and report on trends in System contributions, assets, and liabilities over the past several years.

There was no change to the actuarial methods or assumptions from the prior valuation. However, the merger of the Duluth Teachers Retirement Fund Association (DTRFA) into TRA, effective June 30, 2015, is first reflected in this valuation. The merger increased the unfunded actuarial accrued liability of the System by \$166 million, but also increased the statutory contribution rate this year by 0.31% due to the additional state aid provided as part of the merger to ensure the long term funding of TRA will not be affected.

Due to some difficulties in obtaining complete payroll data from the Minneapolis School District, the total pay for some members in this group was not accurately reported in the census data. Based on discussions with TRA staff, the understatement of pay which was estimated to be \$40 million was allocated to Minneapolis members who worked substantially full time for the year and did not withdraw their member contributions. We believe this is a reasonable estimation given the available information.

The actuarial valuation results provide a “snapshot” view of the System’s financial condition on July 1, 2015. The results reflect net favorable experience for the past plan year as demonstrated by an unfunded actuarial accrued liability (UAAL) that was lower than expected. The UAAL on July 1, 2015 is \$5.865 billion as compared to an expected UAAL of \$6.706 billion (reflecting the \$166 million increase due to the merger with DTRFA). The favorable experience was the combination of an experience gain of \$816 million on the actuarial value of assets in addition to a small net experience gain of \$24 million on System liabilities. Due to the application of the asset smoothing method, a deferred investment gain of \$0.7 billion still exists.

A summary of the key results from the July 1, 2015 actuarial valuation is shown below. Further detail on the valuation results can be found in the following sections of this Executive Summary.

	July 1, 2015 Valuation Results	July 1, 2014 Valuation Results
Total Required Contribution Rate (Chapter 356)	17.87%	19.15%
Statutory Contribution Rate (Chapter 354)	15.97%	15.68%
Sufficiency/(Deficiency)	(1.90%)	(3.47%)
Unfunded Actuarial Accrued Liability (\$M)	\$5,865	\$6,347
Funded Ratio (Actuarial Assets)	77.05%	74.13%

The contribution deficiency decreased from 3.47% of payroll in last year’s valuation to 1.90% of payroll in the 2015 valuation. The most significant component of this decrease was the actuarial gain on the actuarial value of assets.



SECTION 1 – EXECUTIVE SUMMARY

EXPERIENCE FOR THE LAST PLAN YEAR

Numerous factors contributed to the change in the System’s assets, liabilities and actuarial contribution rate between July 1, 2014 and July 1, 2015. The components are examined in the following discussion.

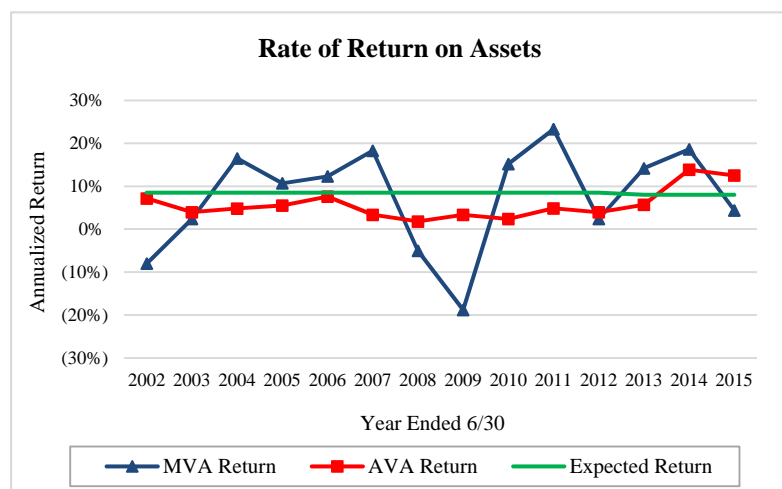
ASSETS

As of June 30, 2015, TRA had net assets of \$20.4 billion, when measured on a market value basis. This was an increase of approximately \$0.1 billion from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the Required Contribution Rate (actuarial contribution rate). An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation. The resulting amount is called the “actuarial value of assets”. In this year’s valuation, the actuarial value of assets as of June 30, 2015 was \$19.7 billion, an increase of \$1.5 billion from the value in the prior valuation. The components of change in the asset values are shown in the following table:

	Actuarial Value (\$M)	Market Value (\$M)
Net Assets, June 30, 2014	\$ 18,182	\$ 20,290
- Employer and Member Contributions and State Aid	+ 690	+ 690
- Benefit Payments and Administrative Expenses	- 1,652	- 1,652
- DTRFA Merger	+ 232	+ 232
- Investment Income	+ 2,245	+ 882
Net Assets, June 30, 2015	\$ 19,697	\$ 20,442

On a market value basis, the rate of return was 4.4% as reported by the State Board of Investment (SBI). Due to the significant amount of deferred investment gain as of July 1, 2014, the net rate of return, measured on the actuarial value of assets, was 12.5%. Because this rate of return was more than the assumed rate of 8.0%, there was an actuarial gain of \$816 million. Please see Section II of this report for more detailed information on the market and actuarial value of assets.



Market value returns have been very volatile. An asset smoothing method is used to calculate the actuarial value of assets that recognizes investment gains and losses equally over a five year period. As can be seen in this graph, the return on actuarial assets is much smoother than the return on market value.



SECTION 1 – EXECUTIVE SUMMARY

LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future normal costs. The difference between this liability and the actuarial value of assets at the same date is called the unfunded actuarial accrued liability (UAAL). The dollar amount of unfunded actuarial accrued liability is reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year's UAAL.

The unfunded actuarial accrued liability is shown as of July 1, 2015 in the following table:

	Actuarial Value of Assets	Market Value of Assets
<i>(\$Millions)</i>		
Actuarial Accrued Liability	\$25,562	\$25,562
Value of Assets	19,697	20,442
Unfunded Actuarial Accrued Liability*	5,865	5,120
Funded Ratio	77.05%	79.97%

*Numbers may not add due to rounding

See Section III of the report for the detailed development of the unfunded actuarial accrued liability.

Changes in the UAAL occur for various reasons. The net reduction in the UAAL from July 1, 2014 to July 1, 2015 was \$482 million. The components of this net change are shown in the table below (in millions):

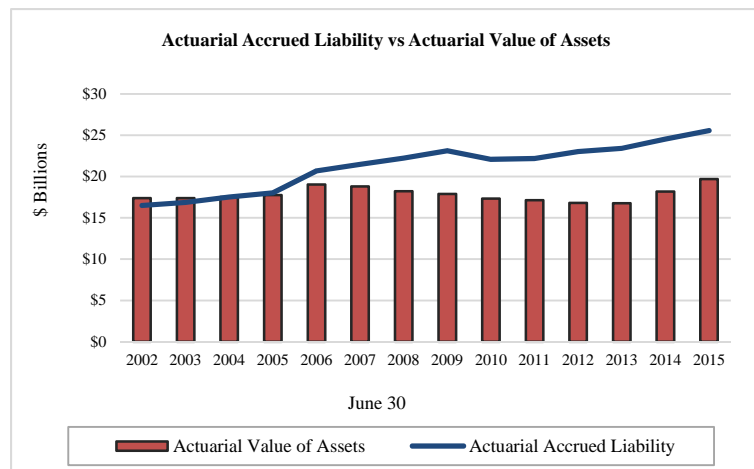
Unfunded Actuarial Accrued Liability, July 1, 2014 (\$M)	\$6,347
• Expected increase from amortization method	\$45
• Expected increase from contributions below Required Rate	157
• Investment experience	(816)
• Liability experience	(24)
• Other experience	(10)
• DTRFA merger	166
• Total	<u>(482)</u>
Unfunded Actuarial Accrued Liability, July 1, 2015	\$5,865

As shown above, various components impacted the UAAL. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on the actuarial assumptions, are reflected in the UAAL and are measured as the difference between the expected unfunded actuarial accrued liability and the actual unfunded actuarial accrued liability, taking into account any changes due to actuarial assumptions and methods or benefit provision changes. Overall, the System experienced a net actuarial gain of \$840 million. The actuarial gain may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was a \$816 million gain, measured on the actuarial value of assets, and a small net liability gain of \$24 million which arose from overall demographic experience that was slightly more favorable than anticipated by the actuarial assumptions. The net liability gain reflected the combined impact of actuarial losses on both retirement experience (retirements occurring earlier than expected) and salary increases (greater than expected) along with an actuarial gain arising from



SECTION 1 – EXECUTIVE SUMMARY

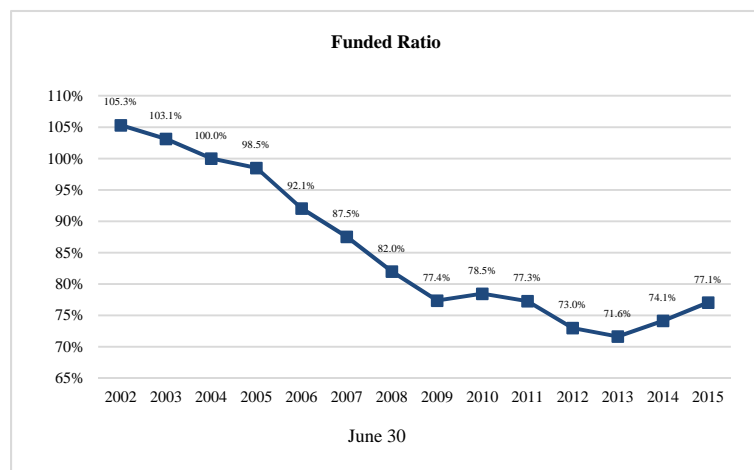
the extension of the assumed date of the COLA increase from 2031 to 2037. (This date was extended because the market value of assets returned less than 8%).



The actuarial value of assets was slightly higher than the actuarial accrued liability in the early part of the period. Investment experience below the assumed rate of return of 8.5%, the merger of the Post Fund into TRA, and the merger of the Minneapolis Teachers Retirement Fund Association all served to increase the difference between the actuarial accrued liability and actuarial assets.

An evaluation of the unfunded actuarial accrued liability on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both very large numbers) is reflected. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial accrued liability. The funded status information is shown below (in millions).

	7/1/11	7/1/12	7/1/13	7/1/14	7/1/15
Funded Ratio	77.3%	73.0%	71.6%	74.1%	77.1%
Unfunded Actuarial Accrued Liability (\$M)	\$5,039	\$6,219	\$6,644	\$6,347	\$5,865



The funded ratio has decreased over this period largely due to investment experience less than the 8.5% assumed rate of return and the dissolution of the Minnesota Post Retirement Investment Fund (MPRIF) with the associated transfer of assets and liabilities to TRA. The benefit reductions passed by the 2010 legislature, the final recognition of the 2008 and 2009 losses, and the strong investment returns since FY10 have resulted in the funded ratio beginning to rebound in the last two valuations.



SECTION 1 – EXECUTIVE SUMMARY

CONTRIBUTION RATE

Under the Entry Age Normal cost method, the actuarial contribution rate consists of two components:

- a "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date, and
- an "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

See Section IV of the report for the detailed development of these contribution rates which are summarized in the following table:

Contribution Rates	July 1, 2015	July 1, 2014
1. Statutory Contribution Rate	15.97%	15.68%
2. Normal Cost Rate	8.57%	8.70%
3. UAAL Contribution Rate	9.07%	10.23%
4. Expenses	0.23%	0.22%
5. Total Required Contribution Rate (2) + (3) + (4)	17.87%	19.15%
6. Deficiency (1) - (5)	(1.90%)	(3.47%)

As discussed earlier, legislation passed in the 2014 session provided for the merger of the Duluth Teachers Retirement Fund Association into TRA and provided for additional ongoing state aid to TRA in the amount of \$14.377 million annually to ensure the long term funding of TRA will not be affected.

The impact of the merger on the 2015 valuation results, using the actuarial value of assets, is summarized in the table below.

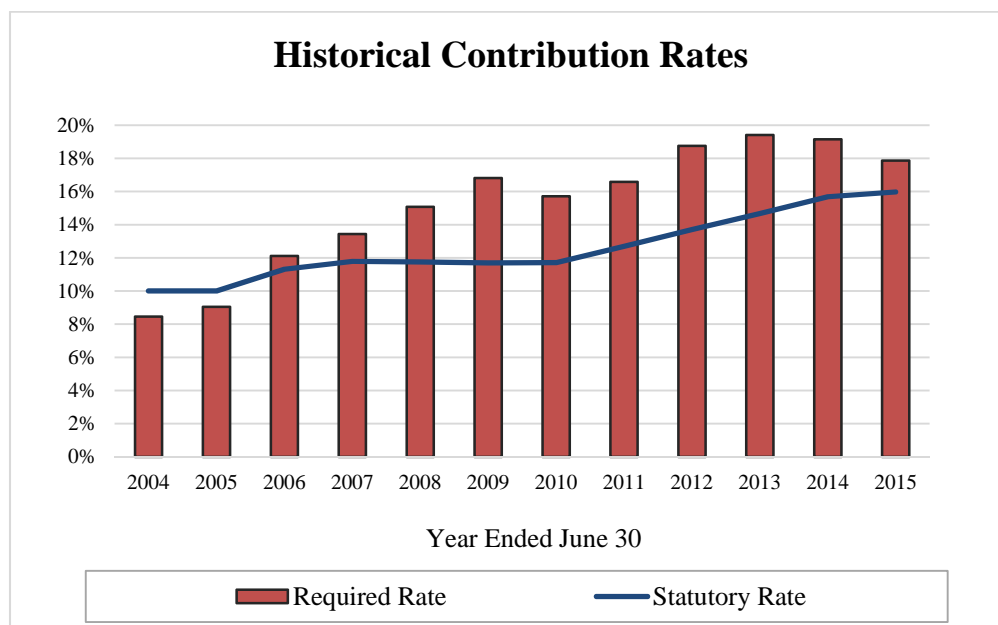
	<u>Before Merger</u>	<u>After Merger</u>	<u>Impact of Merger</u>
Projected Benefit Funding Ratio	95.5%	95.8%	0.3%
Actuarial Accrued Liability Funding Ratio (AVA)	77.4%	77.1%	(0.3%)
Actuarial Value of Assets (AVA)	\$ 19.46B	\$ 19.70B	\$ 0.24B
Unfunded Actuarial Accrued Liability (UAAL)	\$ 5.70B	\$ 5.87B	\$ 0.17B
Normal Cost Rate (% of pay)	8.57%	8.57%	0.00%
Amortization of UAAL (% of pay)	8.91%	9.07%	0.16%
Expenses (% of pay)	0.23%	0.23%	0.00%
Total Required Contribution (% of pay)	17.71%	17.87%	0.16%
Member and Employer Contributions	15.20%	15.20%	0.00%
State Aid	0.47%	0.77%	0.30%
Contribution Deficiency (% of pay)	(2.04%)	(1.90%)	0.14%

(Note: The additional state aid provided as part of the merger is a fixed dollar amount that will decline as a percentage of pay over time while the UAAL amortization calculation assumes a level percentage of payroll.)



SECTION 1 – EXECUTIVE SUMMARY

A historical summary of the Statutory and Required Contribution Rates is shown in the graph below:



When the Statutory Contribution Rate is less than the Required Contribution Rate, the resulting contribution deficiency creates an increase in the unfunded actuarial accrued liability. For the plan year ending June 30, 2015, the contribution deficiency increased the UAAL by an estimated \$157 million.

The actuarial contribution rate (Required Contribution Rate) is determined based on the snapshot of the System taken on the valuation date, July 1, 2015. The actuarial contribution rate in future years will change each year as the deferred actuarial investment experience is recognized and other experience (both investment and demographic) impacts the System. In addition, changes in the funded status of the System from year to year will impact the date at which the COLA is assumed to increase to 2.5%, which will impact the System liabilities and costs. Significant actuarial gains or losses may impact the expected date of the COLA increase and result in significant changes in the actuarial accrued liability.

Contribution rates have increased over the past few years, with the final scheduled increase taking effect July 1, 2014. At this point, a contribution deficiency still exists, although as pointed out earlier the liabilities reflect a 2.5% increase in the COLA in 2037 which is based on the market value of assets earning the assumed rate of return. On a market value basis, the deficiency is almost eliminated. However, during the past year an experience study was performed resulting in recommended changes to the current set of assumptions. If the proposed assumption changes are approved, they will result in a significant increase in the contribution deficiency.

SUMMARY

The investment return on the market value of assets for FY 2015 was 4.4% as reported by SBI. Due to the deferred investment gains and losses from past years, the return on the actuarial value of assets was 12.5%. Since this return was above the assumed 8% return, there was an actuarial gain on the actuarial value of assets and the funded ratio increased from 74.13% in last year's valuation to 77.05% this year.

As mentioned earlier, the System utilizes an asset smoothing method in the valuation process. While this is a common procedure for public retirement systems, it is important to identify the potential impact of the deferred



SECTION 1 – EXECUTIVE SUMMARY

investment experience. The asset smoothing method impacts only the timing of when the actual market experience is recognized in the valuation process. The deferred investment experience gain of \$0.7 billion represents about 4% of the market value of assets, providing some margin to absorb future investment experience that is less than the assumed rate of return.

The key valuation results from the July 1, 2015 actuarial valuation are shown below, using both actuarial and market value of assets.

	<u>Actuarial Value</u>	<u>Market Value</u>
Statutory Rate	15.97%	15.97%
Required Contribution		
Normal Cost	8.57%	8.57%
UAAL Contribution	9.07%	7.92%
Expenses	<u>0.23%</u>	<u>0.23%</u>
Total Required Contribution	17.87%	16.72%
(Deficiency)/Sufficiency	(1.90%)	(0.75%)
UAAL (\$M)	\$5,865	\$5,120
Funded Ratio	77.05%	79.97%

The long-term financial health of this retirement System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. Changes were made by the 2010 Legislature to strengthen the funding of TRA and enhance its long term sustainability. Contributions were increased by a total of 4%, to be phased in over four years beginning July 1, 2011, and benefit reductions were implemented. These changes, along with strong investment performance in three of the last five fiscal years, have significantly improved the projected long term funding of the System. However, a contribution deficiency still exists, based on the results of the 2015 valuation. If the deferred investment gains are reflected, the deficiency is reduced to 0.75%. The actual market returns over the coming years will be a significant factor in whether or not the funding goal will be reached.

During the past year, an experience study was performed resulting in several proposed assumption changes. If these changes are approved (some must be adopted by the Legislature while others must be approved by the Legislative Commission on Pensions and Retirement), there will be a significant increase in the AAL and on-going cost requirements. The Board has already begun discussions regarding possible ways to address this anticipated contribution shortfall.

We conclude this executive summary by presenting comparative statistics and actuarial information on both the July 1, 2015 and July 1, 2014 valuations.



SECTION I - EXECUTIVE SUMMARY

Principal Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows.

	Actuarial Valuation as of	
	July 1, 2015	July 1, 2014
1. PARTICIPANT DATA		
A. Active members		
1. Number	79,406	77,243
2. Projected annual earnings for fiscal year (000s)	4,672,229	4,353,988
3. Average projected annual earnings for fiscal year 2016	58,840	56,367
4. Average age	43.3	43.4
5. Average service	12.0	12.1
B. Service retirements	56,589	53,774
C. Survivors	4,826	4,472
D. Disability retirements	571	563
E. Deferred retirements	13,314	12,907
F. Terminated other non-vested	31,026	29,984
G. Total	185,732	178,943
2. LIABILITIES AND FUNDING RATIOS (dollars in thousands)		
A. Accrued Benefit Funding Ratio		
1. Current assets (AVA)	\$ 19,696,893	\$ 18,181,932
2. Current benefit obligations	24,402,760	23,427,654
3. Funding ratio	80.72%	77.61%
B. Actuarial Accrued Liability Funding Ratio		
1. Current assets (AVA)	\$ 19,696,893	\$ 18,181,932
2. Market value of assets (MVA)	20,441,993	20,289,594
3. Actuarial accrued liability	25,562,155	24,528,506
4. Unfunded actuarial accrued liability (B.3. - B.1.)	5,865,262	6,346,574
5. Funding ratio (AVA) (B.1. / B.3.)	77.05%	74.13%
6. Funding ratio (MVA) (B.2. / B.3.)	79.97%	82.72%
C. Projected Benefit Funding Ratio		
1. Current and expected future assets	\$ 27,943,500	\$ 25,773,148
2. Current and expected future benefit obligations	29,172,991	27,924,756
3. Funding ratio (AVA)	95.79%	92.29%
3. CONTRIBUTIONS (% of Payroll)		
A. Normal Cost Rate	8.57%	8.70%
B. UAAL Amortization Payment	9.07%	10.23%
C. Expenses	0.23%	0.22%
D. Total Required Contribution (Chapter 356)	17.87%	19.15%
E. Statutory Contribution (Chapter 354)	15.97%	15.68%
F. Contribution (Deficiency)/Sufficiency (3.E. - 3.D.)	(1.90%)	(3.47%)



SECTION II
PLAN ASSETS



SECTION II - PLAN ASSETS

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SECTION II - PLAN ASSETS

In this section, the values assigned to the assets held by the System are presented. These assets are valued on two different bases: the market value and the actuarial value.

Market Value of Net Assets

Market values represent a "snapshot" of the fair value of System assets as of the valuation date.

Actuarial Value of Net Assets

The market value of assets may not necessarily be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens volatility in the market value while still indirectly recognizing market value. The methodology used to determine the actuarial value of assets is prescribed in Minnesota Statutes, Section 356.215, Subdivision 1, Paragraph (f). 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 determined 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 value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.



SECTION II - PLAN ASSETS

TABLE 1

STATEMENT OF FIDUCIARY NET POSITION

(Dollars in Thousands)

	June 30, 2015	June 30, 2014
	<u>Amount</u>	<u>Amount</u>
Cash and short-term investments		
Cash	\$ 8,821	\$ 3,391
Building account cash	16	34
Short term investments	400,181	536,124
Total cash and short term investments	\$ 409,018	\$ 539,549
Accounts Receivable	23,111	25,605
Investments (at fair value)		
Fixed income pool	\$ 4,804,240	\$ 4,732,983
Alternative investments pool	2,519,315	2,558,422
Indexed equity pool	3,173,250	3,149,569
Domestic equity pool	6,476,020	6,119,590
Global equity pool	3,040,212	3,170,211
Total investments	\$ 20,013,037	\$ 19,730,775
Securities lending collateral	\$ 2,076,138	\$ 2,194,122
Building		
Land	\$ 171	\$ 171
Building & equipment net of depreciation	7,001	7,283
Deferred bond charge net of amortization	0	0
Total building	\$ 7,172	\$ 7,454
Capital assets net of depreciation	11,809	8,863
Total Assets	\$ 22,540,285	\$ 22,506,368



SECTION II - PLAN ASSETS

TABLE 1 (continued)

STATEMENT OF FIDUCIARY NET POSITION

(Dollars in Thousands)

	June 30, 2015	June 30, 2014
Liabilities	<u>Amount</u>	<u>Amount</u>
Current		
Accounts payable	\$ 10,558	\$ 10,467
Accrued compensated absences	82	77
Accrued expenses - building	3	32
Bonds payable	604	591
Bonds interest payable	13	14
Securities lending collateral	2,076,138	2,194,122
Total current liabilities	\$ 2,087,398	\$ 2,205,303
Long term		
Accrued compensated absences	\$ 726	\$ 649
Bonds payable	6,070	6,732
Total long term liabilities	\$ 6,796	\$ 7,381
Total Liabilities	\$ 2,094,194	\$ 2,212,684
Net position restricted for pensions	\$ 20,446,091	\$ 20,293,684
Earnings Limitation Savings Account (ELSA) accounts payable	(4,098)	(4,090)
Net position restricted for pensions, after adjustment for ELSA accounts	\$ 20,441,993	\$ 20,289,594



SECTION II - PLAN ASSETS

TABLE 2

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION (Dollars in Thousands)

The following exhibit shows the revenue, expenses and resulting assets of the Fund as reported by the Teachers Retirement Association for the Plan's fiscal years ended June 30, 2015 and 2014. For purposes of the funding valuation report, the DTRFA merger is reflected as of June 30, 2015 and all additions and deductions for fiscal year ended June 30, 2015 exclude DTRFA activity.

	For Year Ended	
	June 30, 2015	June 30, 2014
Additions		
Contributions		
Member	\$ 331,905	\$ 294,632
Employer	337,366	299,300
Direct aid (state/city/district)	21,001	21,001
Earnings Limitation Savings Account (ELSA)	1,347	1,647
Total contributions	<u>\$ 691,619</u>	<u>\$ 616,580</u>
Investment Income		
Investment appreciation in fair value	\$ 896,823	\$ 3,277,719
Less investment expenses	(28,464)	(28,205)
Net Investment Income	<u>\$ 868,359</u>	<u>\$ 3,249,514</u>
Securities Lending activities		
Securities lending income	\$ 15,577	\$ 12,182
Securities lending expenses:		
Borrowing rebates	(614)	(107)
Management fees	(4,262)	(3,896)
Total securities lending expenses	<u>(4,876)</u>	<u>(4,003)</u>
Net income from securities lending	<u>10,701</u>	<u>8,179</u>
Total Net Investment Income	<u>\$ 879,060</u>	<u>\$ 3,257,693</u>
Other Income	<u>3,278</u>	<u>3,855</u>
Total Additions	\$ 1,573,957	\$ 3,878,128
Deductions		
Benefits Paid		
Retirement benefits	\$ (1,630,157)	\$ (1,580,120)
Refunds of contributions to members	(11,627)	(12,566)
Total benefits paid	<u>\$ (1,641,784)</u>	<u>\$ (1,592,686)</u>
Administrative Expenses	<u>(10,368)</u>	<u>(9,430)</u>
Total Deductions	\$ (1,652,152)	\$ (1,602,116)
Increase/(Decrease) in ELSA Account Value	(1,354)	(1,612)
Net Increase (Decrease)	(79,549)	2,274,400
Net Position Restricted for Pensions		
Beginning of Year	\$ 20,289,594	\$ 18,015,194
Adjustment to reflect DTRFA merger at End of Year	231,948	0
End of Year	\$ 20,441,993	\$ 20,289,594



SECTION II - PLAN ASSETS

TABLE 3

ACTUARIAL VALUE OF ASSETS AS OF JUNE 30, 2015

(Dollars in Thousands)

1. Market value of assets available for benefits				\$ 20,441,993
2. Determination of average balance				
a. Assets available at July 1, 2014*			\$	20,293,684
b. Assets available at June 30, 2015*				20,214,143
c. Net investment income for fiscal year ending June 30, 2015				879,060
d. Average balance $(a. + b. - c.) / 2$			\$	19,814,384
3. Expected return $(8.0\% * 2.d.)$				1,585,151
4. Actual return				879,060
5. Current year unrecognized asset return				(706,091)
6. Unrecognized asset returns				
		Original	% Not	
		<u>Amount</u>	<u>Recognized</u>	
a. Year ended June 30, 2015	\$	(706,091)	80%	\$ (564,873)
b. Year ended June 30, 2014		1,855,481	60%	1,113,289
c. Year ended June 30, 2013		1,014,336	40%	405,734
d. Year ended June 30, 2012		(1,045,252)	20%	(209,050)
e. Total return not yet recognized				\$ <u>745,100</u>
7. Actuarial value of assets at June 30, 2015 (1. - 6.e.)				\$ 19,696,893

* *Before recognition of ELSA accounts payable.*



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SECTION III
PLAN LIABILITIES



SECTION III - PLAN LIABILITIES

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SECTION III - PLAN LIABILITIES

In the previous section, an analysis was given of the assets of the System as of the valuation date, July 1, 2015. In this section, the discussion will focus on the commitments of the System, which are referred to as its liabilities.

Table 5 contains an analysis of the actuarial present value of all projected benefits for contributing members, inactive members, retirees and their beneficiaries. The analysis is provided for each group.

The liabilities summarized in Table 5 include the actuarial present value of all projected benefits expected to be paid with respect to each member. For an active member, this value includes measures of both benefits already earned and future benefits expected to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of the surviving beneficiaries.

The actuarial assumptions used to determine liabilities are based on the results of the 2004-2008 Quadrennial Experience Study. This set of assumptions is shown in Appendix C.

The liabilities reflect the benefit structure in place as of July 1, 2015 and the merger of DTRFA as of June 30, 2015.

Actuarial Liabilities

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to perform this allocation, it is necessary for the funding method to “breakdown” the present value of future benefits into two components:

- (1) that which is attributable to the past and
- (2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the “past service liability” or the “actuarial accrued liability”. The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the “normal cost”. Table 5 contains the calculation of the unfunded actuarial accrued liability.



SECTION III - PLAN LIABILITIES

TABLE 4

ACTUARIAL VALUATION BALANCE SHEET AS OF JULY 1, 2015

(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 contribution rate is determined as that amount which will make the total present and potential assets balance with the total present value of projected benefits.

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. This reserve system is designed to enable the establishment of a level rate of contribution each year.

A. Actuarial Value of Assets	\$ 19,696,893
B. Expected Future Assets	
1. Present value of expected future statutory supplemental contributions*	\$ 4,635,771
2. Present value of expected future normal cost contributions	<u>3,610,836</u>
3. Total expected future assets (1. + 2.)	\$ 8,246,607
C. Total Current and Expected Future Assets**	\$ 27,943,500

	<u>Non-Vested</u> <u>Benefits</u>	<u>Vested</u> <u>Benefits</u>	<u>Total</u>
D. Current Benefit Obligations			
1. Benefit recipients			
a. Service retirements	\$ 0	\$ 15,345,521	\$ 15,345,521
b. Disability	0	150,617	150,617
c. Survivors	0	1,004,137	1,004,137
2. Deferred retirements with augmentation to Normal Retirement Date	0	552,566	552,566
3. Former members without vested rights***	73,846	0	73,846
4. Active members	<u>59,180</u>	<u>7,216,893</u>	<u>7,276,073</u>
5. Total Current Benefit Obligations	\$ 133,026	\$ 24,269,734	\$ 24,402,760
E. Expected Future Benefit Obligations			4,770,231
F. Total Current and Expected Future Benefit Obligations			29,172,991
G. Unfunded Current Benefit Obligations (D.5. - A.)			4,705,867
H. Unfunded Current and Future Benefit Obligations (F. - C.)			1,229,491

* Under LCPR guidelines, this amount does not include supplemental payments which could occur after the expiration of the remaining 22 year amortization period.

** Does not reflect deferred investment experience in the asset smoothing method. Total expected future assets on a market value basis is \$ 28,688,600.

*** Former members with insufficient service to vest who have not collected a refund of member contributions as of the valuation date.



SECTION III - PLAN LIABILITIES

TABLE 5

**DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY
AS OF JULY 1, 2015**
(Dollars in Thousands)

	<u>Actuarial Present Value of Projected Benefits</u>	<u>Actuarial Present Value of Future Normal Costs</u>	<u>Actuarial Accrued Liability</u>
1. Active Members			
a. Retirement annuities	\$ 10,872,371	\$ (2,733,016)	\$ 8,139,355
b. Disability Benefits	222,722	(88,128)	134,594
c. Survivor benefits	98,592	(35,303)	63,289
d. Deferred retirements	841,607	(629,738)	211,869
e. Refunds	11,012	(124,651)	(113,639)
f. Total	<u>\$ 12,046,304</u>	<u>\$ (3,610,836)</u>	<u>\$ 8,435,468</u>
2. Deferred Retirements with Future Augmentation to Normal Retirement Date	552,566	0	552,566
3. Former Members Without Vested Rights	73,846	0	73,846
4. Benefit Recipients	<u>16,500,275</u>	<u>0</u>	<u>16,500,275</u>
5. Total Actuarial Accrued Liability	\$ 29,172,991	\$ (3,610,836)	\$ 25,562,155
6. Actuarial Value of Assets			\$ 19,696,893
7. Unfunded Actuarial Accrued Liability (UAAL)			\$ 5,865,262

* On a market value of assets basis, the unfunded actuarial accrued liability is \$5,120,162.



SECTION III - PLAN LIABILITIES

TABLE 6

CHANGES IN UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)

(Dollars in Thousands)

A. Unfunded actuarial accrued liability at beginning of year	\$	6,346,574
B. Changes due to interest requirements and current rate of funding*		
1. Normal cost and actual administrative expenses	\$	389,211
2. Contributions		(691,619)
3. Interest on A., B.1., and B.2. at 8.0%		495,862
4. Total (B.1. + B.2. + B.3.)	\$	193,454
C. Expected unfunded actuarial accrued liability at end of year (A. + B.4.)	\$	6,540,028
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected		
1. Salary increases	\$	17,388
2. Investment return (actuarial assets)		(815,899)
3. Mortality of active members		(2,319)
4. Mortality of benefit recipients		6,229
5. Retirement from active service		52,443
6. Change in date COLA is expected to increase		(125,941)
7. Other items		27,761
8. Total	\$	(840,338)
E. Unfunded actuarial accrued liability at end of year before plan amendments and changes in actuarial assumptions (C. + D.7.)	\$	5,699,690
F. Change in unfunded actuarial accrued liability due to DTRFA merger	\$	165,572
G. Unfunded actuarial accrued liability at end of year (E. + F.)	\$	5,865,262

* *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 in the absence of actuarial gains.*



SECTION IV
SYSTEM CONTRIBUTIONS



SECTION IV – SYSTEM CONTRIBUTIONS

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SECTION IV - CONTRIBUTIONS

Sections II and III were devoted to a discussion of the assets and liabilities of the System. A comparison of Tables 3 and 4 indicates that current assets fall short of meeting the actuarial present value of future projected benefits (total liability). This is expected in all but a fully closed fund, where no further contributions are anticipated.

In an active system, there will almost always be a difference between the actuarial value of assets and total liabilities. This deficiency has to be made up by future contributions and investment returns. An actuarial valuation sets out a schedule of future contributions that will finance this deficiency in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost and (2) the payment on the unfunded actuarial accrued liability.

The term “fully funded” is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded and/or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists.

Description of Rate Components

The actuarial cost method for the System is the traditional Entry Age Normal (EAN) – level percent of pay cost method. Under the EAN cost method, the actuarial present value of each member’s projected benefits is allocated on a level basis over the member’s compensation between the entry age of the member and the assumed exit ages. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The actuarial present value of benefits allocated to prior years of service is called the actuarial accrued liability. The unfunded actuarial accrued liability (UAAL) represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses (actual experience versus experience expected based on the actuarial assumptions). The UAAL is amortized over a period set in state statute (by June 30, 2037). Contributions to fund the UAAL are determined as a level percentage of payroll assuming payroll increases 3.75% each year.



SECTION IV - CONTRIBUTIONS

TABLE 7

NORMAL COST AT JULY 1, 2015

(Dollars in Thousands)

	<u>Percent of Pay</u>	<u>Dollar Amount</u>
1. Normal Cost Rate		
a. Retirement benefits	6.64%	\$ 310,267
b. Disability benefits	0.20%	9,346
c. Survivor benefits	0.09%	4,206
d. Deferred retirement benefits*	1.34%	62,611
e. Refunds	0.30%	14,018
f. Total	8.57%	\$ 400,448

* For vested members, includes the greater of the refund amount or the present value of the deferred monthly benefit.



SECTION IV - CONTRIBUTIONS

TABLE 8

DETERMINATION OF SUPPLEMENTAL CONTRIBUTION RATE

(Dollars in Thousands)

	<u>Amount</u>
A. Determination of Unfunded Actuarial Accrued Liability (UAAL)*	
1. Actuarial accrued liability	\$ 25,562,155
2. Actuarial value of assets	19,696,893
3. Unfunded actuarial accrued liability	\$ 5,865,262
B. Determination of Supplemental Contribution Rate*	
1. Present value of future payrolls through the amortization date of June 30, 2037	\$ 64,655,109
2. Supplemental contribution rate (A.3. / B.1.)**	9.07%

* *On a market value of assets basis, the unfunded actuarial accrued liability is \$5,120,162 and the supplemental contribution rate is 7.92% of payroll.*

** *The amortization factor as of July 1, 2015 is 13.8382.*



SECTION IV - CONTRIBUTIONS

TABLE 9

DETERMINATION OF CONTRIBUTION SUFFICIENCY/(DEFICIENCY)

(Dollars in Thousands)

The annual required contribution (ARC) is the sum of normal cost, a supplemental contribution to amortize the UAAL, and an allowance for expenses.

	<u>Percent of Payroll</u>	<u>Dollar Amount</u>
A. Statutory contributions - Chapter 354		
1. Employee contributions	7.50%	\$ 350,438
2. Employer contributions*	7.70%	359,806
3. Supplemental contributions**		
a. 1993 Legislation	0.11%	5,000
b. 1996 Legislation	0.07%	3,047
c. 1997 Legislation	0.28%	12,954
d. 2014 Legislation	0.31%	14,377
4. Total	15.97%	\$ 745,622
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	6.64%	\$ 310,267
b. Disability benefits	0.20%	9,346
c. Survivor benefits	0.09%	4,206
d. Deferred retirement benefits	1.34%	62,611
e. Refunds	0.30%	14,018
f. Total	8.57%	\$ 400,448
2. Supplemental contribution for the amortization of the Unfunded Actuarial Accrued Liability by June 30, 2037	9.07%	423,771
3. Allowance for expenses	0.23%	\$ 10,746
4. Total annual contribution for fiscal year ending June 30, 2016***	17.87%	\$ 834,965
C. Contribution Sufficiency / (Deficiency) (A.4. - B.4.)***	(1.90%)	\$ (89,343)

Note: Projected annual payroll for fiscal year beginning on the valuation date: \$4,672,229

* Employer contribution rate is blended to reflect rates of 15.14% of pay for Basic members, 7.50% of pay for Coordinated members not employed by Special School District #1, and 11.14% of pay for Coordinated members who are employed by Special School District #1.

** Includes contributions from School District #1, the City of Minneapolis, matching state contributions and aid for the Duluth merger.

*** On a market value of assets basis, the total required contribution is 16.72% of payroll and the contribution deficiency is 0.75% of payroll.



SECTION IV - CONTRIBUTIONS

TABLE 10

STATUTORY AND REQUIRED CONTRIBUTION AMOUNTS

(Dollars in Thousands)

Basic Members

	Percent of Payroll		Dollar Amount
A. Statutory contributions - Chapter 354			
1. Employee contributions	11.00%	\$	66
2. Employer contributions*	15.14%		91
3. Supplemental contributions**			
a. 1993 Legislation	0.11%		1
b. 1996 Legislation	0.07%		0
c. 1997 Legislation	0.28%		2
d. 2014 Legislation	0.31%		2
	26.91%		162
4. Total	26.91%	\$	162
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	11.88%	\$	71
b. Disability benefits	0.48%		3
c. Survivor benefits	0.34%		2
d. Deferred retirement benefits	1.91%		11
e. Refunds	0.47%		3
f. Total	15.08%	\$	90

Note: Projected annual payroll for fiscal year beginning on the valuation date: \$600 for 6 members.

* All Basic active members are teachers employed by Special School District #1; employer contribution rate of 15.14% of payroll applies.

** Includes contributions from School District #1, the City of Minneapolis, matching state contributions and aid for the Duluth merger.



SECTION IV - CONTRIBUTIONS

TABLE 11

STATUTORY AND REQUIRED CONTRIBUTION AMOUNTS

(Dollars in Thousands)

Coordinated Members

	Percent of Payroll		Dollar Amount
A. Statutory contributions - Chapter 354			
1. Employee contributions	7.50%	\$	350,372
2. Employer contributions*	7.70%		359,715
3. Supplemental contributions**			
a. 1993 Legislation	0.11%		4,999
b. 1996 Legislation	0.07%		3,047
c. 1997 Legislation	0.28%		12,952
d. 2014 Legislation	0.31%		14,375
	<hr/>		<hr/>
4. Total	15.97%	\$	745,460
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	6.64%	\$	310,196
b. Disability benefits	0.20%		9,343
c. Survivor benefits	0.09%		4,204
d. Deferred retirement benefits	1.34%		62,600
e. Refunds	0.30%		14,015
f. Total	<hr/>	<hr/>	<hr/>
	8.57%	\$	400,358

Note: Projected annual payroll for fiscal year beginning on the valuation date: \$4,671,630. This includes \$4,415,230 for 74,982 Coordinated members who are not employed by Special School District #1 and \$256,400 for 4,418 members who are employed by Special School District #1.

* *Employer contribution rate is blended to reflect rates of 7.50% of pay for Coordinated members not employed by Special School District #1, and 11.14% of pay for Coordinated members who are employed by Special School District #1.*

* *Includes contributions from School District #1, the City of Minneapolis, matching state contributions and aid for the Duluth merger.*



SECTION V
ADDITIONAL INFORMATION



SECTION V – ADDITIONAL INFORMATION

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SECTION V – ADDITIONAL INFORMATION

This section contains information that may be helpful in understanding the Systems' historical funding as well as current information regarding membership information and expected benefit payments. Some of the historical information was required under prior GASB accounting standards, but continues to provide useful information. Current financial reporting information required under Governmental Accounting Standards Board Statement No. 67 is provided in a separate report.



SECTION V – ADDITIONAL INFORMATION

TABLE 12
SUMMARY OF MEMBERSHIP DATA

	<u>July 1, 2015*</u>	<u>July 1, 2014</u>
Active members:		
Vested	62,804	61,552
Non-vested	<u>16,602</u>	<u>15,691</u>
Total	79,406	77,243
Pensioners and Beneficiaries	61,986	58,809
Terminated vested members entitled to, but not yet receiving, benefits:	13,314	12,907
Other terminated, non-vested members entitled to a refund of contributions	<u>31,026</u>	<u>29,984</u>
Total	185,732	178,943

* Includes the addition of approximately 1,500 retirees and 700 not-in-pay members from the merger with DTRFA.



SECTION V – ADDITIONAL INFORMATION

TABLE 13

SCHEDULE OF FUNDING PROGRESS*

(Dollars in Thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Actual Covered Payroll (Previous FY) (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
07/01/91	\$ 5,614,924	\$ 7,213,720	\$ 1,598,796	77.84%	\$ 1,943,375	82.27%
07/01/92	6,324,733	7,662,522	1,337,789	82.54%	1,989,624	67.24%
07/01/93	7,045,937	8,266,059	1,220,122	85.24%	2,065,881	59.06%
07/01/94	7,611,936	9,115,266	1,503,330	83.51%	2,150,300	69.91%
07/01/95	8,348,124	9,717,623	1,369,499	85.91%	2,204,693	62.12%
07/01/96	9,541,221	10,366,168	824,947	92.04%	2,268,390	36.37%
07/01/97	11,103,759	10,963,637	(140,122)	101.28%	2,359,011	(5.94%)
07/01/98	12,727,546	12,046,312	(681,234)	105.66%	2,422,957	(28.12%)
07/01/99	14,011,247	13,259,569	(751,678)	105.67%	2,625,254	(28.63%)
07/01/00	15,573,151	14,802,441	(770,710)	105.21%	2,704,575	(28.50%)
07/01/01	16,834,024	15,903,984	(930,040)	105.85%	2,812,000	(33.07%)
07/01/02	17,378,994	16,503,099	(875,895)	105.31%	2,873,771	(30.48%)
07/01/03	17,384,179	16,856,379	(527,800)	103.13%	2,952,887	(17.87%)
07/01/04	17,519,909	17,518,784	(1,125)	100.01%	3,032,483	(0.04%)
07/01/05	17,752,917	18,021,410	268,493	98.51%	3,121,571	8.60%
07/01/06	19,035,612	20,679,111	1,643,499	92.05%	3,430,645	47.91%
07/01/07	18,794,389	21,470,314	2,675,925	87.54%	3,532,159	75.76%
07/01/08	18,226,985	22,230,841	4,003,856	81.99%	3,645,230	109.84%
07/01/09	17,882,408	23,114,802	5,232,394	77.36%	3,761,484	139.10%
07/01/10	17,323,146	22,081,634	4,758,488	78.45%	3,787,757	125.63%
07/01/11	17,132,383	22,171,493	5,039,110	77.27%	3,838,111	131.29%
07/01/12	16,805,077	23,024,505	6,219,428	72.99%	3,871,809	160.63%
07/01/13	16,774,626	23,418,629	6,644,003	71.63%	3,917,310	169.61%
07/01/14	18,181,932	24,528,506	6,346,574	74.13%	4,056,482	156.46%
07/01/15	19,696,893	25,562,155	5,865,262	77.05%	4,306,426	136.20%

* Information prior to 2004 provided by Milliman; from 2004 to 2008 provided by The Segal Company; and 2009 to 2010 by Mercer.



SECTION V – ADDITIONAL INFORMATION

TABLE 14

SCHEDULE OF CONTRIBUTIONS FROM THE EMPLOYER AND OTHER CONTRIBUTING ENTITIES

(Dollars in Thousands)

Plan Year Ended June 30	Actuarially Required Contribution Rate (a)	Actual Covered Payroll (b)	Actual Member Contributions (c)	Annual Required Contributions [(a)*(b)] - (c)	Actual Employer Contributions¹	Percentage Contributed
2000	8.36%	\$ 2,704,575	\$ 138,696	\$ 87,406	\$ 134,419	153.79%
2001 ²	7.92%	2,812,000	145,075	77,635	139,799	180.07%
2002	7.85%	2,873,771	152,331	73,260	142,222	194.13%
2003 ³	7.57%	2,952,887	155,577	67,957	149,481	219.96%
2004	8.37%	3,032,483	159,140	94,679	151,029	159.52%
2005	8.46%	3,121,571	160,982	103,103	157,693	152.95%
2006 ⁴	9.05%	3,430,645	177,085	133,389	200,286	150.15%
2007 ⁵	12.16%	3,532,159	199,869	229,642	209,219	91.11%
2008 ⁶	13.44%	3,645,230	209,592	280,327	231,562	82.60%
2009 ⁷	15.08%	3,761,484	212,043	355,189	240,718	67.72%
2010 ⁸	16.81%	3,787,757	214,909	421,813	242,088	57.39%
2011 ⁹	15.71%	3,838,111	218,024	384,943	244,233	63.45%
2012 ¹⁰	16.57%	3,871,809	239,834	401,725	266,661	66.38%
2013 ¹¹	18.75%	3,917,310	270,708	463,788	290,662	62.67%
2014 ¹²	19.41%	4,056,482	294,632	492,731	320,301	65.01%
2015 ¹³	19.15%	4,261,626	331,905	484,196	358,367	74.01%
2016 ¹⁴	17.87%					

Note: Information prior to 2004 provided by Milliman USA; 2004 to 2008 information provided by The Segal Company; 2009 and 2010 information provided by Mercer.

- ¹ Includes contributions from other sources (if applicable)
- ² Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Asset Valuation Method is 7.31%.
- ³ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 8.11%.
- ⁴ Actuarially Required Contribution Rate shown is the contribution rate stated in the TRA July 1, 2005 actuarial valuation.
- ⁵ Actuarially Required Contributions calculated according to parameters of GASB 25 (30-year amortization period), and post-merger of the Minneapolis Teachers' Retirement Fund Association.
- ⁶ Actuarially Required Contribution Rate prior to change in Asset Valuation Method is 11.58%.
- ⁷ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 15.36%.
- ⁸ Actuarially Required Contribution Rate prior to change in Asset Valuation Method is 19.98%.
- ⁹ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Plan Provisions is 18.91%.
- ¹⁰ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 16.91%.
- ¹¹ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 18.15%.
- ¹² Actuarially Required Contribution Rate prior to change in Plan Provisions is 19.66%.
- ¹³ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 17.95%. Actual Covered Payroll excludes DTRFA payroll of \$44.8 million.
- ¹⁴ Actuarially Required Contribution Rate prior to DTRFA merger is 17.70%.



SECTION V – ADDITIONAL INFORMATION

TABLE 15

PROJECTED BENEFIT PAYMENTS

(Dollars in Thousands)

The table below shows estimated benefits expected to be paid over the next twenty-five years, based on the assumptions used in the valuation. The “Actives” column shows benefits expected to be paid to members currently active on July 1, 2015. The “Retirees” column shows benefits expected to be paid to all other members. This includes those who, as of July 1, 2015, are receiving benefit payments or who terminated employment and are entitled to a deferred benefit.

Year Ending			
June 30	Actives	Retirees	Total
2016	\$ 41,121	\$ 1,681,671	\$ 1,722,792
2017	105,110	1,659,909	1,765,019
2018	165,509	1,646,873	1,812,383
2019	228,880	1,634,402	1,863,282
2020	293,818	1,622,005	1,915,823
2021	358,562	1,609,325	1,967,886
2022	422,708	1,595,400	2,018,109
2023	485,652	1,579,938	2,065,590
2024	546,346	1,562,750	2,109,096
2025	606,156	1,543,856	2,150,012
2026	668,029	1,521,993	2,190,022
2027	733,964	1,497,977	2,231,941
2028	805,814	1,470,881	2,276,695
2029	884,459	1,440,780	2,325,239
2030	970,634	1,406,963	2,377,598
2031	1,064,889	1,370,812	2,435,701
2032	1,167,430	1,332,097	2,499,528
2033	1,277,934	1,290,025	2,567,959
2034	1,395,802	1,244,886	2,640,687
2035	1,520,546	1,197,866	2,718,412
2036	1,651,758	1,148,322	2,800,080
2037	1,789,119	1,096,319	2,885,438
2038	1,929,121	1,041,608	2,970,729
2039	2,078,794	988,695	3,067,489
2040	2,232,392	934,232	3,166,623

Note: Numbers may not add due to rounding

Cash flows are the expected future non-discounted payments to current members. These numbers exclude refund payouts to current nonvested inactive and assume future retirees and future terminated members make benefit elections according to valuation assumptions.



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APPENDIX A

SUMMARY STATISTICS
ON MEMBERSHIP DATA



APPENDIX A – MEMBERSHIP DATA

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APPENDIX A – MEMBERSHIP DATA

TABLE 16

RECONCILIATION OF MEMBERS*

	Active Members**	Former Members***	Benefit Recipients****			Total
			Service Retirements	Disability Retirements	Survivors	
Members on 7/1/2014	77,243	42,891	53,774	563	4,472	178,943
New hires	5,419	-	-	-	-	5,419
Return from inactive	1,991	(1,991)	-	-	-	0
Return from zero balance	921	-	-	-	-	921
Transfer to inactive	(4,001)	4,001	-	-	-	0
Refunded	(245)	(711)	-	-	-	(956)
Restored write-off	-	163	-	-	-	163
Repay refunds	-	33	-	-	-	33
Transfer from non-status	-	27	-	-	-	27
Retirements	(2,050)	(576)	2,645	(61)	-	(42)
Benefits began	-	-	-	83	473	556
Benefits ended	-	-	-	(6)	(57)	(63)
Deaths	(104)	(44)	(1,200)	(10)	(191)	(1,549)
Adjustments for Disabilitants	(23)	-	-	-	-	(23)
Adjustments (Other)	255	547	-	(7)	-	795
Adjustments due to DTRFA merger	-	-	1,370	9	129	1,508
Net changes	2,163	1,449	2,815	8	354	6,789
Members on 7/1/2015	79,406	44,340	56,589	571	4,826	185,732

* All figures in this chart were provided by the Teachers Retirement Association. Recipient counts include all pensions in force, including double counting of multiple benefit types. Service Retirements include Supplemental and Variable optional joint annuitants. We have found these results to be reasonable.

** Active members include 6 Basic and 79,400 Coordinated members.

*** Former members include 26 Basic and 44,314 Coordinated members.

**** Benefit recipients include 4,228 Basic members, 56,250 Coordinated members, and 1,508 former DTRFA members.

Former Member Statistics

	Vested	Non-vested	Total
Number	13,314	31,026	44,340
Average Age	47.9	45.4	46.1
Average Service (years)	7.5	0.9	2.9
Average annual benefits, with augmentation to Normal Retirement Date and 4% Combined Service Annuity load	\$10,264	N/A	N/A
Average refund value, with 4% Combined Service Annuity load	\$30,663	\$2,409	\$10,893



APPENDIX A – MEMBERSHIP DATA

TABLE 17

DISTRIBUTION OF ACTIVE MEMBERS*

Age	Years of Service as of July 1, 2015										Total	
	<3**	3-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 +		
<25	2,415	54										2,469
Avg. Earnings	27,202	41,639										27,518
25-29	4,644	2,840	1,468	1								8,953
Avg. Earnings	31,291	42,795	47,425	62,841								37,589
30-34	2,429	1,567	5,182	1,453								10,631
Avg. Earnings	30,702	43,149	51,058	60,876								46,583
35-39	1,733	855	2,539	4,520	1,416							11,063
Avg. Earnings	27,668	44,162	51,504	63,427	71,774							54,668
40-44	1,406	667	1,548	2,146	4,410	855						11,032
Avg. Earnings	24,897	43,135	51,071	62,272	71,271	76,288						59,463
45-49	1,221	568	1,253	1,502	2,489	3,373	628					11,034
Avg. Earnings	22,753	39,712	48,683	60,477	69,242	75,698	77,176					61,475
50-54	942	390	989	1,165	1,476	1,900	2,399	606	1			9,868
Avg. Earnings	20,061	38,989	45,833	58,995	67,603	72,585	76,756	77,163	57,684			62,506
55-59	765	297	736	875	1,172	1,262	1,514	1,344	334			8,299
Avg. Earnings	17,651	35,913	43,214	57,458	66,200	71,594	75,355	77,821	77,500			62,508
60-64	550	162	398	476	698	755	712	340	420	111		4,622
Avg. Earnings	11,766	26,722	39,393	56,674	63,659	69,566	74,304	80,134	80,750	78,712		59,112
65-69	347	69	102	109	117	133	90	55	43	73		1,138
Avg. Earnings	5,802	12,288	26,987	47,860	57,609	70,749	74,559	84,616	93,599	85,477		42,715
70 +	150	21	31	14	14	11	19	11	6	20		297
Avg. Earnings	4,544	14,961	17,633	50,384	51,200	92,923	71,458	82,723	75,100	98,490		29,208
Total	16,602	7,490	14,246	12,261	11,792	8,289	5,362	2,356	804	204		79,406
Avg. Earnings	26,375	41,635	49,217	61,298	69,330	73,805	76,028	78,167	80,016	83,072		54,213

* Active members include 6 Basic and 79,400 Coordinated members.

** This exhibit does not reflect service earned in Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is the amount of average annual earnings. Earnings shown in this exhibit are actual salaries earned during the fiscal year ending June 30, 2015 as reported by the Teachers Retirement Association of Minnesota.



APPENDIX A – MEMBERSHIP DATA

TABLE 18

DISTRIBUTION OF SERVICE RETIREMENTS

Age	Years Since Retirement as of July 1, 2015							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<55	3	2						5
Avg. Benefit	22,220	35,255						27,434
55-59	591	1,145	8		1			1,745
Avg. Benefit	33,642	32,731	24,709		7,551			32,988
60-64	1,004	4,688	2,812	49			1*	8,554
Avg. Benefit	28,748	30,928	27,616	31,091			1,593	29,581
65-69	547	4,107	5,870	4,433	472	1	4*	15,434
Avg. Benefit	20,835	22,388	25,142	23,706	29,949	29,459	2,919	23,986
70-74	45	624	2,549	4,289	4,425	81	5	12,018
Avg. Benefit	11,144	18,400	21,517	23,172	25,376	34,199	5,478	23,406
75-79	7	69	323	1,495	4,287	2,045	71	8,297
Avg. Benefit	15,290	14,462	17,994	20,987	29,494	31,757	22,506	27,875
80-84	1	11	34	163	1,347	2,961	1,055	5,572
Avg. Benefit	1,416	16,143	16,123	18,217	30,352	37,111	29,784	33,361
85-89		4	9	29	107	1,030	2,031	3,210
Avg. Benefit		20,894	35,802	18,990	31,399	35,079	33,951	34,082
90 +			1	6	16	67	1,664	1,754
Avg. Benefit			2,060	17,320	28,884	37,529	31,719	31,849
Total	2,198	10,650	11,606	10,464	10,655	6,185	4,831	56,589
Avg. Benefit	27,670	26,970	24,726	23,031	27,929	34,968	32,042	27,296

* Pertaining to the accounts of former participants in the Minnesota Variable Annuity Fund, abolished by law in 1989.

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.



APPENDIX A – MEMBERSHIP DATA

TABLE 19

DISTRIBUTION OF SURVIVORS

Age	Years Since Death as of July 1, 2015							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<45	10	54	34	25	7	1		131
Avg. Benefit	29,757	15,508	12,912	12,768	17,139	31,869		15,611
45-49	5	28	19	3	8		2	65
Avg. Benefit	9,560	14,318	18,257	15,152	20,037		23,892	16,140
50-54	9	31	21	9	3	2	1	76
Avg. Benefit	14,947	13,784	12,573	14,991	21,670	21,006	35,109	14,512
55-59	11	56	48	19	8	3	3	148
Avg. Benefit	22,926	20,300	14,916	15,056	17,106	7,594	13,813	17,514
60-64	23	96	75	33	12	6	2	247
Avg. Benefit	30,130	24,128	19,044	18,014	14,593	25,788	6,717	21,763
65-69	59	185	159	95	37	19	2	556
Avg. Benefit	22,534	21,522	20,445	18,585	19,090	16,642	7,599	20,441
70-74	61	241	189	125	69	29	16	730
Avg. Benefit	24,924	23,428	22,738	21,634	21,806	21,274	16,686	22,681
75-79	72	244	213	153	90	73	26	871
Avg. Benefit	27,514	29,018	30,614	27,338	27,927	28,881	19,612	28,584
80-84	61	267	187	134	99	81	92	921
Avg. Benefit	34,978	32,816	34,868	34,392	36,071	30,707	28,072	33,296
85-89	33	179	174	112	79	53	90	720
Avg. Benefit	38,889	38,935	34,247	33,163	31,317	40,530	29,808	35,043
90 +	17	71	87	60	40	28	58	361
Avg. Benefit	40,880	33,986	39,383	32,566	35,265	31,273	29,290	34,552
Total	361	1,452	1,206	768	452	295	292	4,826
Avg. Benefit	28,720	27,528	27,503	26,444	28,401	29,844	27,034	27,632

In each cell, the top number is the count of survivor participants for the age/years since death combination and the bottom number is the average annual benefit amount.



APPENDIX A – MEMBERSHIP DATA

TABLE 20

DISTRIBUTION OF DISABILITY RETIREMENTS

Age	Years Disabled as of July 1, 2015							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<45	2	14	7	1				24
Avg. Benefit	15,835	12,129	6,415	2,006				10,350
45-49	1	18	9	6	2			36
Avg. Benefit	11,391	14,955	8,658	6,692	4,129			11,303
50-54	9	40	19	8	3	1		80
Avg. Benefit	28,878	19,636	15,391	10,662	6,104	2,790		18,052
55-59	11	60	32	13	10	5		131
Avg. Benefit	27,025	23,095	17,984	15,607	14,804	13,077		20,418
60-64	12	76	77	58	25	12	3	263
Avg. Benefit	25,722	27,720	23,244	18,615	17,581	19,437	9,551	22,761
65 +	1	21	8	6	1			37
Avg. Benefit	36,733	17,545	23,495	12,094	5,549			18,142
Total	36	229	152	92	41	18	3	571
Avg. Benefit	26,268	22,207	19,529	16,115	15,114	16,746	9,551	20,021

In each cell, the top number is the count of disabled participants for the age/years disabled combination and the bottom number is the average annual benefit amount.



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APPENDIX B

**SUMMARY OF
PLAN PROVISIONS**



APPENDIX B - SUMMARY OF PLAN PROVISIONS

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APPENDIX B - 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.

<i>Plan year</i>	July 1 through June 30		
<i>Eligibility</i>	Teachers first hired prior to July 1, 1978 employed by the Board of Education of Special School District No. 1, other than a charter school, and not covered by the Social Security Act. Certain part-time licensed employees of Special School District No. 1 are also covered. These members were transferred to TRA as part of the merger of the Minneapolis Teachers Retirement Fund Association (MTRFA) effective June 30, 2006.		
<i>Contributions</i>	Shown as a percent of Salary:		
	<u>Member</u>		<u>Employer</u>
	11.00%		15.14%
	After June 30, 2015, the member and employer contribution rates may be adjusted if there is a sufficiency of at least 1.00% or a deficiency of at least 0.50%. The Board has discretion to adjust this rate based on discussion with the actuary and consideration of various metrics. The resulting rate may not go below the normal cost plus administrative expenses.		
	Potential contribution increases after June 30, 2015 are not reflected in this valuation report.		
	Employee contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).		
<i>Teaching service</i>	A year is earned during a calendar year if the member is employed in a covered position and employee contributions are deducted. Certain part-time service and military service is also included.		



APPENDIX B - SUMMARY OF PLAN PROVISIONS

BASIC MEMBERS

Salary Periodic compensation used for contribution purposes excluding lump sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.

Average salary Average of the five highest successive years of Salary.

Retirement

Normal retirement

Age/Service requirements Age 60, or any age with 30 years of Teaching Service

Amount 2.50% of Average Salary for each year of Teaching Service.

Early retirement

Age/Service requirements Age 55 with less than 30 years of Teaching Service.

Amount

The greater of (a) or (b):

- (a) 2.25% of Average Salary for each year of Teaching Service with reduction of 0.25% for each month before the Member would first be eligible for a normal retirement benefit.
- (b) 2.50% of Average Salary for each year of Teaching Service assuming augmentation to the age of first eligibility for a normal retirement benefit at 3.00% per year and actuarial reduction for each month before the member would be first eligible for a normal retirement benefit.

An alternative benefit is available to members who are at least age 50 and have seven years of Teaching Service. The benefit is based on the accumulation of the 6.50% "city deposits" to the Retirement Fund. Other benefits are also provided under this alternative depending on the member's age and Teaching Service.

Form of payment

Life annuity. Actuarially equivalent options are:

- (a) 10 or 15 year Certain and Life
- (b) 50%, 75% or 100% Joint and Survivor with bounce back feature (option is canceled if member is predeceased by beneficiary).

Benefit increases

Under current law, the annual post-retirement increase on January 1 is 2.0 percent. When the funded ratio reaches 90 percent (on a market value of assets basis) for two consecutive years, the annual increase will rise to 2.5 percent. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 preceding the increase date will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months as of the June 30 preceding the increase date will receive a prorated increase.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

BASIC MEMBERS

Disability

<i>Age/service requirement</i>	Total and permanent disability with three years of Teaching Service
<i>Amount</i>	An annuity actuarially equivalent to the continued accumulation of member and city contributions at the current rate for a period of 15 years (but not beyond age 65) plus an additional benefit equal to the smaller of 100% of the annuity provided by city contributions only or \$150 per month. A member with 20 years of Teaching Service also receives an additional \$7.50 per month. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.
<i>Form of payment</i>	Same as for retirement.
<i>Benefit increases</i>	Same as for retirement.

Death

Benefit A

<i>Age/Service requirements</i>	Choice of Benefit A, Benefit B or Benefit C Death before retirement.
<i>Amount</i>	The accumulation of member and city contributions plus 6.00% interest. Paid as a life annuity, 15-year Certain and Life, or lump sum. If an annuity is chosen the beneficiary also receives additional benefits.

Benefit B

<i>Age/Service requirements</i>	An active member with seven years of Teaching Service. A former member age 60 with seven years of Teaching Service who dies before retirement or disability benefits begin.
<i>Amount</i>	The actuarial equivalent of any benefits the member could have received if resignation occurred on the date of death.

Benefit C

<i>Age/Service requirements</i>	As an active member who dies and leaves surviving children.
<i>Amount</i>	A monthly benefit of \$248.30 to the surviving widow while caring for a child and an additional \$248.30 per month for each surviving dependent child. The maximum family benefit is \$579.30 per month. Benefits to the widow cease upon death or when no longer caring for an eligible child. Benefits for dependent children cease upon marriage or age 18 (age 22 if a full time student).
<i>Benefit Increases</i>	Same as for retirement.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

BASIC MEMBERS

Withdrawal

Refund of contribution

Age/Service requirements

Termination of Teaching Service.

Amount

Member's contributions earn 4.00% interest compounded annually. For vested members, a deferred annuity may be elected in lieu of a refund.

Deferred annuity

Age/Service Requirements

Seven years of Teaching Service

Amount

The benefit is computed under law in effect at termination and increased by the following percentage compounded annually:

- (a) 3.00% therefore until the earlier of January 1 of the year following attainment of age 55 and June 30, 2012;
- (b) 5.00% thereafter until the earlier of June 30, 2012 and when the annuity begins; and
- (c) 2.00% beginning July 1, 2012.

In addition, the interest earned on the member and city contributions between termination and age 60 can be applied to provide an additional annuity.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED 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.

Plan year

July 1 through June 30

Eligibility

A public school or MNSCU teacher who is covered by the Social Security Act, except for teachers employed by St. Paul public schools or by the University of Minnesota. Charter school teachers employed by St. Paul or Duluth public schools are covered by TRA.

No MNSCU teacher will become a new Member unless that person elects coverage as defined by Minnesota Statutes under Chapter 354B.

Contributions

Shown as a percent of Salary:

<u>Member</u>	<u>Employer</u>
7.50%	7.50%

Employer also contributes Supplemental amount equal to 3.64% of Salary (members employed by Special School District #1 only).

After June 30, 2015, the member and employer contribution rates may be adjusted if there is a sufficiency of at least 1.00% or a deficiency of at least 0.50%. The Board has discretion to adjust this rate based on discussion with the actuary and consideration of various metrics. The resulting rate may not go below the normal cost plus administrative expenses.

Potential contribution increases after June 30, 2015 are not reflected in this valuation report.

Employee contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).

Teaching service

A year is earned during a calendar year if the member is employed in a covered position and employee contributions are deducted. Certain part-time service and military service is also included.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

Salary

Periodic compensation used for contribution purposes excluding lump sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.

Average salary

Average of the five highest successive years of Salary. Average salary is based on all Allowable Service if less than five years.

Retirement

Normal retirement

Age/Service requirements

First hired before July 1, 1989:

- (a) Age 65 and three years of Allowable Service; or
- (b) Age 62 and 30 years of Allowable Service.

Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.

First hired after June 30, 1989:

The age when first eligible for full Social Security retirement benefits (but not to exceed age 66) and three years of Allowable Service.

Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service.

Early retirement

Age/Service requirements

First hired before July 1, 1989:

- (a) Age 55 and three years of Allowable Service; or
- (b) Any age and 30 years of Allowable Service; or
- (c) Rule of 90: Age plus Allowable Service totals 90.

First hired after June 30, 1989:

- (a) Age 55 with three years of Allowable Service.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

Retirement(continued)

Amount

First hired before July 1, 1989:

The greater of (a), (b) or (c):

- (a) 1.20% of Average Salary for each of the first ten years of Allowable Service.
1.70% of Average Salary for each year of Allowable Service in excess of 10 prior to July 1, 2006, and
1.90% of Average Salary for years of Allowable Service after July 1, 2006.
No actuarial reduction if age plus years of service totals 90. Otherwise reduction of 0.25% for each month the member is under age 65 (or 62 if 30 years of Allowable Service) at time of retirement.
- (b) 1.70% of Average Salary for each year of Allowable Service prior to July 1, 2006 and 1.90% for each year of Allowable Service beginning July 1, 2006, assuming augmentation to normal retirement age at 3.00% per year (2.50% per year for members hired after June 30, 2006) and actuarial reduction for each month the member is under the full Social Security benefit retirement age (not to exceed age 66). Beginning July 1, 2015, new early retirement reduction factors will apply, including special factors for members retiring at age 62 or later with at least 30 years of service.
- (c) For eligible members: the monthly benefit that is actuarially equivalent to 2.2 times the members' accumulated deductions plus interest thereon.

First hired after June 30, 1989:

1.70% of Average Salary for each year of Allowable Service prior to July 1, 2006 and 1.90% for each year of Allowable Service beginning July 1, 2006, assuming augmentation to normal retirement age at 3.00% per year (2.50% per year for members hired after June 30, 2006) and actuarial reduction for each month the member is under the full Social Security benefit retirement age (not to exceed age 66). Beginning July 1, 2015, new early retirement reduction factors will apply, including special factors for members retiring at age 62 or later with at least 30 years of service.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

Early Retirement Reduction Factors

Age	Hired before 7/1/89	Hired from 7/1/89 to 6/30/06	Hired after 6/30/06
55	43.56%	51.55%	54.08%
58	33.59%	40.46%	42.74%
60	24.65%	30.75%	32.74%
62	13.68%	18.96%	20.53%
65	0.00%	4.21%	4.68%
66	0.00%	0.00%	0.00%

Members who are age 62 with 30 years of service are eligible for a special set of reduction factors:

Age	Hired before 7/1/89	Hired from 7/1/89 to 6/30/06	Hired after 6/30/06
62	10.40%	14.46%	16.11%
63	6.64%	10.40%	11.70%
64	3.18%	6.64%	7.55%
65	0.00%	3.18%	3.65%
66	0.00%	0.00%	0.00%

All of the early retirement reduction factors shown are the ultimate factors. These are being phased in from the prior factors over a five-year period beginning July 1, 2015.

Form of Payment

Life annuity. Actuarially equivalent options are:

- (a) 50%, 75% or 100% Joint and Survivor with bounce back feature (option is canceled if member is predeceased by beneficiary).
- (b) 15 year Certain and Life
- (c) Guaranteed Refund.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

Retirement(continued)

Benefit increases

Under current law, the annual post-retirement increase on January 1 is 2.0 percent. When the funded ratio reaches 90 percent (on a market value of assets basis) for two consecutive years, the annual increase will rise to 2.5 percent. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 preceding the increase date will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months as of the June 30 preceding the increase date will receive a prorated increase.

Disability

Age/service requirement

Total and permanent disability before Normal Retirement Age with three years of Allowable Service.

Amount

Normal Retirement Benefit based on Allowable Service and Average Salary at disability without reduction for commencement before Normal Retirement Age unless an optional annuity plan is selected.

Payments stop at Normal Retirement Age or the five year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.

Form of payment

Same as for retirement.

Benefit increases

Same as for retirement.

Retirement after disability

Age/service requirement

Normal Retirement Age or the five year anniversary of the effective date of the disability benefit, whichever is later.

Amount

Any optional annuity continues. Otherwise, the larger of the disability benefit paid before Normal Retirement Age or the normal retirement benefit available at Normal Retirement Age, or an actuarially equivalent optional annuity.

Benefit increases

Same as for retirement.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

Death

Surviving spouse optional annuity

Age/Service requirements

Member or former member with three years of Allowable Service who dies before retirement or disability benefits commence.

Amount

Survivor's payment of the 100% Joint and Survivor benefit or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced for early retirement with half the applicable reduction factor used from age 55 to actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer.

Benefit increase

Same as for retirement.

Withdrawal

Refund of contributions

Age/Service requirements

Thirty days following termination of teaching service.

Amount

Member's contributions earn 4.00% interest compounded annually. For vested members, a deferred annuity may be elected in lieu of a refund.

Deferred annuity

Age/Service requirements

Vested at date of termination. Current requirement is three years of Allowable Service.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

Withdrawal (continued)

Amount

For members first hired prior to July 1, 2006, the benefit is computed under law in effect at termination and increased by the following percentage compounded annually:

- (a) 3.00% therefore until the earlier of January 1 of the year following attainment of age 55 and June 30, 2012;
- (b) 5.00% thereafter until the earlier of June 30, 2012 and when the annuity begins; and
- (c) 2.00% from July 1, 2012 forward.

Amount is payable as a normal or early retirement.

A member who terminated service before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5.00% to 6.00% in the post-retirement interest assumption; or

For eligible members; the monthly benefit that is actuarially equivalent to 2.2 times the members' accumulated deductions plus interest thereon.

For members first hired July 1, 2006 and after, the benefit computed under law in effect at termination is increased by 2.50% compounded annually until June 30, 2012 and increased by 2.00% from July 1, 2012 forward until the annuity begins.



APPENDIX C

**ACTUARIAL METHODS
AND ASSUMPTIONS**



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

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APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

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 met. The difference between this liability and the assets (if any) which are held in the fund is the unfunded actuarial accrued liability. The unfunded actuarial accrued 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 actuarial accrued liability is the excess of the present value of projected benefits over the present value of future normal costs.
- The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the assets of the fund, and represents that part of the actuarial accrued liability which has not been funded by accumulated past contributions.

Amortization Method

The unfunded actuarial accrued liability is amortized as a level percentage of payroll each year to the statutory amortization date of June 30, 2037, assuming payroll increases of 3.75% per year (effective with the 2011 valuation). If the unfunded actuarial accrued liability is negative, the surplus amount is amortized over 30 years as a level percentage of payroll. If there is an increase in the unfunded actuarial accrued liability due to a change in the actuarial assumptions, plan provisions, or actuarial cost method, a new amortization period is determined. This new amortization period is determined by blending the period needed to amortize the prior unfunded actuarial accrued liability over the prior amortization period and the increase in unfunded actuarial accrued liability amortized over 30 years. If there is a decrease in the unfunded actuarial accrued liability, no change is made to the amortization period.



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Asset Valuation Method

As prescribed in the Minnesota Statutes Section 356.215, Subdivision 1, Paragraph (f), 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 value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.

Supplemental Contributions

The City of Minneapolis, the Minneapolis School District, and the State of Minnesota are scheduled to make the following supplemental contributions to the Fund in FY15:

<i>1993 Legislation:</i>	Supplemental contributions of \$5,000,000 annually are assumed to be made until full actuarial funding is achieved. Amount is fixed in statute.
<i>1996 Legislation:</i>	Supplemental contributions of \$3,047,009 annually are assumed to be made until the amortization date of June 30, 2037 or full actuarial funding is achieved, whichever is earlier. Amount is variable as described in Minnesota Statutes, Chapter 423A.02. Assumed amount is based on actual amount received in most recent fiscal year, and information provided by the Teachers Retirement Association.
<i>1997 Legislation:</i>	Supplemental contributions of \$12,954,000 annually are assumed to be made until full actuarial funding is achieved or the stabilizer may be used to decrease contribution rates. Amount is fixed in statute.
<i>2014 Legislation:</i>	Supplemental contributions of \$14,377,000 annually are assumed to be made until full actuarial funding is achieved or the stabilizer may be used to decrease contribution rates. Amount is fixed in statute.



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Entry Age Calculation

As required by the LCPR Standards for Actuarial Work, a member's Entry Age is calculated as the age at the valuation date less years of service. Age on the valuation date is calculated as age nearest birthday. The years of service for each member are provided by TRA.

Decrement Timing

All decrements are assumed to occur in the middle of the plan year. This is the preferred decrement timing in the LCPR Standards for Actuarial Work.

Funding Objective

The fundamental financing objective of the fund is to establish contribution rates which, when expressed as a percentage of active member payroll, will remain approximately level from generation to generation and meet the required deadline for full funding.

Benefits included or excluded

To the best of our knowledge, all material benefits have been included in the liability.

IRC Section 415(b): The limitations of Internal Revenue Code Section 415(b) have been incorporated into our calculations. Annual benefits may not exceed the limits in IRC Section 415. This limit is indexed annually. For 2014, the limit is \$210,000.

IRC Section 401(a)(17): The limitations of Internal Revenue Code Section 401(a)(17) have been incorporated into our calculations. Compensation for any 12-month period used to determine accrued benefits may not exceed the limits in IRC Section 401(a)(17) for the calendar year in which the 12-month period begins. This limit is indexed annually. For 2014, the limit is \$260,000. Certain members first hired before July 1, 1995 may have a higher limit.



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

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. The assumptions prescribed are based on the experience study dated October 30, 2009.

The Allowance for Combined Service Annuity was based on the recommendation of a prior actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of this assignment.

<i>Investment Return</i>	8.44% compounded annually to reflect an 8.0% assumption for two (2) years and 8.5% thereafter.
<i>Future post-retirement adjustments</i>	2% per year, increasing to 2.5% on July 1, 2037. Once the funded ratio reaches 90% on a market value basis for two consecutive years, the COLA is scheduled by statute to revert back from 2.0% to 2.5%. Future assets and liabilities were projected using the 2015 valuation results as a starting point and assuming all actuarial assumptions are met in future years. These assumptions include a rate of return on the market value of assets of 8.0% for the next two years and 8.5% thereafter. Further, there is an assumption that the stabilizer provisions will not be utilized by the Board. Based on this methodology, the increased COLA is expected to be implemented with the July 1, 2037 valuation. The calculations in this valuation reflects the increased COLA at that date. For the July 1, 2014 valuation, the COLA was expected to increase with the July 1, 2031 valuation.
<i>Salary Increases</i>	Reported salary for prior fiscal year, with new hires annualized, is increased according to the salary increase table shown in the rate table for current fiscal year and annually for each future year. See table of sample rates.
<i>Payroll Growth</i>	3.75% per year
<i>Future Service</i>	Members are assumed to earn future service at a full-time rate.
<i>Mortality: Pre-retirement</i>	RP 2000 non-annuitant generational mortality, white collar adjustment, male rates set back 5 years and female rates set back 7 years.
<i>Post-retirement</i>	RP 2000 annuitant generational mortality, white collar adjustment, male rates set back 2 years and female rates set back 3 years.
<i>Post-disability</i>	RP 2000 disabled retiree mortality, without adjustment
<i>Disability</i>	Age-related rates based on experience; see table of sample rates.



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Summary of Actuarial Assumptions *(continued)*

<i>Withdrawal</i>	Select and ultimate rates based on actual plan experience. Ultimate rates after the third year are shown in the rate table. Select rates are as follows:												
	<table border="0"> <thead> <tr> <th></th> <th style="text-align: center;"><u>First Year</u></th> <th style="text-align: center;"><u>Second Year</u></th> <th style="text-align: center;"><u>Third Year</u></th> </tr> </thead> <tbody> <tr> <td>Male</td> <td style="text-align: center;">45%</td> <td style="text-align: center;">12%</td> <td style="text-align: center;">6%</td> </tr> <tr> <td>Female</td> <td style="text-align: center;">40%</td> <td style="text-align: center;">10%</td> <td style="text-align: center;">8%</td> </tr> </tbody> </table>		<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>	Male	45%	12%	6%	Female	40%	10%	8%
	<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>										
Male	45%	12%	6%										
Female	40%	10%	8%										
<i>Expenses</i>	Prior year administrative expenses expressed as percentage of prior year payroll.												
<i>Retirement Age</i>	Graded rates beginning at age 55 as shown in rate table. Members who have attained the highest assumed retirement age will retire in one year.												
<i>Percentage Married</i>	85% of male members and 65% of female members are assumed to be married. Members are assumed to have no children.												
<i>Age Difference</i>	Females two years younger than males.												
<i>Allowance for Combined Service Annuity</i>	Liabilities for active members are increased by 1.40% and liabilities for former members are increased by 4.00% to account for the effect of some Participants being eligible for a Combined Service Annuity.												
<i>Refund of Contributions</i>	All employees withdrawing after becoming eligible for a deferred benefit are assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.												
<i>Interest on member contributions</i>	Members and former members who are eligible for the money purchase annuity are assumed to receive interest credits equal to the Pre-Retirement interest rate. All other members and former members receive the interest crediting rate as specified in statutes.												
<i>Commencement of deferred benefits</i>	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at unreduced retirement age.												
<i>Form of payment</i>	Married members are assumed to elect subsidized joint and survivor form of annuity as follows: <table border="0" style="margin-left: 40px;"> <tr> <td style="vertical-align: top;">Males:</td> <td>10% elect 50% J&S option 15% elect 75% J&S option 70% elect 100% J&S option</td> </tr> <tr> <td style="vertical-align: top;">Females:</td> <td>20% elect 50% J&S option 10% elect 75% J&S option 50% elect 100% J&S option</td> </tr> </table> <p>Members eligible for deferred annuities (including current terminated deferred members) and future disability benefits are assumed to elect a life annuity.</p>	Males:	10% elect 50% J&S option 15% elect 75% J&S option 70% elect 100% J&S option	Females:	20% elect 50% J&S option 10% elect 75% J&S option 50% elect 100% J&S option								
Males:	10% elect 50% J&S option 15% elect 75% J&S option 70% elect 100% J&S option												
Females:	20% elect 50% J&S option 10% elect 75% J&S option 50% elect 100% J&S option												



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Summary of Actuarial Assumptions *(continued)*

Missing data for members

Membership data was supplied by TRA as of the valuation date. This information has not been audited by CMC. We have reviewed the information for internal consistency and we have no reason to doubt its substantial accuracy. In the small number of cases where submitted data was missing or incomplete and could not be recovered from prior years, the following assumptions were applied, if needed:

Data for active members:

Salary, Service, and Date of Birth	Based on current active demographics.
Gender	Female

Data for terminated members:

Date of birth	July 1, 1964
Average salary	\$37,000
Date of termination	Derived from date of birth, original entry age, and service

Data for in-pay members:

Beneficiary date of birth	Wife two years younger than husband
Gender	Based on first name
Form of payment	Life annuity for retirees and beneficiaries, 100% J&S option for disabled retirees.

Age	Rate (%)			
	Ultimate Withdrawal		Disability	
	Male	Female	Male	Female
20	3.70	4.50	0.00	0.00
25	3.20	4.50	0.00	0.00
30	2.70	4.50	0.00	0.00
35	2.50	3.90	0.01	0.01
40	2.35	2.75	0.03	0.03
45	2.10	2.10	0.05	0.05
50	1.85	1.85	0.10	0.10
55	0.00	0.00	0.16	0.16
60	0.00	0.00	0.25	0.25
65	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Summary of Actuarial Assumptions *(continued)*

<u>Age</u>	<u>Mortality Rates (%)</u>					
	<u>Pre-Retirement*</u>		<u>Post-Retirement**</u>		<u>Post-Disability</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	0.0269	0.0155	0.0316	0.0184	2.2571	0.7450
25	0.0345	0.0188	0.0373	0.0194	2.2571	0.7450
30	0.0376	0.0197	0.0393	0.0223	2.2571	0.7450
35	0.0353	0.0235	0.0481	0.0363	2.2571	0.7450
40	0.0591	0.0401	0.0766	0.0527	2.2571	0.7450
45	0.0890	0.0562	0.1124	0.0763	2.2571	0.7450
50	0.1342	0.0837	0.1711	0.1229	2.8975	1.1535
55	0.1978	0.1344	0.5716	0.2681	3.5442	1.6544
60	0.2747	0.2015	0.5688	0.4253	4.2042	2.1839
65	0.4263	0.3107	0.9232	0.6736	5.0174	2.8026
70	0.6725	0.4979	1.5834	1.1211	6.2583	3.7635
75	0.9823	0.7591	2.6710	1.8784	8.2067	5.2230

* Rates shown are RP 2000 employee mortality (base), white collar adjustment, set back 5 years for males and 7 years for females.

** Rates shown are RP 2000 annuitant mortality (base), white collar adjustment, set back 2 years for males and 3 years for females.



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Summary of Actuarial Assumptions (*continued*)

Salary Scale	
Service	Salary Increase
1	12.00%
2	9.00%
3	8.00%
4	7.50%
5	7.25%
6	7.00%
7	6.85%
8	6.70%
9	6.55%
10	6.40%
11	6.25%
12	6.00%
13	5.75%
14	5.50%
15	5.25%
16	5.00%
17	4.75%
18	4.50%
19	4.25%
20	4.00%
21	3.90%
22	3.80%
23	3.70%
24	3.60%
25 or more	3.50%



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Summary of Actuarial Assumptions *(continued)*

Retirement Rate (%)					
<u>Age</u>	Coordinated Members Eligible for Rule of 90	Coordinated Members Not Eligible for Rule of 90	<u>Age</u>	Basic Members Eligible for 30 and Out Provision	Basic Members Not Eligible for 30 and Out Provision
55 & Under	50	7	55 & Under	40	5
56	55	7	56	40	5
57	45	7	57	40	5
58	45	8	58	40	5
59	45	10	59	40	5
60	40	12	60	25	25
61	45	16	61	25	25
62	45	20	62	25	25
63	40	18	63	25	25
64	45	20	64	25	25
65	40	40	65	40	40
66	35	35	66	40	40
67	30	30	67	40	40
68	30	30	68	40	40
69	30	30	69	40	40
70	35	35	70-74	60	60
71 & Over	100	100	75-79	60	100
			80 & Over	100	100

Changes in actuarial assumptions and methods since the previous valuation

None.



GLOSSARY

Actuarial Asset Value. The value of assets used in calculating the required contributions. The actuarial asset value may be equal to the fair market value of assets, or it may spread the recognition of certain investment gains or losses over a period of years in accordance with an asset valuation method. The goal of an asset valuation method is to produce a relatively stable asset value thereby reducing year-to-year volatility in contribution requirements.

Actuarial Accrued Liability. The portion of the present value of all benefits attributable to service already rendered.

Actuarial Cost Method. Sometimes called "funding method," a particular technique used by actuaries to establish the amount and incidence of the annual actuarial cost of pension plan benefits, or normal cost, and the related unfunded actuarial accrued liability. Ordinarily, the annual contribution to the plan comprises the normal cost and an amount for amortization of the unfunded actuarial accrued liability.

ASA. Associate of the Society of Actuaries.

Current Benefit Obligations. The present value of benefits earned to the valuation date, based on current service and including future salary increases to retirement.

EA. Enrolled Actuary.

FSA. Fellow of the Society of Actuaries.

MAAA. Member of the American Academy of Actuaries.

Normal Cost. The annual cost assigned to the current year, under the actuarial cost method in use.

Present Value. Sometimes called "actuarial present value," the current worth (on the valuation date) of an amount or series of amounts payable or receivable in the future. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Statement No. 67 of the Governmental Accounting Standards Board (GASB 67). The accounting standard governing the financial reporting for defined benefit pension plans and note disclosures for defined benefit plans.

Statement No. 68 of the Governmental Accounting Standards Board (GASB 68). The accounting standard governing a state or local governmental employer's accounting for pensions.