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Teachers Retirement Association of Minnesota

**Actuarial Valuation Report
For Funding Purposes
As of July 1, 2023**



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Cavanaugh Macdonald

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November 21, 2023

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, 2023. The major findings of the actuarial valuation are contained in this report, which reflects the benefit provisions in place on July 1, 2023. Since the prior valuation, there have been several changes that affect the current valuation results including:

- Omnibus Pension Finance bill, HF 3100, which included reducing the investment return assumption to 7.0%.
- Tax Finance & Policy bill, HF 1938, which lowered the normal retirement age from 66 to 65 for Tier II members, increased the employer and employee contribution rates by 0.75% and 0.25% respectively, and extended the amortization period to 2053 (all effective July 1, 2025).
- Completion of the quadrennial experience study. There were no recommended economic assumption changes other than lowering the investment return assumption to 7.0%. The demographic assumption changes are expected to be reflected in the 2024 valuation after the LCPR approves them.
- Scheduled increases in the employee and employer contribution rates, as provided in the 2018 omnibus pension bill.

The changes discussed above impacted the benefit structure and contribution rates as well as the actuarial assumptions used in the current valuation. One of the most significant legislative changes was reducing the investment return assumption from 7.5% to 7.0%, effective with the July 1, 2023 valuation. Note that although the reduction in the normal retirement age from 66 to 65 is effective July 1, 2025, the provision is reflected in the results of the 2023 valuation. The changes under HF 3100 and HF 1938, and their impact on the current valuation results, are discussed in further detail in the Executive Summary of this report.

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 and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Trustees. Collectively, 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. Although some of the assumptions are set by statute, we believe the full set of actuarial assumptions used in this valuation are reasonable, as defined in Actuarial Standards of Practice, taking into account the past experience of TRA as well as reasonable expectations for future experience. Nevertheless, the emerging costs of the System may vary from those presented in this report to the extent actual experience differs from that anticipated by the actuarial assumptions.

In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. 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 the purpose of determining the required contribution rates for funding the System. Actuarial computations for the purpose 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 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
Consulting Actuary

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

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

A handwritten signature in blue ink that reads 'Ben Mobley'.

Ben Mobley, ASA, FCA, MAAA
Consulting 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 certain college faculty. This report presents the results of the July 1, 2023 actuarial funding valuation of the System. The primary purposes of performing the actuarial funding valuation are to:

- disclose asset and liability measures as of the valuation date;
- 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 actuarial experience of the System since the last valuation date;
- assess and disclose the key risks associated with funding the System; and
- analyze and report on trends in System contributions, assets, and liabilities over the past several years.

There have been several changes since the July 1, 2022 actuarial valuation that impacted the results of the July 1, 2023 actuarial valuation. These include changes to the actuarial assumption, benefit provisions, and contribution rates as well as additional State appropriations. The omnibus pension finance bill, HF 3100, appropriated \$176,166,838 to TRA, payable on October 1, 2023:

- \$28,735,816 for the difference between the statutory 1.1% compounded COLA payable on January 1, 2024 and a one-time 2.5% lump-sum COLA for coordinated plan members;
- \$2,384,222 for the difference between the statutory 1.1% compounded COLA payable on January 1, 2024 and a one-time 4.0% lump-sum COLA for basic plan members; and
- \$145,046,800 to pay down the unfunded actuarial accrued liability.
- The bill also reduced the investment return assumption from 7.5% to 7.0%.

Because both the liability for the additional lump sum COLAs and the offsetting State appropriations will occur in FY 2024, they did not impact the current valuation results. In addition, due to the date the additional contribution of \$145 million was received, it was not included in the System's assets as of July 1, 2023 and therefore, did not impact the current valuation results. The reduction in the investment return assumption to 7.0% is reflected in this valuation and it increased both the actuarial accrued liability and actuarial contribution rate.

The tax finance & policy bill, HF 1938, included the following changes to TRA's benefit structure and financing:

- Normal retirement age for active Tier II members is reduced from 66 to 65;
- Employer contribution rate increases by 0.75%;
- Employee contribution rate increases by 0.25%;
- TRA's amortization date moves to June 30, 2053.

All changes under HF 1938 are effective July 1, 2025 and, therefore, do not impact benefits or contributions until that date. However, the impact of lowering the Tier II normal retirement age on July 1, 2025 is reflected in the current valuation results.

In addition, both the employer and member contribution rates increased July 1, 2023, as provided in the 2018 omnibus pension bill. The TRA employer contribution rate increased by 0.20% (to 8.75%) and the member contribution rate increased by 0.25% (to 7.75%).



SECTION 1 – EXECUTIVE SUMMARY

The regularly scheduled quadrennial experience study was completed in August 2023. Based on the findings of that study, several changes to the set of actuarial assumptions were recommended, including lowering the investment return assumption from 7.5% to 7.0%. Since the change to the investment return assumption requires legislative action, which was included in HF 3100, it is incorporated in the July 1, 2023 actuarial valuation. However, the other proposed assumption changes are awaiting approval by the Legislative Commission on Pensions and Retirement (LCPR). Therefore, those assumption changes are not reflected in the current actuarial valuation. We anticipate that the recommended set of actuarial assumptions will be approved by the LCPR and reflected in the July 1, 2024 actuarial valuation. The changes are expected to lower the actuarial accrued liability and total actuarial contribution rate, primarily due to the proposed mortality assumption.

Section 356.215 of the Minnesota Statutes prescribes the method for amortizing the System's UAAL. In accordance with paragraph (c) of subd. 11, if there is an increase to the System's UAAL 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 amount needed to amortize the prior UAAL as a level percent of pay over the prior amortization period and the amount needed to amortize the increase in the UAAL as a level percent of pay over 30 years. The resulting blended amortization period is then rounded to the nearest integer. Our analysis shows that the blended amortization period rounds to 25 years. Therefore, the UAAL amortization date is unchanged and remains June 30, 2048 in the July 1, 2023 valuation.

The following table shows a summary of the cost impact due to the changes since the prior valuation discussed earlier (\$ in thousands).

	Before Changes	After Changes	Difference
Actuarial Accrued Liability (AAL)	\$32,338,768	\$35,008,293	\$2,669,525
Actuarial Value of Assets (AVA)	<u>26,903,914</u>	<u>26,903,914</u>	<u>0</u>
Unfunded AAL (UAAL)	\$5,434,854	\$8,104,379	\$2,669,525
Funded Ratio	83.2%	76.9%	(6.3%)
Normal Cost Rate	9.28%	11.10%	1.82%
UAAL Amortization Payment	5.90%	8.38%	2.48%
Expenses	<u>0.29%</u>	<u>0.29%</u>	<u>0.00%</u>
Total Required Contribution	15.47%	19.77%	4.30%
Statutory Contribution	17.24%	17.24%	0.00%
Contribution (Deficiency)/Sufficiency	1.77%	(2.53%)	(4.30%)

The most significant cost impact in the table above is due to lowering the investment return assumption from 7.5% to 7.0%. This single change increased the unfunded actuarial accrued liability by \$2.05 billion and increased the actuarial contribution rate by 3.11%. The benefit changes increased the unfunded actuarial accrued liability by \$615 million and the actuarial contribution rate by 1.19%.

As the table above shows, the current valuation results show a contribution deficiency of 2.53% of pay. However, as mentioned earlier, there are additional improvements scheduled or expected in the future that will affect the System's funding outlook. To provide the reader with some insight into the impact of these future changes, the following table illustrates the expected impact of each on the System's contribution sufficiency.



SECTION 1 – EXECUTIVE SUMMARY

	Contribution (Deficiency)/ Sufficiency	Impact
July 1, 2023 Valuation (Current)	(2.53%)	
- Increased Contribution Rates	(1.53%)	+1.00%
- Additional \$145M Contribution	(1.38%)	+0.15%
- Extend Amortization Date	(0.57%)	+0.81%
- Demographic Assumption Changes	0.55%	+1.12%

In addition to all of the changes previously discussed, the actuarial valuation captures the actual experience that has occurred in the last fiscal year. The valuation results, which provide a “snapshot” view of the System’s financial condition on July 1, 2023, 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 as of July 1, 2023 is \$8.104 billion, compared to an expected UAAL of \$8.348 billion. The favorable experience of \$244 million was the combined result of experience gains of \$112 million on the actuarial value of assets and \$132 million on the System liabilities. The rate of return on the market value of assets for fiscal year 2023 was +8.9%, as reported by the State Board of Investment. However, due to the application of the asset smoothing method, the rate of return on the actuarial value of assets was +8.0%, resulting in an experience gain on assets. The primary factor affecting the net liability gain was salary gains from actual salary increases that were lower than expected by the assumption.

A summary of the key valuation results from the July 1, 2023 actuarial valuation, compared to the July 1, 2022 valuation, is shown in the following table. Further detail on the valuation results can be found in the following sections of this Executive Summary.

	July 1, 2023	July 1, 2022
Total Required Contribution Rate (Chapter 356)	19.77%	15.72%
Employer Contributions	8.91%	8.73%
Employee Contributions	7.75%	7.50%
Direct Aid (Chapters 354 and 423A)	0.58%	0.59%
Sufficiency/(Deficiency)	(2.53%)	1.10%
Unfunded Actuarial Accrued Liability (\$M)	\$8,104	\$5,690
Funded Ratio (Actuarial Assets)	76.85%	82.00%

The prior valuation showed that there was a contribution sufficiency of 1.10% of pay. Due to lowering the assumed investment return from 7.5% to 7.0% and lowering the normal retirement age for Tier 2 members, the contribution sufficiency has now become a contribution deficiency of 2.53% of pay in the current valuation. As discussed earlier, there are changes expected to occur in the next two years that will change the current contribution deficiency to a contribution sufficiency, if all assumptions are met.



SECTION 1 – EXECUTIVE SUMMARY

EXPERIENCE FOR THE LAST PLAN YEAR

Numerous factors contributed to the change in the System’s assets, liabilities and Required Contribution Rate (actuarial contribution rate) between July 1, 2022 and July 1, 2023. The components are examined in the following discussion.

ASSETS

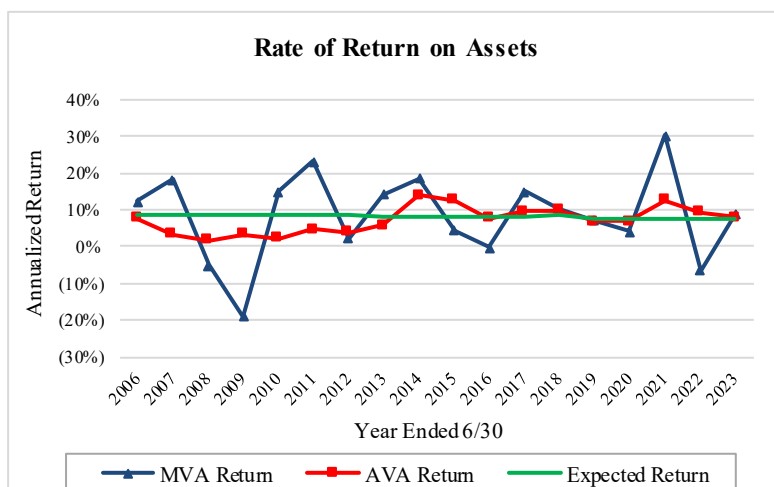
As of June 30, 2023, TRA had net assets of \$26.752 billion, as measured on a market value basis. This represents a \$1.160 billion increase from the prior year.

The market value of assets is not used directly in the calculation of the Unfunded Actuarial Accrued Liability Funded Ratio and the Required 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, called the “actuarial value of assets”. The actuarial value of assets as of June 30, 2023 was \$26.904 billion, an increase of \$978 million from 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, 2022	\$25,926	\$25,592
- Employer and Member Contributions and State Aid	987	987
- Benefit Payments and Administrative Expenses	(2,044)	(2,044)
- Investment Income	<u>2,035</u>	<u>2,217</u>
Net Assets, June 30, 2023	\$26,904	\$26,752
Rate of Return	8.0%	8.9%

The Minnesota State Board of Investment reported a rate of return of +8.9% on the market value of assets for fiscal year 2023. Due to the application of the asset smoothing method, including the scheduled recognition of the deferred investment experience from the four prior years, the rate of return on the actuarial value of assets was +8.0%. Because this rate of return was higher than the assumed rate of return (7.5% for fiscal year 2023), an actuarial gain of \$112 million occurred. Please see Section II of this report for more detailed information on the market and actuarial value of assets.

SECTION 1 – EXECUTIVE SUMMARY



Market value returns have been very volatile. An asset smoothing method is used to calculate the actuarial value of assets that recognizes the difference in the actual and expected investment returns 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.

The net deferred investment loss (actuarial value of assets minus the market value) is \$152 million as of July 1, 2023. Absent favorable investment experience, the deferred asset losses are expected to flow through the smoothing method over the next four years, lowering the funded ratio and increasing the Required Contribution Rate.

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). In general, the UAAL is reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year's UAAL. However, actuarial experience also impacts the UAAL from one year to the next.

The Unfunded Actuarial Accrued Liability as of July 1, 2023 is shown in the following table:

	Actuarial Value of Assets	Market Value of Assets
(\$Millions)		
Actuarial Accrued Liability	\$35,008	\$35,008
Value of Assets	<u>26,904</u>	<u>26,752</u>
Unfunded Actuarial Accrued Liability*	8,104	8,256
Funded Ratio	76.85%	76.42%

*Numbers may not add due to rounding

See Section III of the report for the detailed development of the Unfunded Actuarial Accrued Liability.



SECTION 1 – EXECUTIVE SUMMARY

Changes in the UAAL occur for various reasons. The net increase in the UAAL from July 1, 2022 to July 1, 2023 was \$2,414 billion. The components of this net change are shown in the following table (in millions):

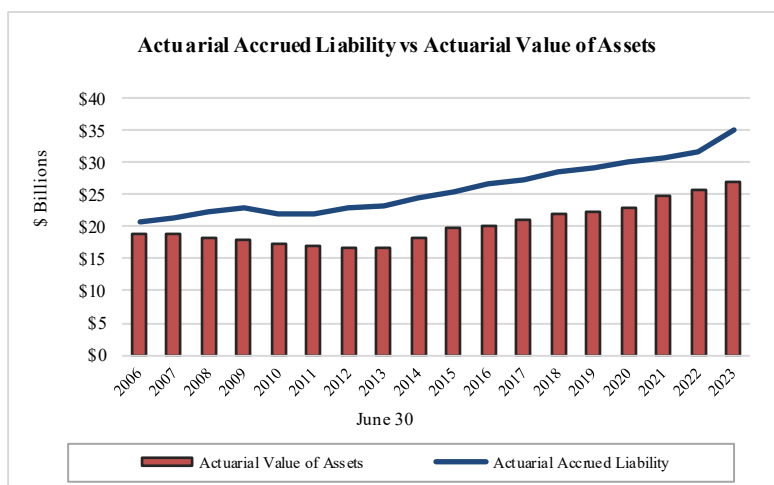
Unfunded Actuarial Accrued Liability, July 1, 2022	\$5,690
• Expected change from amortization method	44
• Actual contributions vs Required Rate	(68)
• Investment experience on actuarial assets	(112)
• Liability experience	(132)
• Lower investment return assumption to 7.0%	2,054
• Benefit provision changes	615
• Other experience	13
• Total	<u>2,414</u>
Unfunded Actuarial Accrued Liability, July 1, 2023	\$8,104

As shown above, various types of experience impacted the UAAL from July 1, 2022 to July 1, 2023, but the most significant was lowering the assumed investment return from 7.5% to 7.0%. The UAAL is financed as a level percentage of payroll so the dollar amount of the UAAL payments increase each year with the payroll increase assumption of 3.0%. As a result of the payment schedule, contributions in the early part of the amortization period are less than the interest on the UAAL so the dollar amount of the UAAL increases. This is illustrated by the expected increase of \$44 million shown in the table above.

To the extent the Statutory Contribution Rate is more than the Required Contribution Rate, which was the case during the prior year, the UAAL is paid off more rapidly than expected based on the System's amortization schedule. During fiscal year 2023, the contribution sufficiency decreased the UAAL by \$68 million.

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. These are measured as the difference between the expected UAAL and the actual UAAL, taking into account any changes due to actuarial assumptions and methods or benefit provision changes. Overall, the System experienced an actuarial gain of \$244 million, which may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was a \$112 million gain on the actuarial value of assets and a \$132 million gain on liabilities. The liability gain was primarily the result of salary gains from increases that were lower than expected, based on the assumption.

SECTION 1 – EXECUTIVE SUMMARY

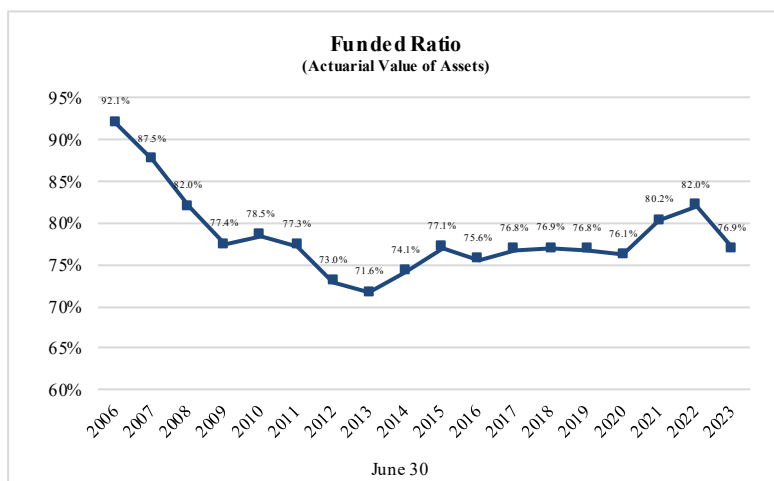


Although the actuarial accrued liability has exceeded the actuarial value of assets during this period, there has been significant growth in asset values since 2013. In addition to actual investment experience, the difference between actuarial accrued liability and actuarial assets has been impacted by benefit changes, which have both increased and decreased liabilities, and actuarial assumption changes which have increased liabilities.

An evaluation of the UAAL 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 in the following table (in millions).

	7/1/19	7/1/20	7/1/21	7/1/22	7/1/23
Funded Ratio	76.8%	76.1%	80.2%	82.0%	76.9%
Unfunded Actuarial Accrued Liability (\$M)	\$6,779	\$7,192	\$6,087	\$5,690	\$8,104

Note that if the funded status was calculated using the market value of assets, the results could differ. The funded ratios and Unfunded Actuarial Accrued Liability measures, as shown, are not indicative of whether or not the System could settle all current benefit obligations with existing assets. Furthermore, these results do not, on their own, indicate whether or not future funding of the System will be required, nor the amount.



Although the funded ratio decreased in the early part of this period, the funded ratio increased significantly between 2013 and 2022. The benefit reductions passed by the 2010 and 2018 legislatures, along with strong investment returns, were key factors in the improvement of the funded ratio. However, the funded ratio dropped in 2023 primarily due to lowering the investment return assumption.



SECTION 1 – EXECUTIVE SUMMARY

CONTRIBUTION RATE

Under the Entry Age Normal cost method, the actuarial contribution rate consists of three 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,
- 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 (Unfunded Actuarial Accrued Liability); and
- an amount to cover estimated administrative expenses for the plan year.

Under the Entry Age Normal cost method, the normal cost rate is very stable, absent changes in the actuarial assumptions or plan changes. However, the UAAL contribution rate tends to fluctuate much more. See Section IV of the report for the detailed development of these contribution rates which are summarized in the following table. These calculations are based on the actuarial value of assets.

Contribution Rates	July 1, 2023	July 1, 2022
1. Normal Cost Rate	11.10%	9.23%
2. UAAL Contribution Rate	8.38%	6.21%
3. Expenses	<u>0.29%</u>	<u>0.28%</u>
4. Total Required Contribution Rate	19.77%	15.72%
5. Statutory Contribution Rate	<u>17.24%</u>	<u>16.82%</u>
6. Contribution (Deficiency)/Sufficiency (5) - (4)	(2.53%)	1.10%

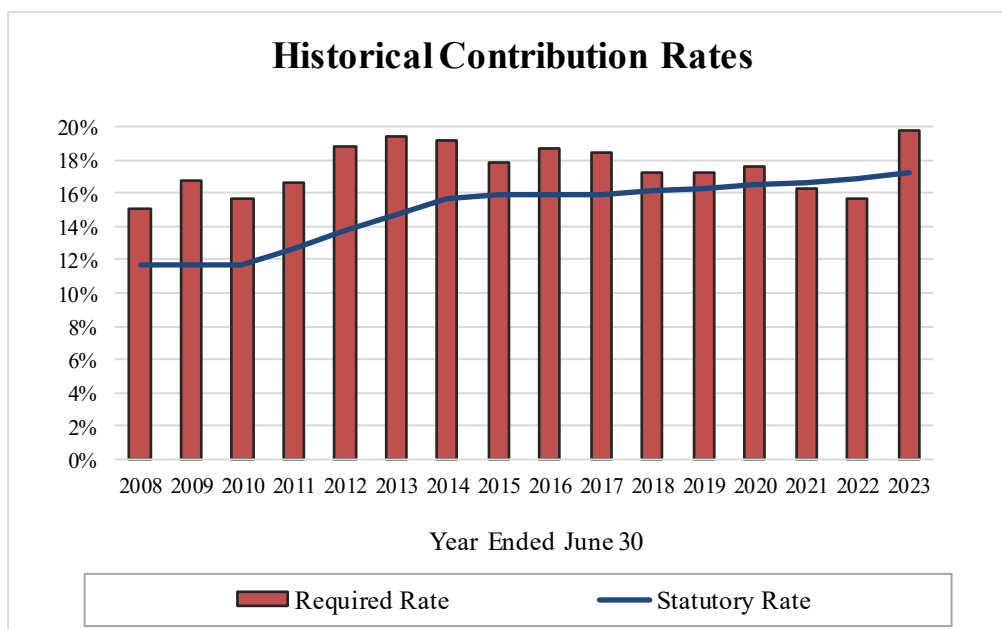
As noted earlier, once the additional \$145 million of State contributions is received in FY 2024, the employee and employer contribution rates increase, the amortization date is extended to 2053, and the demographic assumption changes are reflected, a contribution rate sufficiency of 0.55% is expected.

The impact of the various factors discussed earlier on the Required Contribution Rate are shown in the following table.

Required Contribution Rate, July 1, 2022	15.72%
- Change in normal cost rate	0.05%
- Actual contributions vs Required Rate	(0.07%)
- Investment experience	(0.12%)
- Liability experience	(0.19%)
- Payroll increase different than expected	0.02%
- Lower investment return assumption to 7.0%	3.11%
- Benefit provision changes	1.19%
- Other experience	<u>0.06%</u>
Required Contribution Rate, July 1, 2023	19.77%

SECTION 1 – EXECUTIVE SUMMARY

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



When a system is funded with fixed contribution rates (Statutory Contribution Rate), it is expected that the fixed contribution rate may be either above or below the actuarial contribution rate (Required Contribution Rate for TRA), as determined in the actuarial valuation each year. However, when the Statutory Contribution Rate is consistently lower than the Required Contribution Rate for a long period, it can significantly impact the funding progress of the System and result in an increasing UAAL and declining funded ratio. For TRA, the Statutory Contribution Rate was significantly below the Required Contribution Rate from 2008 to 2017. Over that time, the funded status of the System declined from 92% to 76%. Actual investment experience over the early years of that time period also had a significant impact on the decline in the System's funding. There was a Contribution Sufficiency during fiscal years 2022 and 2023. However, due to lowering the investment return assumption and the normal retirement age for Tier II members, the current valuation results show a Contribution Deficiency of 2.53% of pay. This deficiency means that, if all current assumptions are exactly met in the future, the UAAL will not be fully amortized at the scheduled date of June 30, 2048. However, the UAAL will continue to be significantly impacted from year to year by factors other than statutory contribution levels, such as actual versus expected experience, assumption changes, financing changes and changes to the amortization period. We will continue to monitor the Contribution Deficiency and projected full funding date in future valuations to ensure the current funding policy will meet the System's goals.

The actuarial contribution rate (Required Contribution Rate) is determined based on the snapshot of the System taken on the valuation date, July 1, 2023. 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. The most volatile component of the actuarial contribution rate is typically the actual investment return, although the asset smoothing method mitigates the immediate impact of significantly different returns than assumed.



SECTION 1 – EXECUTIVE SUMMARY

SUMMARY

The two most impactful events since the prior valuation were lowering the investment return assumption and reducing the normal retirement age for Tier 2 members. Their combined impact was an increase in the UAAL of \$2.67 billion, as well as an increase in the Required Contribution Rate of 4.30% of pay. Another factor that had a significant impact on the July 1, 2023 valuation was the investment return on the market value of assets of +8.9% for FY 2023. As a result, the net deferred investment loss of \$334 million in last year's valuation has decreased to \$152 million. Absent favorable investment experience, the deferred asset losses are expected to flow through the smoothing method over the next four years, lowering the funded ratio and increasing the Required Contribution Rate.

Due to the application of the asset smoothing method, the return on the actuarial value of assets was +8.0%. Since this return was higher than the assumed rate of return of 7.5% for the fiscal year ending 2023, there was an actuarial gain on the actuarial value of assets. Coupled with demographic experience for the year, the total actuarial gain was \$244 million. 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 investment experience. The asset smoothing method impacts only the timing of when the actual market experience is recognized in the valuation process. The net deferred investment loss of \$152 million represents about 0.6% of the market value of assets. The key valuation results from the July 1, 2023 actuarial valuation are shown in the following table, using both actuarial and market value of assets.

	Actuarial Value	Market Value
Statutory Rate	17.24%	17.24%
Required Contribution		
Normal Cost	11.10%	11.10%
UAAL Contribution	8.38%	8.53%
Expenses	<u>0.29%</u>	<u>0.29%</u>
Total Required Contribution	19.77%	19.92%
(Deficiency)/Sufficiency	(2.53%)	(2.68%)
UAAL (\$M)	\$8,104	\$8,256
Funded Ratio	76.85%	76.42%

Note: does not reflect future scheduled increases in the employer and employee contribution rates.

The long-term financial health of this System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. Changes made by the 2023 Legislature reduced the assumed investment return from 7.5% to 7.0%, granted some improved benefits, and provided for a one-time state aid contribution in FY 2024 followed by increased member and employer contribution rates. These changes, along with the proposed demographic assumptions expected to be implemented in the 2024 valuation, are expected to result in sufficient long-term funding of the System. Of course, actual experience over time will unfold differently from that assumed, so additional adjustments may be necessary in the future. It is especially important to note that it is the actual investment returns, not the assumed investment return, that will ultimately determine the cost of providing the promised benefits.



SECTION 1 – EXECUTIVE SUMMARY

A typical retirement plan faces many different risks. The term “risk” is most commonly associated with an outcome with undesirable results. However, in the actuarial world risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions each year and that uncertainty, whether favorable or unfavorable, creates risk. Actuarial Standard of Practice Number 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions. Risk evaluation is an important part of managing any defined benefit plan. A discussion of certain key risks for TRA is included in Section V of this report.

We conclude this executive summary by presenting comparative statistics and actuarial information on both the July 1, 2023 and July 1, 2022 valuations.



SECTION 1 – 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, 2023	July 1, 2022	% Change
1. PARTICIPANT DATA			
A. Active members			
1. Number	84,983	84,308	0.8%
2. Projected annual earnings for fiscal year (000s)	6,108,286	5,944,310	2.8%
3. Average projected annual earnings for fiscal year 2024	71,877	70,507	1.9%
4. Average age	43.5	43.2	0.7%
5. Average service	12.3	12.3	0.0%
B. Service retirements	63,219	62,976	0.4%
C. Survivors	6,696	6,488	3.2%
D. Disability retirements	429	427	0.5%
E. Deferred retirements	19,418	17,812	9.0%
F. Non-vested terminated members	40,089	38,903	3.0%
G. Total	214,834	210,914	1.9%
2. LIABILITIES AND FUNDING RATIOS (dollars in thousands)			
A. Accrued Benefit Funding Ratio			
1. Current assets (AVA)	\$ 26,903,914	\$ 25,925,803	3.8%
2. Current benefit obligations	32,394,327	29,859,472	8.5%
3. Funding ratio	83.05%	86.83%	(4.4%)
B. Actuarial Accrued Liability Funding Ratio			
1. Current assets (AVA)	\$ 26,903,914	\$ 25,925,803	3.8%
2. Market Value of Assets (MVA)	26,752,069	25,592,152	4.5%
3. Actuarial Accrued Liability	35,008,293	31,615,897	10.7%
4. Unfunded Actuarial Accrued Liability (B.3. - B.1.)	8,104,379	5,690,094	42.4%
5. Funding ratio (AVA) (B.1. / B.3.)	76.85%	82.00%	(6.3%)
6. Funding ratio (MVA) (B.2. / B.3.)	76.42%	80.95%	(5.6%)
C. Projected Benefit Funding Ratio			
1. Current and expected future assets	\$ 40,309,275	\$ 38,507,266	4.7%
2. Current and expected future benefit obligations	42,753,840	37,496,417	14.0%
3. Funding ratio (AVA)	94.28%	102.70%	(8.2%)
3. CONTRIBUTIONS (% of Payroll)			
A. Normal Cost Rate	11.10%	9.23%	20.3%
B. UAAL Amortization Payment	8.38%	6.21%	34.9%
C. Expenses	0.29%	0.28%	3.6%
D. Total Required Contribution (Chapter 356)	19.77%	15.72%	25.8%
E. Statutory Contribution (Chapter 354)	17.24%	16.82%	2.5%
F. Contribution (Deficiency)/Sufficiency (3.E. - 3.D.)	(2.53%)	1.10%	(330.0%)



SECTION II - PLAN ASSETS

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, 2023	June 30, 2022
	<u>Amount</u>	<u>Amount</u>
Cash and short-term investments		
Cash	\$ 19,077	\$ 13,550
Building account cash	240	262
Short term investments	877,681	520,898
Total cash and short term investments	\$ 896,998	\$ 534,710
Accounts Receivable	28,353	28,710
Investments (at fair value)		
Bond pool	\$ 5,679,008	\$ 5,861,975
Alternative investments pool	6,704,693	6,411,262
Domestic stock pool	8,904,911	8,718,840
Broad International Stock Fund	4,543,600	4,041,893
Total investments	\$ 25,832,212	\$ 25,033,970
Securities lending collateral	\$ 1,384,758	\$ 1,319,939
Building		
Land	\$ 171	\$ 171
Building & equipment net of depreciation	4,644	4,910
Total building	\$ 4,815	\$ 5,081
Capital assets net of depreciation	4,567	6,804
Total Assets	\$ 28,151,703	\$ 26,929,214



SECTION II - PLAN ASSETS

TABLE 1 (continued)

STATEMENT OF FIDUCIARY NET POSITION
(Dollars in Thousands)

	June 30, 2023	June 30, 2022
Liabilities	<u>Amount</u>	<u>Amount</u>
Current		
Accounts payable	\$ 9,087	\$ 10,065
Accrued compensated absences	105	94
Accrued expenses - building	5	83
Bonds payable	664	675
Bonds interest payable	2	2
Securities lending collateral	1,384,758	1,319,939
Unearned Revenue	1,210	0
Total current liabilities	\$ 1,395,831	\$ 1,330,858
Long term		
Accrued compensated absences	\$ 977	\$ 901
Bonds payable	392	1,111
Total long term liabilities	\$ 1,369	\$ 2,012
Total Liabilities	\$ 1,397,200	\$ 1,332,870
Net position restricted for pensions	\$ 26,754,503	\$ 25,596,344
Earnings Limitation Savings Account (ELSA) accounts payable	(2,434)	(4,192)
Net position restricted for pensions, after adjustment for ELSA accounts	\$ 26,752,069	\$ 25,592,152



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, 2023 and 2022.

	For Year Ended	
	June 30, 2023	June 30, 2022
Additions		
Contributions		
Employee	\$ 442,448	\$ 428,993
Employer	508,764	482,679
Direct aid (state/city/district)	35,587	35,590
Earnings Limitation Savings Account (ELSA)	407	2,172
Total contributions	\$ 987,206	\$ 949,434
Investment Income		
Investment appreciation in fair value	\$ 2,235,116	\$ (1,687,285)
Less investment expenses	(27,338)	(29,717)
Net Investment Income	\$ 2,207,778	\$ (1,717,002)
Securities Lending activities		
Securities lending income	\$ 52,314	\$ 10,856
Securities lending expenses:		
Borrowing rebates	(44,852)	(3,227)
Management fees	(1,343)	(1,373)
Total securities lending expenses	(46,195)	(4,600)
Net income from securities lending	6,119	6,256
Total Net Investment Income	\$ 2,213,897	\$ (1,710,746)
Other Income	1,559	1,359
Total Additions	\$ 3,202,662	\$ (759,953)
Deductions		
Benefits Paid		
Retirement benefits	\$ (2,010,031)	\$ (1,971,093)
Refunds of contributions to members	(17,531)	(16,529)
Total benefits paid	\$ (2,027,562)	\$ (1,987,622)
Administrative Expenses	(16,534)	(15,666)
Total Deductions	\$ (2,044,096)	\$ (2,003,288)
Increase/(Decrease) in ELSA Account Value	1,351	(2,435)
Net Increase (Decrease)	1,159,917	(2,765,676)
Net Position Restricted for Pensions		
Beginning of Year	\$ 25,592,152	\$ 28,357,828
End of Year	\$ 26,752,069	\$ 25,592,152



SECTION II - PLAN ASSETS

TABLE 3

ACTUARIAL VALUE OF ASSETS AS OF JUNE 30, 2023

(Dollars in Thousands)

1. Market value of assets available for benefits		\$	26,752,069
2. Determination of average balance			
a. Assets available at July 1, 2022*		\$	25,596,344
b. Assets available at June 30, 2023*			26,754,503
c. Net investment income for fiscal year ending June 30, 2023			2,213,897
d. Average balance (a. + b. - c.) / 2		\$	25,068,475
3. Expected return (7.5% * 2.d.)			1,880,136
4. Actual return			2,213,897
5. Current year unrecognized asset return (4. - 3.)			333,761
6. Unrecognized asset returns			
	Original Amount	% Not Recognized	
a. Year ended June 30, 2023	\$ 333,761	80%	\$ 267,009
b. Year ended June 30, 2022	(3,798,328)	60%	(2,278,997)
c. Year ended June 30, 2021	5,018,257	40%	2,007,303
d. Year ended June 30, 2020	(735,801)	20%	(147,160)
e. Total return not yet recognized			\$ (151,845)
7. Actuarial value of assets at June 30, 2023 (1. - 6.e.)		\$	26,903,914

* Before recognition of ELSA accounts payable.

Fiscal Year Ended	Gain/(Loss) Deferred to Future Years	Gain/(Loss) to be Recognized in Plan Year Ending			
		2024	2025	2026	2027
6/30/2020	(\$147,160)	(147,160)			
6/30/2021	2,007,303	1,003,652	1,003,651		
6/30/2022	(2,278,997)	(759,666)	(759,666)	(759,665)	
6/30/2023	267,009	66,752	66,752	66,752	66,753
Total	(\$151,845)	\$163,578	\$310,737	(\$692,913)	\$66,753



SECTION II - PLAN ASSETS

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SECTION III - PLAN LIABILITIES

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, 2023. 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 demographic actuarial assumptions used to determine liabilities are based on the results of the July 1, 2014 to June 30, 2018 Experience Study completed in June 2019. An experience study covering the period from July 1, 2018 to June 30, 2022 was completed in August 2023. There were no recommended changes to the set of economic assumptions other than a reduction to the investment return assumption from 7.5% to 7.0%, which was implemented by HF 3100. There were several changes to the demographic assumptions recommended that are expected to first be reflected in the June 30, 2024 actuarial valuation once approved by the LCPR. The set of assumptions used in the July 1, 2023 valuation is shown in Appendix C.

The liabilities reflect the benefit structure in place as of July 1, 2023.

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, 2023

(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 the 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				\$	26,903,914	
B. Expected Future Assets						
1. Present value of expected future statutory supplemental contributions*				\$	5,659,814	
2. Present value of expected future normal cost contributions					7,745,547	
3. Total expected future assets (1. + 2.)				\$	13,405,361	
C. Total Current and Expected Future Assets**				\$	40,309,275	
		<u>Non-Vested</u>	<u>Vested</u>			
		<u>Benefits</u>	<u>Benefits</u>		<u>Total</u>	
D. Current Benefit Obligations						
1. Benefit recipients						
a. Service retirements	\$	0	\$	19,151,412	\$	19,151,412
b. Disability		0		146,815		146,815
c. Survivors		0		1,371,912		1,371,912
2. Deferred retirements with applicable future augmentation		0		984,466		984,466
3. Former members without vested rights***		116,253		0		116,253
4. Active members		92,038		10,531,431		10,623,469
5. Total Current Benefit Obligations	\$	208,291	\$	32,186,036	\$	32,394,327
E. Expected Future Benefit Obligations						10,359,513
F. Total Current and Expected Future Benefit Obligations						42,753,840
G. Unfunded Current Benefit Obligations (D.5. - A.)						5,490,413
H. Unfunded Current and Future Benefit Obligations (F. - C.)						2,444,565

* Under LCPR guidelines, this amount does not include supplemental payments which could occur after the expiration of the remaining 25 year amortization period.

** Does not reflect deferred investment experience in the asset smoothing method. Total expected future assets on a market value basis is \$40,157,430.

*** 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, 2023
(Dollars in Thousands)

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
1. Active Members			
a. Retirement annuities	\$ 19,827,999	\$ (6,656,189)	\$ 13,171,810
b. Disability Benefits	448,915	(196,605)	252,310
c. Survivor benefits	145,675	(55,752)	89,923
d. Deferred retirements	543,326	(636,234)	(92,908)
e. Refunds	17,067	(200,767)	(183,700)
f. Total	<u>\$ 20,982,982</u>	<u>\$ (7,745,547)</u>	<u>\$ 13,237,435</u>
2. Deferred Retirements with Applicable Future Augmentation	984,466	0	984,466
3. Former Members Without Vested Rights	116,253	0	116,253
4. Benefit Recipients	<u>20,670,139</u>	<u>0</u>	<u>20,670,139</u>
5. Total Actuarial Accrued Liability	\$ 42,753,840	\$ (7,745,547)	\$ 35,008,293
6. Actuarial Value of Assets			\$ 26,903,914
7. Unfunded Actuarial Accrued Liability (UAAL)			\$ 8,104,379

* On a Market Value of Assets basis, the Unfunded Actuarial Accrued Liability is \$8,256,224.



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	\$ 5,690,094
B. Changes due to interest requirements and current rate of funding*	
1. Normal cost and actual administrative expenses	\$ 565,203
2. Contributions	(987,206)
3. Interest on A., B.1., and B.2. at 7.5%	411,218
4. Total (B.1. + B.2. + B.3.)	\$ (10,785)
C. Expected Unfunded Actuarial Accrued Liability at end of year (A. + B.4.)	\$ 5,679,309
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected	
1. Salary increases	\$ (171,153)
2. Investment return (actuarial assets)	(112,340)
3. Mortality of active members	(339)
4. Mortality of benefit recipients	(42,139)
5. Retirement from active service	75,229
6. Other items	6,287
7. Total	\$ (244,455)
E. Unfunded Actuarial Accrued Liability at end of year before plan amendments and changes in actuarial assumptions (C. + D.7.)	\$ 5,434,854
F. Change in Unfunded Actuarial Accrued Liability due to change in plan amendments	\$ 615,463
G. Change in Unfunded Actuarial Accrued Liability due to change in assumptions	\$ 2,054,062
H. Unfunded Actuarial Accrued Liability at end of year (E. + F. + G.)	\$ 8,104,379

* 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 – CONTRIBUTIONS

SECTION IV SYSTEM CONTRIBUTIONS



SECTION IV – 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 UAAL 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, 2048). Contributions to fund the UAAL are determined as a level percentage of payroll assuming payroll increases 3.00% each year.

Note that by design, this amortization method is expected to pay off the UAAL by 2048 if the actuarial contribution rate is contributed and all actuarial assumptions are met in the future. Based on the contribution rates and state aid schedule, contributions are expected to exceed the normal cost and expenses plus interest on the UAAL by 2030.



SECTION IV – CONTRIBUTIONS

TABLE 7

NORMAL COST AT JULY 1, 2023
(Dollars in Thousands)

	<u>Percent of Pay</u>	<u>Dollar Amount</u>
1. Normal Cost Rate		
a. Retirement benefits	9.59%	\$ 585,793
b. Disability benefits	0.27%	16,493
c. Survivor benefits	0.08%	4,887
d. Deferred retirement benefits*	0.87%	53,142
e. Refunds	0.29%	17,714
f. Total	<u>11.10%</u>	<u>\$ 678,029</u>

* 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	\$ 35,008,293
2. Actuarial Value of Assets	26,903,914
3. Unfunded Actuarial Accrued Liability	<u>\$ 8,104,379</u>
B. Determination of Supplemental Contribution Rate*	
1. Present value of future payrolls through the amortization date of June 30, 2048	\$ 96,748,965
2. Supplemental contribution rate (A.3. / B.1.)	8.38%

* *On a Market Value of Assets basis, the Unfunded Actuarial Accrued Liability is \$8,256,224 and the supplemental contribution rate is 8.53% of payroll.*



SECTION IV – CONTRIBUTIONS

TABLE 9

DETERMINATION OF CONTRIBUTION SUFFICIENCY/(DEFICIENCY) (Dollars in Thousands)

The actuarial contribution rate 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	7.75%	\$ 473,396
2. Employer contributions*	8.91%	544,257
3. Supplemental contributions**		
a. 1993 Legislation	0.08%	5,000
b. 1996 Legislation	0.05%	3,256
c. 1997 Legislation	0.21%	12,954
d. 2014 Legislation	0.24%	14,377
4. Total	17.24%	\$ 1,053,240
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	9.59%	\$ 585,793
b. Disability benefits	0.27%	16,493
c. Survivor benefits	0.08%	4,887
d. Deferred retirement benefits	0.87%	53,142
e. Refunds	0.29%	17,714
f. Total	11.10%	\$ 678,029
2. Supplemental contribution for the amortization of the Unfunded Actuarial Accrued Liability by June 30, 2048	8.38%	511,874
3. Allowance for expenses	0.29%	\$ 17,714
4. Total actuarial contribution for fiscal year ending June 30, 2024***	19.77%	\$ 1,207,617
C. Contribution Sufficiency / (Deficiency) (A.4. - B.4.)***	(2.53%)	\$ (154,377)

Note: Projected annual payroll for fiscal year beginning on the valuation date: \$6,108,286

* Employer contribution rate is blended to reflect rates of 16.39% of pay for Basic members, 8.75% of pay for Coordinated members not employed by Special School District #1, and 12.39% of pay for Coordinated members who are employed by Special School District #1 (Minneapolis Schools).

** Includes contributions from School District #1, the City of Minneapolis, matching state contributions.

*** On a market value of assets basis, the total required contribution is 19.92% of payroll and the contribution deficiency is 2.68% 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	11.25%	\$ 12
2. Employer contributions*	16.39%	18
3. Supplemental contributions**		
a. 1993 Legislation	0.08%	0
b. 1996 Legislation	0.05%	0
c. 1997 Legislation	0.21%	0
d. 2014 Legislation	0.24%	0
4. Total	28.22%	\$ 30
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	17.97%	\$ 19
b. Disability benefits	0.91%	1
c. Survivor benefits	0.35%	0
d. Deferred retirement benefits	0.96%	1
e. Refunds	0.32%	0
f. Total	20.51%	\$ 21

Note: Projected annual payroll for fiscal year beginning on the valuation date: \$108 for 1 member.

* Basic active member is a teacher employed by Special School District #1 (Minneapolis Schools); employer contribution rate of 16.39% of payroll applies.

** Includes contributions from School District #1, the City of Minneapolis, matching state contributions.



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	7.75%	\$ 473,384
2. Employer contributions*	8.91%	544,239
3. Supplemental contributions**		
a. 1993 Legislation	0.08%	5,000
b. 1996 Legislation	0.05%	3,256
c. 1997 Legislation	0.21%	12,954
d. 2014 Legislation	0.24%	14,377
4. Total	17.24%	\$ 1,053,210
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	9.59%	\$ 585,774
b. Disability benefits	0.27%	16,492
c. Survivor benefits	0.08%	4,887
d. Deferred retirement benefits	0.87%	53,141
e. Refunds	0.29%	17,714
f. Total	11.10%	\$ 678,008

Note: Projected annual payroll for fiscal year beginning on the valuation date: \$6,108,178

* Employer contribution rate is blended to reflect rates of 8.75% of pay for Coordinated members not employed by Special School District #1, and 12.39% of pay for Coordinated members who are employed by Special School District #1. The rate was blended using the prior year's actual covered payroll of \$5,735,250, which includes \$5,482,236 for Coordinated members who are not employed by Special School District #1 and \$253,014 for members who are employed by Special School District #1.

** Includes contributions from School District #1, the City of Minneapolis, matching state contributions.



SECTION IV – CONTRIBUTIONS

TABLE 12

REASONABLE ACTUARIALLY DETERMINED CONTRIBUTION (ADC) RATE

As mentioned in our recent experience study report submitted in August 2023, the Government Finance Officers Association (GFOA) and the Conference of Consulting Actuaries (CCA) have published guidance on public pension plan funding, including the amortization period. Although these recommendations are not binding, they do point to an increased focus on developing amortization policies that are designed to pay down the UAAL in a meaningful way over a reasonable period of time. The Actuarial Standards Board recently updated Actuarial Standard of Practice (ASOP) No. 4 to require actuaries to disclose a “reasonable” actuarially determined contribution (ADC), which reflects actuarial methods and assumptions that follow actuarial standards of practice. As a result, we will disclose two different actuarial contribution rates in the valuation report – one for compliance with state statute, and the other for compliance with actuarial standards. This disclosure is in no way intended to imply that TRA’s current funding practices or state statutes are unreasonable. We believe historical practices and the state’s willingness to make benefit changes and increase contributions are consistent with the plan accumulating assets adequate to make benefit payments when due.

We believe that the System’s current assumptions and actuarial cost method meet the “reasonable” standard for purposes of calculating the ADC under ASOP No. 4. However, instead of amortizing the entire UAAL over a single period ending June 30, 2048, which will be extended to June 30, 2053 effective July 1, 2025, we believe a “layered” approach would be appropriate for this purpose. This layered amortization method amortizes the July 1, 2023 UAAL over a closed 25-year period and creates new 20-year amortization layers for future changes in the UAAL in each subsequent valuation. Each layer is paid off over a closed period, as a level-percent of payroll. This method amortizes each base over a reasonable time period and is expected to begin reducing the UAAL four years from now in FYE 2028. As a whole, this “reasonable” method would provide a systematic accumulation of assets in advance of benefit needs while reflecting intergenerational equity desires and helping stabilize contributions.

"Reasonable" ADC Under ASOP No. 4	
Normal Cost Rate	11.10%
Allowance for Expenses	0.29%
UAAL Amortization Rate	8.38%
Total ADC	19.77%
Member Contribution Rate	7.75%
Employer Contribution Rate	8.91%
Supplemental Contribution Rate	0.58%
Total Statutory Contributions	17.24%

Note that the reasonable ADC under ASOP No. 4 is equal to the contribution rate calculated under state statutes this year because both amortization methods coincidentally use a 25-year period in the current valuation. Future disclosures are expected to be different under the two methods.



SECTION IV – CONTRIBUTIONS

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SECTION V – RISK ASSESSMENT

SECTION V RISK ASSESSMENT



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SECTION V – RISK ASSESSMENT

OVERVIEW

Actuarial Standards of Practice (ASOP) No. 51, issued by the Actuarial Standards Board, provides guidance on assessing and disclosing risks related to pension plan funding. This guidance is binding on all credentialed actuaries practicing in the United States.

The term “risk” frequently has a negative connotation, but from an actuarial perspective, it may be thought of as simply the fact that what actually happens in the real world will not always match what was expected, based on actuarial assumptions. Of course, when actual experience is better than expected, the favorable risk is easily absorbed. The risk of unfavorable experience will likely be unpleasant, and so there is an understandable focus on the aspects of risk that are negative.

Risk usually can be reduced or eliminated at some cost. Consumers, for example, buy auto and home insurance to reduce the risk of accidents or catastrophes. Another way to express this concept, however, is that there is generally some reward for assuming risk. Thus, retirement plans invest not just in US Treasury bonds which have almost no risk, but also in equities which are considerably riskier – because they have an expected reward of a higher return that justifies the risk.

Under ASOP 51, the actuary is called on to identify the significant risks to the pension plan and provide information to help those sponsoring and administering the plan understand the implications of these risks. In this section, we identify some of the key risks for TRA and provide information to help interested parties better understand these risks.



SECTION V – RISK ASSESSMENT

INVESTMENT RISK

The investment return on assets is the most significant risk to funding a pension plan. To illustrate the magnitude of this risk, please review the following chart showing the Asset Volatility Ratio (AVR), defined as the market value of assets divided by covered payroll (dollars in thousands).

<u>Valuation</u>	<u>Market Value of Assets</u>	<u>Covered Payroll</u>	<u>Asset Volatility Ratio</u>
2004	\$15,095,804	\$3,032,483	4.98
2005	15,928,604	3,121,571	5.10
2006	17,764,526	3,430,645	5.18
2007	19,938,882	3,532,159	5.64
2008	18,106,966	3,645,230	4.97
2009	13,833,826	3,761,484	3.68
2010	14,939,540	3,787,757	3.94
2011	17,303,576	3,838,111	4.51
2012	16,689,941	3,871,809	4.31
2013	18,019,319	3,917,310	4.60
2014	20,293,684	4,056,482	5.00
2015	20,446,091	4,261,626	4.80
2016	19,424,431	4,515,699	4.30
2017	21,258,090	4,688,875	4.53
2018	22,357,570	4,832,917	4.63
2019	22,872,153	5,000,930	4.57
2020	22,741,046	5,166,241	4.40
2021	28,357,828	5,326,108	5.32
2022	25,592,152	5,573,701	4.59
2023	26,752,069	5,735,250	4.66

The asset volatility ratio is especially useful to compare across plans or through time. It is also frequently useful to consider how the AVR translates into changes in the Required Contribution Rate (actuarial contribution rate). For example, the following table demonstrates that with an AVR of 5.00, if the market value return in one year is 10% below assumed, or -3.00%, there will be an increase in the Required Contribution Rate of 0.61% in the first year. Without asset smoothing or without returns above the expected return in the next four years, the impact on the Required Contribution Rate would be 3.04%. A higher AVR produces more volatility in the Required Contribution Rate.

Impact of Return 10% Below Expected (Percent of Payroll)			
	<u>Asset</u>	<u>Unsmoothed</u>	<u>Smoothed</u>
AVR	<u>Value</u>	<u>Amortization</u>	<u>Amortization</u>
4.00	40%	2.43%	0.49%
5.00	50%	3.04%	0.61%
6.00	60%	3.65%	0.73%



SECTION V – RISK ASSESSMENT

Under the revised Actuarial Standards of Practice (ASOP) No. 4 effective for valuations after February 15, 2023, we are required to include a low-default-risk obligation measure of the System's liability in our funding valuation report. This is an informational disclosure as described below and would not be appropriate for assessing the funding progress or health of the plan. This measure uses the unit credit cost method and reflects all the assumptions and provisions of the funding valuation except the discount rate is derived from considering low-default-risk fixed income securities. For our analysis we used the FTSE Pension Discount Curve based on market bond rates published by the Society of Actuaries as of June 30, 2023 and with the 30-year spot rate used for all durations beyond 30. Using these assumptions, we calculate the low-default-risk obligation liability to be \$37.856 billion. This amount approximates the termination liability if the plan (or all covered employment) ended on the valuation date and all of the accrued benefits had to be paid with cash-flow matched bonds. This assurance of funded status and benefit security is typically more relevant for corporate plans than for governmental plans since governments rarely have the need or option to completely terminate a plan.

SENSITIVITY MEASURES

Valuations are generally performed with a single set of assumptions that reflects the best estimate of future conditions, in the opinion of the actuary and typically the governing board. Note that under Actuarial Standards of Practice, the set of economic assumptions used for funding must be consistent. To enhance the understanding of the importance of an assumption, a sensitivity test can be performed where the valuation results are recalculated using a different assumption or set of assumptions. The Minnesota Legislative Commission on Pensions and Retirement requires that TRA (and Minnesota retirement systems) disclose the sensitivity of valuation results relative to the investment return assumption.

The following table contains the key measures for TRA under the valuation assumption for investment return of 7.0%, along with the results if the assumption were 6.0% or 8.0%. In this analysis, only the investment return assumption is changed. Consequently, there may be inconsistencies between the investment return and other economic assumptions such as inflation or payroll increases. In addition, it should not be assumed that Cavanaugh Macdonald Consulting believes that either assumption (6.0% or 8.0%) would comply with applicable Actuarial Standards of Practice.

	Investment Return Assumption		
	6.00%	7.00%	8.00%
Normal Cost Rate	14.54%	11.10%	8.61%
Amortization of UAAL	12.15%	8.38%	4.65%
Expenses	0.29%	0.29%	0.29%
Total Required Contribution	26.98%	19.77%	13.55%
Contribution Sufficiency/(Deficiency)	(9.74%)	(2.53%)	3.69%
Actuarial Accrued Liability Funding Ratio	67.39%	76.85%	86.82%
Actuarial Accrued Liability (\$B)	\$39.9	\$35.0	\$31.0
Unfunded Actuarial Accrued Liability (\$B)	\$13.0	\$8.1	\$4.1

Note: All calculations are based on the actuarial value of assets.



SECTION V – RISK ASSESSMENT

MORTALITY RISK

The mortality assumption is a significant assumption for valuation results, second only to the investment assumption in most situations. The TRA mortality assumption utilizes a mortality table (with separate rates for males and females, as well as different rates by status) and an improvement scale for how the mortality rates are expected to improve through time. This approach is the current state of the art in retirement actuarial practice, made possible by the increase in computational power over the past 25 years.

The future, however, is not known, and actual mortality improvements may occur at a faster rate than expected, or at a slower rate than expected (or even decline). Although changes in mortality will affect the benefits paid, this assumption is carefully studied during the regular experience studies that TRA conducts so that incremental changes can be made to smoothly reflect unfolding experience.

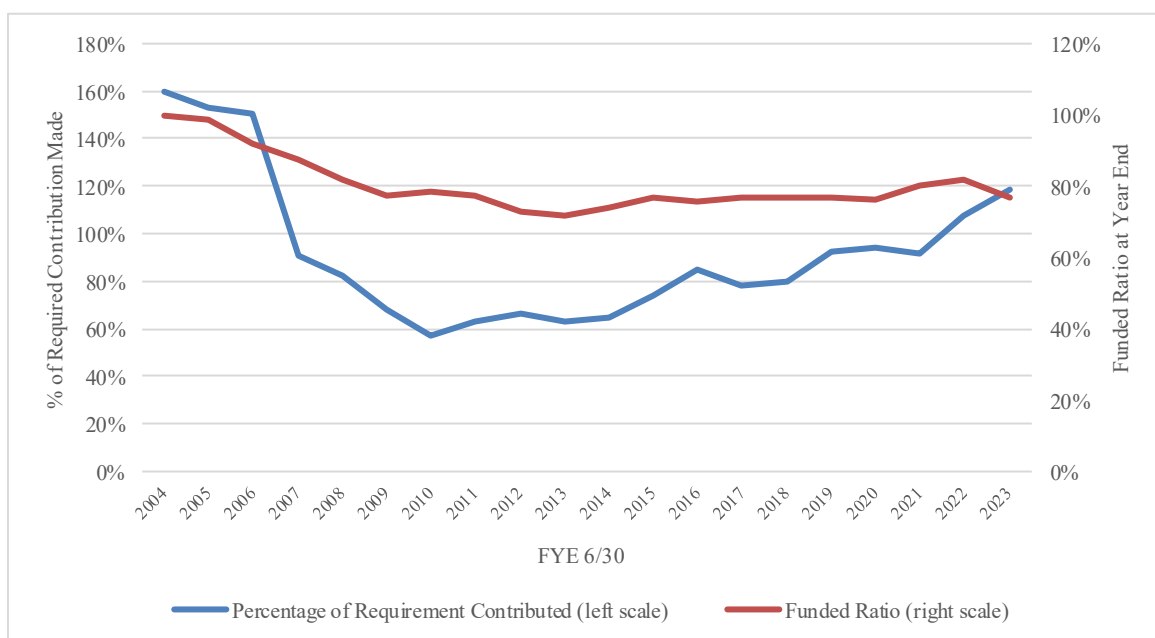
CONTRIBUTION RISK

TRA is primarily funded by member and employer contributions to the trust fund, together with the earnings on those accumulated contributions. The contribution rates are set by state statute and intended to provide the needed amounts to fund the System over time. Each year in the valuation, the Required Contribution Rate is determined, based on TRA's funding policy (also in statute). This rate is the sum of the rates for the normal cost for the plan, the amortization of the UAAL, and the administrative expenses. The difference between this Required Contribution Rate and the Statutory Contribution Rate is determined, resulting in a contribution sufficiency (the Statutory Rate exceeds the Required Contribution Rate) or a deficiency (the Statutory Rate is smaller).

A key risk to TRA's funding is that over time, the Statutory Contribution Rate will be insufficient to accumulate enough funds, with investment income, to fund the promised benefits. The following graph shows two lines: the blue line shows the proportion of the Required Contribution Rate actually made each year for the past 20 years. As can be seen by looking at the scale on the left, through FYE 2006 the Statutory Contribution Rate was at least 100% of the Required Contribution Rate, so more than 100% of the Required Contribution Rate was contributed. From FYE 2007 through FYE 2020, the ratio has been significantly less than 100%, indicating the Statutory Contribution Rate has been less than the Required Contribution Rate. In FYE 2022 and 2023, the Statutory Contribution Rate has again exceeded the Required Contribution Rate.

Also on the graph (with the scale on the right axis) is the funded ratio of the System. While there have been certain events (large financial market drops, the merger of the Minneapolis and Duluth systems into TRA, etc.) that have had an effect on the funded ratio, there is also a noteworthy decline in the funded ratio during the period where the Statutory Contribution Rate was less than the Required Contribution Rate.

SECTION V – RISK ASSESSMENT

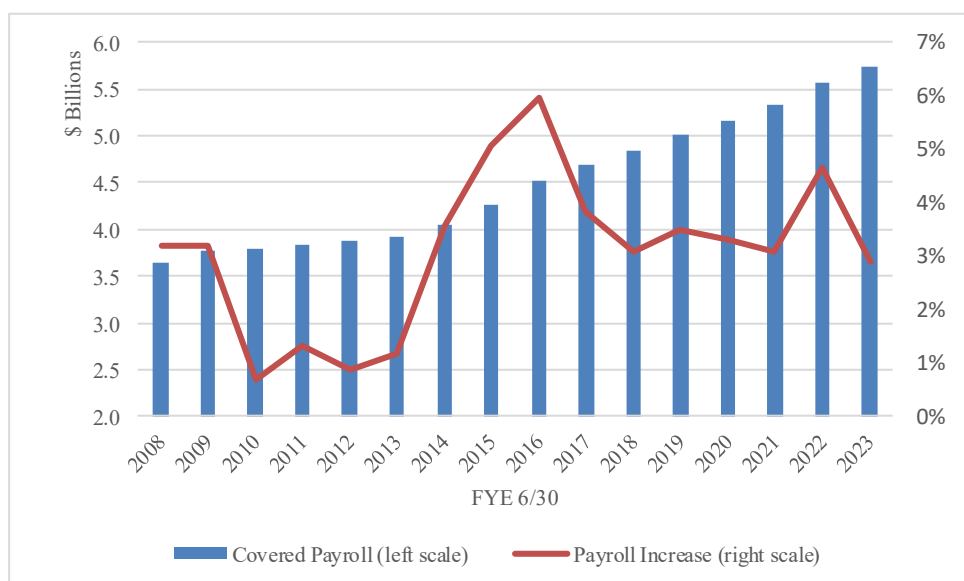


The presence of this risk does not mean that there is an insurmountable problem. For example, benefit and contribution adjustments were made by both the 2010 and the 2018 Legislatures as a way to bring the System's funding into long-term balance and improve its sustainability. The challenge for TRA is that adjustments to address long-term funding require legislative action and the time required to enact such change is outside the control of the Board.

COVERED PAYROLL RISK

The Required Contribution Rate for TRA is calculated under the assumption that total covered payroll will increase over time at a certain rate (currently 3.0% per year). We know that this assumption will not be met exactly every year, because there are many factors that affect the actual pay increases granted by each employer and there are many different employers participating in TRA. The following graph shows actual payroll growth since 2008.

SECTION V – RISK ASSESSMENT



Visually, it is clear that there are years when covered payroll has increased significantly and years when there is little to no change. Sometimes this is a function of external events such as the merger of another school district into TRA (leading to large increases), or a national financial crisis (leading to small increases).

The volatility of covered payroll increases affects the plan's funding in multiple ways. First, lower increases in covered payroll mean that less contribution dollars will be collected, which works against the financial health of the plan. At the same time, if lower covered payroll is the result of lower individual pay increases for active members (rather than a decrease in active membership) this results in an actuarial gain on liabilities since the expected future benefits are lower. The trade-off between these two factors is complex, and so it is not always clear if lower than expected covered payroll helps or hurts the plan's funding. What is important to understand, however, is that actual versus expected covered payroll growth is a source of risk to funding the plan. If actuarial assumptions accurately reflect the average increases over time, then the net consequences should be manageable.



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SECTION VI – ADDITIONAL INFORMATION

This section contains information that may be helpful in understanding the System’s 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 VI – ADDITIONAL INFORMATION

TABLE 13
SUMMARY OF MEMBERSHIP DATA

	<u>July 1, 2023</u>	<u>July 1, 2022</u>
Active members:		
Vested	68,497	68,822
Non-vested	<u>16,486</u>	<u>15,486</u>
Total	84,983	84,308
Pensioners and Beneficiaries	70,344	69,891
Terminated vested members entitled to, but not yet receiving, benefits:	19,418	17,812
Other terminated, non-vested members entitled to a refund of contributions	<u>40,089</u>	<u>38,903</u>
Total	214,834	210,914



SECTION VI – ADDITIONAL INFORMATION

TABLE 14

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)
07/01/94	\$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%
07/01/16	20,194,279	26,716,216	6,521,937	75.59%	4,515,699	144.43%
07/01/17	21,062,789	27,427,702	6,364,913	76.79%	4,688,875	135.74%
07/01/18	22,022,842	28,643,023	6,620,181	76.89%	4,832,917	136.98%
07/01/19	22,466,848	29,246,174	6,779,326	76.82%	5,000,930	135.56%
07/01/20	22,936,908	30,129,180	7,192,272	76.13%	5,166,241	139.22%
07/01/21	24,728,337	30,814,967	6,086,630	80.25%	5,326,108	114.28%
07/01/22	25,925,803	31,615,897	5,690,094	82.00%	5,573,701	102.09%
07/01/23	26,903,914	35,008,293	8,104,379	76.85%	5,735,250	141.31%

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



SECTION VI – ADDITIONAL INFORMATION

TABLE 15

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 Contributions ¹	Percentage Contributed
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 ²	9.05%	3,430,645	177,085	133,389	200,286	150.15%
2007 ³	12.16%	3,532,159	199,869	229,642	209,219	91.11%
2008 ⁴	13.44%	3,645,230	209,592	280,327	231,562	82.60%
2009 ⁵	15.08%	3,761,484	212,043	355,189	240,718	67.72%
2010 ⁶	16.81%	3,787,757	214,909	421,813	242,088	57.39%
2011 ⁷	15.71%	3,838,111	218,024	384,943	244,233	63.45%
2012 ⁸	16.57%	3,871,809	239,834	401,725	266,661	66.38%
2013 ⁹	18.75%	3,917,310	270,708	463,788	290,662	62.67%
2014 ¹⁰	19.41%	4,056,482	294,632	492,731	320,301	65.01%
2015 ¹¹	19.15%	4,261,626	331,905	484,196	358,367	74.01%
2016 ¹²	17.87%	4,515,699	347,256	459,699	390,548	84.96%
2017 ¹³	18.72%	4,688,875	361,175	516,582	403,378	78.09%
2018 ¹⁴	18.43%	4,832,917	374,550	516,157	414,315	80.27%
2019 ¹⁵	17.18%	5,000,930	386,669	472,491	438,887	92.89%
2020	17.18%	5,166,241	396,679	490,881	460,810	93.87%
2021 ¹⁶	17.65%	5,326,108	410,162	529,896	486,669	91.84%
2022	16.33%	5,573,701	428,993	481,192	518,269	107.71%
2023	15.72%	5,735,250	442,448	459,133	544,351	118.56%
2024 ¹⁷	19.77%					

Note: Information prior to 2008 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 shown is the contribution rate stated in the TRA July 1, 2005 actuarial valuation.

³ Actuarially Required Contributions calculated according to parameters of GASB 25 (30-year amortization period), and post-merger of the Minneapolis Teachers' Retirement Fund Association.

⁴ Actuarially Required Contribution Rate prior to change in Asset Valuation Method is 11.58%.

⁵ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 15.36%.

⁶ Actuarially Required Contribution Rate prior to change in Asset Valuation Method is 19.98%.

⁷ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Plan Provisions is 18.91%.

⁸ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 16.91%.

⁹ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 18.15%.

¹⁰ Actuarially Required Contribution Rate prior to change in Plan Provisions is 19.66%.

¹¹ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 17.95%.

Actual Covered Payroll excludes DTRFA payroll of \$44.8 million.

¹² Actuarially Required Contribution Rate prior to DTRFA merger is 17.70%.

¹³ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 17.44%.

¹⁴ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 18.71%.

¹⁵ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Plan Provisions is 18.25%.

¹⁶ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 17.62%.

¹⁷ Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Plan Provisions is 15.42%.



SECTION VI – ADDITIONAL INFORMATION

TABLE 16

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, 2023. The “Retirees” column shows benefits expected to be paid to all other members. This includes those who, as of July 1, 2023, are receiving benefit payments or who terminated employment and are entitled to a deferred benefit.

Year Ending			
June 30	Actives	Retirees	Total
2024	\$ 70,217	\$ 2,000,675	\$ 2,070,892
2025	117,773	1,968,944	2,086,717
2026	160,265	1,938,341	2,098,606
2027	204,910	1,907,499	2,112,409
2028	253,564	1,878,083	2,131,647
2029	307,898	1,850,355	2,158,253
2030	370,379	1,820,587	2,190,966
2031	442,913	1,790,288	2,233,201
2032	526,545	1,757,673	2,284,218
2033	622,138	1,724,414	2,346,552
2034	728,628	1,689,541	2,418,169
2035	844,762	1,653,177	2,497,939
2036	970,627	1,614,253	2,584,880
2037	1,106,076	1,572,223	2,678,299
2038	1,248,587	1,526,133	2,774,720
2039	1,398,048	1,476,664	2,874,712
2040	1,556,050	1,424,832	2,980,882
2041	1,723,020	1,370,294	3,093,314
2042	1,897,899	1,312,898	3,210,797
2043	2,080,333	1,253,379	3,333,712
2044	2,268,674	1,192,622	3,461,296
2045	2,463,908	1,130,275	3,594,183
2046	2,665,423	1,066,310	3,731,733
2047	2,870,205	1,001,984	3,872,189
2048	3,076,337	937,656	4,013,993

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



SECTION VI – ADDITIONAL INFORMATION

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APPENDIX A

SUMMARY STATISTICS

ON MEMBERSHIP DATA



APPENDIX A – MEMBERSHIP DATA

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APPENDIX A – MEMBERSHIP DATA

TABLE 17
RECONCILIATION OF MEMBERS*

	Active Members**	Former Members***	Benefit Recipients****			Total
			Service Retirements	Disability Retirements	Survivors	
Members on 6/30/2022	84,308	56,715	62,976	427	6,488	210,914
New hires	6,137	-	-	-	-	6,137
Transfer from active to inactive	(5,726)	5,726	-	-	-	0
Transfer from inactive to active	1,675	(1,675)	-	-	-	0
Return from zero balance	441	5	-	-	-	446
Return from disability	-	-	-	-	-	0
Refunded	(345)	(750)	-	-	-	(1,095)
Refunded (non-repayable)	(12)	(11)	-	-	-	(23)
Retirements	(1,484)	(484)	1,953	(39)	-	(54)
Benefits began	-	-	-	51	646	697
Benefits ended	-	-	-	-	(40)	(40)
Deaths	(26)	(56)	(1,716)	(10)	(399)	(2,207)
Adjustments	15	37	6	-	1	59
Net changes	675	2,792	243	2	208	3,920
Members on 6/30/2023	84,983	59,507	63,219	429	6,696	214,834

* 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 1 Basic and 84,982 Coordinated members.

*** Former members include 4 Basic and 59,503 Coordinated members.

**** Benefit recipients include 2,415 Basic members and 67,929 Coordinated members.

Former Member Statistics

	Vested	Non-vested	Total
Number	19,418	40,089	59,507
Average Age	48.5	48.0	48.2
Average Service (years)	8.0	0.8	3.1
Average annual benefits, with applicable future augmentation and Combined Service Annuity load	\$8,910	N/A	N/A
Average refund value, with Combined Service Annuity load	\$41,028	\$2,900	\$15,342

Former Member Statistics (Basic)

	Vested	Non-vested	Total
Number	2	2	4
Average Age	73.5	61.0	67.3
Average Service (years)	15.5	0.0	7.8
Average annual benefits, with applicable future augmentation and Combined Service Annuity load	\$48,998	N/A	N/A
Average refund value, with Combined Service Annuity load	\$172,131	\$323	\$86,227

Former Member Statistics (Coordinated)

	Vested	Non-vested	Total
Number	19,416	40,087	59,503
Average Age	48.5	48.0	48.2
Average Service (years)	8.0	0.8	3.1
Average annual benefits, with applicable future augmentation and Combined Service Annuity load	\$8,906	N/A	N/A
Average refund value, with Combined Service Annuity load	\$41,015	\$2,900	\$15,337



APPENDIX A – MEMBERSHIP DATA

TABLE 18
DISTRIBUTION OF ACTIVE MEMBERS*

Age	Years of Service as of July 1, 2023										Total
	<3**	3-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 +	
<25	2,825	78									2,903
Avg. Earnings	35,931	51,593									36,352
25-29	3,757	2,976	2,145								8,878
Avg. Earnings	39,945	51,596	57,570								48,109
30-34	2,095	1,371	5,472	1,491							10,429
Avg. Earnings	40,393	52,989	61,711	70,955							57,603
35-39	1,807	942	3,173	4,350	1,171						11,443
Avg. Earnings	36,765	57,266	64,501	74,574	83,296						65,278
40-44	1,793	782	2,314	2,482	4,507	1,189					13,067
Avg. Earnings	35,740	56,464	66,920	74,718	85,338	91,895					72,122
45-49	1,268	586	1,581	1,449	2,073	4,108	995				12,060
Avg. Earnings	33,920	54,715	65,211	75,552	83,003	91,362	95,012				77,078
50-54	984	423	1,158	1,175	1,330	2,193	3,692	782			11,737
Avg. Earnings	31,608	53,493	64,840	74,359	80,656	87,688	93,085	96,561			79,657
55-59	727	288	726	730	901	1,146	1,817	2,093	155		8,583
Avg. Earnings	30,315	50,602	62,317	73,227	78,674	84,784	89,618	93,659	96,256		78,893
60-64	554	174	416	399	513	666	681	558	278	30	4,269
Avg. Earnings	22,521	41,647	56,346	67,337	76,318	82,833	87,409	91,000	92,723	87,749	70,991
65-69	370	70	146	107	114	100	83	61	33	28	1,112
Avg. Earnings	14,124	31,109	48,653	70,380	78,274	86,003	91,190	91,576	96,071	90,266	52,530
70 +	306	38	53	21	12	19	8	8	9	28	502
Avg. Earnings	8,665	21,037	34,658	41,602	69,147	78,500	75,564	89,198	96,351	98,913	26,768
Total	16,486	7,728	17,184	12,204	10,621	9,421	7,276	3,502	475	86	84,983
Avg. Earnings	35,377	52,770	62,645	73,846	82,976	89,088	91,911	93,837	94,177	92,204	67,535

* Active members include 1 Basic and 84,982 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, 2023 as reported by the Teachers Retirement Association of Minnesota.



APPENDIX A – MEMBERSHIP DATA

TABLE 19
DISTRIBUTION OF SERVICE RETIREMENTS
(TOTAL)

Age	Years Since Retirement as of July 1, 2023							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<55								
Avg. Benefit								
55-59	392	986	3					1,381
Avg. Benefit	45,628	40,006	38,114					41,598
60-64	606	3,482	1,545	3				5,636
Avg. Benefit	37,377	38,219	29,783	20,401				35,807
65-69	462	3,765	4,764	1,946	15			10,952
Avg. Benefit	22,242	25,439	28,346	25,820	32,875			26,647
70-74	54	936	4,839	5,983	3,479	103	1*	15,395
Avg. Benefit	20,560	20,303	24,269	28,159	26,923	40,377	1,777	26,233
75-79	11	116	829	3,385	4,881	4,267	136	13,625
Avg. Benefit	34,346	18,811	21,416	23,934	27,430	26,439	42,680	25,970
80-84	2	15	86	463	1,721	4,308	2,287	8,882
Avg. Benefit	54,089	33,472	21,598	20,519	23,499	28,234	30,827	27,532
85-89	1	4	13	52	173	1,083	3,422	4,748
Avg. Benefit	122,789	29,004	19,382	15,105	17,810	27,365	37,550	34,223
90 +		1	1	8	28	72	2,490	2,600
Avg. Benefit		30,271	3,957	20,521	12,559	28,833	38,080	37,479
Total	1,528	9,305	12,080	11,840	10,297	9,833	8,336	63,219
Avg. Benefit	34,379	31,181	26,364	26,204	26,408	27,491	35,943	28,682

* 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 19A
DISTRIBUTION OF SERVICE RETIREMENTS
(BASIC)

Age	Years Since Retirement as of July 1, 2023							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<55								
Avg. Benefit								
55-59								
Avg. Benefit								
60-64								
Avg. Benefit								
65-69		1	3	5	3			12
Avg. Benefit		9,457	82,307	63,526	66,915			64,563
70-74		3	10	28	50	33		124
Avg. Benefit		8,261	30,128	39,467	60,353	59,850		51,805
75-79		1	9	42	69	193	58	372
Avg. Benefit		29,847	46,237	36,315	46,329	62,448	52,263	54,440
80-84			1	6	28	111	146	292
Avg. Benefit			109,055	62,929	54,624	55,881	61,641	58,967
85-89			1	2	9	48	391	451
Avg. Benefit			82,081	13,529	54,393	52,370	77,175	73,809
90 +					4	8	528	540
Avg. Benefit					41,766	78,239	62,014	62,105
Total		5	24	83	163	393	1,123	1,791
Avg. Benefit		12,817	48,145	40,393	52,768	59,466	66,741	62,252

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 19B
DISTRIBUTION OF SERVICE RETIREMENTS
(COORDINATED)

Age	Years Since Retirement as of July 1, 2023							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<55								
Avg. Benefit								
55-59	392	986	3					1,381
Avg. Benefit	45,628	40,006	38,114					41,598
60-64	606	3,482	1,545	3				5,636
Avg. Benefit	37,377	38,219	29,783	20,401				35,807
65-69	462	3,764	4,761	1,941	12			10,940
Avg. Benefit	22,242	25,443	28,312	25,723	24,365			26,605
70-74	54	933	4,829	5,955	3,429	70	1*	15,271
Avg. Benefit	20,560	20,342	24,257	28,106	26,436	31,197	1,777	26,025
75-79	11	115	820	3,343	4,812	4,074	78	13,253
Avg. Benefit	34,346	18,715	21,143	23,779	27,159	24,733	35,555	25,170
80-84	2	15	85	457	1,693	4,197	2,141	8,590
Avg. Benefit	54,089	33,472	20,569	19,962	22,984	27,502	28,726	26,464
85-89	1	4	12	50	164	1,035	3,031	4,297
Avg. Benefit	122,789	29,004	14,157	15,168	15,803	26,206	32,438	30,068
90 +		1	1	8	24	64	1,962	2,060
Avg. Benefit		30,271	3,957	20,521	7,692	22,658	31,639	31,024
Total	1,528	9,300	12,056	11,757	10,134	9,440	7,213	61,428
Avg. Benefit	34,379	31,191	26,321	26,104	25,984	26,160	31,148	27,703

* 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 20

DISTRIBUTION OF SURVIVORS (TOTAL)

Age	Years Since Death as of July 1, 2023							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<45	13	81	42	25	6	1	1	169
Avg. Benefit	14,610	20,960	15,937	14,566	16,945	505	1,220	17,897
45-49	2	30	8	5	2	3	3	53
Avg. Benefit	8,835	20,215	16,811	16,395	3,860	8,322	24,231	17,848
50-54	11	45	31	15	9	5	1	117
Avg. Benefit	18,079	20,732	12,825	19,343	12,955	14,302	35,545	17,463
55-59	11	52	40	17	12	3	5	140
Avg. Benefit	25,473	23,661	15,502	13,518	17,145	13,273	35,334	19,876
60-64	25	80	62	31	15	5	7	225
Avg. Benefit	23,822	25,292	19,717	17,319	15,666	25,915	18,557	21,657
65-69	25	145	116	55	25	18	7	391
Avg. Benefit	26,745	22,775	20,730	18,975	15,053	19,483	14,046	21,086
70-74	61	265	207	119	60	20	19	751
Avg. Benefit	24,144	22,514	23,823	22,171	21,755	17,198	16,269	22,593
75-79	118	424	337	193	108	60	39	1,279
Avg. Benefit	25,753	24,517	25,135	24,661	22,837	21,307	21,445	24,429
80-84	111	458	338	202	148	87	85	1,429
Avg. Benefit	26,689	29,077	27,623	28,658	29,884	26,819	26,735	28,295
85-89	76	384	313	169	119	78	100	1,239
Avg. Benefit	31,473	34,684	34,421	36,136	37,045	34,502	32,208	34,634
90 +	35	193	207	162	109	75	122	903
Avg. Benefit	41,839	36,554	38,372	38,076	40,638	40,140	36,294	38,204
Total	488	2,157	1,701	993	613	355	389	6,696
Avg. Benefit	27,216	27,745	27,574	28,206	29,487	28,942	29,771	28,072

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 20A

DISTRIBUTION OF SURVIVORS (BASIC)

Age	Years Since Death as of July 1, 2023							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<45		2		2			1	5
Avg. Benefit		39,390		6,948			1,220	18,779
45-49		2						2
Avg. Benefit		17,166						17,166
50-54						1		1
Avg. Benefit						19,940		19,940
55-59		2			1	1	3	7
Avg. Benefit		63,288			26,823	3,469	39,740	39,441
60-64		2					2	4
Avg. Benefit		22,087					28,904	25,495
65-69		4	2	1		4	2	13
Avg. Benefit		26,027	51,543	2,702		35,728	26,634	31,236
70-74	1		5	1	1	1	2	11
Avg. Benefit	38,331		37,905	28,660	69,876	51,051	8,647	35,885
75-79	3	12	13	6	3	2	1	40
Avg. Benefit	73,685	43,147	48,727	52,584	32,595	11,174	91,547	47,486
80-84	4	29	22	16	11	6	10	98
Avg. Benefit	46,369	63,685	55,918	60,291	51,142	47,335	56,196	57,507
85-89	12	60	47	19	25	14	21	198
Avg. Benefit	55,282	64,230	66,234	68,759	56,279	66,161	49,868	62,208
90 +	10	42	52	38	37	27	39	245
Avg. Benefit	68,041	63,856	58,257	58,774	62,195	54,671	50,277	58,626
Total	30	155	141	83	78	56	81	624
Avg. Benefit	59,622	59,925	58,856	58,617	57,246	52,252	48,276	56,959

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 20B

DISTRIBUTION OF SURVIVORS (COORDINATED)

Age	Years Since Death as of July 1, 2023							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<45	13	79	42	23	6	1		164
Avg. Benefit	14,610	20,493	15,937	15,229	16,945	505		17,870
45-49	2	28	8	5	2	3	3	51
Avg. Benefit	8,835	20,433	16,811	16,395	3,860	8,322	24,231	17,875
50-54	11	45	31	15	9	4	1	116
Avg. Benefit	18,079	20,732	12,825	19,343	12,955	12,892	35,545	17,442
55-59	11	50	40	17	11	2	2	133
Avg. Benefit	25,473	22,076	15,502	13,518	16,266	18,175	28,724	18,847
60-64	25	78	62	31	15	5	5	221
Avg. Benefit	23,822	25,374	19,717	17,319	15,666	25,915	14,419	21,587
65-69	25	141	114	54	25	14	5	378
Avg. Benefit	26,745	22,683	20,189	19,277	15,053	14,842	9,011	20,737
70-74	60	265	202	118	59	19	17	740
Avg. Benefit	23,908	22,514	23,474	22,116	20,940	15,417	17,166	22,395
75-79	115	412	324	187	105	58	38	1,239
Avg. Benefit	24,503	23,975	24,188	23,765	22,558	21,656	19,600	23,685
80-84	107	429	316	186	137	81	75	1,331
Avg. Benefit	25,953	26,738	25,653	25,936	28,177	25,299	22,807	26,144
85-89	64	324	266	150	94	64	79	1,041
Avg. Benefit	27,009	29,212	28,800	32,004	31,930	27,577	27,514	29,390
90 +	25	151	155	124	72	48	83	658
Avg. Benefit	31,358	28,960	31,701	31,734	29,560	31,966	29,724	30,601
Total	458	2,002	1,560	910	535	299	308	6,072
Avg. Benefit	25,093	25,253	24,747	25,432	25,440	24,576	24,905	25,103

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 21
DISTRIBUTION OF DISABILITY RETIREMENTS

Age	Years Disabled as of July 1, 2023							Total
	<1	1-4	5-9	10-14	15-19	20-24	25 +	
<45	1	12	8	2				23
Avg. Benefit	10,337	15,471	11,032	4,949				12,789
45-49		7	8	4				19
Avg. Benefit		15,366	17,226	9,445				14,902
50-54	6	23	27	7	6	1		70
Avg. Benefit	33,869	26,896	21,687	12,685	6,534	1,905		21,961
55-59	7	52	36	14	9	5	2	125
Avg. Benefit	25,795	32,852	26,720	14,218	9,329	8,415	4,605	25,481
60-64	1	47	58	33	15	7	3	164
Avg. Benefit	46,695	28,904	26,366	19,815	15,589	10,115	7,075	23,867
65 +		12	9	3	4			28
Avg. Benefit		26,890	24,538	13,781	19,087			23,615
Total	15	153	146	63	34	13	5	429
Avg. Benefit	29,387	28,113	24,134	16,361	12,745	8,830	6,087	23,019

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.



APPENDIX A – MEMBERSHIP DATA

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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>
	11.25%	16.39%
	Employer rate will increase to 17.14% and the member rate will increase to 11.50% effective July 1, 2025.	
	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.	
<i>Salary</i>	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.	
<i>Average salary</i>	Average of the five highest successive years of Salary.	
<i>Retirement</i>		
<u>Normal retirement</u>		
<i>Age/Service requirements</i>	Age 60, or any age with 30 years of Teaching Service	
<i>Amount</i>	2.50% of Average Salary for each year of Teaching Service.	



APPENDIX B - SUMMARY OF PLAN PROVISIONS

BASIC MEMBERS

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 1.0 percent for January, 2019 through January, 2023. Beginning January 1, 2024, this amount will increase in 0.1% step increments until the COLA reaches 1.5%. 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.

Beginning July 1, 2024, eligibility for receipt of first COLA will be changed to Normal Retirement Age. Members who retire under rule of 90 or are least age 62 with 30 years of service are exempt from this delay in COLA.



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
<i>Amount</i>	Death before retirement. 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 3.00% 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;
- (c) 2.00% beginning July 1, 2012 until the earlier of June 30, 2019 and when the annuity begins; and
- (d) 0.00% beginning July 1, 2019.

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.

<i>Plan year</i>	July 1 through June 30				
<i>Eligibility</i>	<p>A public school or Minnesota State 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 statewide are covered by TRA.</p> <p>No Minnesota State teacher will become a new Member unless that person elects coverage as defined by Minnesota Statutes under Chapter 354B.</p>				
<i>Contributions</i>	<p>Shown as a percent of Salary:</p> <table><tr><td><u>Member</u></td><td><u>Employer</u></td></tr><tr><td>7.75%</td><td>8.75%</td></tr></table> <p>Employer also contributes Supplemental amount equal to 3.64% of Salary for members employed by Special School District #1 (Minneapolis Schools) only.</p> <p>Employer rate will increase to 9.50% and the member rate will increase to 8.00% effective July 1, 2025.</p> <p>Employee contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).</p>	<u>Member</u>	<u>Employer</u>	7.75%	8.75%
<u>Member</u>	<u>Employer</u>				
7.75%	8.75%				
<i>Teaching service</i>	<p>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.</p>				
<i>Salary</i>	<p>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.</p>				
<i>Average salary</i>	<p>Average of the five highest successive years of Salary. Average salary is based on all Allowable Service if less than five years.</p>				



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

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.

Effective July 1, 2025, the normal retirement age will decrease to age 65 with 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 65). 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 their normal retirement age. Beginning July 1, 2019, 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. Beginning July 1, 2019, the augmentation adjustment will be phased out.



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

Retirement(continued)

Early Retirement Reduction Factors

First hired before July 1, 1989:

Benefit reductions for retiring prior to meeting normal retirement definitions apply. Members who reach age 62 with 30 years of service are eligible for a more favorable set of reduction factors than members who do not reach age 62 and 30 years of service. An extract of the reduction table is presented below:

Age 62	10.40%
Age 63	6.64%
Age 64	3.18%
Age 65	0.00%

Members who do not reach age 62 with 30 years of service credit are eligible for a different set of factors. When fully implemented on July 1, 2024, the following reduction factors will be applied to an eligible person with the normal retirement age of 65:

Age 55	58.0%	Age 61	28.0%
Age 56	54.0%	Age 62	21.0%
Age 57	50.0%	Age 63	14.0%
Age 58	46.0%	Age 64	7.0%
Age 59	42.0%	Age 65	0.0%
Age 60	35.0%		

First hired after June 30, 1989:

Reduction factors for members of the normal retirement age of 66 first hired from July 1, 1989 through June 30, 2006 and who reach age 62 with 30 years of service credit:

Age 62	14.46%
Age 63	10.40%
Age 64	6.64%
Age 65	3.18%
Age 66	0.00%



APPENDIX B - SUMMARY OF PLAN PROVISIONS

COORDINATED MEMBERS

Retirement(continued)

When fully implemented on July 1, 2024, the following reduction factors will be applied to an eligible person with the normal retirement age of 66 first hired from July 1, 1989 through June 30, 2006 and who do not reach age 62 with 30 years of service credit:

Age 55	65.0%	Age 61	35.0%
Age 56	61.0%	Age 62	28.0%
Age 57	57.0%	Age 63	21.0%
Age 58	53.0%	Age 64	14.0%
Age 59	49.0%	Age 65	7.0%
Age 60	42.0%	Age 66	0.0%

Reduction factors for members of the normal retirement age of 66 first hired on or after July 1, 2006 and who reach age 62 with 30 years of service credit:

Age 62	16.11%
Age 63	11.70%
Age 64	7.55%
Age 65	3.65%
Age 66	0.00%

When fully implemented on July 1, 2024, the following reduction factors will be applied to an eligible person with the normal retirement age of 66 first hired after June 30, 2006 and who do not reach age 62 with 30 years of service credit:

Age 55	65.0%	Age 61	35.0%
Age 56	61.0%	Age 62	28.0%
Age 57	57.0%	Age 63	21.0%
Age 58	53.0%	Age 64	14.0%
Age 59	49.0%	Age 65	7.0%
Age 60	42.0%	Age 66	0.0%

Effective July 1, 2025, the normal retirement age will decrease to age 65 and these rates will adjust.

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 1.0 percent for January, 2019 through January, 2023. Beginning January 1, 2024, this amount will increase in 0.1% step increments until the COLA reaches 1.5%. 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.

Beginning July 1, 2024, eligibility for receipt of first COLA will be changed to Normal Retirement Age. Members who retire under rule of 90 or are least age 62 with 30 years of service are exempt from this delay in COLA.

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 3.00% 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;
- (c) 2.00% from July 1, 2012 forward until the earlier of June 30, 2019 and when the annuity begins; and
- (d) 0.00% from July 1, 2019 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, increased by 2.00% from July 1, 2012 to July 1, 2019 and no increase going 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, 2048, assuming payroll increases of 3.00% per year (effective with the 2018 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 FY24:

<i>1993 Legislation:</i>	Supplemental contributions from the City of Minneapolis in the amount of \$1,250,000, from Minneapolis Schools in the amount of \$1,250,000 and from the State in the amount of \$2,500,000 (\$5,000,000 total) annually are assumed to be made until the amortization date of June 30, 2048 or full actuarial funding is achieved, whichever is earlier. Amount is fixed in statute.
<i>1996 Legislation:</i>	Supplemental contributions from the State in the amount of \$3,256,410 annually are assumed to be made until the amortization date of June 30, 2048 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 from the State in the amount of \$12,954,000 annually are assumed to be made until the amortization date of June 30, 2048 or full actuarial funding is achieved, whichever is earlier. Amount is fixed in statute.
<i>2014 Legislation:</i>	Supplemental contributions from the State in the amount of \$14,377,000 annually are assumed to be made until the amortization date of June 30, 2048 or full actuarial funding is achieved, whichever is earlier. 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 2023, the limit is \$265,000.

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 2023, the limit is \$330,000. 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 used are based on the 2019 experience study, other than the investment return assumption which was reduced from 7.50% to 7.00% by the 2023 Legislature. The proposed demographic assumption changes recommended in the August 2, 2023 experience study, presented to the board this summer, are awaiting the LCPR's approval.

The Allowance for Combined Service Annuity was based on the recommendation of the actuary for the Legislative Commission on Pensions and Retirement (LCPR). We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of this assignment, so we have relied on the LCPR actuary's findings.

<i>Investment Return</i>	7.00% compounded annually.
<i>Future post-retirement adjustments</i>	1.0% for January, 2019 through January, 2023, then increasing by 0.1% each year up to 1.5% annually.
<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>	3.00% per year
<i>Future Service</i>	Members are assumed to earn future service at a full-time rate.
<i>Mortality:</i>	
<i>Pre-retirement</i>	RP 2014 White Collar Employee Table, male rates set back 5 years and female rates set back 7 years. Generational projection uses the MP-2015 scale.
<i>Post-retirement</i>	RP 2014 White Collar Annuitant Table, male rates set back 3 years and female rates set back 3 years, with further adjustments of the rates to fit actual TRA experience. Generational projection uses the MP-2015 scale.
<i>Post-disability</i>	RP 2014 Disabled Retiree Mortality, without adjustment or generational improvement
<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>	Rates vary by service based on actual plan experience, as shown in the rate table.				
<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 are assumed to 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 vested former members are increased by 7.00% and liabilities for non-vested former members are increased by 9.00% 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 present 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 their first unreduced retirement age.				
<i>Form of payment</i>	<p>Married members are assumed to elect subsidized joint and survivor form of annuity as follows:</p> <table> <tr> <td>Males:</td><td> 10.0% elect 50% J&S option 10.0% elect 75% J&S option 60.0% elect 100% J&S option 20.0% elect Straight Life option </td></tr> <tr> <td>Females:</td><td> 13.5% elect 50% J&S option 6.5% elect 75% J&S option 38.0% elect 100% J&S option 42.0% elect Straight Life 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:	10.0% elect 50% J&S option 10.0% elect 75% J&S option 60.0% elect 100% J&S option 20.0% elect Straight Life option	Females:	13.5% elect 50% J&S option 6.5% elect 75% J&S option 38.0% elect 100% J&S option 42.0% elect Straight Life option
Males:	10.0% elect 50% J&S option 10.0% elect 75% J&S option 60.0% elect 100% J&S option 20.0% elect Straight Life option				
Females:	13.5% elect 50% J&S option 6.5% elect 75% J&S option 38.0% elect 100% J&S option 42.0% elect Straight Life 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, 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:

Average salary	\$45,500
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.

Termination Rates

Service	Males	Females
Less than 1	32.00%	29.00%
1	14.00%	12.00%
2	10.00%	10.00%
3	7.50%	8.00%
4	5.75%	6.50%
5	5.00%	5.25%
6	4.60%	4.00%
7	4.10%	3.50%
8	2.80%	3.00%
9	2.30%	2.50%
10	2.00%	2.10%
15	1.10%	1.10%
20	0.60%	0.60%
25	0.50%	0.50%
30	0.50%	0.50%
Over 30	0.00%	0.00%



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Age	Rate (%)			
	Pre-retirement		Disability	
	Mortality*			
	Male	Female	Male	Female
20	0.022	0.013	0.00	0.00
25	0.029	0.013	0.00	0.00
30	0.034	0.014	0.00	0.00
35	0.032	0.017	0.01	0.01
40	0.037	0.022	0.03	0.03
45	0.044	0.029	0.05	0.05
50	0.068	0.045	0.10	0.10
55	0.118	0.076	0.16	0.16
60	0.196	0.121	0.25	0.25
65	0.329	0.177	0.00	0.00

*Rates shown are for 2014, the base year of the tables.

Age	Annuitant Mortality Rates (%)			
	Retirement *		Disability	
	Male	Female	Male	Female
55	0.267	0.196	2.337	1.448
60	0.353	0.267	2.660	1.700
65	0.486	0.430	3.169	2.086
70	0.945	0.706	4.035	2.820
75	2.015	1.352	5.429	4.105
80	4.126	2.682	7.662	6.104
85	7.358	5.456	11.330	9.042
90	13.560	9.947	17.301	13.265
95	24.351	18.062	24.717	19.588
100	38.292	29.731	32.672	27.819

* Rates shown are for 2014, the base year of the tables.



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Summary of Actuarial Assumptions *(continued)*

Service	Salary Scale	
	Select	Ultimate
	Salary Increase Before July 1, 2028	Salary Increase After June 30, 2028
1	8.85%	9.25%
2	7.10%	7.50%
3	6.60%	7.00%
4	6.35%	6.75%
5	6.35%	6.75%
6	6.20%	6.60%
7	6.05%	6.45%
8	5.90%	6.30%
9	5.75%	6.15%
10	5.60%	6.00%
11	5.35%	5.75%
12	5.10%	5.50%
13	4.85%	5.25%
14	4.60%	5.00%
15	4.35%	4.75%
16	4.10%	4.50%
17	3.85%	4.25%
18	3.65%	4.05%
19	3.55%	3.95%
20	3.45%	3.85%
21	3.35%	3.75%
22	3.25%	3.65%
23	3.15%	3.55%
24	3.05%	3.45%
25	2.95%	3.35%
26 or more	2.85%	3.25%



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

<u>Age</u>	Retirement Rate (%)					
	Coordinated Members				Basic Members	
	Tier 1	Tier 1	Tier 2	Tier 2	Eligible for	Not Eligible for
	<u>Early</u>	<u>Unreduced</u>	<u>Early</u>	<u>Unreduced</u>	<u>30 and Out Provision</u>	<u>30 and Out Provision</u>
55	5	35	5		40	5
56	10	35	5		40	5
57	10	35	5		40	5
58	10	35	5		40	5
59	14	35	5		40	5
60	17	35	6		25	25
61	20	35	6		25	25
62	25	35	10		25	25
63	25	35	6		25	25
64	25	35	15		25	25
65		40		40	40	40
66		35		35	40	40
67		30		30	40	40
68		30		25	40	40
69		30		25	40	40
70		35		35	60	60
71-74		100		100	60	60
75-79		100		100	60	100
80 & Over		100		100	100	100

Coordinated Tier 2 Members age 62 or older with 30 or more years of service have 10% added to their early retirement rates.

Note: These retirement rates reflect the change in the Tier 2 normal retirement age effective July 1, 2025. The assumed retirement rates for members who retire before July 1, 2025 can be found in the June 30, 2022 actuarial valuation report.



APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

*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.