

Minnesota State Retirement System

State Patrol Retirement Fund

GASB Statement Nos. 67 and 68

Accounting and Financial Reporting for Pensions

June 30, 2020





November 30, 2020

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 ("SPRF"), as amended by 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 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. 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 Minnesota State Retirement System (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 does not fully reflect the recent and still developing impact of COVID-19, which is likely to influence demographic and investment experience, at least in the short term. We will continue to monitor these developments and their impact on the plan.

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. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

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, 2020 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

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.

The signing actuaries are independent of the plan sponsor.

Brian B. Murphy and Bonita J. Wurst 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,



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



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

BBM/BJW:sc



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SECTION A

EXECUTIVE SUMMARY

Executive Summary

as of June 30, 2020 (Dollars in Thousands)

	2020
Actuarial Valuation Date	June 30, 2020
Measurement Date of the Net Pension Liability	June 30, 2020
Membership	
Number of	
- Service Retirements	891
- Survivors	152
- Disability Retirements	64
- Deferred Retirements	63
- Terminated other non-vested	30
- Active Members	937
- Total	2,137
Covered-employee Payroll ⁽¹⁾	\$ 84,530
Net Pension Liability	
Total Pension Liability	\$ 989,045
Plan Fiduciary Net Position	757,590
Net Pension Liability	\$ 231,455
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	76.60%
Net Pension Liability as a Percentage of Covered-employee Payroll	273.81%
Development of the Single Discount Rate	
Single Discount Rate	7.50%
Long-Term Expected Rate of Investment Return	7.50%
Long-Term Municipal Bond Rate ⁽²⁾	2.45%
Last year ending June 30 in the 2021 to 2120 projection period for which projected benefit payments are fully funded	2120
Total Pension Expense / (Income)	\$ 26,067

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	\$ 1,837	\$ 9,138
Changes in assumptions	47,264	101,010
Net difference between projected and actual earnings on pension plan investments	20,637	17,325
Totals	\$ 69,738	\$ 127,473

⁽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 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 SPRF subsequent to the measurement date of June 30, 2020.

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-2020 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 all actuarial assumptions are met (including the assumption of the plan earning 7.50%), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay 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 28 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, 2020 and a measurement date of June 30, 2020.

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 7.50%; the municipal bond rate is 2.45% (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 7.50%.

SECTION B



FINANCIAL STATEMENTS

Statement of Pension Expense Under GASB Statement No. 68

Fiscal Year Ended June 30, 2020 (Dollars in Thousands)

A. Expense

1. Service Cost	\$	21,122
2. Interest on the Total Pension Liability		70,465
3. Current-Period Benefit Changes		-
4. Employee Contributions (made negative for addition here)		(12,595)
5. Projected Earnings on Plan Investments (made negative for addition here)		(55,487)
6. Pension Plan Administrative Expense		224
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		
<i>Arising from Current Reporting Period</i>		(89)
9. Recognition of Outflow (Inflow) of Resources due to assumption changes		
<i>Arising from Current Reporting Period</i>		-
10. Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.50%) and actual earnings on Pension Plan Investments		
<i>Arising from Current Reporting Period</i>		4,883
11. Increases/(Decreases) from Experience in the Current Reporting Period	\$	28,525
12. Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
<i>Arising from Prior Reporting Periods</i>	\$	(7,182)
13. Recognition of Outflow (Inflow) of Resources due to assumption changes		
<i>Arising from Prior Reporting Periods</i>		7,334
14. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on Pension Plan Investments		
<i>Arising from Prior Reporting Periods</i>		(2,610)
15. Total Pension Expense / (Income)	\$	26,067

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 12,688 years. Additionally, the total plan membership (active employees and inactive employees) was 2,108. 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.

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, 2020 (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	\$	(535)
2. Assumption Changes (gains) or losses		-
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		(89)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes		-
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	\$	(89)
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	\$	(446)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes		-
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	\$	(446)

B. Outflows (Inflows) of Resources due to Assets

1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	\$	24,414
2. Recognition period for Assets {in years}		5
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets		4,883
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	\$	19,531

Statement of Outflows and Inflows

Arising from Current and Prior Reporting Periods

Fiscal Year Ended June 30, 2020 (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	\$ 47,724	\$ 47,661	\$ 63
2. Due to Assets	15,638	13,365	2,273
3. Total	\$ 63,362	\$ 61,026	\$ 2,336

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	\$ 460	\$ 7,731	\$ (7,271)
2. Assumption Changes	47,264	39,930	7,334
3. Net Difference between projected and actual earnings on pension plan investments	15,638	13,365	2,273
4. Total	\$ 63,362	\$ 61,026	\$ 2,336

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	\$ 1,837	\$ 9,138	\$ (7,301)
2. Assumption Changes	47,264	101,010	(53,746)
3. Net Difference between projected and actual earnings on pension plan investments*	20,637	17,325	3,312
4. Total	\$ 69,738	\$ 127,473	\$ (57,735)

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
2021	\$ (5,906)
2022	(40,070)
2023	(16,921)
2024	5,252
2025	(90)
Thereafter	-
Total	\$ (57,735)

* 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, 2020 (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					
2015	\$ (12,855)	6.0000	\$ (2,140)	\$ 0	0.0000
2016	(22,222)	6.0000	(3,704)	(3,702)	1.0000
2017	(2,418)	6.0000	(403)	(806)	2.0000
2018	(8,369)	6.0000	(1,395)	(4,184)	3.0000
2019	2,757	6.0000	460	1,837	4.0000
2020	(535)	6.0000	(89)	(446)	5.0000
Total			\$ (7,271)	\$ (7,301)	
Deferred Outflow (Inflow) Due to Assumption Changes					
2016	\$ 283,584	6.0000	\$ 47,264	\$ 47,264	1.0000
2017	(112,694)	6.0000	(18,782)	(37,566)	2.0000
2018	(126,888)	6.0000	(21,148)	(63,444)	3.0000
Total			\$ 7,334	\$ (53,746)	
Deferred Outflow (Inflow) Due to Differences Between Projected and Actual Earnings on Plan Investments					
2016	\$ 51,938	5.0000	\$ 10,386	\$ 0	0.0000
2017	(47,008)	5.0000	(9,402)	(9,400)	1.0000
2018	(19,814)	5.0000	(3,963)	(7,925)	2.0000
2019	1,844	5.0000	369	1,106	3.0000
2020	24,414	5.0000	4,883	19,531	4.0000
Total			\$ 2,273	\$ 3,312	
Deferred Outflow (Inflow) due to All Sources					
Total			\$ 2,336	\$ (57,735)	

Statement of Fiduciary Net Position as of June 30, 2020 (Dollars in Thousands)

Assets	<u>June 30, 2020</u>
Cash & Short-term Investments	\$ 34,673
Receivables	2,034
Investment Pools (at fair value)	721,249
Securities Lending Collateral	53,017
Capital Assets	<u>-</u>
Total Assets	\$ 810,973
Total Deferred Outflows of Resources	\$ -
Total Liabilities	\$ (53,383)
Total Deferred Inflows of Resources	\$ -
Net Position Restricted for Pensions	<u>\$ 757,590</u>

Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2020 (Dollars in Thousands)

1.	Net Position at market value at beginning of year	\$	753,144
	Additions		
2.	Contributions		
	a. Employee	\$	12,595
	b. Employer		21,975
	c. Other sources - Supplemental State Aid		1,000
	d. Total contributions	\$	<u>35,570</u>
3.	Investment income		
	a. Investment income/(loss)	\$	31,769
	b. Investment expenses		(696)
	c. Net investment income/(loss)	\$	<u>31,073</u>
4.	Other Additions	\$	-
5.	Total Additions (2.d.) + (3.c.) + (4.)	\$	<u>66,643</u>
	Deductions		
6.	Benefits Paid		
	a. Annuity benefits	\$	(61,859)
	b. Refunds		(112)
	c. Total benefits paid	\$	<u>(61,971)</u>
7.	Expenses		
	a. Other deductions	\$	(2)
	b. Administrative		(224)
	c. Total expenses	\$	<u>(226)</u>
8.	Total Deductions (6.c.) + (7.c.)	\$	<u>(62,197)</u>
9.	Net increase/(decrease) in fiduciary net position (5.) + (8.)	\$	4,446
10.	Net position at market value at end of year (1.) + (9.)	\$	<u>757,590</u>
11.	State Board of Investment calculated annual investment return for the State Patrol Retirement Fund*		4.2%

* The fiscal year 2020 investment return for the Combined Funds is 4.2%.

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Changes in Net Pension Liability and Related Ratios

Current Period

Fiscal Year Ended June 30, 2020 (Dollars in Thousands)

A. Total pension liability	
1. Service Cost	\$ 21,122
2. Interest on the Total Pension Liability	70,465
3. Changes of benefit terms	-
4. Difference between expected and actual experience of the Total Pension Liability	(535)
5. Changes of assumptions	-
6. Benefit payments, including refunds of employee contributions	(61,971)
7. Net change in total pension liability	\$ 29,081
8. Total pension liability – beginning	959,964
9. Total pension liability – ending	<u>\$ 989,045</u>
B. Plan fiduciary net position	
1. Contributions – employer ⁽¹⁾	\$ 22,975
2. Contributions – employee	12,595
3. Net investment income	31,073
4. Benefit payments, including refunds of employee contributions	(61,971)
5. Pension Plan Administrative Expense	(224)
6. Other changes	(2)
7. Net change in plan fiduciary net position	\$ 4,446
8. Plan fiduciary net position – beginning	753,144
9. Plan fiduciary net position – ending	<u>\$ 757,590</u>
C. Net pension liability, A.9. - B.9.	<u>\$ 231,455</u>
D. Plan fiduciary net position as a percentage of the total pension liability, B.9. / A.9.	76.60%
E. Covered-employee payroll ⁽²⁾	\$ 84,530
F. Net pension liability as a percentage of covered-employee payroll, C. / E.	273.81%

(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 (which will be built prospectively)

Fiscal year ending June 30,	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Total Pension Liability										
Service Cost	\$ 21,122	\$ 19,375	\$ 24,935	\$ 29,758	\$ 16,555	\$ 16,144	\$ 14,514			
Interest on the Total Pension Liability	70,465	68,227	65,110	58,865	64,592	63,753	60,183			
Benefit Changes	-	-	(2,604)	-	-	-	-			
Difference between Expected and Actual Experience	(535)	2,757	(8,369)	(2,418)	(22,222)	(12,855)	(5,771)			
Assumption Changes	-	-	(126,888)	(112,694)	283,584	-	30,058			
Benefit Payments	(61,859)	(60,375)	(59,653)	(58,560)	(57,695)	(55,465)	(53,697)			
Refunds	(112)	(428)	(39)	(5)	(79)	(15)	(25)			
Net Change in Total Pension Liability	\$ 29,081	\$ 29,556	\$ (107,508)	\$ (85,054)	\$ 284,735	\$ 11,562	\$ 45,262			
Total Pension Liability - Beginning	959,964	930,408	1,037,916	1,122,970	838,235	826,673	781,411			
Total Pension Liability - Ending (a)	\$ 989,045	\$ 959,964	\$ 930,408	\$ 1,037,916	\$ 1,122,970	\$ 838,235	\$ 826,673			
Plan Fiduciary Net Position										
Employer Contributions ⁽¹⁾	\$ 22,975	\$ 20,479	\$ 16,952	\$ 16,783	\$ 14,938	\$ 14,763	\$ 12,894			
Employee Contributions	12,595	12,038	10,657	10,520	9,292	9,174	7,930			
Pension Plan Net Investment Income	31,073	51,823	70,474	93,077	(774)	28,903	107,187			
Benefit Payments	(61,859)	(60,375)	(59,653)	(58,560)	(57,695)	(55,465)	(53,697)			
Refunds	(112)	(428)	(39)	(5)	(79)	(15)	(25)			
Pension Plan Administrative Expense	(224)	(191)	(184)	(208)	(220)	(170)	(150)			
Other	(2)	(1)	(7)	-	-	-	-			
Net Change in Plan Fiduciary Net Position	\$ 4,446	\$ 23,345	\$ 38,200	\$ 61,607	\$ (34,538)	\$ (2,810)	\$ 74,139			
Plan Fiduciary Net Position - Beginning	753,144	729,799	691,599	629,992	664,530	667,340	593,201			
Plan Fiduciary Net Position - Ending (b)	\$ 757,590	\$ 753,144	\$ 729,799	\$ 691,599	\$ 629,992	\$ 664,530	\$ 667,340			
Net Pension Liability - Ending (a) - (b)	\$ 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	76.60 %	78.46 %	78.44 %	66.63 %	56.10 %	79.28 %	80.73 %			
Covered-Employee Payroll ⁽²⁾	\$ 84,530	\$ 80,792	\$ 74,007	\$ 73,056	\$ 69,343	\$ 68,463	\$ 63,952			
Net Pension Liability as a Percentage of Covered-Employee Payroll	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 (which will be built prospectively)

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)	
2011						
2012						
2013						
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

Schedule of Contributions Multiyear (Dollars in Thousands)

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution ⁽¹⁾	Actual Contributions	Contribution Deficiency (Excess)	Covered- Employee Payroll	Actual Contribution as a % of Covered- Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b) / (d)
2011	\$ 14,826	\$ 9,873	\$ 4,953	\$ 63,250	15.61%
2012	14,912	11,620	3,292	62,524 ⁽²⁾	18.58
2013	18,711	11,482	7,229	62,121 ⁽²⁾	18.48
2014	18,444	12,894 ⁽³⁾	5,550	63,952 ⁽²⁾	20.16
2015	20,648	14,763 ⁽³⁾	5,885	68,463 ⁽²⁾	21.56
2016	20,463	14,938 ⁽³⁾	5,525	69,343 ⁽²⁾	21.54
2017	19,031	16,783 ⁽³⁾	2,248	73,056 ⁽²⁾	22.97
2018	20,900	16,952 ⁽³⁾	3,948	74,007 ⁽²⁾	22.91
2019	21,281	20,479 ⁽³⁾	802	80,792 ⁽²⁾	25.35
2020	21,580	22,975 ⁽³⁾	(1,395)	84,530 ⁽²⁾	27.18

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Fiscal Year Ending June 30, 2020 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) Assumed equal to actual member contributions divided by employee contribution rate.

(3) Includes supplemental state aid of \$1,000.

Valuation Date	June 30, 2019
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	29 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.50%
Payroll Growth	3.25%
Salary Increases	Service based tables ranging from 15.25% with one year of service to 3.25% 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 2017 valuation pursuant to an experience study of the period 2011 - 2015.
Healthy Post-retirement Mortality	RP-2014 annuitant generational mortality table, projected with mortality improvement scale MP-2015, white collar adjustment.

Other Information:

Benefit Increases After Retirement: The post-retirement benefit increase is assumed to be 1.00% for all future years. See separate funding actuarial valuation report as of July 1, 2019 for additional detail. To obtain this report, contact MSRS as noted on page 3. The report is also available online at www.msrs.state.mn.us/annual-reports-fy-2019



Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return⁽¹⁾
2011	
2012	
2013	
2014	18.7 %
2015	4.5
2016	(0.1)
2017	15.2
2018	10.5
2019	7.3
2020	4.2

⁽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, 2020, the annual money-weighted rate of return for the State Patrol Retirement Fund was 4.2%. 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.

Ten-Year Schedule of Money-Weighted Investment Return

Ten-year data is not available. Additional years will be provided when they become available.

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, 2020, these estimates are summarized in the following table:

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return (Geometric Mean)</u>
Domestic Equity	36%	5.10%
International Equity	17%	5.30%
Private Markets	25%	5.90%
Fixed Income	20%	0.75%
Cash	2%	0.00%
Total	<u>100%</u>	

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 7.50%. This assumption is based on a review of inflation and investment return assumptions in our experience study report for the State Employees Retirement Fund dated June 27, 2019.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

Single Discount Rate

A Single Discount Rate of 7.5% 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 7.50%. 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 7.5%, 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 (6.50%) or one percent higher (8.50%) than the current rate:

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 6.50%	Current Single Discount Rate Assumption 7.50%	1% Increase 8.50%
Total Pension Liability	\$1,109,305	\$989,045	\$889,486
Net Position Restricted for Pensions	757,590	757,590	757,590
Net Pension Liability	<u><u>\$ 351,715</u></u>	<u><u>\$231,455</u></u>	<u><u>\$131,896</u></u>

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

Note that we believe the 8.5% interest rate assumption would 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	\$ 959,964	\$ 753,144	\$ 206,820	\$ 108,686	\$ 187,964	
Changes for the Year:						
Service Cost	\$ 21,122		\$ 21,122			\$ 21,122
Interest on Total Pension Liability	70,465		70,465			70,465
Interest on Fiduciary Net Position		\$ 55,487 ⁽¹⁾	(55,487)			(55,487)
Changes in Benefit Terms	-		-			-
Liability Experience Gains and Losses	(535)		(535)	\$ -	\$ 446	(89)
Changes in Assumptions	-		-	-	-	-
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				(460)	(7,642)	(7,182)
Assumption Changes				(47,264)	(39,930)	7,334
Investment Gains/(Losses)				(10,755)	(13,365)	(2,610)
Contributions - Employer		22,975 ⁽²⁾	(22,975)			
Contributions - Employees		12,595	(12,595)			(12,595)
Asset Gain/(Loss)		(24,414) ⁽¹⁾	24,414	19,531	-	4,883
Benefit Payments and Refunds	(61,971)	(61,971)	-			
Administrative Expenses		(224)	224			224
Other changes		(2)	2			2
Net Changes	\$ 29,081	\$ 4,446	\$ 24,635	\$ (38,948)	\$ (60,491)	\$ 26,067
Balance End of Year	\$ 989,045	\$ 757,590	\$ 231,455	\$ 69,738	\$ 127,473	

⁽¹⁾ The sum of these items in column (b) equals the net investment income of \$31,073

⁽²⁾ Includes supplemental state aid of \$1,000.



Summary of Population Statistics

	Terminated			Recipients			Total
	Actives	Deferred	Other Non-	Service	Disability	Survivor	
		Retirement	Vested	Retirement	Retirement		
Members on 7/1/2019	943	56	31	863	60	155	2,108
New members	53						53
Return to active	0	0	0	0	0	0	0
Terminated non-vested	(4)	0	4	0	0	0	0
Service retirements	(37)	(4)	0	41	0	0	0
Terminated deferred	(10)	10	0	0	0	0	0
Terminated refund/transfer	(4)	0	(4)	0	0	0	(8)
Deaths	0	0	0	(18)	0	(7)	(25)
New beneficiary	0	0	0	0	0	5	5
Disabled	(4)	0	0	0	4	0	0
Unexpected status change	0	1	(1)	5	0	(1)	4
Net change	(6)	7	(1)	28	4	(3)	29
Members on 6/30/2020	937	63	30	891	64	152	2,137

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:				
	<u>Effective as of</u>	<u>Member</u>	<u>Regular Employer</u>	<u>Supplemental Employer</u>	<u>Total</u>
	Prior to July 1, 2018	14.40%	21.60%	0.00%	36.00%
	July 1, 2018	14.90%	22.35%	1.75%	39.00%
	July 1, 2019	14.90%	23.10%	3.00%	41.00%
	July 1, 2020	15.40%	23.10%	5.00%	43.50%
	July 1, 2021 and later	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.				
	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.				
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.				

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 1/10% for each month that the member is under age 55. If the effective date of retirement is after June 30, 2015, the reduction is 0.34% 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.

Disability

Occupational disability benefit

Age/Service requirement Member who cannot perform his duties as a direct result of a disability relating to an act of duty.



Summary of Plan Provisions (Continued)

Disability (continued)

Occupational disability benefit (Continued)

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.

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.



Summary of Plan Provisions (Continued)

Death

Surviving spouse benefit

Age/Service requirement	Member who is active or receiving a disability benefit or former member.
Amount	<p>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.</p> <p>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.</p> <p>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.</p>
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.

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.



Summary of Plan Provisions (Concluded)

Termination (Continued)	
Deferred benefit	
Age/service requirement	Three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	<p>Benefit is computed under law in effect at termination and increased by the following annual augmentation percentage:</p> <ul style="list-style-type: none">(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. <p>Amount is payable at normal or early retirement.</p> <p>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%.</p>
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%.
Combined service annuity	<p>Members are eligible for combined service benefits if they:</p> <ul style="list-style-type: none">(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; and(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. <p>Members who meet the above requirements must have their benefit based on the following:</p> <ul style="list-style-type: none">(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	There have been no changes in plan provisions since the prior valuation.



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 last experience study, dated July 26, 2016, and a review of inflation and investment return assumptions for the State Employees Retirement Fund, dated June 27, 2019.

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	7.50% per annum.
Single discount rate	7.50% 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	2.50% per year.
Payroll growth	3.25% per year.
Mortality rates	
Healthy pre-retirement	RP-2014 employee generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2006, white collar adjustment.
Healthy post-retirement	RP-2014 annuitant generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2006, white collar adjustment.
Disabled	RP-2014 annuitant generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2006, white collar adjustment.
Notes	The RP-2014 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 and beneficiaries 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 ultimately result in behavior changes not anticipated in these actuarial assumptions.

Summary of Actuarial Assumptions (Continued)

Withdrawal	<p>Select and Ultimate rates based on actual experience. Ultimate rates after the third year are shown in rate table. Select rates in the first three years are:</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Year</th> <th style="text-align: center;">Select Withdrawal Rates</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2.50%</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">2.00%</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">1.50%</td> </tr> </tbody> </table>	Year	Select Withdrawal Rates	1	2.50%	2	2.00%	3	1.50%
Year	Select Withdrawal Rates								
1	2.50%								
2	2.00%								
3	1.50%								
Disability	Age-related rates based on experience; see table of sample rates. All incidences are assumed to be duty-related.								
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.								
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	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit. Account balances for deferred members accumulate interest until normal retirement date and are discounted back to the valuation date.								
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	<p>Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows:</p> <p style="margin-left: 40px;">20% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 55% elect 100% Joint & Survivor option</p> <p>Remaining married and unmarried members are assumed to elect the Straight Life option.</p>								
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.

There are no members reported with missing birth dates. In cases where submitted data was missing or incomplete, the following assumptions were applied:

Data for active members:

There were no members reported with missing salary or service.

Data for terminated members:

There were two 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.

Data for members receiving benefits:

There were no members reported without a benefit.

There were no survivors reported with an expired benefit.

There were six 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 was one retiree 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 (170 members) and/or the survivor gender was missing or invalid (186 members).

Changes in actuarial assumptions

There have been no changes in actuarial assumptions since the prior valuation.

Summary of Actuarial Assumptions (Continued)

Age in 2020	Percentage of Members Dying each Year*					
	Healthy Post- Retirement Mortality**		Healthy Pre- Retirement Mortality**		Disability Mortality**	
	Male	Female	Male	Female	Male	Female
20	0.02%	0.01%	0.02%	0.01%	0.02%	0.01%
25	0.03	0.02	0.03	0.01	0.03	0.02
30	0.05	0.04	0.03	0.02	0.05	0.04
35	0.07	0.08	0.03	0.03	0.07	0.08
40	0.11	0.11	0.04	0.03	0.11	0.11
45	0.16	0.14	0.06	0.05	0.16	0.14
50	0.24	0.19	0.10	0.08	0.24	0.19
55	0.36	0.27	0.18	0.14	0.36	0.27
60	0.50	0.39	0.31	0.20	0.50	0.39
65	0.72	0.62	0.55	0.30	0.72	0.62
70	1.17	0.99	0.97	0.51	1.17	0.99
75	2.03	1.67	1.74	0.90	2.03	1.67
80	3.61	2.97	3.12	1.61	3.61	2.97
85	6.65	5.44	6.50	4.31	6.65	5.44
90	12.20	9.94	12.34	9.62	12.20	9.94

* Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. The adjustment has no material effect on these results.

** Rates are adjusted for mortality improvements using Scale MP-2015 from a base year of 2006.

Age	Percent of Members Decrementing Each Year			
	Termination (Withdrawal)		Disability Retirement	
	Male	Female	Male	Female
20	1.47%	1.47%	0.03%	0.03%
25	1.13	1.13	0.05	0.05
30	0.80	0.80	0.06	0.06
35	0.47	0.47	0.11	0.11
40	0.40	0.40	0.18	0.18
45	0.40	0.40	0.30	0.30
50	0.00	0.00	0.48	0.48
55	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00
65	0.00	0.00	0.00	0.00

Summary of Actuarial Assumptions (Concluded)

Age	Percent Retiring	Salary Scale	
		Year	Increase
50	5 %	1	15.25 %
51	5	2	9.25
52	5	3	7.75
53	5	4	7.25
54	5	5	6.75
55	65	6	6.25
56	50	7	6.00
57	30	8	5.75
58	20	9	5.50
59	30	10	5.25
60+	100	11	5.00
		12	4.75
		13	4.50
		14	4.25
		15	4.25
		16	4.25
		17	4.00
		18	4.00
		19	3.75
		20	3.75
		21	3.65
		22	3.55
		23	3.45
		24	3.35
		25+	3.25

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 7.50%; the municipal bond rate is 2.45% (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, 2020 is 7.50%**. 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			Projected Contributions				
	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 UAL*	Additional State Contributions**	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) x 15.4%	(e) = (a) x 30.1%***	(f)	(g)	(h) = (d) + (e) + (f) + (g)
2020	\$ 84,530		\$ 84,530					
2021	86,482	\$ -	86,482	\$ 13,318	\$ 24,302	\$ 1,000	\$ 1,000	\$ 38,620
2022	87,374	1,919	89,293	13,456	24,552	356	1,000	39,364
2023	87,633	4,562	92,195	13,495	26,378	937	1,000	41,810
2024	87,520	7,671	95,191	13,478	26,343	1,576	1,000	42,397
2025	87,040	11,245	98,285	13,404	26,199	2,310	1,000	42,913
2026	86,316	15,163	101,479	13,293	25,981	3,115	1,000	43,389
2027	85,495	19,283	104,778	13,166	25,734	3,961	1,000	43,861
2028	84,092	24,091	108,183	12,950	25,312	4,948	1,000	44,210
2029	82,070	29,629	111,699	12,639	24,703	6,086	1,000	44,428
2030	79,823	35,506	115,329	12,293	24,027	7,293	1,000	44,613
2031	77,483	41,594	119,077	11,932	23,322	8,544	-	43,798
2032	74,878	48,069	122,947	11,531	22,538	9,873	-	43,942
2033	72,060	54,883	126,943	11,097	21,690	11,273	-	44,060
2034	69,532	61,537	131,069	10,708	20,929	12,640	-	44,277
2035	67,001	68,327	135,328	10,318	20,167	14,034	-	44,519
2036	64,062	75,664	139,726	9,866	14,798	10,245	-	34,909
2037	60,794	83,474	144,268	9,362	14,043	11,302	-	34,707
2038	57,494	91,462	148,956	8,854	13,281	12,384	-	34,519
2039	54,082	99,715	153,797	8,329	12,493	13,502	-	34,324
2040	50,162	108,634	158,796	7,725	11,587	14,709	-	34,021
2041	46,182	117,775	163,957	7,112	10,668	15,947	-	33,727
2042	41,971	127,314	169,285	6,464	9,695	17,238	-	33,397
2043	37,520	137,267	174,787	5,778	8,667	18,586	-	33,031
2044	33,448	147,020	180,468	5,151	7,726	19,907	-	32,784
2045	29,341	156,992	186,333	4,519	6,778	21,257	-	32,554
2046	24,836	167,553	192,389	3,825	5,737	22,687	-	32,249
2047	20,629	178,012	198,641	3,177	4,765	24,103	-	32,045
2048	16,481	188,616	205,097	2,538	3,807	25,539	-	31,884
2049	12,550	199,213	211,763	1,933	2,899	26,973	-	31,805
2050	9,163	209,482	218,645	1,411	2,117	28,364	-	31,892
2051	6,119	219,632	225,751	942	1,414	29,738	-	32,094
2052	3,780	229,308	233,088	582	873	31,048	-	32,503
2053	2,042	238,621	240,663	315	472	32,309	-	33,096
2054	1,106	247,379	248,485	170	255	33,495	-	33,920
2055	634	255,927	256,561	98	146	34,652	-	34,896
2056	321	264,578	264,899	49	74	35,824	-	35,947
2057	129	273,379	273,508	20	30	37,015	-	37,065
2058	23	282,374	282,397	3	5	38,233	-	38,241
2059	-	291,575	291,575	-	-	39,479	-	39,479
2060	-	301,051	301,051	-	-	40,762	-	40,762
2061	-	310,835	310,835	-	-	42,087	-	42,087
2062	-	320,937	320,937	-	-	43,455	-	43,455
2063	-	331,368	331,368	-	-	44,867	-	44,867
2064	-	342,137	342,137	-	-	46,325	-	46,325
2065	-	353,257	353,257	-	-	47,831	-	47,831
2066	-	364,738	364,738	-	-	49,385	-	49,385
2067	-	376,592	376,592	-	-	50,991	-	50,991
2068	-	388,831	388,831	-	-	52,648	-	52,648
2069	-	401,468	401,468	-	-	54,359	-	54,359
2070	-	414,516	414,516	-	-	56,125	-	56,125

* Equal to contributions (ultimately 45.50% of payroll for new employees) net of normal cost and expenses (24.96% of payroll).

** Additional state contributions assumed to end after 10 years. Actual end date will depend on the funding status of this plan and the PERA Police and Fire Plan.

*** Employer contributions are equal to 28.1% for fiscal year ending June 30, 2021; the supplemental employer contribution is assumed to stop after 15 years.



Single Discount Rate Development

Projection of Contributions (Dollars in Thousands, Concluded)

Fiscal Year Ending	Projected Covered-Employee Payroll			Projected Contributions				
	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 UAL*	Additional State Contributions	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d)	(e)	(f)	(g)	(h) = (d) + (e) + (f) + (g)
2071	\$ -	\$ 427,987	\$ 427,987	\$ -	\$ -	\$ 57,949	\$ -	\$ 57,949
2072	-	441,897	441,897	-	-	59,833	-	59,833
2073	-	456,259	456,259	-	-	61,777	-	61,777
2074	-	471,087	471,087	-	-	63,785	-	63,785
2075	-	486,397	486,397	-	-	65,858	-	65,858
2076	-	502,205	502,205	-	-	67,999	-	67,999
2077	-	518,527	518,527	-	-	70,209	-	70,209
2078	-	535,379	535,379	-	-	72,490	-	72,490
2079	-	552,779	552,779	-	-	74,846	-	74,846
2080	-	570,744	570,744	-	-	77,279	-	77,279
2081	-	589,293	589,293	-	-	79,790	-	79,790
2082	-	608,445	608,445	-	-	82,383	-	82,383
2083	-	628,220	628,220	-	-	85,061	-	85,061
2084	-	648,637	648,637	-	-	87,825	-	87,825
2085	-	669,718	669,718	-	-	90,680	-	90,680
2086	-	691,483	691,483	-	-	93,627	-	93,627
2087	-	713,957	713,957	-	-	96,670	-	96,670
2088	-	737,160	737,160	-	-	99,811	-	99,811
2089	-	761,118	761,118	-	-	103,055	-	103,055
2090	-	785,854	785,854	-	-	106,405	-	106,405
2091	-	811,395	811,395	-	-	109,863	-	109,863
2092	-	837,765	837,765	-	-	113,433	-	113,433
2093	-	864,992	864,992	-	-	117,120	-	117,120
2094	-	893,104	893,104	-	-	120,926	-	120,926
2095	-	922,130	922,130	-	-	124,856	-	124,856
2096	-	952,100	952,100	-	-	128,914	-	128,914
2097	-	983,043	983,043	-	-	133,104	-	133,104
2098	-	1,014,992	1,014,992	-	-	137,430	-	137,430
2099	-	1,047,979	1,047,979	-	-	141,896	-	141,896
2100	-	1,082,038	1,082,038	-	-	146,508	-	146,508
2101	-	1,117,205	1,117,205	-	-	151,269	-	151,269
2102	-	1,153,514	1,153,514	-	-	156,186	-	156,186
2103	-	1,191,003	1,191,003	-	-	161,262	-	161,262
2104	-	1,229,710	1,229,710	-	-	166,503	-	166,503
2105	-	1,269,676	1,269,676	-	-	171,914	-	171,914
2106	-	1,310,941	1,310,941	-	-	177,501	-	177,501
2107	-	1,353,546	1,353,546	-	-	183,270	-	183,270
2108	-	1,397,536	1,397,536	-	-	189,226	-	189,226
2109	-	1,442,956	1,442,956	-	-	195,376	-	195,376
2110	-	1,489,852	1,489,852	-	-	201,726	-	201,726
2111	-	1,538,273	1,538,273	-	-	208,282	-	208,282
2112	-	1,588,266	1,588,266	-	-	215,051	-	215,051
2113	-	1,639,885	1,639,885	-	-	222,040	-	222,040
2114	-	1,693,181	1,693,181	-	-	229,257	-	229,257
2115	-	1,748,210	1,748,210	-	-	236,708	-	236,708
2116	-	1,805,027	1,805,027	-	-	244,401	-	244,401
2117	-	1,863,690	1,863,690	-	-	252,344	-	252,344
2118	-	1,924,260	1,924,260	-	-	260,545	-	260,545
2119	-	1,986,798	1,986,798	-	-	269,012	-	269,012
2120	-	2,051,369	2,051,369	-	-	277,755	-	277,755

* Equal to contributions (ultimately 45.50% of payroll for new employees) net of normal cost and expenses (24.96% of payroll).



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 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2021	\$ 757,590	\$ 38,620	\$ 63,295	\$ 225	\$ 55,902	\$ 788,592
2022	788,592	39,364	64,736	227	58,202	821,195
2023	821,195	41,810	66,428	228	60,675	857,024
2024	857,024	42,397	68,276	228	63,315	894,232
2025	894,232	42,913	70,212	226	66,054	932,761
2026	932,761	43,389	72,307	224	68,884	972,503
2027	972,503	43,861	74,335	222	71,807	1,013,614
2028	1,013,614	44,210	76,653	219	74,818	1,055,770
2029	1,055,770	44,428	79,084	213	77,899	1,098,800
2030	1,098,800	44,613	81,612	208	81,040	1,142,633
2031	1,142,633	43,798	84,162	201	84,204	1,186,272
2032	1,186,272	43,942	87,004	195	87,377	1,230,392
2033	1,230,392	44,060	89,711	187	90,591	1,275,145
2034	1,275,145	44,277	92,101	181	93,868	1,321,008
2035	1,321,008	44,519	94,434	174	97,231	1,368,150
2036	1,368,150	34,909	96,923	167	100,322	1,406,291
2037	1,406,291	34,707	99,466	158	103,081	1,444,455
2038	1,444,455	34,519	101,880	149	105,848	1,482,793
2039	1,482,793	34,324	104,303	141	108,627	1,521,300
2040	1,521,300	34,021	107,001	130	111,405	1,559,595
2041	1,559,595	33,727	109,762	120	114,165	1,597,605
2042	1,597,605	33,397	112,709	109	116,896	1,635,080
2043	1,635,080	33,031	115,734	98	119,582	1,671,861
2044	1,671,861	32,784	118,399	87	122,234	1,708,393
2045	1,708,393	32,554	121,080	76	124,867	1,744,658
2046	1,744,658	32,249	124,047	65	127,467	1,780,262
2047	1,780,262	32,045	126,741	54	130,031	1,815,543
2048	1,815,543	31,884	129,375	43	132,574	1,850,583
2049	1,850,583	31,805	131,749	33	135,112	1,885,718
2050	1,885,718	31,892	133,669	24	137,680	1,921,597
2051	1,921,597	32,094	135,185	16	140,323	1,958,813
2052	1,958,813	32,503	136,028	10	143,099	1,998,377
2053	1,998,377	33,096	136,265	5	146,079	2,041,282
2054	2,041,282	33,920	135,521	3	149,355	2,089,033
2055	2,089,033	34,896	134,399	2	153,013	2,142,541
2056	2,142,541	35,947	132,966	1	157,118	2,202,639
2057	2,202,639	37,065	131,412	-	161,724	2,270,016
2058	2,270,016	38,241	129,621	-	166,887	2,345,523
2059	2,345,523	39,479	127,720	-	172,665	2,429,947
2060	2,429,947	40,762	125,747	-	179,117	2,524,079
2061	2,524,079	42,087	123,683	-	186,302	2,628,785
2062	2,628,785	43,455	121,524	-	194,284	2,745,000
2063	2,745,000	44,867	119,269	-	203,136	2,873,734
2064	2,873,734	46,325	116,916	-	212,931	3,016,074
2065	3,016,074	47,831	114,461	-	223,752	3,173,196
2066	3,173,196	49,385	111,903	-	235,688	3,346,366
2067	3,346,366	50,991	109,238	-	248,833	3,536,952
2068	3,536,952	52,648	106,465	-	263,290	3,746,425
2069	3,746,425	54,359	103,583	-	279,170	3,976,371
2070	3,976,371	56,125	100,592	-	296,591	4,228,495

For purposes of this projection, we assumed the current fixed rate contribution would continue after the plan becomes fully funded. If we reflected a decrease in contribution rates due to full funding, future assets and contributions would be less than what is shown herein.



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 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2071	\$ 4,228,495	\$ 57,949	\$ 97,495	\$ -	\$ 315,681	\$ 4,504,630
2072	4,504,630	59,833	94,295	-	336,578	4,806,746
2073	4,806,746	61,777	90,997	-	359,430	5,136,956
2074	5,136,956	63,785	87,606	-	384,395	5,497,530
2075	5,497,530	65,858	84,129	-	411,642	5,890,901
2076	5,890,901	67,999	80,573	-	441,355	6,319,682
2077	6,319,682	70,209	76,946	-	473,728	6,786,673
2078	6,786,673	72,490	73,256	-	508,972	7,294,879
2079	7,294,879	74,846	69,513	-	547,313	7,847,525
2080	7,847,525	77,279	65,724	-	588,990	8,448,070
2081	8,448,070	79,790	61,900	-	634,264	9,100,224
2082	9,100,224	82,383	58,052	-	683,413	9,807,968
2083	9,807,968	85,061	54,189	-	736,735	10,575,575
2084	10,575,575	87,825	50,324	-	794,549	11,407,625
2085	11,407,625	90,680	46,471	-	857,200	12,309,034
2086	12,309,034	93,627	42,647	-	925,055	13,285,069
2087	13,285,069	96,670	38,873	-	998,509	14,341,375
2088	14,341,375	99,811	35,169	-	1,077,984	15,484,001
2089	15,484,001	103,055	31,560	-	1,163,933	16,719,429
2090	16,719,429	106,405	28,069	-	1,256,842	18,054,607
2091	18,054,607	109,863	24,722	-	1,357,231	19,496,979
2092	19,496,979	113,433	21,542	-	1,465,657	21,054,527
2093	21,054,527	117,120	18,553	-	1,582,719	22,735,813
2094	22,735,813	120,926	15,776	-	1,709,058	24,550,021
2095	24,550,021	124,856	13,231	-	1,845,362	26,507,008
2096	26,507,008	128,914	10,932	-	1,992,370	28,617,360
2097	28,617,360	133,104	8,889	-	2,150,876	30,892,451
2098	30,892,451	137,430	7,105	-	2,321,733	33,344,509
2099	33,344,509	141,896	5,577	-	2,505,858	35,986,686
2100	35,986,686	146,508	4,294	-	2,704,238	38,833,138
2101	38,833,138	151,269	3,240	-	2,917,936	41,899,103
2102	41,899,103	156,186	2,393	-	3,148,096	45,200,992
2103	45,200,992	161,262	1,728	-	3,395,949	48,756,475
2104	48,756,475	166,503	1,220	-	3,662,822	52,584,580
2105	52,584,580	171,914	841	-	3,950,143	56,705,796
2106	56,705,796	177,501	567	-	4,259,450	61,142,180
2107	61,142,180	183,270	374	-	4,592,399	65,917,475
2108	65,917,475	189,226	242	-	4,950,770	71,057,229
2109	71,057,229	195,376	155	-	5,336,481	76,588,931
2110	76,588,931	201,726	98	-	5,751,595	82,542,154
2111	82,542,154	208,282	63	-	6,198,329	88,948,702
2112	88,948,702	215,051	41	-	6,679,070	95,842,782
2113	95,842,782	222,040	27	-	7,196,384	103,261,179
2114	103,261,179	229,257	19	-	7,753,030	111,243,447
2115	111,243,447	236,708	14	-	8,351,975	119,832,116
2116	119,832,116	244,401	10	-	8,996,408	129,072,915
2117	129,072,915	252,344	8	-	9,689,761	139,015,012
2118	139,015,012	260,545	6	-	10,435,720	149,711,271
2119	149,711,271	269,012	5	-	11,238,251	161,218,529
2120	161,218,529	277,755	3	-	12,101,618	173,597,899

For purposes of this projection, we assumed the current fixed rate contribution would continue after the plan becomes fully funded. If we reflected a decrease in contribution rates due to full funding, future assets and contributions would be less than what is shown herein.



Single Discount Rate Development

Present Values of Projected Benefits (Dollars in Thousands)

Fiscal Year Ending	Projected Beginning Plan		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)
	Fiduciary Net Position							
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ^{(a)-.5}	(g)=(e)*vf ^{(a)-.5}	(h)=(c)/(1+s dr) ^{(a)-.5}	
2021	\$ 757,590	\$ 63,295	\$ 63,295	\$ 0	\$ 61,047	\$ 0	\$ 61,047	
2022	788,592	64,736	64,736	0	58,081	0	58,081	
2023	821,195	66,428	66,428	0	55,441	0	55,441	
2024	857,024	68,276	68,276	0	53,008	0	53,008	
2025	894,232	70,212	70,212	0	50,708	0	50,708	
2026	932,761	72,307	72,307	0	48,577	0	48,577	
2027	972,503	74,335	74,335	0	46,456	0	46,456	
2028	1,013,614	76,653	76,653	0	44,562	0	44,562	
2029	1,055,770	79,084	79,084	0	42,768	0	42,768	
2030	1,098,800	81,612	81,612	0	41,056	0	41,056	
2031	1,142,633	84,162	84,162	0	39,385	0	39,385	
2032	1,186,272	87,004	87,004	0	37,874	0	37,874	
2033	1,230,392	89,711	89,711	0	36,328	0	36,328	
2034	1,275,145	92,101	92,101	0	34,694	0	34,694	
2035	1,321,008	94,434	94,434	0	33,091	0	33,091	
2036	1,368,150	96,923	96,923	0	31,594	0	31,594	
2037	1,406,291	99,466	99,466	0	30,160	0	30,160	
2038	1,444,455	101,880	101,880	0	28,737	0	28,737	
2039	1,482,793	104,303	104,303	0	27,368	0	27,368	
2040	1,521,300	107,001	107,001	0	26,117	0	26,117	
2041	1,559,595	109,762	109,762	0	24,922	0	24,922	
2042	1,597,605	112,709	112,709	0	23,806	0	23,806	
2043	1,635,080	115,734	115,734	0	22,739	0	22,739	
2044	1,671,861	118,399	118,399	0	21,640	0	21,640	
2045	1,708,393	121,080	121,080	0	20,586	0	20,586	
2046	1,744,658	124,047	124,047	0	19,619	0	19,619	
2047	1,780,262	126,741	126,741	0	18,646	0	18,646	
2048	1,815,543	129,375	129,375	0	17,706	0	17,706	
2049	1,850,583	131,749	131,749	0	16,773	0	16,773	
2050	1,885,718	133,669	133,669	0	15,830	0	15,830	
2051	1,921,597	135,185	135,185	0	14,893	0	14,893	
2052	1,958,813	136,028	136,028	0	13,940	0	13,940	
2053	1,998,377	136,265	136,265	0	12,990	0	12,990	
2054	2,041,282	135,521	135,521	0	12,018	0	12,018	
2055	2,089,033	134,399	134,399	0	11,087	0	11,087	
2056	2,142,541	132,966	132,966	0	10,203	0	10,203	
2057	2,202,639	131,412	131,412	0	9,381	0	9,381	
2058	2,270,016	129,621	129,621	0	8,607	0	8,607	
2059	2,345,523	127,720	127,720	0	7,889	0	7,889	
2060	2,429,947	125,747	125,747	0	7,225	0	7,225	
2061	2,524,079	123,683	123,683	0	6,611	0	6,611	
2062	2,628,785	121,524	121,524	0	6,042	0	6,042	
2063	2,745,000	119,269	119,269	0	5,517	0	5,517	
2064	2,873,734	116,916	116,916	0	5,030	0	5,030	
2065	3,016,074	114,461	114,461	0	4,581	0	4,581	
2066	3,173,196	111,903	111,903	0	4,166	0	4,166	
2067	3,346,366	109,238	109,238	0	3,783	0	3,783	
2068	3,536,952	106,465	106,465	0	3,430	0	3,430	
2069	3,746,425	103,583	103,583	0	3,104	0	3,104	
2070	3,976,371	100,592	100,592	0	2,804	0	2,804	



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)
2071	\$ 4,228,495	\$ 97,495	\$ 97,495	\$ -	\$ 2,528	\$ -	\$ 2,528
2072	4,504,630	94,295	94,295	-	2,275	-	2,275
2073	4,806,746	90,997	90,997	-	2,042	-	2,042
2074	5,136,956	87,606	87,606	-	1,829	-	1,829
2075	5,497,530	84,129	84,129	-	1,634	-	1,634
2076	5,890,901	80,573	80,573	-	1,456	-	1,456
2077	6,319,682	76,946	76,946	-	1,293	-	1,293
2078	6,786,673	73,256	73,256	-	1,145	-	1,145
2079	7,294,879	69,513	69,513	-	1,011	-	1,011
2080	7,847,525	65,724	65,724	-	889	-	889
2081	8,448,070	61,900	61,900	-	779	-	779
2082	9,100,224	58,052	58,052	-	680	-	680
2083	9,807,968	54,189	54,189	-	590	-	590
2084	10,575,575	50,324	50,324	-	510	-	510
2085	11,407,625	46,471	46,471	-	438	-	438
2086	12,309,034	42,647	42,647	-	374	-	374
2087	13,285,069	38,873	38,873	-	317	-	317
2088	14,341,375	35,169	35,169	-	267	-	267
2089	15,484,001	31,560	31,560	-	223	-	223
2090	16,719,429	28,069	28,069	-	184	-	184
2091	18,054,607	24,722	24,722	-	151	-	151
2092	19,496,979	21,542	21,542	-	122	-	122
2093	21,054,527	18,553	18,553	-	98	-	98
2094	22,735,813	15,776	15,776	-	78	-	78
2095	24,550,021	13,231	13,231	-	60	-	60
2096	26,507,008	10,932	10,932	-	46	-	46
2097	28,617,360	8,889	8,889	-	35	-	35
2098	30,892,451	7,105	7,105	-	26	-	26
2099	33,344,509	5,577	5,577	-	19	-	19
2100	35,986,686	4,294	4,294	-	14	-	14
2101	38,833,138	3,240	3,240	-	10	-	10
2102	41,899,103	2,393	2,393	-	7	-	7
2103	45,200,992	1,728	1,728	-	4	-	4
2104	48,756,475	1,220	1,220	-	3	-	3
2105	52,584,580	841	841	-	2	-	2
2106	56,705,796	567	567	-	1	-	1
2107	61,142,180	374	374	-	1	-	1
2108	65,917,475	242	242	-	-	-	-
2109	71,057,229	155	155	-	-	-	-
2110	76,588,931	98	98	-	-	-	-
2111	82,542,154	63	63	-	-	-	-
2112	88,948,702	41	41	-	-	-	-
2113	95,842,782	27	27	-	-	-	-
2114	103,261,179	19	19	-	-	-	-
2115	111,243,447	14	14	-	-	-	-
2116	119,832,116	10	10	-	-	-	-
2117	129,072,915	8	8	-	-	-	-
2118	139,015,012	6	6	-	-	-	-
2119	149,711,271	5	5	-	-	-	-
2120	161,218,529	3	3	-	-	-	-
Totals					\$ 1,203,759	\$ -	\$ 1,203,759



SECTION H

GLOSSARY OF TERMS

Glossary of Terms

<i>Accrued Service</i>	Service credited under the system which was rendered before the date of the actuarial valuation.
<i>Actuarial Accrued Liability (AAL)</i>	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.”
<i>Actuarial Assumptions</i>	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.
<i>Actuarial Cost Method</i>	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.
<i>Actuarial Equivalent</i>	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.
<i>Actuarial Gain (Loss)</i>	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.
<i>Actuarial Present Value (APV)</i>	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.
<i>Actuarial Valuation</i>	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.
<i>Actuarial Valuation Date</i>	The date as of which an actuarial valuation is performed.
<i>Actuarially Determined Contribution (ADC)</i>	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

<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Amortization Method</i>	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).
<i>Cost-of-Living Adjustments</i>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i>	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.
<i>Covered-Employee Payroll</i>	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.
<i>Deferred Inflows and Outflows of Resources</i>	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.
<i>Discount Rate or Single Discount Rate</i>	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: <ol style="list-style-type: none">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; and2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
<i>Entry Age Actuarial Cost Method or Entry Age Normal (EAN)</i>	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

<i>Fiduciary Net Position</i>	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
<i>GASB</i>	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
<i>Long-Term Expected Rate of Return</i>	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.
<i>Money-Weighted Rate of Return</i>	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.
<i>Multiple-Employer Defined Benefit Pension Plan</i>	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
<i>Municipal Bond Rate</i>	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.
<i>Net Pension Liability (NPL)</i>	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
<i>Non-Employer Contributing Entities</i>	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.
<i>Normal Cost</i>	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
<i>Other Postemployment Benefits (OPEB)</i>	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 post-employment benefits do not include termination benefits.
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	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.