Teachers Retirement Association of Minnesota

Actuarial Valuation
As of July 1, 2024

Submitted: November 20, 2024

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November 20, 2024

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, 2024. The major findings of the actuarial valuation are contained in this report, which reflects the benefit provisions in place on July 1, 2024. Since the prior valuation, there have been several changes that affect the current valuation results including:

- The 2024 Omnibus Pensions and Retirement Bill (HF 5040/SF 4643) lowered the normal retirement age for Tier 2 members from 66 to 65 effective July 1, 2024 (previously July 1, 2025) and provided for a one-time State appropriation of $28.46 million to cover the cost.
- HF 3100, appropriated $176,166,838 to TRA, payable on October 1, 2023 to provide for a one-time lump-sum COLA for retired members as well as pay down the unfunded actuarial accrued liability
    - $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 provision in Tax Finance & Policy bill, HF 1938, to extend the amortization period from 2048 to 2053 effective July 1, 2025 was rescinded.
- The quadrennial experience study was completed. The demographic assumption changes are first reflected in the current valuation after being approved by the LCPR.

The changes discussed above impacted the benefit structure as well as the actuarial assumptions used in the current valuation. These changes 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.

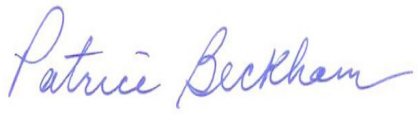
The statutory benefits of the System are reflected in the actuarially calculated contribution rates which are developed using the Entry Age Normal (EAN) cost method. An asset smoothing method is used for actuarial valuation purposes. Gains and losses are reflected in the Unfunded Actuarial Accrued Liability 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, Pat and Brent meet the requirements of "approved actuary" under Minnesota Statutes, Section 356.215, Subdivision 1, Paragraph (c).

Respectfully submitted,



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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, 2024 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, 2023 actuarial valuation that impacted the results of the July 1, 2024 actuarial valuation. These include changes to the actuarial assumptions and benefit provisions. The 2023 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 demographic assumption changes based on our quadrennial experience study report, dated August 2, 2023, have been approved by the Legislative Commission on Pensions and Retirement (LCPR). These changes include:

- Updating the assumed mortality tables for active employees, healthy retirees, disabled retirees, and contingent beneficiaries to Pub2010 family of tables.
- Increasing retirement rates for some of the tier 2 early retirement ages and adjusting some of the unreduced retirement rates for both tiers to better match the observed experience.
- Adjusting the probability that new female retirees elect either the Straight Life Annuity or 100% Joint & Survivor Annuity to better match the observed experience.
- Reducing termination rates in the first ten years of employment and slightly increasing termination rates in years 16 to 25 to better match the observed experience.
- Decreasing disability rates beyond age 45 by 15% to reflect the continued lower than expected observations.

The 2024 Omnibus Pensions and Retirement Bill (HF 5040/SF 4643) lowered the normal retirement age for Tier 2 members from 66 to 65 effective July 1, 2024 instead of July 1, 2025 and provided for a one-time State appropriation of $28.46 million to cover the cost. However, the State appropriation was not received until August, 2024, so this change increased the UAAL as of July 1, 2024, and there will be a decrease next year due to the appropriations.

In addition to other changes, the 2023 Tax Finance & Policy bill (HF 1938) extended the amortization period from 2048 to 2053 effective July 1, 2025. This change has since been rescinded and the amortization date will remain in 2048. This did not have an impact on the current valuation results.

The following table shows a summary of the cost impact on the July 1, 2024 valuation results due to the changes since the prior valuation discussed earlier ($ in thousands).

	Before Changes	HF 3100 Contribution	Assumption Changes	Tier 2 NRA 65
Unfunded AAL (UAAL) **Impact**	$8,161,350	$8,008,753 **-$152,597**	$7,099,429 **-$909,324**	$7,124,000 **+$24,571**
Funded Ratio **Impact**	77.6%	78.0% **+0.4%**	80.0% **+2.0%**	79.9% **-0.1%**
Total Required Contribution **Impact**	19.76%	19.61% **-0.15%**	18.44% **-1.17%**	18.46% **+0.02%**
Contribution (Deficiency)/Sufficiency	(2.55%)	(2.40%)	(1.23%)	(1.25%)
Ultimate (Deficiency)/Sufficiency*	(1.55%)	(1.40%)	(0.23%)	(0.25%)

* Reflects contribution rate increases of 0.75% for employers and 0.25% for employees effective July 1, 2025.

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. Overall, the changes to the actuarial assumptions and plan provisions do not increase the UAAL. Therefore, the UAAL amortization date is unchanged and remains June 30, 2048 in the July 1, 2024 valuation.

In addition to all 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, 2024, 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, 2024 is $7.124 billion, compared to an expected UAAL of $7.259 billion. The favorable experience of $135 million was the net result of an experience gain of $409 million on the actuarial value of assets and an experience loss of $273 million on the System's liabilities. The rate of return on the market value of assets for fiscal year 2024 was +12.3%, as reported by the State Board of Investment. Due to the application of the asset smoothing method, the rate of return on the actuarial value of assets was +8.6%, resulting in an experience gain on assets. The primary factor affecting the net liability loss was salary losses from actual salary increases that were larger than expected by the assumption.

A summary of the key valuation results from the July 1, 2024 actuarial valuation, compared to the July 1, 2023 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, 2024	July 1, 2023
Total Required Contribution Rate (Chapter 356)	18.46%	19.77%
Employer Contributions	8.91%	8.91%
Employee Contributions	7.75%	7.75%
Direct Aid (Chapters 354 and 423A)	0.55%	0.58%
Sufficiency/(Deficiency)	(1.25%)	(2.53%)
Unfunded Actuarial Accrued Liability ($M)	$7,124	$8,104
Funded Ratio (Actuarial Assets)	79.90%	76.85%

The prior valuation showed that there was a contribution deficiency of 2.53% of pay. Due to a combination of factors, including the favorable investment experience and adopting the new set of demographic assumptions, the contribution deficiency decreased to 1.25% of pay in the current valuation. Effective July 1, 2025, the employer contribution rate will increase by 0.75% and the employee contribution rate will increase by 0.25%, resulting in an ultimate contribution deficiency of 0.25%.

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, 2023 and July 1, 2024. The components are examined in the following discussion.

ASSETS

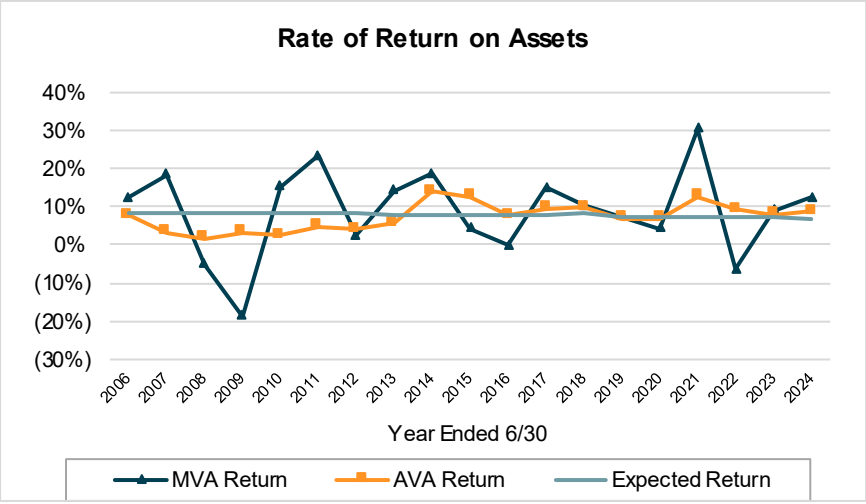
As of June 30, 2024, TRA had net assets of $29.092 billion, as measured on a market value basis. This represents a $2.340 billion increase from the prior year.

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, 2024 was $28.323 billion, an increase of $1.419 billion from the prior valuation. The components of change in the asset values are shown in the following table:

($ in millions)	Actuarial Value	Market Value
Net Assets, June 30, 2023	$26,904	$26,752
- Total Contributions and State Aid	1,237	1,237
- Benefit Payments and Administrative Expenses	(2,098)	(2,098)
- Investment Income	2,280	3,201
Net Assets, June 30, 2024	$28,323	$29,092
Rate of Return	8.6%	12.3%

SECTION 1 – EXECUTIVE SUMMARY

The Minnesota State Board of Investment reported a rate of return of +12.3% on the market value of assets for fiscal year 2024. 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 +8.6%. Because this rate of return was higher than the assumed rate of return (7.0% for fiscal year 2024), an actuarial gain of $409 million occurred. Please see Section 2 of this report for more detailed information on the market and actuarial value of assets.



Market value returns have been very volatile. An asset smoothing method is used to calculate the actuarial value of assets that recognizes 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 gain (actuarial value of assets minus the market value) is $770 million as of July 1, 2024. Absent unfavorable investment experience, the deferred asset gains are expected to flow through the smoothing method over the next four years, increasing the funded ratio and decreasing 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, 2024 is shown in the following table:

($ Millions)	Actuarial Value of Assets	Market Value of Assets
Actuarial Accrued Liability	$35,447	$35,447
Value of Assets	28,323	29,092
Unfunded Actuarial Accrued Liability*	7,124	6,354
Funded Ratio	79.90%	82.07%

* Numbers may not add due to rounding

See Section 3 of the report for the detailed development of the Unfunded Actuarial Accrued Liability.

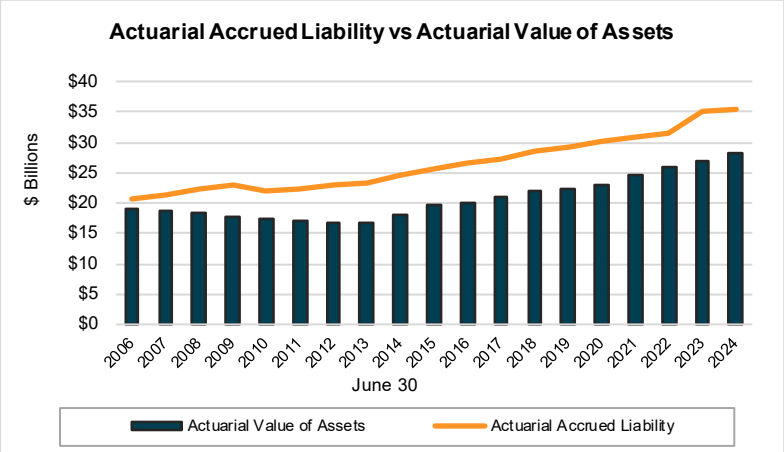
Changes in the UAAL occur for various reasons. The net decrease in the UAAL from July 1, 2023 to July 1, 2024 was $980 million. The components of this net change are shown in the following table (in millions):

Unfunded Actuarial Accrued Liability, July 1, 2023		$8,104
· Expected change from amortization method	38	
· Actual contributions vs. Required Rate	160	
· Additional contributions per HF 3100	(153)	
· Investment experience on actuarial assets	(409)	
· Liability experience	274	
· Assumption changes	(909)	
· Benefit provision changes	25	
· Other experience	(6)	
· Total		(980)
Unfunded Actuarial Accrued Liability, July 1, 2024		$7,124

As shown above, various types of experience impacted the UAAL from July 1, 2023 to July 1, 2024, but the most significant were the adoption of a new set of demographic assumptions and favorable investment experience during fiscal year 2024. 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 $38 million shown in the table above.

To the extent the Required Contribution Rate is more than the Statutory Contribution Rate, which was the case during the prior year, the UAAL is paid off less rapidly than expected based on the System's amortization schedule. During fiscal year 2024, the contribution deficiency increased the UAAL by $160 million. However, this was largely offset by the additional contributions provided by HF 3100, which decreased the UAAL by $153 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 $135 million, which may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was a $409 million gain on the actuarial value of assets and a $274 million loss on liabilities. The liability loss was primarily the result of salary losses from pay increases that were larger than expected, based on the assumption.

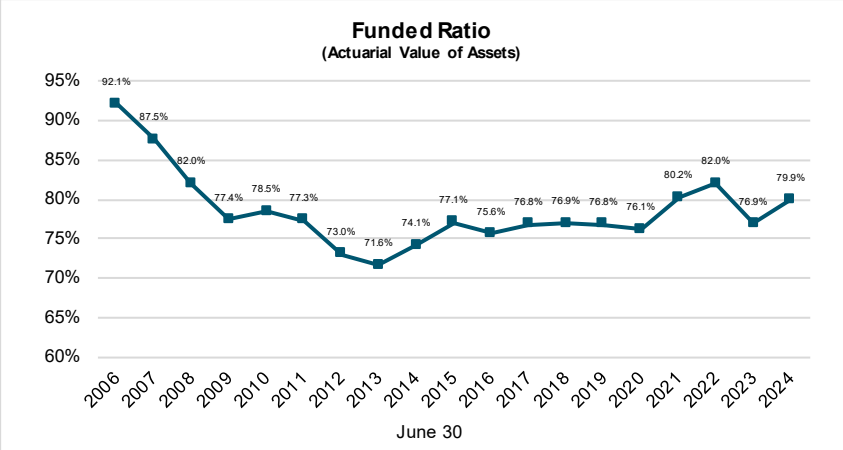


Although the actuarial accrued liability has exceeded the actuarial value of assets during this period, there has been significant growth in asset values since 2013. In addition to actual investment experience, the difference between actuarial accrued liability and actuarial assets has been impacted 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).

	7/1/20	7/1/21	7/1/22	7/1/23	7/1/24
Funded Ratio	76.1%	80.2%	82.0%	76.9%	79.9%
Unfunded Actuarial Accrued Liability ($M)	$7,192	$6,087	$5,690	$8,104	$7,124

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. The decrease in the funded ratio in 2023 was primarily due to lowering the investment return assumption. The funded ratio improved in 2024, largely due to the new set of demographic assumptions and favorable investment experience.

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 4 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.

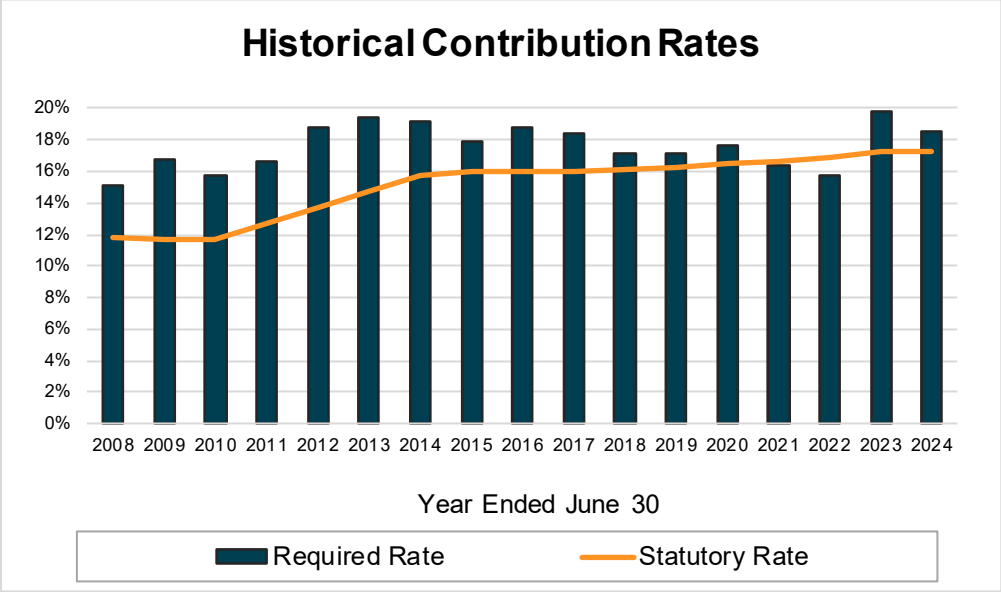
Contribution Rates	July 1, 2024	July 1, 2023
1. Normal Cost Rate	11.08%	11.10%
2. UAAL Contribution Rate	7.09%	8.38%
3. Expenses	0.29%	0.29%
4. Total Required Contribution Rate	18.46%	19.77%
5. Statutory Contribution Rate	17.21%	17.24%
6. Contribution (Deficiency)/Sufficiency (5) - (4)	(1.25%)	(2.53%)

As noted earlier, once the employer and employee contribution rates increase, the contribution rate deficiency is expected to be 0.25% of pay.

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

Required Contribution Rate, July 1, 2023	19.77%
- Change in normal cost rate	0.06%
- Actual contributions vs Required Rate	0.16%
- Additional contributions per HF 3100	(0.15%)
- Investment experience	(0.41%)
- Liability experience	0.27%
- Payroll increase different than expected	(0.27%)
- Assumption changes	(1.17%)
- Benefit provision changes	0.02%
- Other experience	0.18%
Required Contribution Rate, July 1, 2024	18.46%

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, after lowering the investment return assumption from 7.5% to 7.0% in 2023, the valuation results have shown a Contribution Deficiency in the past two valuations. 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, 2024. 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.

SUMMARY

The two most impactful events since the prior valuation were adopting a new set of demographic assumptions and favorable investment experience during fiscal year 2024. Their combined impact decreased the UAAL by $1.32 billion and the Required Contribution Rate by 1.58% of pay. As a result of the favorable investment experience on the market value of assets during fiscal year 2024, the net deferred investment loss of $152 million in last year's valuation has now become a $770 million net deferred investment gain. Absent unfavorable investment experience, the deferred asset gains are expected to flow through the smoothing method over the next four years, increasing the funded ratio and decreasing the Required Contribution Rate. Another factor that had a significant impact on the July 1, 2024 valuation was the experience loss on the System's liabilities. The largest source of liability experience was due to larger pay increases than expected, based on the assumption.

Due to the application of the asset smoothing method, the return on the actuarial value of assets was +8.6%. Since this return was higher than the assumed rate of return of 7.0% for fiscal year 2024, there was a $409 million actuarial gain on the actuarial value of assets. Coupled with a $274 million loss on the System's liabilities, the net actuarial gain was $135 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 gain of $770 million represents about 2.6% of the market value of assets. The key valuation results from the July 1, 2024 actuarial valuation are shown in the following table, using both actuarial and market value of assets.

	Actuarial Value	Market Value
Statutory Rate	17.21%	17.21%
Required Contribution		
Normal Cost	11.08%	11.08%
UAAL Contribution	7.09%	6.33%
Expenses	0.29%	0.29%
Total Required Contribution	18.46%	17.70%
(Deficiency)/Sufficiency	(1.25%)	(0.49%)
UAAL ($M)	$7,124	$6,354
Funded Ratio	79.90%	82.07%

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 benefit improvements, 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 implemented in the 2024 valuation, are expected to result in a small contribution deficiency for the 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.

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 5 of this report.

We conclude this executive summary by presenting comparative statistics and actuarial information on both the July 1, 2024 and July 1, 2023 valuations.

Principal Valuation Results

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

	Actuarial Valuation as of July 1, 2024	Actuarial Valuation as of July 1, 2023	% Change
1. PARTICIPANT DATA			
A. Active members			
1. Number	85,962	84,983	1.2%
2. Projected annual earnings for fiscal year *(000s)*	6,501,070	6,108,286	6.4%
3. Average projected annual earnings for FY 2025	75,627	71,877	5.2%
4. Average age	43.7	43.5	0.5%
5. Average service	12.4	12.3	0.8%
B. Service retirements	63,128	63,219	(0.1%)
C. Survivors	6,920	6,696	3.3%
D. Disability retirements	432	429	0.7%
E. Deferred retirements	20,606	19,418	6.1%
F. Non-vested terminated members	41,476	40,089	3.5%
G. Total	**218,524**	**214,834**	1.7%
2. LIABILITIES AND FUNDING RATIOS *(dollars in thousands)*			
A. Accrued Benefit Funding Ratio			
1. Current assets (AVA)	$ 28,322,800	$ 26,903,914	5.3%
2. Current benefit obligations	33,313,003	32,394,327	2.8%
3. Funding ratio	85.02%	83.05%	2.4%
B. Actuarial Accrued Liability Funding Ratio			
1. Current assets (AVA)	$ 28,322,800	$ 26,903,914	5.3%
2. Market Value of Assets (MVA)	29,092,479	26,752,069	8.7%
3. Actuarial Accrued Liability	35,446,800	35,008,293	1.3%
4. Unfunded Actuarial Accrued Liability *(B.3. - B.1.)*	7,124,000	8,104,379	(12.1%)
5. Funding ratio (AVA) *(B.1. / B.3.)*	79.90%	76.85%	4.0%
6. Funding ratio (MVA) *(B.2. / B.3.)*	82.07%	76.42%	7.4%
C. Projected Benefit Funding Ratio			
1. Current and expected future assets	$ 42,213,918	$ 40,309,275	4.7%
2. Current and expected future benefit obligations	43,471,130	42,753,840	1.7%
3. Funding ratio (AVA)	97.11%	94.28%	3.0%
3. CONTRIBUTIONS *(% of Payroll)*			
A. Normal Cost Rate	11.08%	11.10%	(0.2%)
B. UAAL Amortization Payment	7.09%	8.38%	(15.4%)
C. Expenses	0.29%	0.29%	0.0%
D. Total Required Contribution (Chapter 356)	18.46%	19.77%	(6.6%)
E. Statutory Contribution (Chapter 354)	17.21%	17.24%	(0.2%)
F. Contribution (Deficiency)/Sufficiency *(3.E. - 3.D.)*	(1.25%)	(2.53%)	(50.6%)

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SECTION 2

PLAN ASSETS

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SECTION 2 – 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.

TABLE 1

STATEMENT OF FIDUCIARY NET POSITION
(Dollars in Thousands)

	June 30, 2024 Amount	June 30, 2023 Amount
Cash and short-term investments		
Cash	$ 14,948	$ 19,077
Building account cash	603	240
Short term investments	553,150	877,681
Total cash and short term investments	$ 568,701	$ 896,998
Accounts Receivable	30,644	28,353
Investments (at fair value)		
Bond pool	$ 6,817,675	$ 5,679,008
Alternative investments pool	7,058,107	6,704,693
Domestic stock pool	9,727,479	8,904,911
Broad International Stock Fund	4,914,670	4,543,600
Total investments	$ 28,517,931	$ 25,832,212
Securities lending collateral	$ 1,244,369	$ 1,384,758
Building		
Land	$ 171	$ 171
Building & equipment net of depreciation	4,378	4,644
Total building	$ 4,549	$ 4,815
Capital assets net of depreciation	2,530	4,567
Total Assets	**$ 30,368,724**	**$ 28,151,703**

TABLE 1 (continued)

STATEMENT OF FIDUCIARY NET POSITION
(Dollars in Thousands)

	June 30, 2024	June 30, 2023
Liabilities	Amount	Amount
Current		
Accounts payable*	$ 30,405	$ 9,087
Accrued compensated absences	107	105
Accrued expenses - building	10	5
Bonds payable	360	664
Bonds interest payable	0	2
Securities lending collateral	1,244,369	1,384,758
Unearned Revenue	0	1,210
Total current liabilities	$ 1,275,251	$ 1,395,831
Long term		
Accrued compensated absences	$ 986	$ 977
Bonds payable	8	392
Total long term liabilities	$ 994	$ 1,369
Total Liabilities	**$ 1,276,245**	$ **1,397,200**
Net position restricted for pensions	**$ 29,092,479**	**$ 26,754,503**
Earnings Limitation Savings Account (ELSA) accounts payable	N/A	(2,434)
Net position restricted for pensions, after adjustment for ELSA accounts	**$ 29,092,479**	$ **26,752,069**

** Starting June 30, 2024, ELSA balance is included in the Accounts payable.*

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, 2024 and 2023.

	For Year Ended	
	June 30, 2024	**June 30, 2023**
Additions		
Contributions		
Employee	$ 480,136	$ 442,448
Employer	544,667	508,764
Direct aid (state/city/district)	211,754	35,587
Earnings Limitation Savings Account (ELSA)	N/A	407
Total contributions	$ 1,236,557	$ 987,206
Investment Income		
Investment appreciation in fair value	$ 3,302,484	$ 2,235,116
Less investment expenses	(108,835)	(27,338)
Net Investment Income	$ 3,193,649	$ 2,207,778
Securities Lending activities		
Securities lending income	$ 77,154	$ 52,314
Securities lending expenses:		
Borrowing rebates	(70,562)	(44,852)
Management fees	(1,186)	(1,343)
Total securities lending expenses	(71,748)	(46,195)
Net income from securities lending	5,406	6,119
Total Net Investment Income	$ 3,199,055	$ 2,213,897
Other Income	803	1,559
Total Additions	**$ 4,436,415**	**$ 3,202,662**
Deductions		
Benefits Paid		
Retirement benefits	$ (2,059,353)	$ (2,010,031)
Refunds of contributions to members	(21,501)	(17,531)
Total benefits paid	$ (2,080,854)	$ (2,027,562)
Administrative Expenses	(17,502)	(16,534)
Total Deductions	**$ (2,098,356)**	**$ (2,044,096)**
Increase/(Decrease) in ELSA Account Value	2,351	1,351
Net Increase (Decrease)	**2,340,410**	**1,159,917**
Net Position Restricted for Pensions		
Beginning of Year	**$ 26,752,069**	**$ 25,592,152**
End of Year	**$ 29,092,479**	**$ 26,752,069**

TABLE 3

ACTUARIAL VALUE OF ASSETS AS OF JUNE 30, 2024

(Dollars in Thousands)

1. Market value of assets available for benefits				**$ 29,092,479**
2. Determination of average balance				
a. Assets available at July 1, 2023*				$ 26,754,503
b. Assets available at June 30, 2024*				29,092,479
c. Net investment income for fiscal year ending June 30, 2024				3,199,055
d. Average balance (a. + b. - c.) / 2				$ 26,323,964
3. Expected return (7.0% * 2.d.)				1,842,677
4. Actual return				3,199,055
5. Current year unrecognized asset return (4. - 3.)				1,356,378
6. Unrecognized asset returns				
	Original Amount	**% Not Recognized**		
a. Year ended June 30, 2024	$ 1,356,378	80%		$ 1,085,102
b. Year ended June 30, 2023	333,761	60%		200,257
c. Year ended June 30, 2022	(3,798,328)	40%		(1,519,331)
d. Year ended June 30, 2021	5,018,257	20%		1,003,651
e. Total return not yet recognized				$ 769,679
7. Actuarial value of assets at June 30, 2024 (1. - 6.e.)				**$ 28,322,800**

* *Before recognition of ELSA accounts payable.*

Fiscal Year Ended	Gain/(Loss) Deferred to Future Years	Gain/(Loss) to be Recognized in Plan Year Ending			
		2025	2026	2027	2028
6/30/2021	$1,003,651	1,003,651			
6/30/2022	(1,519,331)	(759,666)	(759,665)		
6/30/2023	200,257	66,752	66,752	66,753	
6/30/2024	1,085,102	271,276	271,276	271,276	271,274
Total	$769,679	$582,013	($421,637)	$338,029	$271,274

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SECTION 3

PLAN LIABILITIES

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SECTION 3 – PLAN LIABILITIES

In the previous section, an analysis was given of the assets of the System as of the valuation date, July 1, 2024. 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 set of actuarial assumptions used to determine liabilities are based on the results of the July 1, 2018 to June 30, 2022 Experience Study completed in June 2023. The only recommended change to the set of economic assumptions was a reduction to the investment return assumption from 7.5% to 7.0%, which was first implemented in the July 1, 2023 valuation due to the passage of HF 3100. The recommended changes to the set of demographic assumptions have been approved by the LCPR and are first reflected in the July 1, 2024 actuarial valuation. The set of assumptions used in the July 1, 2024 valuation is shown in Appendix C.

The liabilities reflect the benefit structure in place as of July 1, 2024.

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.

TABLE 4

ACTUARIAL VALUATION BALANCE SHEET AS OF JULY 1, 2024

(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	$ 28,322,800
B. Expected Future Assets	
1. Present value of expected future statutory supplemental contributions*	$ 5,866,788
2. Present value of expected future normal cost contributions	8,024,330
3. Total expected future assets *(1. + 2.)*	$ 13,891,118
C. Total Current and Expected Future Assets**	$ 42,213,918

	Non-Vested Benefits	Vested Benefits	Total
D. Current Benefit Obligations			
1. Benefit recipients			
a. Service retirements	$ 0	$ 18,672,071	$ 18,672,071
b. Disability	0	154,625	154,625
c. Survivors	0	1,318,330	1,318,330
2. Deferred retirements with applicable future augmentation	0	1,076,989	1,076,989
3. Former members without vested rights***	123,485	0	123,485
4. Active members	110,102	11,857,401	11,967,503
5. Total Current Benefit Obligations	$ 233,587	$ 33,079,416	$ 33,313,003

E. Expected Future Benefit Obligations	10,158,127
F. Total Current and Expected Future Benefit Obligations	43,471,130
G. Unfunded Current Benefit Obligations *(D.5. - A.)*	4,990,203
H. Unfunded Current and Future Benefit Obligations *(F. - C.)*	1,257,212

* *Under LCPR guidelines, this amount does not include supplemental payments which could occur after the expiration of the remaining 24 year amortization period.*

** *Does not reflect deferred investment experience in the asset smoothing method. Total expected future assets on a market value basis is $42,983,597.*

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

TABLE 5

DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY AS OF JULY 1, 2024

(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	$ 20,893,229	$ (6,959,858)	$ 13,933,371
b. Disability Benefits	425,247	(189,684)	235,563
c. Survivor benefits	195,106	(73,348)	121,758
d. Deferred retirements	596,624	(649,584)	(52,960)
e. Refunds	15,424	(151,856)	(136,432)
f. Total	$ 22,125,630	$ (8,024,330)	$ 14,101,300
2. Deferred Retirements with Applicable Future Augmentation	1,076,989	0	1,076,989
3. Former Members Without Vested Rights	123,485	0	123,485
4. Benefit Recipients	20,145,026	0	20,145,026
5. Total Actuarial Accrued Liability	$ 43,471,130	$ (8,024,330)	$ 35,446,800
6. Actuarial Value of Assets			$ 28,322,800
7. Unfunded Actuarial Accrued Liability (UAAL)*			$ 7,124,000

* On a Market Value of Assets basis, the Unfunded Actuarial Accrued Liability is $6,354,321.

TABLE 6

CHANGES IN UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)

(Dollars in Thousands)

A. UAAL at beginning of year	$	8,104,379
B. Changes due to interest requirements and current rate of funding*		
1. Normal cost and actual administrative expenses	$	695,531
2. Contributions		(1,236,557)
3. One-time lump sum COLA payments per HF 3100		31,120
4. Interest on A., B.1., B.2., and B.3. at 7.0%		549,762
5. Total *(B.1. + B.2. + B.3. + B.4.)*	$	39,856
C. Expected UAAL at end of year *(A. + B.4.)*	$	8,144,235
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected		
1. Salary increases	$	197,432
2. Investment return (actuarial assets)		(408,960)
3. Mortality of active members		(1,408)
4. Mortality of benefit recipients		(45,928)
5. Retirement from active service		102,494
6. Other items		20,888
7. Total	$	(135,482)
E. UAAL at end of year before plan amendments and changes in actuarial assumptions *(C. + D.7.)*	$	8,008,753
F. Change in UAAL due to change in plan amendments	$	24,571
G. Change in UAAL due to change in assumptions	$	(909,324)
H. UAAL at end of year *(E. + F. + G.)*	$	7,124,000

* *The amortization of the 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 4

SYSTEM CONTRIBUTIONS

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SECTION 4 – SYSTEM CONTRIBUTIONS

Sections 2 and 3 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. 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 2027.

As mentioned in our most recent experience study report submitted in August 2023, the Government Finance Officers Association and the Conference of Consulting Actuaries 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. 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.

TABLE 7

NORMAL COST AT JULY 1, 2024
(Dollars in Thousands)

	Percent of Pay		Dollar Amount
1. Normal Cost Rate			
a. Retirement benefits	9.65%	$	627,363
b. Disability benefits	0.25%		16,253
c. Survivor benefits	0.10%		6,501
d. Deferred retirement benefits*	0.86%		55,909
e. Refunds	0.22%		14,302
f. Total	11.08%	$	720,328

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

TABLE 8

DETERMINATION OF SUPPLEMENTAL CONTRIBUTION RATE
(Dollars in Thousands)

		Amount
A. Determination of Unfunded Actuarial Accrued Liability (UAAL)*		
1. Actuarial Accrued Liability	$	35,446,800
2. Actuarial Value of Assets		28,322,800
3. Unfunded Actuarial Accrued Liability	$	7,124,000
B. Determination of Supplemental Contribution Rate*		
1. Present value of future payrolls through the amortization date of June 30, 2048	$	100,458,706
2. Supplemental contribution rate *(A.3. / B.1.)*		7.09%

* *On a Market Value of Assets basis, the Unfunded Actuarial Accrued Liability is $6,354,321 and the supplemental contribution rate is 6.33% of payroll.*

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.

	Percent of Payroll		Dollar Amount
A. Statutory contributions - Chapter 354			
1. Employee contributions	7.75%	$	503,836
2. Employer contributions*	8.91%		579,254
3. Supplemental contributions**			
a. 1993 Legislation	0.08%		5,000
b. 1996 Legislation	0.05%		3,256
c. 1997 Legislation	0.20%		12,954
d. 2014 Legislation	0.22%		14,377
4. Total	17.21%	$	1,118,677
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	9.65%	$	627,363
b. Disability benefits	0.25%		16,253
c. Survivor benefits	0.10%		6,501
d. Deferred retirement benefits	0.86%		55,909
e. Refunds	0.22%		14,302
f. Total	11.08%	$	720,328
2. Supplemental contribution for the amortization of the Unfunded Actuarial Accrued Liability by June 30, 2048	7.09%		460,926
3. Allowance for expenses	0.29%	$	18,853
4. Total actuarial contribution for fiscal year ending June 30, 2025***	18.46%	$	1,200,107
C. Contribution Sufficiency / (Deficiency) *(A.4. - B.4.)****	(1.25%)	$	(81,430)

Note: Projected annual payroll for fiscal year beginning on the valuation date: $6,501,070

* *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 17.70% of payroll and the contribution deficiency is 0.49% of payroll.*

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	0.20%		0
d. 2014 Legislation	0.22%		0
4. Total	28.19%	$	30
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	18.35%	$	20
b. Disability benefits	0.80%		1
c. Survivor benefits	0.41%		0
d. Deferred retirement benefits	0.90%		1
e. Refunds	0.23%		0
f. Total	20.69%	$	22

Note: Projected annual payroll for fiscal year beginning on the valuation date: $111 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.*

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%	$	503,824
2. Employer contributions*	8.91%		579,236
3. Supplemental contributions**			
a. 1993 Legislation	0.08%		5,000
b. 1996 Legislation	0.05%		3,256
c. 1997 Legislation	0.20%		12,954
d. 2014 Legislation	0.22%		14,377
4. Total	17.21%	$	1,118,647
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	9.65%	$	627,343
b. Disability benefits	0.25%		16,252
c. Survivor benefits	0.10%		6,501
d. Deferred retirement benefits	0.86%		55,908
e. Refunds	0.22%		14,302
f. Total	11.08%	$	720,306

Note: Projected annual payroll for fiscal year beginning on the valuation date: $6,500,960

* *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 $6,094,735, which includes $5,823,505 for Coordinated members who are not employed by Special School District #1 and $271,230 for members who are employed by Special School District #1.*

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

SECTION 5

RISK ASSESSMENT

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SECTION 5 – 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.

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).

Valuation	Market Value of Assets	Covered Payroll	Asset Volatility Ratio
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
2024	29,092,479	6,094,735	4.77

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 0.62% 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 3.12%. A higher AVR produces more volatility in the Required Contribution Rate.

Impact of Return 10% Below Expected (Percent of Payroll)

AVR	Asset Value	Unsmoothed Amortization	Smoothed Amortization
4.00	40%	2.50%	0.50%
5.00	50%	3.12%	0.62%
6.00	60%	3.74%	0.75%

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, 2024 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 $36.574 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 inconsistences 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	14.44%	11.08%	8.59%
Amortization of UAAL	10.79%	7.09%	3.44%
Expenses	0.29%	0.29%	0.29%
Total Required Contribution	25.52%	18.46%	12.32%
Contribution Sufficiency/(Deficiency)	(8.31%)	(1.25%)	4.89%
Actuarial Accrued Liability Funding Ratio	70.31%	79.90%	90.01%
Actuarial Accrued Liability ($B)	$40.3	$35.4	$31.5
Unfunded Actuarial Accrued Liability ($B)	$12.0	$7.1	$3.1

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

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.

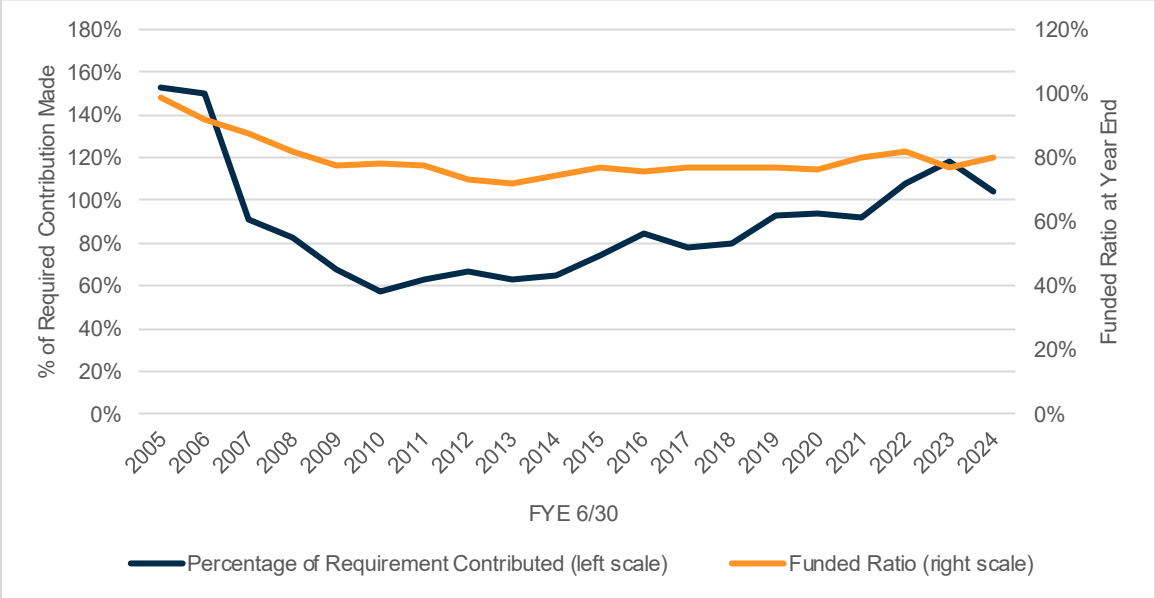
The future, however, is not known, and actual mortality improvements may occur at a faster rate than expected, or at a slower rate than expected (or even decline). Although changes in mortality will affect the benefits paid, this assumption is carefully studied during the regular experience studies that 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, from FYE 2007 through FYE 2021, the ratio was consistently less than 100%, indicating the Statutory Contribution Rate had been less than the Required Contribution Rate. Since FYE 2022 the Statutory Contribution Rate has exceeded the Required Contribution Rate.

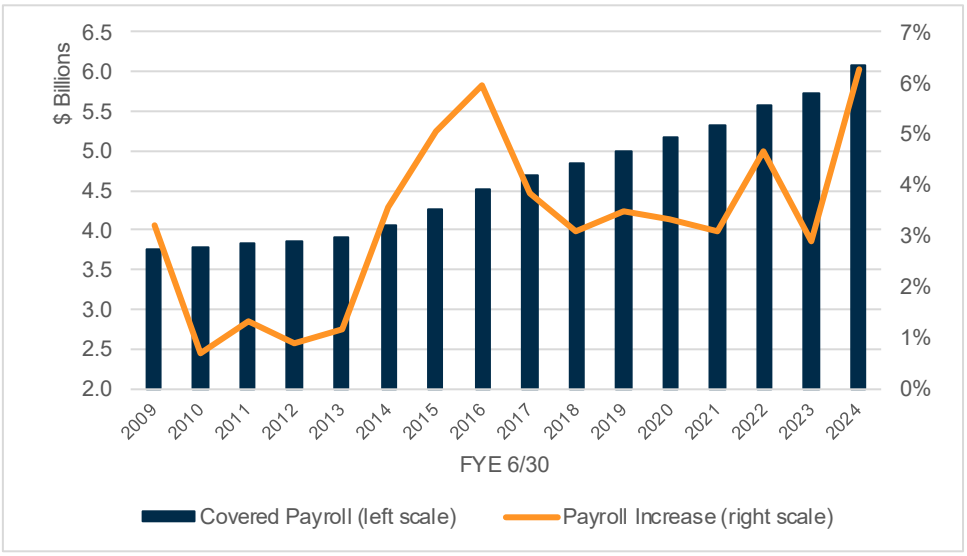
Also on the graph (with the scale on the right axis) is the funded ratio of the System. While there have been certain events (large financial market drops, the merger of the Minneapolis and Duluth systems into TRA, etc.) that have had an effect on the funded ratio, there is also a noteworthy decline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



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.



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.

SECTION 6

ADDITIONAL INFORMATION

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SECTION 6 – 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.

TABLE 12

SUMMARY OF MEMBERSHIP DATA

	July 1, 2024	July 1, 2023
Active members:		
Vested	69,058	68,497
Non-vested	16,904	16,486
Total	85,962	84,983
Pensioners and Beneficiaries	70,480	70,344
Terminated vested members entitled to, but not yet receiving, benefits:	20,606	19,418
Other terminated, non-vested members entitled to a refund of contributions	41,476	40,089
Total	**218,524**	**214,834**

TABLE 13

SCHEDULE OF FUNDING PROGRESS*

(Dollars in Thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Actual Covered Payroll (Previous FY) (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
07/01/95	$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%
07/01/24	28,322,800	35,446,800	7,124,000	79.90%	6,094,735	116.89%

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

TABLE 14

SCHEDULE OF CONTRIBUTIONS FROM THE EMPLOYER AND OTHER CONTRIBUTING ENTITIES

(Dollars in Thousands)

Plan Year Ended June 30	Actuarially Required Contribution Rate (a)	Actual Covered Payroll (b)	Actual Member Contributions (c)	Annual Required Contributions [(a)*(b)] - (c)	Actual Employer Contributions[1]	Percentage Contributed
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%	6,094,735	480,136	724,793	756,421	104.36%
2025[18]	18.46%					

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%.*

18 *Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Plan Provisions is 19.61%.*

TABLE 15

PROJECTED BENEFIT PAYMENTS

(Dollars in Thousands)

The table below shows estimated benefits expected to be paid over the next twenty-five years, based on the assumptions used in the valuation. The "Actives" column shows benefits expected to be paid to members currently active on July 1, 2024. The "Retirees" column shows benefits expected to be paid to all other members. This includes those who, as of July 1, 2024, are receiving benefit payments or who terminated employment and are entitled to a deferred benefit.

Year Ending June 30	Actives	Retirees	Total
2025	$68,251	$2,019,323	$2,087,574
2026	123,005	1,980,848	2,103,853
2027	175,315	1,946,550	2,121,865
2028	232,181	1,913,140	2,145,321
2029	295,150	1,881,192	2,176,342
2030	366,118	1,847,925	2,214,043
2031	446,576	1,813,557	2,260,133
2032	537,164	1,777,559	2,314,723
2033	637,712	1,741,603	2,379,315
2034	746,853	1,703,652	2,450,505
2035	863,144	1,663,369	2,526,513
2036	987,123	1,620,854	2,607,977
2037	1,119,687	1,575,040	2,694,727
2038	1,259,610	1,525,162	2,784,772
2039	1,407,283	1,471,424	2,878,707
2040	1,563,794	1,415,063	2,978,857
2041	1,729,034	1,356,044	3,085,078
2042	1,902,048	1,294,648	3,196,696
2043	2,082,792	1,231,425	3,314,217
2044	2,269,387	1,166,925	3,436,312
2045	2,461,614	1,101,690	3,563,304
2046	2,658,927	1,035,157	3,694,084
2047	2,858,421	968,788	3,827,209
2048	3,058,337	903,038	3,961,375
2049	3,257,740	838,491	4,096,231

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

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APPENDIX A

SUMMARY STATISTICS ON MEMBERSHIP DATA

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TABLE 16

RECONCILIATION OF MEMBERS*

	Active Members**	Former Members***	Benefit Recipients**** Service Retirements	Disability Retirements	Survivors	Total
Members on 6/30/2023	**84,983**	**59,507**	**63,219**	**429**	**6,696**	**214,834**
New hires	6,032	-	-	-	-	**6,032**
Transfer from active to inactive	(5,459)	5,459	-	-	-	**0**
Transfer from inactive to active	1,697	(1,697)	-	-	-	**0**
Return from zero balance	342	6	-	-	-	**348**
Return from disability	1	-	-	-	-	**1**
Refunded	(369)	(677)	-	-	-	**(1,046)**
Refunded (non-repayable)	(7)	(10)	-	-	-	**(17)**
Retirements	(1,247)	(483)	1,711	(26)	-	**(45)**
Benefits began	-	-	-	50	667	**717**
Benefits ended	-	-	-	(5)	(52)	**(57)**
Deaths	(33)	(70)	(1,785)	(13)	(390)	**(2,291)**
Adjustments	22	47	(17)	(3)	(1)	**48**
Net changes	979	2,575	(91)	3	224	**3,690**
Members on 6/30/2024	**85,962**	**62,082**	**63,128**	**432**	**6,920**	**218,524**

* ***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 85,961 Coordinated members.*

*** *Former members include 3 Basic and 62,079 Coordinated members.*

**** *Benefit recipients include 2,228 Basic members and 68,252 Coordinated members.*

Former Member Statistics	**Vested**	**Non-vested**	**Total**
Number	20,606	41,476	62,082
Average Age	48.6	48.4	48.4
Average Service (years)	8.1	0.8	3.2
Average annual benefits, with applicable future augmentation and Combined Service Annuity load	$9,312	N/A	N/A
Average refund value, with Combined Service Annuity load	$43,049	$2,977	$16,278

Former Member Statistics (Basic)	**Vested**	**Non-vested**	**Total**
Number	1	2	3
Average Age	80.0	61.5	67.7
Average Service (years)	16.0	0.0	5.3
Average annual benefits, with applicable future augmentation and Combined Service Annuity load	$61,290	N/A	N/A
Average refund value, with Combined Service Annuity load	$154,751	$332	$51,805

Former Member Statistics (Coordinated)	**Vested**	**Non-vested**	**Total**
Number	20,605	41,474	62,079
Average Age	48.6	48.4	48.4
Average Service (years)	8.1	0.8	3.2
Average annual benefits, with applicable future augmentation and Combined Service Annuity load	$9,310	N/A	N/A
Average refund value, with Combined Service Annuity load	$43,044	$2,977	$16,276

TABLE 17

DISTRIBUTION OF ACTIVE MEMBERS*

	Years of Service as of July 1, 2024										
Age	**<3****	**3-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40 +**	**Total**
<25	2,776	98									**2,874**
Avg. Earnings	37,649	53,990									**38,206**
25-29	3,758	2,948	2,121								**8,827**
Avg. Earnings	42,321	53,950	60,389								**50,546**
30-34	2,105	1,342	5,136	1,560							**10,143**
Avg. Earnings	42,231	56,886	64,742	74,883							**60,591**
35-39	1,841	932	2,999	4,592	1,045						**11,409**
Avg. Earnings	39,508	59,023	68,302	78,108	87,231						**68,578**
40-44	1,887	807	2,251	2,596	4,316	1,203					**13,060**
Avg. Earnings	38,129	59,443	70,020	79,522	89,168	96,574					**75,421**
45-49	1,416	589	1,661	1,593	2,164	3,940	1,231				**12,594**
Avg. Earnings	36,490	58,678	70,200	79,941	87,079	96,098	100,148				**81,033**
50-54	1,021	436	1,127	1,189	1,285	1,962	3,755	830			**11,605**
Avg. Earnings	35,465	54,402	67,872	77,663	85,406	92,204	97,622	100,996			**83,568**
55-59	775	318	761	786	926	1,091	1,928	2,576	205		**9,366**
Avg. Earnings	33,309	57,117	66,883	77,955	81,296	88,821	94,477	97,336	101,171		**83,489**
60-64	592	181	397	417	500	617	729	632	287	27	**4,379**
Avg. Earnings	24,566	44,583	61,604	71,518	78,774	84,607	91,394	95,786	97,894	97,403	**74,531**
65-69	390	69	146	119	121	105	93	47	32	31	**1,153**
Avg. Earnings	14,786	41,588	49,494	67,939	80,590	89,955	91,612	88,809	102,556	100,997	**53,990**
70 +	343	48	57	24	17	18	13	8	6	18	**552**
Avg. Earnings	9,333	23,354	32,779	45,637	69,781	92,529	97,606	75,432	111,942	109,027	**26,529**
Total	**16,904**	**7,768**	**16,656**	**12,876**	**10,374**	**8,936**	**7,749**	**4,093**	**530**	**76**	**85,962**
Avg. Earnings	**37,526**	**55,634**	**66,078**	**77,811**	**86,736**	**93,546**	**96,583**	**97,698**	**99,602**	**101,622**	**71,119**

* *Active members include 1 Basic and 85,961 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, 2024 as reported by the Teachers Retirement Association of Minnesota.

TABLE 18

DISTRIBUTION OF SERVICE RETIREMENTS (TOTAL)

	Years Since Retirement as of July 1, 2024							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<55								
Avg. Benefit								
55-59	215	792	3					**1,010**
Avg. Benefit	41,249	39,753	29,996					**40,042**
60-64	576	3,346	1,563	3				**5,488**
Avg. Benefit	39,637	40,455	31,940	31,610				**37,939**
65-69	504	3,605	4,587	1,853	9			**10,558**
Avg. Benefit	23,817	26,135	29,272	25,893	32,618			**27,350**
70-74	57	859	4,790	5,781	3,036	68	1*	**14,592**
Avg. Benefit	25,327	21,364	24,299	28,010	27,037	37,764	1,797	**26,231**
75-79	11	123	900	3,958	5,115	3,923	394	**14,424**
Avg. Benefit	50,536	22,543	21,484	24,862	28,334	26,699	34,089	**26,634**
80-84	2	18	75	536	1,913	3,739	3,066	**9,349**
Avg. Benefit	153,644	43,759	24,545	22,099	23,987	26,618	30,503	**27,138**
85-89	1	5	11	50	205	1,053	3,723	**5,048**
Avg. Benefit	864	56,660	23,558	16,605	19,117	24,290	36,293	**32,882**
90 +		2	1	10	23	75	2,548	**2,659**
Avg. Benefit		30,510	7,970	17,633	17,445	25,217	38,810	**38,144**
Total	**1,366**	**8,750**	**11,930**	**12,191**	**10,301**	**8,858**	**9,732**	**63,128**
Avg. Benefit	**33,683**	**32,379**	**27,001**	**26,352**	**26,941**	**26,451**	**35,035**	**28,917**

** 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.

TABLE 18A

DISTRIBUTION OF SERVICE RETIREMENTS (BASIC)

	Years Since Retirement as of July 1, 2024							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<55								
Avg. Benefit								
55-59								
Avg. Benefit								
60-64								
Avg. Benefit								
65-69	1		1	2	1			**5**
Avg. Benefit	17,595		94,360	72,049	75,877			**66,386**
70-74		1	10	19	33	19		**82**
Avg. Benefit		9,561	39,583	47,907	61,927	62,093		**55,354**
75-79		1	6	46	69	162	76	**360**
Avg. Benefit		30,175	36,292	31,931	48,578	62,182	56,078	**53,900**
80-84			1	8	27	102	154	**292**
Avg. Benefit			109,675	61,929	51,259	59,624	58,639	**58,566**
85-89			1		8	40	322	**371**
Avg. Benefit			82,984		52,924	56,325	74,584	**72,171**
90 +					1	11	508	**520**
Avg. Benefit					63,013	61,774	65,952	**65,858**
Total	**1**	**2**	**19**	**75**	**139**	**334**	**1,060**	**1,630**
Avg. Benefit	**17,595**	**19,868**	**47,400**	**40,248**	**52,818**	**60,681**	**66,804**	**62,821**

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.

TABLE 18B

DISTRIBUTION OF SERVICE RETIREMENTS (COORDINATED)

	Years Since Retirement as of July 1, 2024							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<55								
Avg. Benefit								
55-59	215	792	3					**1,010**
Avg. Benefit	41,249	39,753	29,996					**40,042**
60-64	576	3,346	1,563	3				**5,488**
Avg. Benefit	39,637	40,455	31,940	31,610				**37,939**
65-69	503	3,605	4,586	1,851	8			**10,553**
Avg. Benefit	23,830	26,135	29,258	25,843	27,210			**27,332**
70-74	57	858	4,780	5,762	3,003	49	1*	**14,510**
Avg. Benefit	25,327	21,378	24,267	27,944	26,654	28,330	1,797	**26,067**
75-79	11	122	894	3,912	5,046	3,761	318	**14,064**
Avg. Benefit	50,536	22,480	21,384	24,779	28,057	25,171	28,834	**25,936**
80-84	2	18	74	528	1,886	3,637	2,912	**9,057**
Avg. Benefit	153,644	43,759	23,395	21,495	23,596	25,693	29,015	**26,125**
85-89	1	5	10	50	197	1,013	3,401	**4,677**
Avg. Benefit	864	56,660	17,616	16,605	17,744	23,025	32,668	**29,765**
90 +		2	1	10	22	64	2,040	**2,139**
Avg. Benefit		30,510	7,970	17,633	15,374	18,934	32,051	**31,407**
Total	**1,365**	**8,748**	**11,911**	**12,116**	**10,162**	**8,524**	**8,672**	**61,498**
Avg. Benefit	**33,695**	**32,382**	**26,968**	**26,266**	**26,587**	**25,110**	**31,152**	**28,019**

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.

TABLE 19

DISTRIBUTION OF SURVIVORS (TOTAL)

	Years Since Death as of July 1, 2024							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<45	12	69	50	28	8	1	1	**169**
Avg. Benefit	13,723	21,281	18,242	12,807	16,574	510	1,233	**17,977**
45-49	10	36	10	4	3	1	2	**66**
Avg. Benefit	18,142	18,359	16,749	16,354	20,423	6,291	17,937	**17,859**
50-54	12	49	22	11	12	5	4	**115**
Avg. Benefit	30,443	20,022	16,447	22,894	11,023	7,715	28,489	**19,521**
55-59	8	41	55	23	10	5	6	**148**
Avg. Benefit	30,076	22,371	19,423	11,389	20,049	16,670	33,385	**20,082**
60-64	17	81	63	32	11	6	5	**215**
Avg. Benefit	26,096	25,433	21,640	17,697	11,813	21,800	21,992	**22,344**
65-69	31	126	121	49	40	16	12	**395**
Avg. Benefit	22,296	25,009	21,451	18,740	16,822	19,300	15,031	**21,565**
70-74	71	241	204	109	53	18	20	**716**
Avg. Benefit	25,137	22,812	22,751	23,490	21,451	15,754	15,775	**22,654**
75-79	91	463	342	206	111	55	38	**1,306**
Avg. Benefit	25,946	24,789	24,401	24,200	24,635	21,192	19,823	**24,366**
80-84	126	492	364	213	147	82	93	**1,517**
Avg. Benefit	26,411	27,643	28,685	29,137	28,898	27,475	25,699	**27,994**
85-89	89	397	339	182	119	85	104	**1,315**
Avg. Benefit	33,753	33,036	34,035	36,960	35,016	33,523	30,240	**33,875**
90 +	39	219	221	169	105	73	132	**958**
Avg. Benefit	37,284	35,161	39,523	40,794	42,177	44,868	37,173	**39,033**
Total	**506**	**2,214**	**1,791**	**1,026**	**619**	**347**	**417**	**6,920**
Avg. Benefit	**27,705**	**27,385**	**28,012**	**29,040**	**29,151**	**29,957**	**29,142**	**28,209**

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.

TABLE 19A

DISTRIBUTION OF SURVIVORS (BASIC)

	Years Since Death as of July 1, 2024							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<45		2		2			1	**5**
Avg. Benefit		39,823		7,025			1,233	**18,986**
45-49		1						**1**
Avg. Benefit		9,950						**9,950**
50-54		1				1		**2**
Avg. Benefit		24,759				20,159		**22,459**
55-59		1	1			2	3	**7**
Avg. Benefit		51,855	76,114			15,312	40,177	**39,875**
60-64	1	2					2	**5**
Avg. Benefit	30,693	22,330					29,222	**26,759**
65-69		3	1	1		2	3	**10**
Avg. Benefit		33,413	64,822	2,731		52,723	26,352	**35,229**
70-74	2	2	3	3		2	2	**14**
Avg. Benefit	36,786	21,884	29,489	30,730		32,723	8,742	**27,209**
75-79	2	7	13	4	4	2		**32**
Avg. Benefit	71,236	55,335	48,761	39,266	42,376	11,297		**47,278**
80-84	3	24	27	15	5	6	7	**87**
Avg. Benefit	49,501	55,941	59,421	61,124	58,404	48,361	70,505	**58,483**
85-89	5	53	47	21	18	13	18	**175**
Avg. Benefit	74,668	64,873	62,814	68,813	51,112	65,453	48,076	**61,973**
90 +	10	44	61	44	29	28	44	**260**
Avg. Benefit	60,588	62,813	65,780	62,675	69,109	65,349	48,799	**62,004**
Total	**23**	**140**	**153**	**90**	**56**	**56**	**80**	**598**
Avg. Benefit	**59,759**	**59,192**	**61,651**	**59,841**	**60,459**	**57,412**	**47,285**	**58,300**

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.

TABLE 19B

DISTRIBUTION OF SURVIVORS (COORDINATED)

	Years Since Death as of July 1, 2024							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<45	12	67	50	26	8	1		**164**
Avg. Benefit	13,723	20,728	18,242	13,252	16,574	510		**17,946**
45-49	10	35	10	4	3	1	2	**65**
Avg. Benefit	18,142	18,599	16,749	16,354	20,423	6,291	17,937	**17,980**
50-54	12	48	22	11	12	4	4	**113**
Avg. Benefit	30,443	19,924	16,447	22,894	11,023	4,603	28,489	**19,469**
55-59	8	40	54	23	10	3	3	**141**
Avg. Benefit	30,076	21,634	18,373	11,389	20,049	17,575	26,593	**19,100**
60-64	16	79	63	32	11	6	3	**210**
Avg. Benefit	25,809	25,512	21,640	17,697	11,813	21,800	17,172	**22,239**
65-69	31	123	120	48	40	14	9	**385**
Avg. Benefit	22,296	24,804	21,090	19,074	16,822	14,525	11,257	**21,210**
70-74	69	239	201	106	53	16	18	**702**
Avg. Benefit	24,800	22,820	22,651	23,285	21,451	13,632	16,557	**22,563**
75-79	89	456	329	202	107	53	38	**1,274**
Avg. Benefit	24,928	24,320	23,439	23,902	23,972	21,565	19,823	**23,791**
80-84	123	468	337	198	142	76	86	**1,430**
Avg. Benefit	25,847	26,191	26,222	26,714	27,859	25,826	22,052	**26,139**
85-89	84	344	292	161	101	72	86	**1,140**
Avg. Benefit	31,318	28,130	29,402	32,806	32,147	27,757	26,507	**29,561**
90 +	29	175	160	125	76	45	88	**698**
Avg. Benefit	29,248	28,208	29,512	33,092	31,900	32,124	31,360	**30,477**
Total	**483**	**2,074**	**1,638**	**936**	**563**	**291**	**337**	**6,322**
Avg. Benefit	**26,178**	**25,238**	**24,870**	**26,079**	**26,036**	**24,674**	**24,835**	**25,362**

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.

TABLE 20

DISTRIBUTION OF DISABILITY RETIREMENTS

	Years Disabled as of July 1, 2024							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<45		11	8	1				**20**
Avg. Benefit		12,631	11,191	7,157				**11,781**
45-49	3	7	6	5	1			**22**
Avg. Benefit	26,033	22,317	11,521	11,452	2,850			**16,525**
50-54	2	22	21	11	5	2		**63**
Avg. Benefit	42,071	28,542	23,477	13,452	6,269	5,097		**22,136**
55-59	8	53	38	14	7	5	3	**128**
Avg. Benefit	40,001	36,089	25,816	15,201	10,807	7,586	7,141	**27,824**
60-64	5	48	55	37	17	3	3	**168**
Avg. Benefit	46,328	31,373	28,157	22,338	15,492	14,967	3,894	**26,385**
65 +	1	9	13	5	1	2		**31**
Avg. Benefit	10,181	27,259	22,021	12,804	6,900	1,680		**19,873**
Total	**19**	**150**	**141**	**73**	**31**	**12**	**6**	**432**
Avg. Benefit	**38,109**	**30,580**	**24,593**	**18,024**	**12,262**	**8,032**	**5,517**	**24,546**

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

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APPENDIX B

SUMMARY OF PLAN PROVISIONS

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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.

Plan year

July 1 through June 30

Eligibility

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.

Contributions

Shown as a percent of Salary:

Member	Employer
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).

Teaching service

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

Salary

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

Average salary

Average of the five highest successive years of Salary.

Retirement

Normal retirement

Age/Service requirements

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

Amount

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

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.

BASIC MEMBERS

Disability

Age/service requirement	Total and permanent disability with three years of Teaching Service.
Amount	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.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.

Death — Choice of Benefit A, Benefit B or Benefit C

Benefit A

Age/Service requirements	Death before retirement.
Amount	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

Age/Service requirements	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.
Amount	The actuarial equivalent of any benefits the member could have received if resignation occurred on the date of death.

Benefit C

Age/Service requirements	As an active member who dies and leaves surviving children.
Amount	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).
Benefit Increases	Same as for retirement.

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.

Plan year	July 1 through June 30
Eligibility	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. No Minnesota State teacher will become a new Member unless that person elects coverage as defined by Minnesota Statutes under Chapter 354B.
Contributions	Shown as a percent of Salary: Member 7.75%, Employer 8.75% Employer also contributes Supplemental amount equal to 3.64% of Salary for members employed by Special School District #1 (Minneapolis Schools) only. Employer rate will increase to 9.50% and the member rate will increase to 8.00% effective July 1, 2025. Employee contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
Teaching service	A year is earned during a calendar year if the member is employed in a covered position and employee contributions are deducted. Certain part-time service and military service is also included.
Salary	Periodic compensation used for contribution purposes excluding lump sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.
Average salary	Average of the five highest successive years of Salary. Average salary is based on all Allowable Service if less than five years.

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:
Age 65 and three years of Allowable Service.

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

Early retirement

Age/Service requirements

First hired before July 1, 1989:

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

First hired after June 30, 1989:

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

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.

COORDINATED MEMBERS

Retirement (continued)

Early Retirement Reduction Factors

First hired before July 1, 1989 (Tier II service credit formula):

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. Effective July 1, 2024, the following reduction factors are 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 65 first hired from July 1, 1989 through June 30, 2006 and who reach age 62 with 30 years of service credit:

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

COORDINATED MEMBERS

Retirement(continued)

Effective July 1, 2024, the following reduction factors are applied to an eligible person with the normal retirement age of 65 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	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%		

Reduction factors for members of the normal retirement age of 65 first hired on or after July 1, 2006 and who reach age 62 with 30 years of service credit:

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

Effective July 1, 2024, the following reduction factors are applied to an eligible person with the normal retirement age of 65 first hired after June 30, 2006 and who do not reach age 62 with 30 years of service credit:

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%		

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.

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 for new retirees has 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.

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.

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

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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.

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 FY25:

1993 Legislation:	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.
1996 Legislation:	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.
1997 Legislation:	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.
2014 Legislation:	Supplemental contributions from the State in the amount of $14,377,000 annually are assumed to made until the amortization date of June 30, 2048 or full actuarial funding is achieved, whichever is earlier. Amount is fixed in statute.

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 2024, the limit is $275,000.

IRC Section 401(a)(17): The limitations of Internal Revenue Code Section 401(a)(l7) 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 2024, the limit is $345,000. 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. For funding purposes, all assumptions are prescribed by Statutes, the LCPR, or the Board of Trustees. The assumptions prescribed are based on the experience study dated August 2, 2023.

The Allowance for Combined Service Annuity was based on the recommendation of Deloitte Consulting LLP, 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 Deloitte's findings.

Investment Return		7.00% compounded annually.
Future post-retirement adjustments		1.0% for January, 2019 through January, 2023, then increasing by 0.1% each year up to 1.5% annually.
Salary Increases		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.
Payroll Growth		3.00% per year
Future Service		Members are assumed to earn future service at a full-time rate.
Mortality:	***Pre-retirement***	PubT-2010(A) Employee Mortality Table, male rates set forward 1 year and female rates unadjusted. Generational projection uses the MP-2021 scale.
	Healthy Retirees	PubT-2010(A) Retiree Mortality Table, male rates set forward 1 year and female rates unadjusted. Generational projection uses the MP-2021 scale.
	Beneficiaries	Pub-2010(A) Contingent Survivor Mortality Table, male rates set forward 1 year and female rates unadjusted. Generational projection uses the MP-2021 scale.
	Disabled Retirees	PubNS-2010 Disabled Retiree Mortality Table, male rates set forward 1 year and female rates unadjusted. Generational projection uses the MP-2021 scale.
Disability		Age-related rates based on experience; see table of sample rates.

Withdrawal	Rates vary by service based on actual plan experience, as shown in the rate table.
Expenses	Prior year administrative expenses expressed as percentage of prior year payroll.
Retirement Age	Graded rates beginning at age 55 as shown in rate table. Members who have attained the highest assumed retirement age will retire in one year.
Percentage Married	85% of male members and 65% of female members are assumed to be married. Members are assumed to have no children.
Age Difference	Females two years younger than males.
Allowance for Combined Service Annuity	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.
Refund of Contributions	All employees withdrawing after becoming eligible for a deferred benefit are assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Interest on member contributions	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.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at unreduced retirement age.
Form of payment	Married members are assumed to elect subsidized joint and survivor form of annuity as follows:

Males:	10.0% elect 50% J&S option 5.0% elect 75% J&S option 70.0% elect 100% J&S option 15.0% elect Straight Life option
Females:	10.0% elect 50% J&S option 5.0% elect 75% J&S option 45.0% elect 100% J&S option 40.0% elect Straight Life option

Members eligible for deferred annuities (including current terminated deferred members) and future disability benefits are assumed to elect a life annuity.

Missing data for members

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

Data for active members:	
Salary, Service, and Date of Birth	Based on current active demographics.
Gender	Female
Data for terminated members:	
Average salary	$47,000
Date of termination	Derived from date of birth, original entry age, and service
Data for in-pay members:	
Beneficiary date of birth	Wife two years younger than husband
Gender	Based on first name
Form of payment	Life annuity for retirees and beneficiaries, 100% J&S option for disabled retirees.

Termination Rates

Service	Males	Females
Less than 1	20.00%	20.00%
1	12.00%	10.00%
2	8.50%	8.50%
3	6.00%	7.00%
4	5.00%	5.50%
5	4.25%	4.50%
6	3.75%	3.50%
7	3.25%	3.00%
8	2.75%	2.50%
9	2.25%	2.25%
10	2.00%	2.00%
15	1.10%	1.10%
20	0.80%	0.80%
25	0.55%	0.55%
30	0.50%	0.50%
Over 30	0.00%	0.00%

	Rate (%)			
	Pre-retirement Mortality*		Disability	
Age	Male	Female	Male	Female
20	0.029	0.012	0.000	0.000
25	0.015	0.008	0.000	0.000
30	0.021	0.013	0.000	0.000
35	0.029	0.019	0.010	0.010
40	0.041	0.029	0.030	0.030
45	0.067	0.045	0.043	0.043
50	0.110	0.068	0.085	0.085
55	0.169	0.099	0.136	0.136
60	0.263	0.149	0.213	0.213
65	0.436	0.250	0.000	0.000

* *Rates shown are for 2010, the base year of the tables.*

	Annuitant Mortality Rates (%)*					
	Retirement		Contingent Survivor		Disability	
Age	Male	Female	Male	Female	Male	Female
55	0.245	0.189	0.854	0.439	2.201	1.742
60	0.379	0.284	1.067	0.596	2.584	1.956
65	0.618	0.446	1.446	0.839	3.193	2.256
70	1.134	0.766	2.258	1.272	4.113	2.862
75	2.161	1.443	3.586	2.037	5.537	4.003
80	4.082	2.762	5.711	3.410	7.929	6.007
85	7.677	5.241	9.361	6.075	11.678	9.331
90	13.971	9.744	15.547	10.979	17.681	13.665
95	23.960	17.771	24.625	18.386	25.226	19.298
100	34.636	28.160	34.636	28.160	34.636	28.160

* *Rates shown are for 2010, the base year of the tables.*

Salary Scale		
Service	Select Salary Increase Before July 1, 2028	Ultimate 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%

	Retirement Rate (%)					
	Coordinated Members				Basic Members	
Age	Tier 1 Early	Tier 1 Unreduced	Tier 2 Early	Tier 2 Unreduced	Eligible for 30 and Out Provision	Not Eligible for 30 and Out Provision
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	10		25	25
61	20	35	15		25	25
62	25	35	20		25	25
63	25	35	20		25	25
64	25	35	20		25	25
65		40		45	40	40
66		40		35	40	40
67		30		30	40	40
68		30		30	40	40
69		30		30	40	40
70		30		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 5% added to their early retirement rates.

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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.