Minnesota State Retirement System
Correctional Employees Retirement Fund

GASB Statement Nos. 67 and 68

Accounting and Financial Reporting for Pensions

June 30, 2021

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November 24, 2021

Minnesota State Retirement System
Correctional Employees 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 Correctional Employees Retirement Fund ("CERF"), as amended by GASB Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting statements.

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

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing 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. The Minnesota State Retirement System (MSRS) is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer. This report may be provided to parties other than MSRS only in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

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

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2021 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

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

This report reflects the impact of COVID-19 through June 30, 2021. It does not reflect the ongoing 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 and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled

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

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,
Gabriel, Roeder, Smith & Company

Brian B. Murphy

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

Bonita J. Wurst

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

BBM/BJW:ah

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SECTION A

EXECUTIVE SUMMARY

Executive Summary
as of June 30, 2021 (Dollars in Thousands)

	2021
Actuarial Valuation Date	June 30, 2021
Measurement Date of the Net Pension Liability	June 30, 2021
Membership	
Number of	
- Service Retirements	3,127
- Survivors	276
- Disability Retirements	325
- Deferred Retirements	1,428
- Terminated other non-vested	1,068
- Active Members	4,504
- Total	10,728
Covered-employee Payroll [1]	$ 282,667
Net Pension Liability	
Total Pension Liability	$ 2,023,040
Plan Fiduciary Net Position	1,580,953
Net Pension Liability	$ 442,087
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	78.15%
Net Pension Liability as a Percentage of Covered-Employee Payroll	156.40%
Development of the Single Discount Rate	
Single Discount Rate	6.50%
Long-Term Expected Rate of Investment Return	6.50%
Long-Term Municipal Bond Rate [2]	1.92%
Last year ending June 30 in the 2022 to 2121 projection period for which projected benefit payments are fully funded	2121
Total Pension Expense/ (Income)	$ (122,025)

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 the Total Pension Liability	$ 7,802	$ 4,489
Changes in assumptions	215,651	123,568
Net difference between projected and actual earnings on pension plan investments	24,181	225,739
Total	$ 247,634	$ 353,796

[1] *Assumed equal to actual member contributions divided by employee contribution rate.*

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

Discussion

Accounting Standard

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

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

Financial Statements

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

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to subsequent to the measurement date of June 30, 2021.

The pension expense 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 Correctional Employees Retirement Fund can be found online at www.msrs.state.mn.us/annual-reports-fy-2021 or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, Minnesota, 55103 or requested via email at info@msrs.us or telephone at 1.800.657.5757.

Required Supplementary Information

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

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

Measurement of the Net Pension Liability

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

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

Given the plan's contribution allocation procedure, if there are no changes in benefits, Chapter 356 required contributions are made, and all actuarial assumptions are met (including the assumption of the plan earning 7.50% on an actuarial value of assets basis, as prescribed by statutes), then the following outcomes are expected:

1. The normal cost of the plan is expected to remain approximately level as a percent of pay;
2. The funded status of the plan is expected to gradually improve and is expected to be 100% funded within the next 27 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

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, 2021 and a measurement date of June 30, 2021.

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 long-term expected rate of return on pension plan investments is 6.50%; the municipal bond rate is 1.92% (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 6.50%.

SECTION B

FINANCIAL STATEMENTS

Statement of Pension Expense Under GASB Statement No. 68
Fiscal Year Ended June 30, 2021 (Dollars in Thousands)

A. Expense			
1.	Service Cost	$	47,383
2.	Interest on the Total Pension Liability		123,942
3.	Current-Period Benefit Changes		-
4.	Employee Contributions		(27,136)
5.	Projected Earnings on Plan Investments		(91,430)
6.	Pension Plan Administrative Expense		950
7.	Other Changes in Plan Fiduciary Net Position		(20)
8.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Current Reporting Period		(948)
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		53,913
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.50%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		(54,984)
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**51,670**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Prior Reporting Periods		3,760
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		(166,199)
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(11,256)
15.	**Total Pension Expense / (Income)**	**$**	**(122,025)**

Recognition of Deferred Outflows and Inflows of Resources

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 47,702 years. Additionally, the total plan membership (active employees and inactive employees) was 10,543. 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 5.0000 years (rounded).

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

Statement of Outflows and Inflows
Arising from Current Reporting Period
Fiscal Year Ended June 30, 2021 (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	$	(4,738)
2. Assumption Changes (gains) or losses		269,564
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		5
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		(948)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes		53,913
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	52,965
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	$	(3,790)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes		215,651
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	211,861
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(274,922)
2. Recognition period for Assets {in years}		5
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets		(54,984)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(219,938)

Statement of Outflows and Inflows
Arising from Current and Prior Reporting Periods
Fiscal Year Ended June 30, 2021 (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	$ 58,373	$ 167,847	$ (109,474)
2. Due to Assets	8,209	74,449	(66,240)
3. Totals	$ 66,582	$ 242,296	$ (175,714)

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	$ 4,460	$ 1,648	$ 2,812
2. Assumption Changes	53,913	166,199	(112,286)
3. Net Difference between projected and actual earnings on pension plan investments	8,209	74,449	(66,240)
4. Totals	$ 66,582	$ 242,296	$ (175,714)

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	$ 7,802	$ 4,489	$ 3,313
2. Assumption Changes	215,651	123,568	92,083
3. Net Difference between projected and actual earnings on pension plan investments*	24,181	225,739	(201,558)
4. Total	$ 247,634	$ 353,796	$ (106,162)

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
2022	$ (120,732)
2023	9,337
2024	7,253
2025	(2,020)
2026	-
Thereafter	-
Total	$ (106,162)

** 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, 2021 (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					
2017	$ 6,566	5.0000	$ 1,314	$ -	0.0000
2018	(3,499)	5.0000	(700)	(699)	1.0000
2019	8,180	5.0000	1,636	3,272	2.0000
2020	7,550	5.0000	1,510	4,530	3.0000
2021	(4,738)	5.0000	(948)	(3,790)	4.0000
Total			**$ 2,812**	**$ 3,313**	
Deferred Outflow (Inflow) due to Assumption Changes					
2017	$ (213,159)	5.0000	$ (42,631)	$ -	0.0000
2018	(617,840)	5.0000	(123,568)	(123,568)	1.0000
2021	269,564	5.0000	53,913	215,651	4.0000
Total			**$ (112,286)**	**$ 92,083**	
Deferred Outflow (Inflow) due to Differences Between Projected and Actual Earnings on Plan Investments					
2017	$ (68,307)	5.0000	$ (13,663)	$ -	0.0000
2018	(29,009)	5.0000	(5,802)	(5,801)	1.0000
2019	2,231	5.0000	446	893	2.0000
2020	38,814	5.0000	7,763	23,288	3.0000
2021	(274,922)	5.0000	(54,984)	(219,938)	4.0000
Total			**$ (66,240)**	**$ (201,558)**	
Deferred Outflow (Inflow) due to All Sources					
Total			**$ (175,714)**	**$ (106,162)**	

Statement of Fiduciary Net Position
as of June 30, 2021 (Dollars in Thousands)

Assets		**June 30, 2021**
Cash & Short-term Investments	$	27,175
Receivables		4,746
Investment Pools (at fair value)		1,551,121
Securities Lending Collateral		100,400
Capital Assets		-
Total Assets	**$**	**1,683,442**
Total Deferred Outflows of Resources	**$**	**-**
Total Liabilities	**$**	**(102,489)**
Total Deferred Inflows of Resources	**$**	**-**
Net Position Restricted for Pensions	**$**	**1,580,953**

Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2021 (Dollars in Thousands)

1. Net position at market value at beginning of year	**$**	**1,223,537**
Additions		
2. Contributions		
a. Employee	$	27,136
b. Employer		48,823
c. Other sources		-
d. Total contributions	$	75,959
3. Investment income		
a. Investment income/(loss)	$	367,836
b. Investment expenses		(1,484)
c. Net investment income/(loss)	$	366,352
4. Other Additions		22
5. Total Additions *(2.d.) + (3.c.) + (4.)*	**$**	**442,333**
Deductions		
6. Benefits Paid		
a. Annuity benefits	$	(81,829)
b. Refunds		(2,136)
c. Total benefits paid	$	(83,965)
7. Expenses		
a. Other deductions	$	(2)
b. Administrative		(950)
c. Total expenses	$	(952)
8. Total deductions *(6.c.) + (7.c.)*	**$**	**(84,917)**
9. Net increase/(decrease) in fiduciary net position *(5.) + (8.)*	**$**	**357,416**
10. Net position at market value at end of year *(1.) + (9.)*	**$**	**1,580,953**
11. State Board of Investment calculated annual investment return for the Correctional Employees Retirement Fund*		30.2%

** The fiscal year 2021 investment return for the Combined Funds is 30.3%.*

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Changes in Net Pension Liability and Related Ratios
Current Period
Fiscal Year Ended June 30, 2021 (Dollars in Thousands)

A. Total Pension Liability		
1. Service Cost	$	47,383
2. Interest on the Total Pension Liability		123,942
3. Changes of benefit terms		-
4. Difference between expected and actual experience of the Total Pension Liability		(4,738)
5. Changes of assumptions		269,564
6. Benefit payments, including refunds of employee contributions		(83,965)
7. Net change in Total Pension Liability	$	352,186
8. Total Pension Liability – Beginning		1,670,854
9. Total Pension Liability – Ending	**$**	**2,023,040**
B. Plan Fiduciary Net Position		
1. Contributions – Employer	$	48,823
2. Contributions – Employee		27,136
3. Net investment income		366,352
4. Benefit payments, including refunds of employee contributions		(83,965)
5. Pension Plan Administrative Expense		(950)
6. Other changes		20
7. Net change in Plan Fiduciary Net Position	$	357,416
8. Plan Fiduciary Net Position – Beginning		1,223,537
9. Plan Fiduciary Net Position – Ending	**$**	**1,580,953**
C. Net Pension Liability, *A.9 - B.9.*	**$**	**442,087**
D. Plan Fiduciary Net Position as a percentage of the Total Pension Liability, *B.9 / A.9.*		**78.15%**
E. Covered-Employee payroll	**$**	**282,667** (1)
F. Net Pension Liability as a percentage of Covered-Employee payroll, *C. / E.*		**156.40%**

(1) *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,	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Total Pension Liability										
Service Cost	$ 47,383	$ 46,258	$ 44,912	$ 85,364	$ 95,522	$ 56,718	$ 48,805	$ 54,443		
Interest on the Total Pension Liability	123,942	117,205	110,664	108,421	95,307	97,571	92,039	85,702		
Benefit Changes	-	-	-	(164,182)	-	-	-	-		
Difference between Expected and Actual Experience	(4,738)	7,550	8,180	(3,499)	6,566	(764)	7,115	4,103		
Assumption Changes	269,564	-	-	(617,840)	(213,159)	576,552	118,399	(147,067)		
Benefit Payments	(81,829)	(77,045)	(72,419)	(67,622)	(63,221)	(59,045)	(54,909)	(50,842)		
Refunds	(2,136)	(2,488)	(2,484)	(2,052)	(1,466)	(1,895)	(1,590)	(1,447)		
Net Change in Total Pension Liability	**$ 352,186**	**$ 91,480**	**$ 88,853**	**$ (661,410)**	**$ (80,451)**	**$ 669,137**	**$ 209,859**	**$ (55,108)**		
Total Pension Liability - Beginning	**$ 1,670,854**	**$ 1,579,374**	**$ 1,490,521**	**$ 2,151,931**	**$ 2,232,382**	**$ 1,563,245**	**$ 1,353,386**	**$ 1,408,494**		
Total Pension Liability - Ending (a)	**$ 2,023,040**	**$ 1,670,854**	**$ 1,579,374**	**$ 1,490,521**	**$ 2,151,931**	**$ 2,232,382**	**$ 1,563,245**	**$ 1,353,386**		
Plan Fiduciary Net Position										
Employer Contributions	$ 48,823	$ 43,658	$ 38,245	$ 32,893	$ 31,763	$ 30,678	$ 29,480	$ 26,468		
Employee Contributions	27,136	26,734	25,686	23,417	22,648	21,953	21,061	18,855		
Pension Plan Net Investment Income	366,352	49,608	80,942	105,263	135,359	(195)	38,624	137,523		
Benefit Payments	(81,829)	(77,045)	(72,419)	(67,622)	(63,221)	(59,045)	(54,909)	(50,842)		
Refunds	(2,136)	(2,488)	(2,484)	(2,052)	(1,466)	(1,895)	(1,590)	(1,447)		
Pension Plan Administrative Expense	(950)	(924)	(856)	(827)	(856)	(906)	(720)	(657)		
Other Changes	20	(1)	(6)	(2)	(2)	-	-	(1)		
Net Change in Plan Fiduciary Net Position	**$ 357,416**	**$ 39,542**	**$ 69,108**	**$ 91,070**	**$ 124,225**	**$ (9,410)**	**$ 31,946**	**$ 129,899**		
Plan Fiduciary Net Position - Beginning	**$ 1,223,537**	**$ 1,183,995**	**$ 1,114,887**	**$ 1,023,817**	**$ 899,592**	**$ 909,002**	**$ 877,056**	**$ 747,157**		
Plan Fiduciary Net Position - Ending (b)	**$ 1,580,953**	**$ 1,223,537**	**$ 1,183,995**	**$ 1,114,887**	**$ 1,023,817**	**$ 899,592**	**$ 909,002**	**$ 877,056**		
Net Pension Liability - Ending (a) - (b)	**$ 442,087**	**$ 447,317**	**$ 395,379**	**$ 375,634**	**$ 1,128,114**	**$ 1,332,790**	**$ 654,243**	**$ 476,330**		
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**78.15 %**	**73.23 %**	**74.97 %**	**74.80 %**	**47.58 %**	**40.30 %**	**58.15 %**	**64.80 %**		
Covered-Employee Payroll (1)	**$ 282,667**	**$ 278,479**	**$ 267,563**	**$257,330**	**$248,879**	**$241,242**	**$231,440**	**$219,244**		
Net Pension Liability as a Percentage of Covered-Employee Payroll	**156.40 %**	**160.63 %**	**147.77 %**	**145.97 %**	**453.28 %**	**552.47 %**	**282.68 %**	**217.26 %**		

Notes to Schedule:

(1) Assumed equal to plan 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)
2012						
2013						
2014	$ 1,353,386	$ 877,056	$ 476,330	64.80%	$ 219,244	217.26%
2015	1,563,245	909,002	654,243	58.15	231,440	282.68
2016	2,232,382	899,592	1,332,790	40.30	241,242	552.47
2017	2,151,931	1,023,817	1,128,114	47.58	248,879	453.28
2018	1,490,521	1,114,887	375,634	74.80	257,330	145.97
2019	1,579,374	1,183,995	395,379	74.97	267,563	147.77
2020	1,670,854	1,223,537	447,317	73.23	278,479	160.63
2021	2,023,040	1,580,953	442,087	78.15	282,667	156.40

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 (2)	Actual Contribution as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b)/(d)
2012	$ 34,806	$ 24,188	$ 10,618	$ 200,035	12.09%
2013	34,060	24,632	9,428	204,198	12.06
2014	38,390	26,468	11,922	219,244	12.07
2015	40,109	29,480	10,629	231,440	12.74
2016	44,171	30,678	13,493	241,242	12.72
2017	45,943	31,763	14,180	248,879	12.76
2018	49,665	32,893	16,772	257,330	12.78
2019	43,265	38,245	5,020	267,563	14.29
2020	45,726	43,658	2,068	278,479	15.68
2021	46,781	48,823	(2,042)	282,667	17.27

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Fiscal Year Ending June 30, 2021 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.
Valuation Date	June 30, 2020
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	28 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.50%
Payroll Growth	3.25%
Salary Increases	Service based tables ranging from 12.25% with one year of service to 3.25% with 24 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 from a base year of 2006, white collar adjustment, set forward 2-years for males and set forward 1-year for females.

Other Information

Benefit Increases After Retirement	1.5% per annum beginning January 1, 2020.

See separate funding actuarial valuation report as of July 1, 2020 for additional detail. To obtain this report, contact MSRS as noted on page 3. This report is also available online at https://www.msrs.state.mn.us/annual-reports-fy-2020

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2012	
2013	
2014	18.6 %
2015	4.4
2016	(0.0)
2017	15.2
2018	10.4
2019	7.3
2020	4.2
2021	30.2

[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, 2021, the annual money-weighted rate of return for the Correctional Employees Retirement Fund was 30.2%. 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.

10-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 real 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, 2021, these estimates are summarized in the following table:

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

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

For purposes of this valuation, the long-term expected rate of return assumption is 6.50%. This assumption is based on a review of inflation and investment return assumptions in our report dated June 24, 2021.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

Single Discount Rate

A Single Discount Rate of 6.50% was used to measure the total pension liability. This Single Discount Rate was based on an expected rate of return on pension plan investments of 6.50%. The projection of cash flows used to determine this single discount rate assumed that plan 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 was projected to be available to make 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 6.50%, as well as what the fund's net pension liability would be if it were calculated using a Single Discount Rate that is 1-percentage-point lower (5.50%) or 1-percentage-point higher (7.50%) than the current rate.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 5.50%	Current Single Discount Rate Assumption 6.50%	1% Increase 7.50%
Total Pension Liability	$ 2,334,684	$ 2,023,040	$ 1,770,998
Net Position Restricted for Pensions	1,580,953	1,580,953	1,580,953
Net Pension Liability	**$ 753,731**	**$ 442,087**	**$ 190,045**

For more information on the calculation of the Single Discount Rate, refer to Section G of this report.

Note that we believe the 7.50% interest rate assumption does not comply with Actuarial Standards of Practice.

GASB Statement No. 68 Reconciliation (Dollars in Thousands)

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Total Pension Expense
Balance Beginning of Year	**$ 1,670,854**	**$ 1,223,537**	**$ 447,317**	**$ 44,652**	**$ 316,432**	
Changes for the Year:						
Service Cost	$ 47,383		$ 47,383			$ 47,383
Interest on Total Pension Liability	123,942		123,942			123,942
Interest on Plan Fiduciary Net Position [1]		$ 91,430 [1]	(91,430)			(91,430)
Changes in Benefit Terms	-		-			-
Liability Experience Gains and Losses	(4,738)		(4,738)	$ -	$ 3,790	(948)
Changes in Assumptions	269,564		269,564	215,651	-	53,913
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				(4,460)	(700)	3,760
Assumption Changes				-	(166,199)	(166,199)
Investment Gains/(Losses)				(8,209)	(19,465)	(11,256)
Contributions - Employer		48,823	(48,823)			
Contributions - Employees		27,136	(27,136)			(27,136)
Asset Gain/(Loss) [1]		274,922 [1]	(274,922)	-	219,938	(54,984)
Benefit Payment and Refunds	(83,965)	(83,965)				
Administrative Expenses		(950)	950			950
Other Changes		20	(20)			(20)
Net Changes	**$ 352,186**	**$ 357,416**	**$ (5,230)**	**$ 202,982**	**$ 37,364**	**$ (122,025)**
Balance End of Year	**$ 2,023,040**	**$ 1,580,953**	**$ 442,087**	**$ 247,634**	**$ 353,796**	

[1] *The sum of these items in column (b) equals the net investment income of $366,352.*

Summary of Population Statistics

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on July 1, 2020	**4,523**	**1,426**	**1,008**	**3,013**	**320**	**253**	**10,543**
New members	374						**374**
Return to active	24	(13)	(11)	0	0	0	**0**
Terminated non-vested	(129)	0	129	0	0	0	**0**
Service retirements	(125)	(48)	0	173	0	0	**0**
Terminated deferred	(62)	62	0	0	0	0	**0**
Terminated refund/transfer	(89)	(9)	(116)	0	0	0	**(214)**
Deaths	(5)	(3)	(1)	(65)	(8)	(8)	**(90)**
New beneficiary	0	0	0	0	0	33	**33**
Disabled	(7)	0	0	0	7	0	**0**
Unexpected status change	0	13	59	6	6	(2)	**82**
Net change	(19)	2	60	114	5	23	**185**
Members on July 1, 2021	**4,504**	**1,428**	**1,068**	**3,127**	**325**	**276**	**10,728**

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 employees in covered correctional service. Certain state employees with 75 percent working time spent in direct contact with inmates or patients are also eligible.
Contributions	Shown as a percent of salary:

Effective as of	Member	Regular Employer	Supplemental Employer	Total
Prior to July 1, 2018	9.10%	12.85%	0.00%	21.95%
July 1, 2018	9.60%	14.40%	0.00%	24.00%
July 1, 2019	9.60%	14.40%	1.45%	25.45%
July 1, 2020	9.60%	14.40%	2.95%	26.95%
July 1, 2021 and later	9.60%	14.40%	4.45%	28.45%

Supplemental employer contribution remains 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).

Allowable service	Service during which member contributions were made. May also include certain leave of absence, military service and periods while temporary Worker’s Compensation is paid.
Salary	Includes wages, allowances and fees. Excludes lump sum payments of separation and reduced salary while receiving Worker’s Compensation benefits.
Average salary	Average of the five highest successive years of Salary. Average Salary is based on all Allowable Service if less than five years.
Vesting	Hired before July 1, 2010: 100% vested after 3 years of Allowable Service. Hired after June 30, 2010: 50% vested after 5 years of Allowable Service; 60% vested after 6 years of Allowable Service; 70% vested after 7 years of Allowable Service; 80% vested after 8 years of Allowable Service; 90% vested after 9 years of Allowable Service; 100% vested after 10 years of Allowable Service.

Summary of Plan Provisions (Continued)

Retirement	
<u>**Normal retirement benefit**</u>	
Age/Service requirement	Age 55 and vested. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.
Amount	2.40% (2.20% if first hired after June 30, 2010) of Average Salary for each year of Allowable Service, pro-rata for completed months.
<u>**Early retirement**</u>	
Age/Service requirement	Age 50 and vested.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date reduced by 2/10% (5/12% if first hired after June 30, 2010, or if hired before July 1, 2010, and retire after June 30, 2015) per month for each month that the member is under age 55.
<u>**Form of payment**</u>	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.
<u>**Benefit increases**</u>	Through December 31, 2018: 2.00% January 1, 2019 and after: 1.50% 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	
<u>**Duty Disability**</u>	
Age/Service requirement	Physically or mentally unable to perform normal job duties as a direct result of a disability relating to an incident while performing the duties of the job which present inherent dangers to the employee. Members who become disabled after June 30, 2009, will have disability benefits converted to retirement benefits at age 55 instead of age 65.
Amount	50.00% of Average Salary plus 2.40% (2.20% if first hired after June 30, 2010) of Average Salary for each year in excess of 20 years and 10 months of Allowable Service (pro rata for completed months).

Disability (Continued)	
<u>Duty Disability Continued</u>	
Amount (Continued)	Payment begins at disability and ends at age 55 (age 65 if disabled prior to July 1, 2009) or the five-year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability. Member is reclassified from disabled to retired at age 55 (age 65 if disabled prior to July 1, 2009). Optional amount continues. Otherwise, normal retirement benefit equal to the disability benefit paid, or an actuarially equivalent option.
<u>Regular Disability</u>	
Age/Service requirement	At least one year of covered Correctional service for employees hired before July 1, 2009, or a vested Correctional employee hired after June 30, 2009, and the employee is determined to have a regular disability not related to an incident while performing the duties of the job.
Amount	Normal retirement benefit based on covered Correctional Service (minimum of 15 years if hired prior to July 1, 2009) and Average Salary at disability. Payment begins at disability and ends at age 55 (age 65 if disabled prior to July 1, 2009) or the five-year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability. Member is reclassified from disabled to retired at age 55 (age 65 if disabled prior to July 1, 2009). Optional amount continues. Otherwise, normal retirement benefit equal to the disability benefit paid, or an actuarially equivalent option.
<u>Benefit Increases</u>	Same as for retirement.
Death	
<u>Surviving spouse benefit</u>	
Age/Service requirement	Member at any age or former member age 50 or older who dies before retirement or disability benefit commences and was vested. If a former member dies before age 55 and has less than 30 years of Allowable Service, benefits commence when the former member would have been age 55. If an active member dies, benefits may commence immediately, regardless of age.

Summary of Plan Provisions (Continued)

Death (Continued)	
<u>**Surviving spouse benefit Continued)**</u>	
Amount	Surviving spouse receives the 100% joint and survivor benefits using the Normal Retirement formula above. If commencement is prior to age 55, the appropriate early retirement formula described above applies except that one-half the monthly reduction factor is used from age 50 to the commencement age and the Rule of 90 does not apply. In lieu of this benefit, the surviving spouse may elect a refund of member contributions with interest or an actuarially equivalent term certain annuity (lump sum payable to estate at death).
Benefit increases	Same as for retirement.
<u>**Surviving dependent children's benefit**</u>	
Age/service requirement	If no surviving spouse, all children (biological or adopted) below age 20 who are dependent for more than half of their support on deceased member.
Amount	Actuarially equivalent to surviving spouse 100% joint and survivor annuity payable to the later of age 20 or five years. The amount is to be proportionally divided among surviving children.
Benefit increases	Same as for retirement.
<u>**Refund of contributions with interest**</u>	
Age/service requirement	Active employee dies and survivor benefits are not payable or a former employee dies before annuity begins. If accumulated member contributions with interest exceed total payments to the surviving spouse and children, then the remainder is paid out.
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	
<u>**Refund of contributions**</u>	
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	Partially or fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971, to January 1, 1981; (c.) 3.00% thereafter (2.50% if hired after June 30, 2006) until January 1 of the year following attainment of age 55 or January 1, 2012, whichever is earlier; (d.) 5.00% thereafter until the annuity begins (2.50% if hired after June 30, 2006), but before January 1, 2012; and (e.) 2.00% from January 1, 2012 to December 31, 2018; and (f.) 0.00% thereafter. Amount is payable at normal or early retirement.
Optional form conversion factors	Effective July 1, 2019 and phased in over a 12-month period, actuarially equivalent factors based on the RP-2014 mortality table for healthy annuitants for a member turning age 56 in 2021, reflecting projected mortality improvements using Scale MP-2017, white collar adjustment, male rates set forward two years, female rates set forward one year, blended 70% males, 5.91% 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	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Changes in plan provisions	There were 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 in 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 June 30, 2020, and a review of inflation and investment assumptions dated June 24, 2021. 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	6.50% per annum.
Single discount rate	6.50% 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	2.25% per year.
Payroll Growth	3.00% per year.
Mortality rates	
Healthy pre-retirement	Pub-2010 General Employee Mortality Table adjusted for mortality improvements using mortality improvement Scale MP-2019.
Healthy post-retirement	Pub-2010 General Retired Mortality Table adjusted for mortality improvements using mortality improvement Scale MP-2019.
Disabled	Pub-2010 General Disabled Mortality Table adjusted for mortality improvements using mortality improvement Scale MP-2019.
Notes	The Pub-2010 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 18 to 80 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have extended the annuitant mortality table as needed for members younger than age 50 who are receiving a benefit by deriving rates based on the employee table and the juvenile table. Similarly, we have extended the employee table as needed for members older than age 80 by deriving rates based on the annuitant table.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year. Note that plan changes reflected in this report may result in behavior changes that are not anticipated in the current retirement rates.

Summary of Actuarial Assumptions (Continued)

Withdrawal	Service-related rates are based on experience; see table of sample rates.
Disability	Age-related rates based on experience; see table of sample rates. All incidences are assumed to be duty-related.
Allowance for combined service annuity	Liabilities for former members are increased by 17.0% for vested members and 6.0% for non-vested members 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 a percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Refund of contributions	For non-vested members, account balances accumulate interest until the assumed commencement date and are discounted back to the valuation date. Active members decrementing after becoming eligible for a benefit are assumed to take the contributions accumulated with interest if larger than the value of the benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 55.
Percentage married	75% of active male members are assumed to be married and 60% of active female 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 male spouses.
Form of payment	Married members retiring from active status are assumed to elect subsidized Joint and Survivor form of annuity as follows: Males: 12.5% elect 50% Joint & Survivor option 12.5% elect 75% Joint & Survivor option 65.0% elect 100% Joint & Survivor option Females: 15.0% elect 50% Joint & Survivor option 10.0% elect 75% Joint & Survivor option 50.0% elect 100% Joint & Survivor option Remaining members and unmarried members are assumed to elect the Straight Life option. Members receiving deferred annuities (including current terminated deferred members) are assumed to elect a straight life annuity, except that current terminated deferred members who terminated prior to July 1, 1997, are assumed to receive the Level Social Security option to age 62.

Summary of Actuarial Assumptions (Continued)

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.
Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: <u>Data for active members</u>: There was 1 member reported without a gender and no members reported with an invalid date of birth. We assumed a hire age of 34 and male gender. There were 11 members reported with zero or invalid salary. We used prior year salary (11 members), if available, otherwise, high five salary with a 10% load to account for salary increases (0 members). If neither pay or high five salary was available, we assumed a value of $45,000 (0 members). There were 2 members reported with zero service. Due to the small number of members with zero service, and based on direction from MSRS, we used service of 0 years for these members.

Summary of Actuarial Assumptions (Continued)

Unknown data for certain members (Concluded)	Data for terminated members: There were no members reported with missing or invalid gender or birth dates. There were 36 members reported without a benefit. If available, we calculated benefits for these members using the reported Average Salary, Credited Service and Termination Date provided. If Average Salary was not reported (14 members), we assumed a value of $45,000. If Credited Service was not reported (1 member), we assumed a value of 5.0 years. There were no members reported without a Termination Date. Data for members receiving benefits: There was 1 member reported with a missing gender. We assumed male gender for retirees and female gender for survivors. There were no members reported with a missing or invalid birth date. There were no survivors reported on the data file with an expired benefit. There were 4 members reported without a benefit. Due to the small number of members with missing benefits, we made no adjustment to the reported data for members receiving benefits. There were no retirees reported with a survivor option and a survivor date of death. There were 19 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 are two retirees reported with an accelerated benefit election, are younger than the accelerated age, and are missing accelerated benefit amount and end date. Due to the small number of affected members, we did not modify the valuation data. There were retired members reported with a survivor option and an invalid or missing survivor gender (346 members) and/or survivor date of birth (286 members). We used the valuation assumptions if the survivor gender or date of birth was missing or invalid.

Summary of Actuarial Assumptions (Continued)

Changes in actuarial assumptions	The investment return and single discount rates were changed from 7.50% to 6.50%. The inflation assumption was changed from 2.50% to 2.25%. The wage growth assumption was changed from 3.25% to 3.00%. The base mortality table for healthy annuitants and employees was changed from the RP-2014 table to the Pub-2010 General Mortality table. The mortality improvement scale was changed from MP-2015 to MP-2019. The base mortality table for disabled annuitants was changed from RP-2014 disabled annuitant mortality table (with future mortality improvement according to Scale MP-2015) to the Pub-2010 General disabled annuitant mortality table (with future mortality improvement according to Scale MP-2019). Assumed rates of salary increase were modified as recommended in the June 30, 2020 experience study. The overall impact results in a decrease in gross salary increase rates. Assumed rates of retirement were changed as recommended in the June 30, 2020 experience study. The changes result in more unreduced (Normal) retirements and fewer assumed early retirements. Assumed rates of withdrawal were changed from select and ultimate rates to service-based rates. The changes result in more assumed terminations. Assumed rates of disability were lowered and the disability incidence assumption was extended to age 70. Assumed percent married for active female members was lowered from 75% to 60%. Minor changes to form of payment assumptions were applied.

Summary of Actuarial Assumptions (Continued)

Age in 2021	Percentage of Members Dying Each Year* Healthy Post-Retirement Mortality** Male	Female	Healthy Pre-Retirement Mortality** Male	Female	Disability Mortality** Male	Female
20	0.04%	0.01%	0.04%	0.01%	0.44%	0.26%
25	0.03	0.01	0.03	0.01	0.34	0.20
30	0.05	0.02	0.05	0.02	0.50	0.35
35	0.07	0.03	0.07	0.03	0.67	0.55
40	0.08	0.04	0.08	0.04	0.82	0.74
45	0.11	0.06	0.10	0.06	1.04	0.98
50	0.28	0.21	0.14	0.08	1.50	1.42
55	0.42	0.30	0.21	0.13	2.06	1.82
60	0.64	0.41	0.33	0.20	2.60	2.08
65	0.92	0.59	0.47	0.29	3.07	2.18
70	1.42	0.96	0.66	0.44	3.64	2.58
75	2.42	1.71	0.99	0.73	4.70	3.63
80	4.36	3.14	1.58	1.24	6.70	5.62
85	7.96	5.91	6.70	5.08	10.03	8.89
90	13.77	10.98	13.77	10.98	15.25	13.06

* *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-2019 from a base year of 2010.*

Age	Percent of Members Decrementing Each Year Disability Retirement Male	Female
20	0.05%	0.05%
25	0.08	0.08
30	0.11	0.11
35	0.15	0.15
40	0.22	0.22
45	0.28	0.28
50	0.38	0.38
55	0.70	0.70
60	0.70	0.70
65	0.70	0.70
70	0.70	0.70

Summary of Actuarial Assumptions (Concluded)

	Percent	Salary Scale		Percent of Members Terminating (Withdrawing) Each Year		
Age	Retiring	Year	Increase	Year	Males	Females
50	4%	1	11.50%	1	20.00%	25.00%
51	3	2	7.00	2	15.00	15.00
52	3	3	5.00	3	10.00	15.00
53	3	4	5.00	4	10.00	15.00
54	3	5	4.75	5	8.50	12.50
55	50	6	4.75	6	7.75	10.00
56	30	7	4.75	7	6.75	10.00
57	15	8	4.75	8	5.50	10.00
58	15	9	4.50	9	5.00	10.00
59	15	10	4.50	10	2.75	7.50
60	15	11	4.50	11	2.75	7.25
61	15	12	4.50	12	2.50	7.00
62	30	13	4.25	13	2.25	5.00
63	30	14	4.00	14	2.25	5.00
64	15	15	3.75	15	2.00	4.00
65	30	16	3.75	16	2.00	4.00
66	30	17	3.75	17	2.00	4.00
67	25	18	3.50	18	1.50	4.00
68	25	19	3.50	19	1.25	3.00
69	25	20	3.50	20	1.00	3.00
70+	100	21	3.25	21	1.00	2.50
		22	3.25	22	1.00	2.25
		23	3.25	23	1.00	1.50
		24	3.25	24	1.00	0.75
		25+	3.00	25+	0.00	0.00

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term expected rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond 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 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 6.50%; the municipal bond rate is 1.92% (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, 2021 is 6.50%**. 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)

	Projected Covered-Employee Payroll			Projected Contributions			
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) x 9.60%	(e) = (a) x 18.85%**	(f)	(g) = (d) + (e) + (f)
2021	$ 282,667		$ 282,667				
2022	275,318	$ 9,650	284,968	$ 26,431	$ 51,897	$ 974	$ 79,302
2023	258,234	35,283	293,517	24,790	48,677	3,560	77,027
2024	242,985	59,337	302,322	23,327	45,803	5,987	75,117
2025	230,153	81,239	311,392	22,095	43,384	8,197	73,676
2026	218,031	102,703	320,734	20,931	41,099	10,363	72,393
2027	206,563	123,793	330,356	19,830	38,937	12,491	71,258
2028	196,677	143,589	340,266	18,881	37,074	14,488	70,443
2029	187,876	162,598	350,474	18,036	35,415	16,406	69,857
2030	179,364	181,625	360,989	17,219	33,810	18,326	69,355
2031	171,164	200,654	371,818	16,432	32,264	20,246	68,942
2032	163,172	219,801	382,973	15,665	30,758	22,178	68,601
2033	155,229	239,233	394,462	14,902	22,353	13,493	50,748
2034	147,223	259,073	406,296	14,133	21,200	14,612	49,945
2035	139,223	279,262	418,485	13,365	20,048	15,750	49,163
2036	130,718	300,321	431,039	12,549	18,823	16,938	48,310
2037	121,643	322,327	443,970	11,678	17,517	18,179	47,374
2038	112,728	344,562	457,290	10,822	16,233	19,433	46,488
2039	104,177	366,831	471,008	10,001	15,001	20,689	45,691
2040	95,588	389,550	485,138	9,176	13,765	21,971	44,912
2041	86,729	412,964	499,693	8,326	12,489	23,291	44,106
2042	78,252	436,431	514,683	7,512	11,268	24,615	43,395
2043	70,485	459,639	530,124	6,767	10,150	25,924	42,841
2044	63,274	482,754	546,028	6,074	9,111	27,227	42,412
2045	56,272	506,136	562,408	5,402	8,103	28,546	42,051
2046	49,397	529,884	579,281	4,742	7,113	29,885	41,740
2047	42,789	553,870	596,659	4,108	6,162	31,238	41,508
2048	36,852	577,707	614,559	3,538	5,307	32,583	41,428
2049	31,493	601,503	632,996	3,023	4,535	33,925	41,483
2050	26,343	625,643	651,986	2,529	3,793	35,286	41,608
2051	21,637	649,908	671,545	2,077	3,116	36,655	41,848
2052	17,548	674,143	691,691	1,685	2,527	38,022	42,234
2053	14,060	698,382	712,442	1,350	2,025	39,389	42,764
2054	10,995	722,820	733,815	1,056	1,583	40,767	43,406
2055	8,471	747,359	755,830	813	1,220	42,151	44,184
2056	6,563	771,942	778,505	630	945	43,538	45,113
2057	5,083	796,777	801,860	488	732	44,938	46,158
2058	3,928	821,988	825,916	377	566	46,360	47,303
2059	3,022	847,671	850,693	290	435	47,809	48,534
2060	2,285	873,929	876,214	219	329	49,290	49,838
2061	1,679	900,821	902,500	161	242	50,806	51,209
2062	1,200	928,375	929,575	115	173	52,360	52,648
2063	849	956,614	957,463	82	122	53,953	54,157
2064	590	985,597	986,187	57	85	55,588	55,730
2065	389	1,015,383	1,015,772	37	56	57,268	57,361
2066	247	1,045,998	1,046,245	24	36	58,994	59,054
2067	151	1,077,482	1,077,633	14	22	60,770	60,806
2068	86	1,109,876	1,109,962	8	12	62,597	62,617
2069	42	1,143,219	1,143,261	4	6	64,478	64,488
2070	16	1,177,542	1,177,558	1	2	66,413	66,416
2071	5	1,212,880	1,212,885	-	1	68,406	68,407

* *Equal to total contributions (28.45% of payroll for 11 years and 24.00% of payroll thereafter for new employee payroll) net of new employee normal cost and expenses (18.36% of pay).*

** *Employer contributions are equal to 18.85% for fiscal year ending June 30, 2022; the supplemental employer contribution equal to 4.45% of pay is assumed to stop after 11 years.*

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

	Projected Covered-Employee Payroll			Projected Contributions			
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) x 9.60%	(e) = (a) x 18.85%	(f)	(g) = (d) + (e) + (f)
2072	$ 1	$ 1,249,271	$ 1,249,272	$ -	$ -	$ 70,459	$ 70,459
2073	-	1,286,750	1,286,750	-	-	72,573	72,573
2074	-	1,325,352	1,325,352	-	-	74,750	74,750
2075	-	1,365,113	1,365,113	-	-	76,992	76,992
2076	-	1,406,066	1,406,066	-	-	79,302	79,302
2077	-	1,448,248	1,448,248	-	-	81,681	81,681
2078	-	1,491,696	1,491,696	-	-	84,132	84,132
2079	-	1,536,447	1,536,447	-	-	86,656	86,656
2080	-	1,582,540	1,582,540	-	-	89,255	89,255
2081	-	1,630,016	1,630,016	-	-	91,933	91,933
2082	-	1,678,917	1,678,917	-	-	94,691	94,691
2083	-	1,729,284	1,729,284	-	-	97,532	97,532
2084	-	1,781,163	1,781,163	-	-	100,458	100,458
2085	-	1,834,598	1,834,598	-	-	103,471	103,471
2086	-	1,889,635	1,889,635	-	-	106,575	106,575
2087	-	1,946,325	1,946,325	-	-	109,773	109,773
2088	-	2,004,714	2,004,714	-	-	113,066	113,066
2089	-	2,064,856	2,064,856	-	-	116,458	116,458
2090	-	2,126,801	2,126,801	-	-	119,952	119,952
2091	-	2,190,605	2,190,605	-	-	123,550	123,550
2092	-	2,256,324	2,256,324	-	-	127,257	127,257
2093	-	2,324,013	2,324,013	-	-	131,074	131,074
2094	-	2,393,734	2,393,734	-	-	135,007	135,007
2095	-	2,465,546	2,465,546	-	-	139,057	139,057
2096	-	2,539,512	2,539,512	-	-	143,228	143,228
2097	-	2,615,697	2,615,697	-	-	147,525	147,525
2098	-	2,694,168	2,694,168	-	-	151,951	151,951
2099	-	2,774,993	2,774,993	-	-	156,510	156,510
2100	-	2,858,243	2,858,243	-	-	161,205	161,205
2101	-	2,943,991	2,943,991	-	-	166,041	166,041
2102	-	3,032,310	3,032,310	-	-	171,022	171,022
2103	-	3,123,280	3,123,280	-	-	176,153	176,153
2104	-	3,216,978	3,216,978	-	-	181,438	181,438
2105	-	3,313,487	3,313,487	-	-	186,881	186,881
2106	-	3,412,892	3,412,892	-	-	192,487	192,487
2107	-	3,515,279	3,515,279	-	-	198,262	198,262
2108	-	3,620,737	3,620,737	-	-	204,210	204,210
2109	-	3,729,359	3,729,359	-	-	210,336	210,336
2110	-	3,841,240	3,841,240	-	-	216,646	216,646
2111	-	3,956,477	3,956,477	-	-	223,145	223,145
2112	-	4,075,171	4,075,171	-	-	229,840	229,840
2113	-	4,197,427	4,197,427	-	-	236,735	236,735
2114	-	4,323,349	4,323,349	-	-	243,837	243,837
2115	-	4,453,050	4,453,050	-	-	251,152	251,152
2116	-	4,586,641	4,586,641	-	-	258,687	258,687
2117	-	4,724,241	4,724,241	-	-	266,447	266,447
2118	-	4,865,968	4,865,968	-	-	274,441	274,441
2119	-	5,011,947	5,011,947	-	-	282,674	282,674
2120	-	5,162,305	5,162,305	-	-	291,154	291,154
2121	-	5,317,174	5,317,174	-	-	299,889	299,889

* *Equal to total contributions (28.45% of payroll for 11 years and 24.00% of payroll thereafter for new employee payroll) net of new employee normal cost and expenses (18.36% of pay).*

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 6.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2022	$ 1,580,953	$ 79,302	$ 90,879	$ 909	$ 102,363	$ 1,670,830
2023	1,670,830	77,027	95,415	852	107,988	1,759,578
2024	1,759,578	75,117	100,211	802	113,544	1,847,226
2025	1,847,226	73,676	104,701	760	119,053	1,934,494
2026	1,934,494	72,393	109,609	720	124,529	2,021,087
2027	2,021,087	71,258	115,164	682	129,944	2,106,443
2028	2,106,443	70,443	120,735	649	135,289	2,190,791
2029	2,190,791	69,857	126,427	620	140,572	2,274,173
2030	2,274,173	69,355	132,454	592	145,784	2,356,266
2031	2,356,266	68,942	138,886	565	150,902	2,436,659
2032	2,436,659	68,601	145,136	538	155,917	2,515,503
2033	2,515,503	50,748	151,759	512	160,260	2,574,240
2034	2,574,240	49,945	158,445	486	163,839	2,629,093
2035	2,629,093	49,163	165,324	459	167,161	2,679,634
2036	2,679,634	48,310	172,730	431	170,182	2,724,965
2037	2,724,965	47,374	180,597	401	172,848	2,764,189
2038	2,764,189	46,488	188,341	372	175,123	2,797,087
2039	2,797,087	45,691	195,624	344	177,004	2,823,814
2040	2,823,814	44,912	202,999	315	178,481	2,843,893
2041	2,843,893	44,106	210,153	286	179,532	2,857,092
2042	2,857,092	43,395	216,663	258	180,160	2,863,726
2043	2,863,726	42,841	222,430	233	180,390	2,864,294
2044	2,864,294	42,412	227,624	209	180,248	2,859,121
2045	2,859,121	42,051	232,408	186	179,748	2,848,326
2046	2,848,326	41,740	236,907	163	178,893	2,831,889
2047	2,831,889	41,508	241,056	141	177,685	2,809,885
2048	2,809,885	41,428	244,350	122	176,147	2,782,988
2049	2,782,988	41,483	246,966	104	174,318	2,751,719
2050	2,751,719	41,608	249,197	87	172,218	2,716,261
2051	2,716,261	41,848	250,784	71	169,871	2,677,125
2052	2,677,125	42,234	251,593	58	167,314	2,635,022
2053	2,635,022	42,764	251,678	46	164,592	2,590,654
2054	2,590,654	43,406	251,182	36	161,745	2,544,587
2055	2,544,587	44,184	249,947	28	158,815	2,497,611
2056	2,497,611	45,113	247,899	22	155,857	2,450,660
2057	2,450,660	46,158	245,237	17	152,924	2,404,488
2058	2,404,488	47,303	242,067	13	150,061	2,359,772
2059	2,359,772	48,534	238,462	10	147,309	2,317,143
2060	2,317,143	49,838	234,492	8	144,707	2,277,188
2061	2,277,188	51,209	230,192	6	142,292	2,240,491
2062	2,240,491	52,648	225,566	4	140,100	2,207,669
2063	2,207,669	54,157	220,614	3	138,174	2,179,383
2064	2,179,383	55,730	215,369	2	136,553	2,156,295
2065	2,156,295	57,361	209,861	1	135,281	2,139,075
2066	2,139,075	59,054	204,092	1	134,400	2,128,436
2067	2,128,436	60,806	198,074	-	133,957	2,125,125
2068	2,125,125	62,617	191,822	-	134,000	2,129,920
2069	2,129,920	64,488	185,351	-	134,578	2,143,635
2070	2,143,635	66,416	178,667	-	135,745	2,167,129
2071	2,167,129	68,407	171,783	-	137,556	2,201,309

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 6.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2072	$ 2,201,309	$ 70,459	$ 164,718	$ -	$ 140,070	$ 2,247,120
2073	2,247,120	72,573	157,489	-	143,346	2,305,550
2074	2,305,550	74,750	150,118	-	147,450	2,377,632
2075	2,377,632	76,992	142,625	-	152,447	2,464,446
2076	2,464,446	79,302	135,036	-	158,406	2,567,118
2077	2,567,118	81,681	127,379	-	165,401	2,686,821
2078	2,686,821	84,132	119,683	-	173,506	2,824,776
2079	2,824,776	86,656	111,982	-	182,800	2,982,250
2080	2,982,250	89,255	104,311	-	193,365	3,160,559
2081	3,160,559	91,933	96,708	-	205,284	3,361,068
2082	3,361,068	94,691	89,215	-	218,644	3,585,188
2083	3,585,188	97,532	81,872	-	233,538	3,834,386
2084	3,834,386	100,458	74,721	-	250,058	4,110,181
2085	4,110,181	103,471	67,802	-	268,303	4,414,153
2086	4,414,153	106,575	61,155	-	288,373	4,747,946
2087	4,747,946	109,773	54,812	-	310,374	5,113,281
2088	5,113,281	113,066	48,804	-	334,419	5,511,962
2089	5,511,962	116,458	43,154	-	360,622	5,945,888
2090	5,945,888	119,952	37,879	-	389,108	6,417,069
2091	6,417,069	123,550	32,993	-	420,006	6,927,632
2092	6,927,632	127,257	28,502	-	453,455	7,479,842
2093	7,479,842	131,074	24,406	-	489,602	8,076,112
2094	8,076,112	135,007	20,701	-	528,604	8,719,022
2095	8,719,022	139,057	17,381	-	570,628	9,411,326
2096	9,411,326	143,228	14,432	-	615,856	10,155,978
2097	10,155,978	147,525	11,840	-	664,479	10,956,142
2098	10,956,142	151,951	9,588	-	716,703	11,815,208
2099	11,815,208	156,510	7,656	-	772,750	12,736,812
2100	12,736,812	161,205	6,021	-	832,857	13,724,853
2101	13,724,853	166,041	4,658	-	897,278	14,783,514
2102	14,783,514	171,022	3,542	-	966,286	15,917,280
2103	15,917,280	176,153	2,643	-	1,040,173	17,130,963
2104	17,130,963	181,438	1,934	-	1,119,254	18,429,721
2105	18,429,721	186,881	1,385	-	1,203,865	19,819,082
2106	19,819,082	192,487	971	-	1,294,366	21,304,964
2107	21,304,964	198,262	665	-	1,391,143	22,893,704
2108	22,893,704	204,210	445	-	1,494,609	24,592,078
2109	24,592,078	210,336	290	-	1,605,204	26,407,328
2110	26,407,328	216,646	185	-	1,723,400	28,347,189
2111	28,347,189	223,145	115	-	1,849,701	30,419,920
2112	30,419,920	229,840	70	-	1,984,645	32,634,335
2113	32,634,335	236,735	42	-	2,128,803	34,999,831
2114	34,999,831	243,837	25	-	2,282,788	37,526,431
2115	37,526,431	251,152	14	-	2,447,251	40,224,820
2116	40,224,820	258,687	8	-	2,622,888	43,106,387
2117	43,106,387	266,447	5	-	2,810,438	46,183,267
2118	46,183,267	274,441	3	-	3,010,691	49,468,396
2119	49,468,396	282,674	1	-	3,224,488	52,975,557
2120	52,975,557	291,154	1	-	3,452,724	56,719,434
2121	56,719,434	299,889	-	-	3,696,356	60,715,679

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 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)
2022	$ 1,580,953	$ 90,879	$ 90,879	$ -	$ 88,062	$ -	$ 88,062
2023	1,670,830	95,415	95,415	-	86,815	-	86,815
2024	1,759,578	100,211	100,211	-	85,613	-	85,613
2025	1,847,226	104,701	104,701	-	83,990	-	83,990
2026	1,934,494	109,609	109,609	-	82,560	-	82,560
2027	2,021,087	115,164	115,164	-	81,451	-	81,451
2028	2,106,443	120,735	120,735	-	80,179	-	80,179
2029	2,190,791	126,427	126,427	-	78,835	-	78,835
2030	2,274,173	132,454	132,454	-	77,552	-	77,552
2031	2,356,266	138,886	138,886	-	76,355	-	76,355
2032	2,436,659	145,136	145,136	-	74,921	-	74,921
2033	2,515,503	151,759	151,759	-	73,558	-	73,558
2034	2,574,240	158,445	158,445	-	72,112	-	72,112
2035	2,629,093	165,324	165,324	-	70,651	-	70,651
2036	2,679,634	172,730	172,730	-	69,310	-	69,310
2037	2,724,965	180,597	180,597	-	68,044	-	68,044
2038	2,764,189	188,341	188,341	-	66,631	-	66,631
2039	2,797,087	195,624	195,624	-	64,984	-	64,984
2040	2,823,814	202,999	202,999	-	63,318	-	63,318
2041	2,843,893	210,153	210,153	-	61,549	-	61,549
2042	2,857,092	216,663	216,663	-	59,582	-	59,582
2043	2,863,726	222,430	222,430	-	57,435	-	57,435
2044	2,864,294	227,624	227,624	-	55,189	-	55,189
2045	2,859,121	232,408	232,408	-	52,910	-	52,910
2046	2,848,326	236,907	236,907	-	50,642	-	50,642
2047	2,831,889	241,056	241,056	-	48,384	-	48,384
2048	2,809,885	244,350	244,350	-	46,052	-	46,052
2049	2,782,988	246,966	246,966	-	43,704	-	43,704
2050	2,751,719	249,197	249,197	-	41,407	-	41,407
2051	2,716,261	250,784	250,784	-	39,128	-	39,128
2052	2,677,125	251,593	251,593	-	36,858	-	36,858
2053	2,635,022	251,678	251,678	-	34,620	-	34,620
2054	2,590,654	251,182	251,182	-	32,443	-	32,443
2055	2,544,587	249,947	249,947	-	30,313	-	30,313
2056	2,497,611	247,899	247,899	-	28,230	-	28,230
2057	2,450,660	245,237	245,237	-	26,223	-	26,223
2058	2,404,488	242,067	242,067	-	24,304	-	24,304
2059	2,359,772	238,462	238,462	-	22,481	-	22,481
2060	2,317,143	234,492	234,492	-	20,757	-	20,757
2061	2,277,188	230,192	230,192	-	19,133	-	19,133
2062	2,240,491	225,566	225,566	-	17,604	-	17,604
2063	2,207,669	220,614	220,614	-	16,167	-	16,167
2064	2,179,383	215,369	215,369	-	14,819	-	14,819
2065	2,156,295	209,861	209,861	-	13,559	-	13,559
2066	2,139,075	204,092	204,092	-	12,381	-	12,381
2067	2,128,436	198,074	198,074	-	11,283	-	11,283
2068	2,125,125	191,822	191,822	-	10,260	-	10,260
2069	2,129,920	185,351	185,351	-	9,309	-	9,309
2070	2,143,635	178,667	178,667	-	8,425	-	8,425
2071	2,167,129	171,783	171,783	-	7,606	-	7,606

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)
2072	$ 2,201,309	$ 164,718	$ 164,718	$ -	$ 6,848	$ -	$ 6,848
2073	2,247,120	157,489	157,489	-	6,148	-	6,148
2074	2,305,550	150,118	150,118	-	5,503	-	5,503
2075	2,377,632	142,625	142,625	-	4,909	-	4,909
2076	2,464,446	135,036	135,036	-	4,364	-	4,364
2077	2,567,118	127,379	127,379	-	3,865	-	3,865
2078	2,686,821	119,683	119,683	-	3,410	-	3,410
2079	2,824,776	111,982	111,982	-	2,996	-	2,996
2080	2,982,250	104,311	104,311	-	2,620	-	2,620
2081	3,160,559	96,708	96,708	-	2,281	-	2,281
2082	3,361,068	89,215	89,215	-	1,976	-	1,976
2083	3,585,188	81,872	81,872	-	1,703	-	1,703
2084	3,834,386	74,721	74,721	-	1,459	-	1,459
2085	4,110,181	67,802	67,802	-	1,243	-	1,243
2086	4,414,153	61,155	61,155	-	1,053	-	1,053
2087	4,747,946	54,812	54,812	-	886	-	886
2088	5,113,281	48,804	48,804	-	741	-	741
2089	5,511,962	43,154	43,154	-	615	-	615
2090	5,945,888	37,879	37,879	-	507	-	507
2091	6,417,069	32,993	32,993	-	415	-	415
2092	6,927,632	28,502	28,502	-	336	-	336
2093	7,479,842	24,406	24,406	-	270	-	270
2094	8,076,112	20,701	20,701	-	215	-	215
2095	8,719,022	17,381	17,381	-	170	-	170
2096	9,411,326	14,432	14,432	-	132	-	132
2097	10,155,978	11,840	11,840	-	102	-	102
2098	10,956,142	9,588	9,588	-	78	-	78
2099	11,815,208	7,656	7,656	-	58	-	58
2100	12,736,812	6,021	6,021	-	43	-	43
2101	13,724,853	4,658	4,658	-	31	-	31
2102	14,783,514	3,542	3,542	-	22	-	22
2103	15,917,280	2,643	2,643	-	16	-	16
2104	17,130,963	1,934	1,934	-	11	-	11
2105	18,429,721	1,385	1,385	-	7	-	7
2106	19,819,082	971	971	-	5	-	5
2107	21,304,964	665	665	-	3	-	3
2108	22,893,704	445	445	-	2	-	2
2109	24,592,078	290	290	-	1	-	1
2110	26,407,328	185	185	-	1	-	1
2111	28,347,189	115	115	-	-	-	-
2112	30,419,920	70	70	-	-	-	-
2113	32,634,335	42	42	-	-	-	-
2114	34,999,831	25	25	-	-	-	-
2115	37,526,431	14	14	-	-	-	-
2116	40,224,820	8	8	-	-	-	-
2117	43,106,387	5	5	-	-	-	-
2118	46,183,267	3	3	-	-	-	-
2119	49,468,396	1	1	-	-	-	-
2120	52,975,557	1	1	-	-	-	-
2121	56,719,434	-	-	-	-	-	-
				Totals	$ 2,452,747	$ -	$ 2,452,747

SECTION H

GLOSSARY OF TERMS

Glossary of Terms

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

Glossary of Terms

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

Glossary of Terms

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

Glossary of Terms

Total Pension Expense	The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year: 1. Service Cost 2. Interest on the Total Pension Liability 3. Current-Period Changes in Benefit Terms 4. Employee Contributions 5. Projected Earnings on Plan Investments 6. Pension Plan Administrative Expense 7. Other Changes in Plan Fiduciary Net Position 8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual in measurement of the Total Pension Liability 9. Recognition of Outflow (Inflow) of Resources due to Assumption Changes 10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments
Total Pension Liability (TPL)	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
Unfunded Actuarial Accrued Liability (UAAL)	The UAAL is the difference between actuarial accrued liability and valuation assets.
Valuation Assets	The valuation assets are the plan fiduciary net position used in determining the net position liability of the plan. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.