Minnesota State Retirement System

State Patrol Retirement Fund

GASB Statement Nos. 67 and 68

Accounting and Financial Reporting for Pensions

June 30, 2023

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November 27, 2023

Minnesota State Retirement System
State Patrol Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 for the State Patrol Retirement Fund, as amended by GASB Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust. GASB Statement No. 82 is an amendment to GASB Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. The calculation of the plan's liability for this report may not be applicable for purposes of funding the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statements No. 67 and No. 68 may produce significantly different results. The information in this report is calculated on a total plan basis. Minnesota State Retirement System (MSRS) is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the MSRS only in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by MSRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2023 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

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To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the State Patrol Retirement Fund as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

Bonita J. Wurst and Sheryl L. Christensen are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Bonita J. Wurst

Bonita J. Wurst, ASA, EA, FCA, MAAA

Sheryl Christensen

Sheryl L. Christensen, FSA, EA, FCA, MAAA

BJW/SLC:dj

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SECTION A

EXECUTIVE SUMMARY

Executive Summary
as of June 30, 2023 (Dollars in Thousands)

		2023
Actuarial Valuation Date		June 30, 2023
Measurement Date of the Net Pension Liability		June 30, 2023
Membership		
Number of		
- Service Retirements		911
- Survivors		163
- Disability Retirements		94
- Deferred Retirements		76
- Terminated Other Non-Vested		54
- Active Members		979
- Total		2,277
Covered-employee Payroll [(1)]	$	106,714
Net Pension Liability		
Total Pension Liability	$	1,170,196
Plan Fiduciary Net Position		943,099
Net Pension Liability	$	227,097
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		80.59%
Net Pension Liability as a Percentage of Covered-employee Payroll		212.81%
Development of the Single Discount Rate		
Single Discount Rate		7.00%
Long-Term Expected Rate of Investment Return		7.00%
Long-Term Municipal Bond Rate[(2)]		3.86%
Last year ending June 30 in the 2024 to 2123 projection period for which projected benefit payments are fully funded		2123
Total Pension Expense / (Income)	$	16,371

Deferred Outflows and Deferred Inflows of Resources by Source Arising from Current and Prior Periods to be Recognized in Future Pension Expenses

		Deferred Outflows of Resources		Deferred Inflows of Resources
Difference between expected and actual experience in the measurement of Total Pension Liability	$	37,573	$	1,668
Changes in assumptions		45,072		52,749
Net difference between projected and actual earnings on pension plan investments		77,564		82,001
Totals	$	160,209	$	136,418

(1) *Assumed equal to actual member contributions divided by employee contribution rate.*

(2) *Based on the 20-Year Municipal GO Index of mixed maturity general obligation municipal bonds as of the weekly rate closest to but not later than the Measurement Date.*

Discussion

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans*, establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements. GASB Statement No. 82, *Pension Issues*, is an amendment to GASB Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state and local governmental employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to the State Patrol Retirement Fund subsequent to the measurement date of June 30, 2023.

The pension expense or income recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the difference between expected and actual experience in the measurement of the total pension liability, assumption changes, and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position in accordance with GASB Statement No. 67. The *Statement of Fiduciary Net Position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *Statement of Changes in Fiduciary Net Position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain descriptive information about the pension plans through which the pension benefits are provided. The list of disclosure items should include:

- A description of benefits provided by the plan;
- The classes of employees and number of members covered by the pension plan;
- A description of the plan's funding policy, which includes member and employer contribution requirements;
- The pension plan's investment policies;
- The pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability using a discount rate that is 1% higher and 1% lower than the current discount rate used to calculate the total pension liability and net pension liability for financial reporting purposes;
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the discount rates; and
- Certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- The composition of the pension plan's Board and the authority under which benefit terms may be amended;
- A description of how fair value is determined;
- Information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- Annual money-weighted rate of return.

MSRS' comprehensive annual financial report, which contains the basic financial statements and related note disclosures for the State Patrol Retirement Fund, can be found online at www.msrs.state.mn.us/annual-reports-fy-2023 or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, Minnesota, 55103 or requested via email at info@msrs.us or telephone at 1.800.657.5757.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- Sources of changes in the net pension liability;
- Information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- A comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if there are no changes in benefits, Chapter 356 required contributions are made, and all actuarial assumptions are met (including the assumption of the plan earning 7.00% on an actuarial value of assets basis, as prescribed by statutes), then the following outcomes are expected:

1. The employer normal cost is expected to remain approximately level as a percentage of payroll;
2. The funded status of the plan is expected to gradually improve and is expected to be 100% funded within the next 25 years; and
3. The unfunded liability will grow initially as a dollar amount before beginning to decline.

The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the market value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1. The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
2. The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
3. The measurement would produce a different result if the actuarial value of assets were used instead of the market value of assets.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

GASB Statement Nos. 67 and 68 require that an actuarial valuation to determine the total pension liability is required to be performed at least every two years. For employer reporting, the net pension liability and pension expense should be measured as of a date (measurement date) no earlier than the end of the employer's prior fiscal year, consistently applied from period to period. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2023 and a measurement date of June 30, 2023.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00%; the municipal bond rate is 3.86% (based on the weekly rate closest to but not later than the measurement date of the "20-Year Municipal GO AA Index" as published by Fidelity); and the resulting single discount rate is 7.00%.

SECTION B

FINANCIAL STATEMENTS

Statement of Pension Expense Under GASB Statement No. 68
Fiscal Year Ended June 30, 2023 (Dollars in Thousands)

A. Expense			
1.	Service Cost	$	29,951
2.	Interest on the Total Pension Liability		77,346
3.	Current-Period Benefit Changes		2,002
4.	Employee Contributions		(16,434)
5.	Projected Earnings on Plan Investments		(59,039)
6.	Pension Plan Administrative Expense		235
7.	Other Changes in Plan Fiduciary Net Position		2
8.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Current Reporting Period		(298)
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		(5,819)
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.50%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		(3,665)
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**24,281**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Prior Reporting Periods	$	8,321
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		(12,038)
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(4,193)
15.	**Total Pension Expense / (Income)**	**$**	**16,371**

Differences between expected and actual experience and changes in assumptions are recognized in pension expense using a systematic and rational method over a closed period equal to the average of the expected remaining service lives of all employees that are provided with pension through the pension plan (active employees and inactive employees) determined as of the beginning of the measurement period.

At the beginning of the current measurement period, the expected remaining service lives of all active employees in the plan was approximately 12,168 years. Additionally, the total plan membership (active employees and inactive employees) was 2,196. As a result, the average of the expected remaining service lives for purposes of recognizing the applicable deferred outflows and inflows of resources established in the current measurement period is 6.0000 years (rounded).

Additionally, differences between projected and actual earnings on plan investments should be recognized in pension expense using a systematic and rational method over a closed five-year period. For this purpose, the deferred outflows and inflows of resources are recognized in the pension expense as a level dollar amount over the closed period identified above.

Statement of Outflows and Inflows
Arising from Current Reporting Period
Fiscal Year Ended June 30, 2023 (Dollars in Thousands)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	(1,787)
2. Assumption Changes (gains) or losses		(34,912)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years, rounded to the nearest whole number}		6
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability		(298)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes		(5,819)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(6,117)
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	(1,489)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes		(29,093)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(30,582)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(18,325)
2. Recognition period for Assets {in years}		5
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets		(3,665)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(14,660)

Statement of Outflows and Inflows
Arising from Current and Prior Reporting Periods
Fiscal Year Ended June 30, 2023 (Dollars in Thousands)

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Due to Liabilities	$ 24,828	$ 34,662	$ (9,834)
2. Due to Assets	29,478	37,336	(7,858)
3. Total	$ 54,306	$ 71,998	$ (17,692)

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Differences between expected and actual experience	$ 9,804	$ 1,781	$ 8,023
2. Assumption Changes	15,024	32,881	(17,857)
3. Net Difference between projected and actual earnings on pension plan investments	29,478	37,336	(7,858)
4. Total	$ 54,306	$ 71,998	$ (17,692)

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows/ (Inflows) of Resources
1. Differences between expected and actual experience	$ 37,573	$ 1,668	$ 35,905
2. Assumption Changes	45,072	52,749	(7,677)
3. Net Difference between projected and actual earnings on pension plan investments*	77,564	82,001	(4,437)
4. Total	$ 160,209	$ 136,418	$ 23,791

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending June 30	Net Deferred Outflows/ (Inflows) of Resources
2024	$ 4,481
2025	(860)
2026	32,901
2027	(6,616)
2028	(6,115)
Thereafter	-
Total	$ 23,791

** Paragraph 71(b) of GASB Statement No. 68 requires deferred outflows and inflows arising from differences between projected and actual earnings on pension plan investments to be aggregated and shown as a net amount. For purposes of this valuation, amounts are shown separately for calculation purposes.*

Recognition of Deferred Outflows and Inflows of Resources
Fiscal Year Ended June 30, 2023 (Dollars in Thousands)

Year Established	Initial Amount	Initial Recognition Period	Current Year Recognition	Remaining Recognition	Remaining Recognition Period
Deferred Outflow (Inflow) Due to Differences Between Expected and Actual Experience on Liabilities					
2018	$ (8,369)	6.0000	$ (1,394)	$ 0	0.0000
2019	2,757	6.0000	459	459	1.0000
2020	(535)	6.0000	(89)	(179)	2.0000
2021	1,596	6.0000	266	798	3.0000
2022	54,474	6.0000	9,079	36,316	4.0000
2023	(1,787)	6.0000	(298)	(1,489)	5.0000
Total			**$ 8,023**	**$ 35,905**	
Deferred Outflow (Inflow) Due to Assumption Changes					
2018	$ (126,888)	6.0000	$ (21,148)	$ 0	0.0000
2021	90,144	6.0000	15,024	45,072	3.0000
2022	(35,484)	6.0000	(5,914)	(23,656)	4.0000
2023	(34,912)	6.0000	(5,819)	(29,093)	5.0000
Total			**$ (17,857)**	**$ (7,677)**	
Deferred Outflow (Inflow) Due to Differences Between Projected and Actual Earnings on Plan Investments					
2019	$ 1,844	5.0000	$ 368	$ 0	0.0000
2020	24,414	5.0000	4,883	4,882	1.0000
2021	(168,354)	5.0000	(33,671)	(67,341)	2.0000
2022	121,136	5.0000	24,227	72,682	3.0000
2023	(18,325)	5.0000	(3,665)	(14,660)	4.0000
Total			**$ (7,858)**	**$ (4,437)**	
Deferred Outflow (Inflow) Due to All Sources					
Total			**$ (17,692)**	**$ 23,791**	

Statement of Fiduciary Net Position as of June 30, 2023 (Dollars in Thousands)

Assets		June 30, 2023
Cash & Short-term Investments	$	31,410
Receivables		1,602
Investment Pools (at fair value)		910,539
Securities Lending Collateral		48,722
Capital Assets		-
Total Assets	**$**	**992,273**
Total Deferred Outflows of Resources	**$**	**-**
Total Liabilities	**$**	**(49,174)**
Total Deferred Inflows of Resources	**$**	**-**
Net Position Restricted for Pensions	**$**	**943,099**

Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2023 (Dollars in Thousands)

1.	**Net Position at market value at beginning of year**	**$**	**883,581**
Additions			
2.	Contributions		
	a. Employee	$	16,434
	b. Employer		31,537
	c. Other sources - Supplemental State Aid		1,000
	d. Total contributions	$	48,971
3.	Investment income		
	a. Investment income/(loss)	$	78,314
	b. Investment expenses		(950)
	c. Net investment income/(loss)	$	77,364
4.	Other Additions	$	-
5.	**Total Additions** *(2.d.) + (3.c.) + (4.)*	**$**	**126,335**
Deductions			
6.	Benefits Paid		
	a. Annuity benefits	$	(66,343)
	b. Refunds		(237)
	c. Total benefits paid	$	(66,580)
7.	Expenses		
	a. Other deductions	$	(2)
	b. Administrative		(235)
	c. Total expenses	$	(237)
8.	**Total Deductions** *(6.c.) + (7.c.)*	**$**	**(66,817)**
9.	**Net increase/(decrease) in fiduciary net position** *(5.) + (8.)*	**$**	**59,518**
10.	**Net position at market value at end of year** *(1.) + (9.)*	**$**	**943,099**
11.	State Board of Investment calculated annual investment return for the State Patrol Retirement Fund*		8.9%

** The fiscal year 2023 investment return for the Combined Funds is 8.9%.*

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Changes in Net Pension Liability and Related Ratios
Current Period
Fiscal Year Ended June 30, 2023 (Dollars in Thousands)

A. Total pension liability		
1. Service cost	$	29,951
2. Interest on the total pension liability		77,346
3. Changes of benefit terms		2,002
4. Difference between expected and actual experience of the total pension liability		(1,787)
5. Changes of assumptions		(34,912)
6. Benefit payments, including refunds of employee contributions		(66,580)
7. Net change in total pension liability	$	6,020
8. Total pension liability – beginning		1,164,176
9. Total pension liability – ending	**$**	**1,170,196**
B. Plan fiduciary net position		
1. Contributions – employer [1]	$	32,537
2. Contributions – employee		16,434
3. Net investment income		77,364
4. Benefit payments, including refunds of employee contributions		(66,580)
5. Pension plan administrative expense		(235)
6. Other changes		(2)
7. Net change in plan fiduciary net position	$	59,518
8. Plan fiduciary net position – beginning		883,581
9. Plan fiduciary net position – ending	**$**	**943,099**
C. Net pension liability, *A.9. - B.9.*	**$**	**227,097**
D. Plan fiduciary net position as a percentage of the total pension liability, *B.9. / A.9.*		**80.59%**
E. Covered-employee payroll [2]	**$**	**106,714**
F. Net pension liability as a percentage of covered-employee payroll, *C. / E.*		**212.81%**

[1] *Includes $1 million supplemental state aid.*
[2] *Assumed equal to actual member contributions divided by employee contribution rate.*

Schedule of Changes in Net Pension Liability and Related Ratios Multiyear
(Dollars in Thousands)

Last 10 Fiscal Years

Fiscal year ending June 30,	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Total Pension Liability										
Service Cost	$ 29,951	$ 26,648	$ 21,795	$ 21,122	$ 19,375	$ 24,935	$ 29,758	$ 16,555	$ 16,144	$ 14,514
Interest on the Total Pension Liability	77,346	71,049	72,625	70,465	68,227	65,110	58,865	64,592	63,753	60,183
Benefit Changes	2,002	0	0	0	0	(2,604)	0	0	0	0
Difference between Expected and Actual Experience	(1,787)	54,474	1,596	(535)	2,757	(8,369)	(2,418)	(22,222)	(12,855)	(5,771)
Assumption Changes	(34,912)	(35,484)	90,144	0	0	(126,888)	(112,694)	283,584	0	30,058
Benefit Payments	(66,343)	(64,332)	(63,094)	(61,859)	(60,375)	(59,653)	(58,560)	(57,695)	(55,465)	(53,697)
Refunds	(237)	(174)	(116)	(112)	(428)	(39)	(5)	(79)	(15)	(25)
Net Change in Total Pension Liability	$ 6,020	$ 52,181	$ 122,950	$ 29,081	$ 29,556	$ (107,508)	$ (85,054)	$ 284,735	$ 11,562	$ 45,262
Total Pension Liability - Beginning	1,164,176	1,111,995	989,045	959,964	930,408	1,037,916	1,122,970	838,235	826,673	781,411
Total Pension Liability - Ending (a)	**$ 1,170,196**	**$ 1,164,176**	**$ 1,111,995**	**$ 989,045**	**$ 959,964**	**$ 930,408**	**$1,037,916**	**$1,122,970**	**$ 838,235**	**$ 826,673**
Plan Fiduciary Net Position										
Employer Contributions [(1)]	$ 32,537	$ 33,258	$ 25,809	$ 22,975	$ 20,479	$ 16,952	$ 16,783	$ 14,938	$ 14,763	$ 12,894
Employee Contributions	16,434	16,515	13,606	12,595	12,038	10,657	10,520	9,292	9,174	7,930
Pension Plan Net Investment Income	77,364	(59,360)	224,273	31,073	51,823	70,474	93,077	(774)	28,903	107,187
Benefit Payments	(66,343)	(64,332)	(63,094)	(61,859)	(60,375)	(59,653)	(58,560)	(57,695)	(55,465)	(53,697)
Refunds	(237)	(174)	(116)	(112)	(428)	(39)	(5)	(79)	(15)	(25)
Pension Plan Administrative Expense	(235)	(190)	(204)	(224)	(191)	(184)	(208)	(220)	(170)	(150)
Other	(2)	0	0	(2)	(1)	(7)	0	0	0	0
Net Change in Plan Fiduciary Net Position	**$ 59,518**	**$ (74,283)**	**$ 200,274**	**$ 4,446**	**$ 23,345**	**$ 38,200**	**$ 61,607**	**$ (34,538)**	**$ (2,810)**	**$ 74,139**
Plan Fiduciary Net Position - Beginning	**883,581**	**957,864**	**757,590**	**753,144**	**729,799**	**691,599**	**629,992**	**664,530**	**667,340**	**593,201**
Plan Fiduciary Net Position - Ending (b)	**$ 943,099**	**$ 883,581**	**$ 957,864**	**$ 757,590**	**$ 753,144**	**$ 729,799**	**$ 691,599**	**$ 629,992**	**$ 664,530**	**$ 667,340**
Net Pension Liability - Ending (a) - (b)	**$ 227,097**	**$ 280,595**	**$ 154,131**	**$ 231,455**	**$ 206,820**	**$ 200,609**	**$ 346,317**	**$ 492,978**	**$ 173,705**	**$ 159,333**
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**80.59 %**	**75.90 %**	**86.14 %**	**76.60 %**	**78.46 %**	**78.44 %**	**66.63 %**	**56.10 %**	**79.28 %**	**80.73 %**
Covered-Employee Payroll [(2)]	**$ 106,714**	**$ 107,240**	**$ 88,351**	**$ 84,530**	**$ 80,792**	**$ 74,007**	**$ 73,056**	**$ 69,343**	**$ 68,463**	**$ 63,952**
Net Pension Liability as a Percentage of Covered-Employee Payroll	**212.81 %**	**261.65 %**	**174.45 %**	**273.81 %**	**255.99 %**	**271.07 %**	**474.04 %**	**710.93 %**	**253.72 %**	**249.15 %**

Notes to Schedule:

[(1)] *Includes $1 million supplemental state aid.*

[(2)] *Assumed equal to actual member contributions divided by employee contribution rate.*

Schedule of Net Pension Liability Multiyear
(Dollars in Thousands)

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered-Employee Payroll	Net Pension Liability as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(b) / (c)	(d)	(c) / (d)
2014	$ 826,673	$ 667,340	$ 159,333	80.73%	$ 63,952	249.14%
2015	838,235	664,530	173,705	79.28	68,463	253.72
2016	1,122,970	629,992	492,978	56.10	69,343	710.93
2017	1,037,916	691,599	346,317	66.63	73,056	474.04
2018	930,408	729,799	200,609	78.44	74,007	271.07
2019	959,964	753,144	206,820	78.46	80,792	255.99
2020	989,045	757,590	231,455	76.60	84,530	273.81
2021	1,111,995	957,864	154,131	86.14	88,351	174.45
2022	1,164,176	883,581	280,595	75.90	107,240	261.65
2023	1,170,196	943,099	227,097	80.59	106,714	212.81

Schedule of Contributions Multiyear (Dollars in Thousands)

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution (1)	Actual Contributions (2)	Contribution Deficiency (Excess)	Covered-Employee Payroll (3)	Actual Contribution as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b) / (d)
2014	$ 18,444	$ 12,894	$ 5,550	$ 63,952	20.16%
2015	20,648	14,763	5,885	68,463	21.56
2016	20,463	14,938	5,525	69,343	21.54
2017	19,031	16,783	2,248	73,056	22.97
2018	20,900	16,952	3,948	74,007	22.91
2019	21,281	20,479	802	80,792	25.35
2020	21,580	22,975	(1,395)	84,530	27.18
2021	22,203	25,809	(3,606)	88,351	29.21
2022	20,611	33,258	(12,647)	107,240	31.01
2023	19,902	32,537	(12,635)	106,714	30.49

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Fiscal Year Ending June 30, 2023 Contribution Rates Reported in this Schedule:

Notes	(1) Actuarially determined contribution rates are calculated as of each June 30 and apply to the fiscal year beginning on the day after the measurement date. (2) Includes supplemental state aid of $1 million. (3) Assumed equal to actual member contributions divided by employee contribution rate.
Valuation Date	June 30, 2022
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	26 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.25%
Payroll Growth	3.00%
Salary Increases	Service based tables ranging from 12.50% with one year of service to 3.00% with 25 or more years of service, including inflation
Investment Rate of Return	7.50%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2021 valuation pursuant to an experience study of the period 2015-2019.
Healthy Post-retirement Mortality	Pub-2010 General Retired Mortality Table adjusted for mortality improvements using mortality improvement Scale MP-2019.

Other Information:

Benefit Increases After Retirement	1.00% per annum

See separate funding actuarial valuation report as of July 1, 2022 for additional detail. To obtain this report, contact MSRS as noted on page 3. The report is also available online at https://www.msrs.state.mn.us/annual-reports-fy-2022

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2014	18.7 %
2015	4.5
2016	(0.1)
2017	15.2
2018	10.5
2019	7.3
2020	4.2
2021	30.3
2022	(6.3)
2023	8.9

[1] *Annual money-weighted rate of return, net of investment expenses.*

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

Rate of Return

For the fiscal year ended June 30, 2023, the annual money-weighted rate of return for the State Patrol Retirement Fund was 8.9%. The money-weighted rate of return is a method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of this schedule, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

To request additional information about the computation of the annual money-weighted rate of return and the investments for the Minnesota Retirement Systems (including the investments for MSRS' defined benefit retirement funds), contact SBI at 60 Empire Drive, Suite 355, St. Paul, Minnesota, 55103, via email at minn.sbi@state.mn.us or telephone at 651.296.3328.

SECTION D

ADDITIONAL FINANCIAL STATEMENT DISCLOSURES

Asset Allocation

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method. Estimates for expected future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectation from a number of investment management and consulting organizations. The asset class estimates and the target allocations were then combined to produce a geometric, long-term expected rate of return for the portfolio. Inflation expectations were applied to derive the nominal rate of return for the portfolio. For each major asset class that is included in the pension fund's target asset allocation as of June 30, 2023, these estimates are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Geometric Mean)
Domestic Equity	33.5%	5.10%
International Equity	16.5%	5.30%
Private Markets	25.0%	5.90%
Fixed Income	25.0%	0.75%
Total	100.0%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

For purposes of this valuation, the long-term expected rate of return assumption is 7.00%. This assumption is based on the State Employees Retirement Fund experience study report dated June 29, 2023.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

Single Discount Rate

A Single Discount Rate of 7.00% was used to measure the total pension liability. This Single Discount Rate was based on the expected rate of return on pension plan investments of 7.00%. The projection of cash flows used to determine this Single Discount Rate assumed that member, employer, and state contributions will be made at the current statutory contribution rates. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 7.00%, as well as what the plan's net pension liability would be if it were calculated using a Single Discount Rate that is one percent lower (6.00%) or one percent higher (8.00%) than the current rate:

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 6.00%	Current Single Discount Rate Assumption 7.00%	1% Increase 8.00%
Total Pension Liability	$1,320,990	$1,170,196	$1,046,281
Net Position Restricted for Pensions	943,099	943,099	943,099
Net Pension Liability	**$ 377,891**	**$ 227,097**	**$ 103,182**

For more information on the calculation of the single discount rate, refer to Section G of this report.

Note that we believe the 8.00% interest rate assumption does not comply with Actuarial Standards of Practice.

GASB Statement No. 68 Reconciliation (Dollars in Thousands)

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Total Pension Expense
Balance Beginning of Year	**$ 1,164,176**	**$ 883,581**	**$ 280,595**	**$ 214,515**	**$ 153,392**	
Changes for the Year:						
Service Cost	$ 29,951		$ 29,951			$ 29,951
Interest on Total Pension Liability	77,346		77,346			77,346
Interest on Fiduciary Net Position		$ 59,039 [1]	(59,039)			(59,039)
Changes in Benefit Terms	2,002		2,002			2,002
Liability Experience Gains and Losses	(1,787)		(1,787)	$ -	$ 1,489	(298)
Changes in Assumptions	(34,912)		(34,912)	-	29,093	(5,819)
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				(9,804)	(1,483)	8,321
Assumption Changes				(15,024)	(27,062)	(12,038)
Investment Gains/(Losses)				(29,478)	(33,671)	(4,193)
Contributions - Employer		32,537 [2]	(32,537)			
Contributions - Employees		16,434	(16,434)			(16,434)
Asset Gain/(Loss)		18,325 [1]	(18,325)	-	14,660	(3,665)
Benefit Payments and Refunds	(66,580)	(66,580)	-			
Administrative Expenses		(235)	235			235
Other changes		(2)	2			2
Net Changes	**$ 6,020**	**$ 59,518**	**$ (53,498)**	**$ (54,306)**	**$ (16,974)**	**$ 16,371**
Balance End of Year	**$ 1,170,196**	**$ 943,099**	**$ 227,097**	**$ 160,209**	**$ 136,418**	

[1] *The sum of these items in column (b) equals the net investment income of $77,364.*
[2] *Includes supplemental state aid of $1,000.*

Summary of Population Statistics

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on July 1, 2022	**937**	**78**	**41**	**888**	**85**	**167**	**2,196**
New members	100						**100**
Return to active	0	0	0	0	0	0	**0**
Terminated non-vested	(7)	0	7	0	0	0	**0**
Service retirements	(35)	(4)	0	39	0	0	**0**
Terminated deferred	(6)	6	0	0	0	0	**0**
Terminated refund/transfer	(3)	(1)	(1)	0	0	0	**(5)**
Deaths	0	0	0	(21)	(1)	(7)	**(29)**
New beneficiary	0	0	0	0	0	3	**3**
Disabled	(7)	0	0	0	7	0	**0**
Unexpected status change	0	(3)	7	5	3	0	**12**
Net change	42	(2)	13	23	9	(4)	**81**
Members on July 1, 2023	**979**	**76**	**54**	**911**	**94**	**163**	**2,277**

SECTION E

SUMMARY OF BENEFITS

Summary of Plan Provisions

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30
Eligibility	State troopers, conservation officers, certain crime bureau and gambling enforcement officers, and certain other persons listed in Minnesota Statutes 352B.011 subdivision 10.
Contributions	Percent of Salary: **Effective as of** / **Member** / **Regular Employer** / **Supplemental Employer** / **Total** July 1, 2021 / 15.40% / 23.10% / 7.00% / 45.50% Supplemental employer contributions remain in effect until the plan is 100% funded on a market value of assets basis for a minimum of three consecutive years. Member contributions are “picked up” according to the provisions of Internal Revenue Code 414(h).
State contributions	$1 million paid annually on October 1 until the earlier of 1) both the Public Employees Retirement Association Police and Fire Plan and the State Patrol Retirement Fund attaining 90% funded status (on an actuarial value of assets basis), or 2) July 1, 2048. Additional one-time direct state aid payment of $11,970,568, payable October 1, 2023.
Allowable service	Service during which member contributions were deducted. Includes period receiving temporary Worker's Compensation and reduced salary from employer. See Normal Retirement benefit definition below for information about service limits.
Salary	Salaries excluding lump sum payments at separation.
Average salary	Average of the five highest years of Salary. Average Salary is based on all Allowable Service if less than five years. Average Salary is based on all years without regard to any service limits.

Contribution rates (Percent of Salary):

Effective as of	Member	Regular Employer	Supplemental Employer	Total
July 1, 2021	15.40%	23.10%	7.00%	45.50%

Summary of Plan Provisions (Continued)

Retirement

Normal retirement benefit

Age/Service requirement	Age 55 and three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	3.00% of Average Salary for each year of Allowable Service up to 33 years. Members with at least 28 years of service as of July 1, 2013, are not subject to this service limit. Member contributions made after the service cap will be refunded at retirement.

Early retirement benefit

Age/Service requirement	Age 50 and three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement reduced by 0.34% for each month that the member is under age 55. If the effective date of retirement is before July 1, 2015, the reduction is 1/10% for each month that the member is under age 55 at the time of retirement.

Form of payment	Life annuity. Actuarially equivalent options are: 50%, 75%, or 100% Joint and Survivor, or 15-year certain. If a Joint and Survivor benefit is elected and the beneficiary predeceases the annuitant, the annuitant's benefit increases to the Life Annuity amount. This "bounce back" is subsidized by the plan.
Benefit increases	1.00% per year. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase. An additional one-time, non-compounding benefit increase of 3.00%, payable for calendar year 2024 in a lump sum by March 31, 2024, to benefit recipients who have been receiving a benefit for at least 12 full months as of June 30, 2023.

Summary of Plan Provisions (Continued)

Disability

Duty disability benefit

Age/Service requirement	Member who cannot perform his duties as a direct result of a disability relating to an act of duty.
Amount	60% of Average Salary plus 3.00% of Average Salary for each year in excess of 20 years of Allowable Service (pro rata for completed months). Payments cease at age 65 (age 55 if disabled after June 30, 2015) or the 5-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 paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.

Non-duty disability benefit

Age/Service requirement	At least one year of Allowable Service and disability not related to covered employment.
Amount	Normal Retirement Benefit based on Allowable Service (minimum of 15 years) and Average Salary at disability without reduction for commencement before age 55. Payments cease at age 65 (age 55 if disabled after June 30, 2015) or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.

Total and permanent duty disability benefit

Age/Service requirement	Member who cannot perform any substantial gainful activity as a direct result of a disability (physical or psychological) relating to an act of duty, which is expected to persist for a period of 12 months or more. If condition no longer qualifies as total and permanent, benefit will be recalculated under the duty disability benefit provisions.
Amount	99% of member's average monthly salary.

Summary of Plan Provisions (Continued)

Disability (Concluded)

Retirement after disability

Age/Service requirement	Age 65 (age 55 if disabled after June 30, 2015) with continued disability.
Amount	Optional annuity continues. Otherwise, normal retirement benefit equal to the disability benefit paid, or an actuarially equivalent option.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.

Death

Surviving spouse benefit

Age/Service requirement	Member who is active or receiving a disability benefit or former member.
Amount	50% of Average Salary if member was active or occupational disability and either had less than three years (five years if first hired after June 30, 2013) of Allowable Service or was under age 55. Annuity is paid for life. Surviving spouse receives the 100% joint and survivor benefit commencing on the member's 55th birthday if member was active or a disability with three years (five years if first hired after June 30, 2013) of Allowable Service. A spouse who had been receiving the 50% benefit shall be entitled to the greater benefit. The surviving spouse of a former member receives the 100% joint and survivor benefit commencing on the member's 55th birthday if former member had three years (five years if first hired after June 30, 2013) of Allowable Service.
Benefit increases	Same as for retirement.

Surviving dependent children's benefit

Age/Service requirement	Member who is active or receiving a disability benefit. Child must be unmarried, under age 18 (or 23 if full-time student) and dependent upon the member.
Amount	10% of Average Salary for each child and $20 per month prorated among all dependent children. Benefit must not be less than 50% nor exceed 70% of Average Salary.
Benefit increases	Same as for retirement.

Refund of contributions

Age/Service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	Member's contributions with 6.00% interest through June 30, 2011. Beginning July 1, 2011, a member's contributions increase with 4.00% interest. Beginning July 1, 2018, member contributions increase with 3.00% interest.

Summary of Plan Provisions (Continued)

Termination	
Refund of contributions	
Age/service requirement	Termination of state service.
Amount	Member's contributions with 6.00% interest through June 30, 2011. Beginning July 1, 2011, a member's contributions increase with 4.00% interest. Beginning July 1, 2018, member contributions increase with 3.00% interest. If a member is vested, a deferred annuity may be elected in lieu of a refund.
Deferred benefit	
Age/service requirement	Three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	Benefit is computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971, to January 1, 1981; (c.) 3.00% thereafter (2.50% if hired after June 30, 2006) until January 1, 2012; (d.) 2.00% after December 31, 2011, through December 31, 2018; and (e.) 0.00% thereafter. Amount is payable at normal or early retirement. If a member terminated employment prior to July 1, 1997, but was not eligible to commence their pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Optional form conversion factors	Effective July 1, 2019 and phased in over a 24-month period, actuarially equivalent factors based on the RP-2014 mortality table for healthy annuitants for a member turning age 55 in 2021, reflecting projected mortality improvements using Scale MP-2017, white collar adjustment, blended 90% males, 6.44% post-retirement interest, and 7.50% pre-retirement interest. Reflecting statutory requirements, joint and survivor factors are based on an interest assumption of 6.50%.

Summary of Plan Provisions (Concluded)

Combined service annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Changes in plan provisions	Supplemental employer contributions will continue until the Plan is fully funded for a minimum of three consecutive years on a market value of assets basis. These contributions were previously due to expire upon attainment of fully funded status on a market value of assets basis. Additional one-time direct state aid contribution of $12.0 million will be contributed to the Plan on October 1, 2023. A one-time, non-compounding benefit increase of 3.00% will be payable in a lump sum for calendar year 2024 by March 31, 2024. Psychological treatment is required effective July 1, 2023 prior to approval for a duty disability benefit for a psychological condition relating to the member's occupation. A total and permanent duty disability benefit was added, effective July 1, 2023.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Actuarial Methods Used for the Determination of Total Pension Liability and Related Values

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) The annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and

(ii) Each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains/(losses), as they occur, reduce (increase) the Total Pension Liability.

Asset Valuation Method

Fair value of assets.

Summary of Actuarial Assumptions Used for the Determination of Total Pension Liability and Related Values

The following assumptions were used in valuing the liabilities and benefits under the plan. The assumptions are based on the experience study dated June 30, 2020 and a review of inflation and investment assumptions included in the State Employees Retirement Fund Experience Study report dated June 29, 2023. The Allowance for Combined Service Annuity assumptions are based on an analysis completed by the LCPR actuary and documented in a report dated October 2016.

Investment return	7.00% per annum.
Single discount rate	7.00% per annum.
Salary increases	Reported salary at valuation date increased according to the rate table, to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for members with less than one year of service.
Inflation	2.25% per year.
Payroll growth	3.00% per year.
Mortality rates	
Healthy pre-retirement	Pub-2010 General Employee Mortality Table adjusted for mortality improvements using mortality improvement Scale MP-2019.
Healthy post-retirement	Pub-2010 General Retired Mortality Table adjusted for mortality improvements using mortality improvement Scale MP-2019.
Disabled	Pub-2010 General Disabled Mortality Table adjusted for mortality improvements using mortality improvement Scale MP-2019.
Notes	The Pub-2010 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 18 to 80 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have extended the annuitant mortality table as needed for members younger than age 50 who are receiving a benefit by deriving rates based on the employee table and the juvenile table. Similarly, we have extended the employee table as needed for members older than age 80 by deriving rates based on the annuitant table.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year. Note that plan changes reflected in this report may result in behavior changes that are not anticipated in the current retirement rates.
Withdrawal	Service-related rates based on experience; see table of sample rates.
Disability	Age-related rates based on experience; see table of sample rates. All incidences are assumed to be duty-related. There is no assumed incidence of the total and permanent duty disability benefit; actual incidence of this benefit will be monitored and may be included in future valuations.
Allowance for combined service annuity	Liabilities for former, vested members are increased by 13.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.

Summary of Actuarial Assumptions (Continued)

Administrative expenses	In the valuation year, equal to prior year administrative expenses expressed as percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Refund of contributions	For non-vested members, account balances accumulate interest until the assumed commencement date and are discounted back to the valuation date. Active members decrementing after becoming eligible for a benefit are assumed to take the contributions accumulated with interest if larger than the value of the benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 55.
Percentage married	85% of active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Females are assumed to be two years younger than their spouses, and males are assumed to be two years older than their spouses.
Eligible children	Each member may have two dependent children depending on member's age. Assumed first child is born at member's age 28 and second child at member's age 31.
Form of payment	Married members retiring from active status are assumed to elect subsidized Joint and Survivor form of annuity as follows: 12.5% elect 50% Joint & Survivor option 12.5% elect 75% Joint & Survivor option 70.0% elect 100% Joint & Survivor option Remaining married and unmarried members are assumed to elect the Straight Life option.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year.
Service credit accruals	It is assumed that members accrue one year of service credit per year.
Pay increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.

Summary of Actuarial Assumptions (Continued)

Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: <u>Data for active members</u>: There was 1 member reported with zero or invalid salary (<$100). We used prior year salary. There were no members reported with 0 service, or a missing or invalid date of birth or gender. <u>Data for terminated members</u>: There were 3 members reported without a benefit. We calculated benefits for these members using the reported Credited Service and Termination Date. Average Salary was not reported, so we assumed a value of $45,000. There were no members reported with a missing or invalid date of birth or gender. <u>Data for members receiving benefits</u>: There were 3 members reported with a missing gender. We assumed male gender for retirees and female gender for survivors. There were no members reported with a missing or invalid birth date. There were no members reported without a benefit. There were no survivors reported with an expired benefit. There were 8 retirees reported with a bounceback annuity and an unreasonable reduction factor. A factor of 0.80, 0.85 and 0.90 was assumed for the 100%, 75% and 50% joint and survivor annuity, respectively. There were 3 retirees reported with a survivor option and a survivor date of death. We assumed no benefit was payable to the survivor, and the member benefit already reflected the "pop-up," if any. For retirees who elected a survivor benefit option, we used the valuation assumptions if the survivor date of birth was missing or invalid (156 members) and/or the survivor gender was missing or invalid (143 members).
Changes in actuarial assumptions	The investment return and single discount rate were changed from 6.75% to 7.00%.

Summary of Actuarial Assumptions (Continued)

Age in 2023	Percentage of Members Dying each Year*					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality**	
	Male	Female	Male	Female	Male	Female
20	0.04%	0.01%	0.04%	0.01%	0.44%	0.26%
25	0.03	0.01	0.03	0.01	0.34	0.21
30	0.05	0.02	0.05	0.02	0.51	0.36
35	0.07	0.03	0.07	0.03	0.69	0.56
40	0.09	0.04	0.09	0.04	0.85	0.76
45	0.12	0.07	0.10	0.06	1.06	0.99
50	0.28	0.21	0.14	0.08	1.50	1.41
55	0.41	0.29	0.21	0.13	2.03	1.80
60	0.63	0.41	0.33	0.20	2.57	2.07
65	0.91	0.59	0.47	0.29	3.05	2.18
70	1.41	0.95	0.65	0.44	3.62	2.56
75	2.39	1.68	0.98	0.72	4.64	3.56
80	4.28	3.09	1.55	1.22	6.59	5.52
85	7.84	5.83	6.59	5.01	9.87	8.76
90	13.58	10.85	13.58	10.85	15.04	12.91

* *Generally, mortality rates are expected to increase as age increases (with the exception of young ages, where expected mortality may decrease as age increases). In cases where the application of the projection scale would reverse the nature of this trend, standard mortality rates have been adjusted slightly. The adjustment has no material effect on results.*

** *Rates are adjusted for mortality improvements using Scale MP-2019 from a base year of 2010.*

Age	Percent of Members Decrementing Each Year Due to Disability Retirement
20	0.030%
25	0.050
30	0.090
35	0.135
40	0.155
45	0.239
50	0.481
55	0.800
60+	0.000

Summary of Actuarial Assumptions (Concluded)

Age	Percent Retiring
50	3 %
51	5
52	5
53	3
54	4
55	65
56	40
57	30
58	15
59	20
60+	100

Salary Scale	
Year	Increase
1	12.50%
2	8.50
3	7.50
4	7.25
5	7.00
6	6.75
7	6.50
8	5.50
9	5.00
10	4.50
11	4.25
12	4.00
13	4.00
14	4.00
15	4.00
16	3.75
17	3.50
18	3.50
19	3.50
20	3.50
21	3.40
22	3.30
23	3.20
24	3.10
25+	3.00

Year	Percent of Members Terminating (Withdrawing) Each Year
1	5.00%
2	3.50
3	2.50
4	2.25
5	2.00
6	1.75
7	1.50
8	1.25
9	1.00
10	0.75
11	0.75
12	0.75
13	0.75
14	0.75
15	0.50
16	0.50
17	0.50
18	0.50
19	0.50
20	0.50
21	0.50
22+	0.00

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term expected rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal rate is required, as described in the following paragraph.

The *Single Discount Rate* (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the plan fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00%; the municipal bond rate is 3.86% (based on the weekly rate closest to but not later than the measurement date of the “20-Year Municipal GO Index” as published by Fidelity) and **the resulting single discount rate as of June 30, 2023 is 7.00%**. In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax-exempt securities.

The tables in this section provide background for the development of the single discount rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

Single Discount Rate Development
Projection of Contributions (Dollars in Thousands)

Fiscal Year Ending	Projected Covered-Employee Payroll: Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Projected Contributions: Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL[1]	Additional State Contributions[2]	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) x 15.4%	(e) = (a) x 23.1%[3]	(f)	(g)	(h) = (d) + (e) + (f) + (g)
2023	$ 106,714		$ 106,714					
2024	108,637	$ 101	108,738	$ 16,730	$ 32,700	$ 19	$ 12,971	$ 62,420
2025	108,256	3,744	112,000	16,671	32,585	704	1,000	50,960
2026	107,254	8,106	115,360	16,517	32,283	1,524	1,000	51,324
2027	106,395	12,426	118,821	16,385	32,025	2,336	1,000	51,746
2028	105,055	17,330	122,385	16,178	31,621	3,258	1,000	52,057
2029	103,157	22,900	126,057	15,886	31,050	4,305	1,000	52,241
2030	101,131	28,707	129,838	15,574	30,441	5,397	-	51,412
2031	98,711	35,023	133,734	15,201	29,712	6,584	-	51,497
2032	95,627	42,119	137,746	14,727	28,784	7,918	-	51,429
2033	92,247	49,631	141,878	14,206	27,766	9,331	-	51,303
2034	89,195	56,939	146,134	13,736	26,848	10,704	-	51,288
2035	86,371	64,147	150,518	13,301	25,998	12,060	-	51,359
2036	83,393	71,641	155,034	12,843	25,101	13,468	-	51,412
2037	80,398	79,287	159,685	12,381	24,200	14,906	-	51,487
2038	77,515	86,960	164,475	11,937	23,332	16,349	-	51,618
2039	74,315	95,095	169,410	11,445	22,369	17,878	-	51,692
2040	70,443	104,049	174,492	10,848	16,272	12,278	-	39,398
2041	66,327	113,400	179,727	10,214	15,321	13,381	-	38,916
2042	61,591	123,528	185,119	9,485	14,228	14,576	-	38,289
2043	56,674	133,998	190,672	8,728	13,092	15,812	-	37,632
2044	52,128	144,264	196,392	8,028	12,041	17,023	-	37,092
2045	47,311	154,973	202,284	7,286	10,929	18,287	-	36,502
2046	41,939	166,414	208,353	6,459	9,688	19,637	-	35,784
2047	36,513	178,090	214,603	5,623	8,434	21,015	-	35,072
2048	31,214	189,827	221,041	4,807	7,210	22,400	-	34,417
2049	26,365	201,307	227,672	4,060	6,090	23,754	-	33,904
2050	21,769	212,734	234,503	3,353	5,029	25,103	-	33,485
2051	17,111	224,427	241,538	2,635	3,953	26,482	-	33,070
2052	12,952	235,832	248,784	1,995	2,992	27,828	-	32,815
2053	9,249	246,998	256,247	1,424	2,137	29,146	-	32,707
2054	6,291	257,644	263,935	969	1,453	30,402	-	32,824
2055	3,902	267,951	271,853	601	901	31,618	-	33,120
2056	2,332	277,676	280,008	359	539	32,766	-	33,664
2057	1,410	286,999	288,409	217	326	33,866	-	34,409
2058	782	296,279	297,061	120	181	34,961	-	35,262
2059	396	305,577	305,973	61	91	36,058	-	36,210
2060	155	314,997	315,152	24	36	37,170	-	37,230
2061	54	324,552	324,606	8	12	38,297	-	38,317
2062	22	334,323	334,345	3	5	39,450	-	39,458
2063	5	344,370	344,375	1	1	40,636	-	40,638
2064	-	354,706	354,706	-	-	41,855	-	41,855
2065	-	365,347	365,347	-	-	43,111	-	43,111
2066	-	376,308	376,308	-	-	44,404	-	44,404
2067	-	387,597	387,597	-	-	45,736	-	45,736
2068	-	399,225	399,225	-	-	47,109	-	47,109
2069	-	411,202	411,202	-	-	48,522	-	48,522
2070	-	423,538	423,538	-	-	49,977	-	49,977
2071	-	436,244	436,244	-	-	51,477	-	51,477
2072	-	449,331	449,331	-	-	53,021	-	53,021
2073	-	462,811	462,811	-	-	54,612	-	54,612

1. *Equal to contributions (45.50% of payroll for 16 years and 38.50% of payroll thereafter for new employees) net of normal cost and expenses (26.70% of payroll).*
2. *State contributions equal to $1.0 million are assumed to end after 6 years. Actual end dates will depend on the funding status of this plan and the PERA Police and Fire Plan. The projected 2023 contribution includes an additional $12.0 million in one-time State aid.*
3. *Ultimate contribution rate; projected 2023 through 2039 employer contribution rates are based on a 30.1% of pay contribution.*

Single Discount Rate Development
Projection of Contributions (Dollars in Thousands, Concluded)

	Projected Covered-Employee Payroll			Projected Contributions				
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL1	Additional State Contributions	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d)	(e)	(f)	(g)	(h) = (d) + (e) + (f) + (g)
2074	$ -	$ 476,696	$ 476,696	$ -	$ -	$ 56,250	$ -	$ 56,250
2075	-	490,996	490,996	-	-	57,938	-	57,938
2076	-	505,726	505,726	-	-	59,676	-	59,676
2077	-	520,898	520,898	-	-	61,466	-	61,466
2078	-	536,525	536,525	-	-	63,310	-	63,310
2079	-	552,621	552,621	-	-	65,209	-	65,209
2080	-	569,199	569,199	-	-	67,166	-	67,166
2081	-	586,275	586,275	-	-	69,180	-	69,180
2082	-	603,864	603,864	-	-	71,256	-	71,256
2083	-	621,980	621,980	-	-	73,394	-	73,394
2084	-	640,639	640,639	-	-	75,595	-	75,595
2085	-	659,858	659,858	-	-	77,863	-	77,863
2086	-	679,654	679,654	-	-	80,199	-	80,199
2087	-	700,043	700,043	-	-	82,605	-	82,605
2088	-	721,045	721,045	-	-	85,083	-	85,083
2089	-	742,676	742,676	-	-	87,636	-	87,636
2090	-	764,956	764,956	-	-	90,265	-	90,265
2091	-	787,905	787,905	-	-	92,973	-	92,973
2092	-	811,542	811,542	-	-	95,762	-	95,762
2093	-	835,889	835,889	-	-	98,635	-	98,635
2094	-	860,965	860,965	-	-	101,594	-	101,594
2095	-	886,794	886,794	-	-	104,642	-	104,642
2096	-	913,398	913,398	-	-	107,781	-	107,781
2097	-	940,800	940,800	-	-	111,014	-	111,014
2098	-	969,024	969,024	-	-	114,345	-	114,345
2099	-	998,095	998,095	-	-	117,775	-	117,775
2100	-	1,028,037	1,028,037	-	-	121,308	-	121,308
2101	-	1,058,879	1,058,879	-	-	124,948	-	124,948
2102	-	1,090,645	1,090,645	-	-	128,696	-	128,696
2103	-	1,123,364	1,123,364	-	-	132,557	-	132,557
2104	-	1,157,065	1,157,065	-	-	136,534	-	136,534
2105	-	1,191,777	1,191,777	-	-	140,630	-	140,630
2106	-	1,227,530	1,227,530	-	-	144,849	-	144,849
2107	-	1,264,356	1,264,356	-	-	149,194	-	149,194
2108	-	1,302,287	1,302,287	-	-	153,670	-	153,670
2109	-	1,341,356	1,341,356	-	-	158,280	-	158,280
2110	-	1,381,596	1,381,596	-	-	163,028	-	163,028
2111	-	1,423,044	1,423,044	-	-	167,919	-	167,919
2112	-	1,465,736	1,465,736	-	-	172,957	-	172,957
2113	-	1,509,708	1,509,708	-	-	178,146	-	178,146
2114	-	1,554,999	1,554,999	-	-	183,490	-	183,490
2115	-	1,601,649	1,601,649	-	-	188,995	-	188,995
2116	-	1,649,698	1,649,698	-	-	194,664	-	194,664
2117	-	1,699,189	1,699,189	-	-	200,504	-	200,504
2118	-	1,750,165	1,750,165	-	-	206,519	-	206,519
2119	-	1,802,670	1,802,670	-	-	212,715	-	212,715
2120	-	1,856,750	1,856,750	-	-	219,096	-	219,096
2121	-	1,912,452	1,912,452	-	-	225,669	-	225,669
2122	-	1,969,826	1,969,826	-	-	232,439	-	232,439
2123	-	2,028,921	2,028,921	-	-	239,413	-	239,413

1. *Equal to contributions (45.50% of payroll for 16 years and 38.50% of payroll thereafter for new employees) net of normal cost and expenses (26.70% of payroll).*
2. *State contributions equal to $1.0 million are assumed to end after 6 years. Actual end dates will depend on the funding status of this plan and the PERA Police and Fire Plan. The projected 2023 contribution includes an additional $12.0 million in one-time State aid.*
3. *Ultimate contribution rate; projected 2023 through 2039 employer contribution rates are based on a 30.1% of pay contribution.*

Single Discount Rate Development
Projection of Plan Fiduciary Net Position (Dollars in Thousands)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2024	$ 943,099	$ 62,420	$ 70,592	$ 239	$ 65,728	$ 1,000,416
2025	1,000,416	50,960	70,855	238	69,336	1,049,619
2026	1,049,619	51,324	73,157	236	72,714	1,100,264
2027	1,100,264	51,746	75,511	234	76,193	1,152,458
2028	1,152,458	52,057	77,967	231	79,773	1,206,090
2029	1,206,090	52,241	80,590	227	83,443	1,260,957
2030	1,260,957	51,412	83,208	222	87,165	1,316,104
2031	1,316,104	51,497	86,014	217	90,932	1,372,302
2032	1,372,302	51,429	89,094	210	94,758	1,429,185
2033	1,429,185	51,303	92,111	203	98,632	1,486,806
2034	1,486,806	51,288	94,783	196	102,573	1,545,688
2035	1,545,688	51,359	97,285	190	106,612	1,606,184
2036	1,606,184	51,412	99,853	183	110,760	1,668,320
2037	1,668,320	51,487	102,386	177	115,025	1,732,269
2038	1,732,269	51,618	104,836	171	119,422	1,798,302
2039	1,798,302	51,692	107,401	163	123,959	1,866,389
2040	1,866,389	39,398	110,280	155	128,203	1,923,555
2041	1,923,555	38,916	113,357	146	132,082	1,981,050
2042	1,981,050	38,289	116,866	136	135,965	2,038,302
2043	2,038,302	37,632	120,417	125	139,829	2,095,221
2044	2,095,221	37,092	123,692	115	143,682	2,152,188
2045	2,152,188	36,502	127,135	104	147,531	2,208,982
2046	2,208,982	35,784	131,008	92	151,349	2,265,015
2047	2,265,015	35,072	134,781	80	155,118	2,320,344
2048	2,320,344	34,417	138,432	69	158,843	2,375,103
2049	2,375,103	33,904	141,666	58	162,547	2,429,830
2050	2,429,830	33,485	144,750	48	166,258	2,484,775
2051	2,484,775	33,070	147,725	38	169,988	2,540,070
2052	2,540,070	32,815	150,221	28	173,764	2,596,400
2053	2,596,400	32,707	152,301	20	177,632	2,654,418
2054	2,654,418	32,824	153,468	14	181,658	2,715,418
2055	2,715,418	33,120	154,257	9	185,911	2,780,183
2056	2,780,183	33,664	154,047	5	190,470	2,850,265
2057	2,850,265	34,409	153,340	3	195,426	2,926,757
2058	2,926,757	35,262	152,099	2	200,853	3,010,771
2059	3,010,771	36,210	150,607	1	206,818	3,103,191
2060	3,103,191	37,230	148,828	-	213,383	3,204,976
2061	3,204,976	38,317	146,813	-	220,615	3,317,095
2062	3,317,095	39,458	144,685	-	228,576	3,440,444
2063	3,440,444	40,638	142,415	-	237,329	3,575,996
2064	3,575,996	41,855	140,006	-	246,943	3,724,788
2065	3,724,788	43,111	137,470	-	257,488	3,887,917
2066	3,887,917	44,404	134,797	-	269,044	4,066,568
2067	4,066,568	45,736	131,987	-	281,692	4,262,009
2068	4,262,009	47,109	129,040	-	295,522	4,475,600
2069	4,475,600	48,522	125,958	-	310,628	4,708,792
2070	4,708,792	49,977	122,744	-	327,112	4,963,137
2071	4,963,137	51,477	119,403	-	345,082	5,240,293
2072	5,240,293	53,021	115,941	-	364,655	5,542,028
2073	5,542,028	54,612	112,363	-	385,955	5,870,232

For purposes of this projection, we assumed the 23.1% regular employer statutory contribution rate would continue after the plan becomes fully funded.

Single Discount Rate Development
Projection of Plan Fiduciary Net Position
(Dollars in Thousands, Concluded)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2074	$ 5,870,232	$ 56,250	$ 108,677	$ -	$ 409,112	$ 6,226,917
2075	6,226,917	57,938	104,890	-	434,268	6,614,233
2076	6,614,233	59,676	101,009	-	461,574	7,034,474
2077	7,034,474	61,466	97,038	-	491,189	7,490,091
2078	7,490,091	63,310	92,984	-	523,285	7,983,702
2079	7,983,702	65,209	88,851	-	558,046	8,518,106
2080	8,518,106	67,166	84,644	-	595,666	9,096,294
2081	9,096,294	69,180	80,369	-	636,355	9,721,460
2082	9,721,460	71,256	76,032	-	680,338	10,397,022
2083	10,397,022	73,394	71,641	-	727,852	11,126,627
2084	11,126,627	75,595	67,205	-	779,153	11,914,170
2085	11,914,170	77,863	62,736	-	834,512	12,763,809
2086	12,763,809	80,199	58,250	-	894,222	13,679,980
2087	13,679,980	82,605	53,769	-	958,591	14,667,407
2088	14,667,407	85,083	49,315	-	1,027,949	15,731,124
2089	15,731,124	87,636	44,915	-	1,102,649	16,876,494
2090	16,876,494	90,265	40,600	-	1,183,063	18,109,222
2091	18,109,222	92,973	36,401	-	1,269,592	19,435,386
2092	19,435,386	95,762	32,350	-	1,362,659	20,861,457
2093	20,861,457	98,635	28,479	-	1,462,716	22,394,329
2094	22,394,329	101,594	24,817	-	1,570,245	24,041,351
2095	24,041,351	104,642	21,391	-	1,685,759	25,810,361
2096	25,810,361	107,781	18,223	-	1,809,807	27,709,726
2097	27,709,726	111,014	15,330	-	1,942,973	29,748,383
2098	29,748,383	114,345	12,725	-	2,085,883	31,935,886
2099	31,935,886	117,775	10,411	-	2,239,206	34,282,456
2100	34,282,456	121,308	8,390	-	2,403,657	36,799,031
2101	36,799,031	124,948	6,654	-	2,580,002	39,497,327
2102	39,497,327	128,696	5,190	-	2,769,062	42,389,895
2103	42,389,895	132,557	3,977	-	2,971,717	45,490,192
2104	45,490,192	136,534	2,994	-	3,188,908	48,812,640
2105	48,812,640	140,630	2,214	-	3,421,647	52,372,703
2106	52,372,703	144,849	1,608	-	3,671,018	56,186,962
2107	56,186,962	149,194	1,148	-	3,938,181	60,273,189
2108	60,273,189	153,670	808	-	4,224,383	64,650,434
2109	64,650,434	158,280	563	-	4,530,957	69,339,108
2110	69,339,108	163,028	390	-	4,859,333	74,361,079
2111	74,361,079	167,919	271	-	5,211,044	79,739,771
2112	79,739,771	172,957	192	-	5,587,728	85,500,264
2113	85,500,264	178,146	139	-	5,991,143	91,669,414
2114	91,669,414	183,490	104	-	6,423,169	98,275,969
2115	98,275,969	188,995	81	-	6,885,818	105,350,701
2116	105,350,701	194,664	65	-	7,381,245	112,926,545
2117	112,926,545	200,504	54	-	7,911,755	121,038,750
2118	121,038,750	206,519	46	-	8,479,817	129,725,040
2119	129,725,040	212,715	39	-	9,088,070	139,025,786
2120	139,025,786	219,096	34	-	9,739,342	148,984,190
2121	148,984,190	225,669	29	-	10,436,657	159,646,487
2122	159,646,487	232,439	24	-	11,183,251	171,062,153
2123	171,062,153	239,413	76	-	11,982,586	183,284,076

For purposes of this projection, we assumed the 23.1% statutory regular employer statutory contribution rate would continue after the plan becomes fully funded.

Single Discount Rate Development
Present Values of Projected Benefits (Dollars in Thousands)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=(c)/(1+sdr)^(a-.5)
2024	$ 943,099	$ 70,592	$ 70,592	$ 0	$ 68,244	$ 0	$ 68,244
2025	1,000,416	70,855	70,855	0	64,017	0	64,017
2026	1,049,619	73,157	73,157	0	61,773	0	61,773
2027	1,100,264	75,511	75,511	0	59,589	0	59,589
2028	1,152,458	77,967	77,967	0	57,502	0	57,502
2029	1,206,090	80,590	80,590	0	55,548	0	55,548
2030	1,260,957	83,208	83,208	0	53,601	0	53,601
2031	1,316,104	86,014	86,014	0	51,783	0	51,783
2032	1,372,302	89,094	89,094	0	50,129	0	50,129
2033	1,429,185	92,111	92,111	0	48,436	0	48,436
2034	1,486,806	94,783	94,783	0	46,580	0	46,580
2035	1,545,688	97,285	97,285	0	44,682	0	44,682
2036	1,606,184	99,853	99,853	0	42,861	0	42,861
2037	1,668,320	102,386	102,386	0	41,073	0	41,073
2038	1,732,269	104,836	104,836	0	39,305	0	39,305
2039	1,798,302	107,401	107,401	0	37,632	0	37,632
2040	1,866,389	110,280	110,280	0	36,113	0	36,113
2041	1,923,555	113,357	113,357	0	34,692	0	34,692
2042	1,981,050	116,866	116,866	0	33,426	0	33,426
2043	2,038,302	120,417	120,417	0	32,189	0	32,189
2044	2,095,221	123,692	123,692	0	30,901	0	30,901
2045	2,152,188	127,135	127,135	0	29,683	0	29,683
2046	2,208,982	131,008	131,008	0	28,587	0	28,587
2047	2,265,015	134,781	134,781	0	27,486	0	27,486
2048	2,320,344	138,432	138,432	0	26,384	0	26,384
2049	2,375,103	141,666	141,666	0	25,234	0	25,234
2050	2,429,830	144,750	144,750	0	24,096	0	24,096
2051	2,484,775	147,725	147,725	0	22,983	0	22,983
2052	2,540,070	150,221	150,221	0	21,842	0	21,842
2053	2,596,400	152,301	152,301	0	20,696	0	20,696
2054	2,654,418	153,468	153,468	0	19,490	0	19,490
2055	2,715,418	154,257	154,257	0	18,309	0	18,309
2056	2,780,183	154,047	154,047	0	17,088	0	17,088
2057	2,850,265	153,340	153,340	0	15,896	0	15,896
2058	2,926,757	152,099	152,099	0	14,736	0	14,736
2059	3,010,771	150,607	150,607	0	13,637	0	13,637
2060	3,103,191	148,828	148,828	0	12,594	0	12,594
2061	3,204,976	146,813	146,813	0	11,611	0	11,611
2062	3,317,095	144,685	144,685	0	10,694	0	10,694
2063	3,440,444	142,415	142,415	0	9,838	0	9,838
2064	3,575,996	140,006	140,006	0	9,039	0	9,039
2065	3,724,788	137,470	137,470	0	8,294	0	8,294
2066	3,887,917	134,797	134,797	0	7,601	0	7,601
2067	4,066,568	131,987	131,987	0	6,956	0	6,956
2068	4,262,009	129,040	129,040	0	6,355	0	6,355
2069	4,475,600	125,958	125,958	0	5,798	0	5,798
2070	4,708,792	122,744	122,744	0	5,280	0	5,280
2071	4,963,137	119,403	119,403	0	4,801	0	4,801
2072	5,240,293	115,941	115,941	0	4,356	0	4,356
2073	5,542,028	112,363	112,363	0	3,946	0	3,946

Single Discount Rate Development
Present Values of Projected Benefits
(Dollars in Thousands, Concluded)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=(c)/(1+sdr)^(a-.5)
2074	$ 5,870,232	$ 108,677	$ 108,677	$ -	$ 3,567	$ -	$ 3,567
2075	6,226,917	104,890	104,890	-	3,217	-	3,217
2076	6,614,233	101,009	101,009	-	2,895	-	2,895
2077	7,034,474	97,038	97,038	-	2,600	-	2,600
2078	7,490,091	92,984	92,984	-	2,328	-	2,328
2079	7,983,702	88,851	88,851	-	2,079	-	2,079
2080	8,518,106	84,644	84,644	-	1,851	-	1,851
2081	9,096,294	80,369	80,369	-	1,643	-	1,643
2082	9,721,460	76,032	76,032	-	1,452	-	1,452
2083	10,397,022	71,641	71,641	-	1,279	-	1,279
2084	11,126,627	67,205	67,205	-	1,121	-	1,121
2085	11,914,170	62,736	62,736	-	978	-	978
2086	12,763,809	58,250	58,250	-	849	-	849
2087	13,679,980	53,769	53,769	-	732	-	732
2088	14,667,407	49,315	49,315	-	628	-	628
2089	15,731,124	44,915	44,915	-	534	-	534
2090	16,876,494	40,600	40,600	-	451	-	451
2091	18,109,222	36,401	36,401	-	378	-	378
2092	19,435,386	32,350	32,350	-	314	-	314
2093	20,861,457	28,479	28,479	-	258	-	258
2094	22,394,329	24,817	24,817	-	210	-	210
2095	24,041,351	21,391	21,391	-	170	-	170
2096	25,810,361	18,223	18,223	-	135	-	135
2097	27,709,726	15,330	15,330	-	106	-	106
2098	29,748,383	12,725	12,725	-	82	-	82
2099	31,935,886	10,411	10,411	-	63	-	63
2100	34,282,456	8,390	8,390	-	47	-	47
2101	36,799,031	6,654	6,654	-	35	-	35
2102	39,497,327	5,190	5,190	-	26	-	26
2103	42,389,895	3,977	3,977	-	18	-	18
2104	45,490,192	2,994	2,994	-	13	-	13
2105	48,812,640	2,214	2,214	-	9	-	9
2106	52,372,703	1,608	1,608	-	6	-	6
2107	56,186,962	1,148	1,148	-	4	-	4
2108	60,273,189	808	808	-	3	-	3
2109	64,650,434	563	563	-	2	-	2
2110	69,339,108	390	390	-	1	-	1
2111	74,361,079	271	271	-	1	-	1
2112	79,739,771	192	192	-	-	-	-
2113	85,500,264	139	139	-	-	-	-
2114	91,669,414	104	104	-	-	-	-
2115	98,275,969	81	81	-	-	-	-
2116	105,350,701	65	65	-	-	-	-
2117	112,926,545	54	54	-	-	-	-
2118	121,038,750	46	46	-	-	-	-
2119	129,725,040	39	39	-	-	-	-
2120	139,025,786	34	34	-	-	-	-
2121	148,984,190	29	29	-	-	-	-
2122	159,646,487	24	24	-	-	-	-
2123	171,062,153	76	76	-	-	-	-
				Totals	$ 1,453,474	$ -	$ 1,453,474

SECTION H

GLOSSARY OF TERMS

Glossary of Terms

Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Accrued Liability (AAL)	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
Actuarial Assumptions	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
Actuarial Gain (Loss)	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
Actuarial Present Value (APV)	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future benefit payments at predetermined rates of interest to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial Valuation	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Determined Contribution (ADC)	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically, the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Glossary of Terms

Amortization Method	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be "open" (meaning, reset each year) or "closed" (the number of years remaining will decline each year).
Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Cost-of-Living Adjustments	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-Employee Payroll	The payroll of covered employees, which is typically only the pensionable pay (meets the statutory salary definition) and does not include pay above any pay cap.
Deferred Inflows and Outflows of Resources	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
Discount Rate or Single Discount Rate	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: 1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and 2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
Entry Age Actuarial Cost Method or Entry Age Normal (EAN)	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit age(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

Glossary of Terms

Fiduciary Net Position	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Long-Term Expected Rate of Return	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
Money-Weighted Rate of Return	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
Net Pension Liability (NPL)	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contributing Entities	Non-employer contributing entities are entities that make contributing to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting Statements No. 67 and No. 68 plan members are not considered non-employer contributing entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
Other Postemployment Benefits (OPEB)	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

Glossary of Terms

Total Pension Expense The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:

1. Service Cost
2. Interest on the Total Pension Liability
3. Current-Period Changes in Benefit Terms
4. Employee Contributions
5. Projected Earnings on Plan Investments
6. Pension Plan Administrative Expense
7. Other Changes in Plan Fiduciary Net Position
8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual in measurement of the Total Pension Liability
9. Recognition of Outflow (Inflow) of Resources due to Assumption Changes
10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments

Total Pension Liability (TPL) The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.

Unfunded Actuarial Accrued Liability (UAAL) The UAAL is the difference between actuarial accrued liability and valuation assets.

Valuation Assets The valuation assets are the plan fiduciary net position used in determining the net position liability of the plan. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.