Gabriel Roeder Smith & Company
Consultants & Actuaries

MINNESOTA STATE RETIREMENT SYSTEM

CORRECTIONAL EMPLOYEES RETIREMENT FUND

GASB STATEMENT NOS. 67 AND 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

JUNE 30, 2015

GRS
Gabriel Roeder Smith & Company
Consultants & Actuaries
100 South Fifth Street
Suite 1900
Minneapolis, MN 55402-1267
612.605.6200 phone
612.605.6203 fax
www.gabrielroeder.com

November 30, 2015

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"). These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. The information in this report is calculated on a total plan basis. MSRS is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the Minnesota State Retirement System (MSRS) only in its entirety and only with the permission of MSRS.

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 otherwise audited.

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. 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,

Bonita J. Wurst

By ______________________________
Bonita J. Wurst
ASA, EA, MAAA

Brian B Murphy

By ______________________________
Brian B. Murphy
FSA, EA, FCA, MAAA

OTHER OBSERVATIONS

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 actuarial 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 a 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 market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

TABLE OF CONTENTS

SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
AS OF JUNE 30, 2015 (DOLLARS IN THOUSANDS)

	2015
Actuarial Valuation Date	June 30, 2015
Measurement Date of the Net Pension Liability	June 30, 2015
Membership	
Number of	
- Service Retirements	2,292
- Survivors	198
- Disability Retirements	279
- Deferred Retirements	1,276
- Terminated other non-vested	531
- Active Members	4,449
- Total	9,025
Covered-employee Payroll [1]	$ 231,440
Net Pension Liability	
Total Pension Liability	$ 1,563,245
Plan Fiduciary Net Position	909,002
Net Pension Liability	$ 654,243
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	58.15%
Net Pension Liability as a Percentage of Covered-Employee Payroll	282.68%
Development of the Single Discount Rate	
Single Discount Rate	6.25%
Long-Term Expected Rate of Investment Return	7.90%
Long-Term Municipal Bond Rate [2]	3.80%
Last year ending June 30 in the 2016 to 2115 projection period for which projected benefit payments are fully funded	2054
Total Pension Expense/ (Income)	$ 38,891

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	$ 8,664	$ 0
Changes in assumptions	98,666	98,045
Net difference between projected and actual earnings on pension plan investments	$ 24,320	47,279
Total	$ 131,650	$ 145,324

(1) *Assumed equal to actual member contributions divided by employee contribution rate*
(2) *Based on the Bond Buyer 20-Bond Index of general obligation municipal bonds as of June 25, 2015*

The covered-employee payroll figure shown represents the annual compensation for active employees on which contributions to the pension plan are based and does not necessarily represent Covered-Employee Payroll as defined in GASB Statement Nos. 67 and 68. If a different payroll figure should be used in this schedule, please let us know.

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.

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 CERF subsequent to the measurement date of June 30, 2015.

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/financial-information or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 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.

Timing of the Valuation

GASB Statements Nos. 67 and 68 require that an actuarial valuation to determine the total pension liability be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. 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, 2015 and a measurement date of June 30, 2015.

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 (which is published by the Federal Reserve Board) 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 7.90%; the municipal bond rate is 3.80% (based on the weekly rate closest to but not later than the measurement date of the 20-Year Bond Buyer Index as published by the Federal Reserve Board); and the resulting single discount rate is 6.25%.

Effective Date and Transition

GASB Statements No. 67 and No. 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively. Earlier application is encouraged by the GASB. MSRS first implemented GASB Statement No. 67 for fiscal year 2014.

SECTION B

FINANCIAL STATEMENTS

PENSION EXPENSE UNDER GASB STATEMENT NO. 68
FISCAL YEAR ENDED JUNE 30, 2015 (DOLLARS IN THOUSANDS)

A. Expense			
1.	Service Cost	$	48,805
2.	Interest on the Total Pension Liability		92,039
3.	Current-Period Benefit Changes		0
4.	Employee Contributions (made negative for addition here)		(21,061)
5.	Projected Earnings on Plan Investments (made negative for addition here)		(69,024)
6.	Pension Plan Administrative Expense		720
7.	Other Changes in Plan Fiduciary Net Position		0
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		1,186
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		19,733
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		6,080
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**78,478**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Prior Reporting Periods		684
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		(24,511)
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(15,760)
15.	**Total Pension Expense / (Income)**	**$**	**38,891**

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2015 (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	$	7,115
2. Assumption Changes (gains) or losses	$	118,399
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		6.0000
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*	$	1,186
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	19,733
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	20,919
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	$	5,929
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	98,666
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	104,595
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	30,400
2. Recognition period for Assets {in years}		5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	6,080
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	24,320

* *Includes impact of changes in expected timing of future post-retirement benefit increases.*

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT AND PRIOR REPORTING PERIODS FISCAL YEAR ENDED JUNE 30, 2015 (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	$ 21,603	$ 24,511	$ (2,908)
2. Due to Assets	6,080	15,760	(9,680)
3. Totals	$ 27,683	$ 40,271	$ (12,588)

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	$ 1,870	$ 0	$ 1,870
2. Assumption Changes	19,733	24,511	(4,778)
3. Net Difference between projected and actual earnings on pension plan investments	6,080	15,760	(9,680)
4. Totals	$ 27,683	$ 40,271	$ (12,588)

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	$ 8,664	$ 0	$ 8,664
2. Assumption Changes	98,666	98,045	621
3. Net Difference between projected and actual earnings on pension plan investments	24,320	47,279	(22,959)
4. Total	$ 131,650	$ 145,324	$ (13,674)

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
2016	$ (12,588)
2017	(12,588)
2018	(12,587)
2019	3,170
2020	20,919
Thereafter	0
Total	$ (13,674)

STATEMENT OF FIDUCIARY NET POSITION AS OF JUNE 30, 2015 (DOLLARS IN THOUSANDS)

Assets		**June 30, 2015**
Cash & Short-term Investments	$	18,800
Receivables		1,973
Investment Pools (at fair value)		889,532
Securities Lending Collateral		92,513
Capital Assets		0
Total Assets	**$**	**1,002,818**
Total Deferred Outflows of Resources	**$**	**0**
Total Liabilities	**$**	**(93,816)**
Total Deferred Inflows of Resources	**$**	**0**
Net Position Restricted for Pensions	**$**	**909,002**

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR YEAR ENDED JUNE 30, 2015 (DOLLARS IN THOUSANDS)

1. Net position at market value at beginning of year	**$**	**877,056**
Additions		
2. Contributions		
a. Employee	$	21,061
b. Employer		29,480
c. Other sources		0
d. Total contributions	$	50,541
3. Investment income		
a. Investment income/(loss)	$	39,877
b. Investment expenses		(1,253)
c. Net investment income/(loss)	$	38,624
4. Other Additions		0
5. Total Additions *(2.d.) + (3.c.) + (4.)*	**$**	**89,165**
Deductions		
6. Benefits Paid		
a. Annuity benefits	$	(54,909)
b. Refunds		(1,590)
c. Total benefits paid	$	(56,499)
7. Expenses		
a. Other deductions	$	0
b. Administrative		(720)
c. Total expenses	$	(720)
8. Total deductions *(6.c.) + (7.c.)*	**$**	**(57,219)**
9. Net increase/(decrease) in fiduciary net position *(5.) + (8.)*	**$**	**31,946**
10. Net position at market value at end of year *(1.) + (9.)*	**$**	**909,002**
11. State Board of Investment calculated annual investment return		4.4%

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS
CURRENT PERIOD
FISCAL YEAR ENDED JUNE 30, 2015 (DOLLARS IN THOUSANDS)

A. Total pension liability			
1. Service Cost	$	48,805	
2. Interest on the Total Pension Liability		92,039	
3. Changes of benefit terms		0	
4. Difference between expected and actual experience of the Total Pension Liability		7,115	(1)
5. Changes of assumptions		118,399	(2)
6. Benefit payments, including refunds of employee contributions		(56,499)	
7. Net change in total pension liability	$	209,859	
8. Total pension liability – beginning		1,353,386	
9. Total pension liability – ending	**$**	**1,563,245**	
B. Plan fiduciary net position			
1. Contributions – employer	$	29,480	
2. Contributions – employee		21,061	
3. Net investment income		38,624	
4. Benefit payments, including refunds of employee contributions		(56,499)	
5. Pension Plan Administrative Expense		(720)	
6. Other changes		0	
7. Net change in plan fiduciary net position	$	31,946	
8. Plan fiduciary net position – beginning		877,056	
9. Plan fiduciary net position – ending	**$**	**909,002**	
C. Net pension liability, *A.9 - B.9.*	**$**	**654,243**	
D. Plan fiduciary net position as a percentage of the total pension liability, *B.9 / A.9.*		**58.15%**	
E. Covered-employee payroll	**$**	**231,440**	(3)
F. Net pension liability as a percentage of covered-employee payroll, *C. / E.*		**282.68%**	

(1) *Includes impact of changes in expected timing of future post-retirement benefit increases.*

(2) *Assumption changes are summarized on page 29.*

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

The covered-employee payroll figure shown represents the annual compensation for active employees on which contributions to the pension plan are based and does not necessarily represent Covered-Employee Payroll as defined in GASB Statement Nos. 67 and 68. If a different payroll figure should be used in this schedule, please let us know.

Schedules of Required Supplementary Information

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,	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Total Pension Liability										
Service Cost	$ 48,805	$ 54,443								
Interest on the Total Pension Liability	92,039	85,702								
Benefit Changes	0	0								
Difference between Expected and Actual Experience	7,115	4,103								
Assumption Changes	118,399 (1)	(147,067)								
Benefit Payments	(54,909)	(50,842)								
Refunds	(1,590)	(1,447)								
Net Change in Total Pension Liability	$ 209,859	$ (55,108)								
Total Pension Liability - Beginning	1,353,386	1,408,494								
Total Pension Liability - Ending (a)	**$ 1,563,245**	**$ 1,353,386**								
Plan Fiduciary Net Position										
Employer Contributions	$ 29,480	$ 26,468								
Employee Contributions	21,061	18,855								
Pension Plan Net Investment Income	38,624	137,523								
Benefit Payments	(54,909)	(50,842)								
Refunds	(1,590)	(1,447)								
Pension Plan Administrative Expense	(720)	(657)								
Other Changes	0	(1)								
Net Change in Plan Fiduciary Net Position	**$ 31,946**	**$ 129,899**								
Plan Fiduciary Net Position - Beginning	**877,056**	**747,157**								
Plan Fiduciary Net Position - Ending (b)	**$ 909,002**	**$ 877,056**								
Net Pension Liability - Ending (a) - (b)	**$ 654,243**	**$ 476,330**								
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**58.15 %**	**64.80 %**								
Covered-Employee Payroll (2)	**$ 231,440**	**$ 219,244**								
Net Pension Liability as a Percentage of Covered-Employee Payroll	**282.68 %**	**217.26 %**								

Notes to Schedule:

(1) Assumption changes are summarized on page 29.

(2) Assumed equal to plan member contributions divided by employee contribution rate.

The covered-employee payroll figure shown represents the annual compensation for active employees on which contributions to the pension plan are based and does not necessarily represent Covered-Employee Payroll as defined in GASB Statement Nos. 67 and 68. If a different payroll figure should be used in this schedule, please let us know.

Schedules of Required Supplementary Information
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 (a)	Plan Net Position (b)	Net Pension Liability (a) - (b) = (c)	Plan Net Position as a % of Total Pension Liability (b)/(c)	Covered-Employee Payroll (d)	Net Pension Liability as a % of Covered-Employee Payroll (c)/(d)
2006						
2007						
2008						
2009						
2010						
2011						
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%

The covered-employee payroll figure shown represents the annual compensation for active employees on which contributions to the pension plan are based and does not necessarily represent Covered-Employee Payroll as defined in GASB Statement Nos. 67 and 68. If a different payroll figure should be used in this schedule, please let us know.

SCHEDULE OF CONTRIBUTIONS MULTIYEAR

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution	Actual Contributions	Contribution Deficiency (Excess)	Covered-Employee Payroll	Actual Contribution as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b)/(d)
2006	$ 16,871	$ 12,152	$ 4,719	$ 145,879	8.33%
2007	29,115	13,927	15,188	167,727	8.30
2008	34,734	18,623	16,111	194,391	9.58
2009	31,738	20,126	11,612	193,445	10.40
2010	32,557	21,988	10,569	192,450	11.43
2011	33,274	23,892	9,382	197,702	12.08
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

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	June 30, 2015
Notes	Actuarially determined contribution rates are calculated as of each July 1 and apply to the fiscal year beginning on the measurement date.

Methods and Assumptions Used to Determine Contribution Rates Reported in this Schedule:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	23 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.75%
Salary Increases	Service based tables ranging from 5.75% with one year of service to 3.50% with 19 or more years of service, including inflation.
Investment Rate of Return	8.00%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study of the period 2006 - 2011, prepared by a former actuary.
Healthy Post-Retirement Mortality	RP-2000 annuitant generational mortality table, projected with mortality improvement scale AA, white collar adjustment, set forward one year for males and set back one year for females.

Other Information:

Benefit Increases After Retirement	The post-retirement increase is assumed to stay at 2.0% indefinitely. See separate funding actuarial valuation report as of July 1, 2015 for additional detail. To obtain this report, contact MSRS as noted on page 3. This report is also available online at www.msrs.state.mn.us/actuarial-reports.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2006	
2007	
2008	
2009	
2010	
2011	
2012	
2013	
2014	18.62 %
2015	4.44 %

[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, 2015, the annual money-weighted rate of return for the Correctional Employees Retirement Fund was 4.44%. 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. Best 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, 2015, these best estimates are summarized in the following table:

Asset Allocation

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Geometric)
Domestic Stocks	45.00%	5.50%
International Stocks	15.00	6.00
Bonds	18.00	1.45
Alternative Assets	20.00	6.40
Unallocated Cash	2.00	0.50
Total	100.00%	

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.

At MSRS' direction, for purposes of this valuation, the long-term expected rate of return assumption is 7.90%. This assumption is based on a review of inflation and investment return assumptions dated September 11, 2014.

SENSITIVITY OF NET PENSION LIABILITY TO THE SINGLE DISCOUNT RATE ASSUMPTION

<u>Single Discount Rate</u>

A Single Discount Rate of 6.25% 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 7.90% and a municipal bond rate of 3.80%. The projection of cash flows used to determine this Single Discount Rate assumed that employee and employer contributions will be made at the current statutory contribution rates. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments through the year ending June 30, 2054. As a result, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year ending June 30, 2054, and the municipal bond rate was applied to all benefit payments after the point of asset depletion.

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 6.25%, 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 (5.25%) or 1-percentage-point higher (7.25%) than the current rate.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 5.25%	Current Single Discount Rate Assumption 6.25%	1% Increase 7.25%
Total Pension Liability	$1,809,697	$1,563,245	$1,364,332
Net Position Restricted for Pensions	909,002	909,002	909,002
Net Pension Liability	**$ 900,695**	**$ 654,243**	**$ 455,330**

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	**$ 1,353,386**	**$ 877,056**	**$ 476,330**	**$ 3,419**	**$ 185,595**	
Changes for the Year:						
Service Cost	$ 48,805		$ 48,805			$ 48,805
Interest on Total Pension Liability	92,039		92,039			92,039
Interest on Plan Fiduciary Net Position [1]		$ 69,024	(69,024)			(69,024)
Changes in Benefit Terms						
Liability Experience Gains and Losses	7,115		7,115	$ 5,929		1,186
Changes in Assumptions	118,399		118,399	98,666		19,733
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				(684)		684
Assumption Changes					$ (24,511)	(24,511)
Investment Gains/(Losses)					(15,760)	(15,760)
Contributions - Employer		29,480	(29,480)			
Contributions - Employees		21,061	(21,061)			(21,061)
Asset Gain/(Loss) [1]		(30,400)	30,400	24,320		6,080
Benefit Payment and Refunds	(56,499)	(56,499)				
Administrative Expenses		(720)	720			720
Other Changes						
Net Changes	**$ 209,859**	**$ 31,946**	**$ 177,913**	**$ 128,231**	**$ (40,271)**	**$ 38,891**
Balance End of Year	**$ 1,563,245**	**$ 909,002**	**$ 654,243**	**$ 131,650**	**$ 145,324**	

[1] *The sum of these items equals the net investment income of $38,624.*

SUMMARY OF POPULATION STATISTICS

	Actives	Terminated: Deferred Retirement	Terminated: Other Non-Vested	Recipients: Service Retirement	Recipients: Disability Retirement	Recipients: Survivor	Total
Members on 7/1/2014	**4,504**	**1,232**	**384**	**2,075**	**268**	**174**	**8,637**
New Members	524	0	0	0	0	0	**524**
Return to active	16	(15)	(1)	0	0	0	**0**
Terminated non-vested	(178)	0	178	0	0	0	**0**
Service retirements	(180)	(51)	0	231	0	0	**0**
Terminated deferred	(120)	120	0	0	0	0	**0**
Terminated refund/transfer	(103)	(16)	(80)	0	0	0	**(199)**
Deaths	(3)	(1)	0	(39)	(1)	(3)	**(47)**
New beneficiary	0	0	0	0	0	26	**26**
Disabled	(10)	0	0	0	10	0	**0**
Unexpected status change	(1)	7	50	25	2	1	**84**
Net change	(55)	44	147	217	11	24	**388**
Members on 6/30/2015	**4,449**	**1,276**	**531**	**2,292**	**279**	**198**	**9,025**

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 date	**Member**	**Employer**
July 1, 2014	9.10%	12.85%
	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.
Retirement		
Normal retirement benefit		
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.	
Early retirement		
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.	

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Retirement (Continued)	
Form of payment	Life annuity. Actuarially equivalent options are: 50%, 75%, or 100% Joint and Survivor, or 15-year certain. If a Joint and Survivor benefit is elected and the beneficiary predeceases the annuitant, the annuitant's benefit increases to the Life Annuity amount. This "bounce back" is subsidized by the plan.
Benefit increases	Since 2011, benefit recipients have received annual 2.0% benefit increases. If the accrued liability funding ratio reaches 90% (actuarial accrued liability ratio on a Market Value of Assets basis) for two consecutive years, the benefit increase will revert to 2.5%. If, after reverting to a 2.5% increase, the funding ratio declines to less than 80% for one year or 85% for two consecutive years, the benefit increase will decrease to 2.0%. 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	
Duty Disability	
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). 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.
Regular Disability	
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.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Disability (Continued)	
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.
Benefit Increases	Same as for retirement.
Death	
Surviving spouse benefit	
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.
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.
Surviving dependent children's benefit	
Age/service requirement	If no surviving spouse, all dependent 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.
Refund of contributions with interest	
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.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Death (Continued)	
Amount	Member's contributions with 6.00% interest compounded daily until July 1, 2011 and 4.00% thereafter.
Termination	
Refund of contributions	
Age/Service requirement	Termination of state service.
Amount	Member's contributions with 6.00% interest through June 30, 2011 compounded daily. Beginning July 1, 2011 a member's contributions will increase at 4.00% interest compounded daily. If a member is vested, a deferred annuity may be elected in lieu of a refund.
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 thereafter. Amount is payable at normal or early retirement.
Optional form conversion factors	Actuarially equivalent factors based on RP-2000 mortality for healthy annuitants, white collar adjustment, projected to 2027 using scale AA, set forward one year for males and set back one year for females, blended 70% males, and 6.5% interest.
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.

SUMMARY OF PLAN PROVISIONS (CONCLUDED)

Contribution Stabilizer	The following is a summary of the contribution stabilizer provisions in Minnesota Statute 352.045: • If a contribution sufficiency of at least 1.0% exists, member and employer contributions may be adjusted by the Board of Directors to a level necessary to maintain a 1.0% sufficiency. Member and employer contributions may not be less than the sum of normal cost and administrative expenses. Employer contributions must be equal to 60% of the sum of member and employer contributions. • If a contribution deficiency of at least 0.5% exists, member and employer contribution rates may be increased by the Board of Directors to eliminate the deficiency. Employer contributions must be equal to 60% of the sum of member and employer contributions. • Any adjustment to the contribution rates must be reported to the Legislative Commission on Pensions and Retirement (LCPR) by January 15 following the most recent valuation report. If the LCPR does not recommend against or alter the change in rates, the adjustment becomes effective on the first day of the first full payroll period of the next fiscal year.
Changes in plan provisions	The Contribution Stabilizer statutes were revised to make changes to contribution rates less prescriptive and more flexible. Effective July 1, 2015, a provision was added so that if the 2.5% post-retirement benefit increase is triggered and the funding ratio (determined on a market value of assets basis) subsequently drops below 80% for one year or 85% for two consecutive years, the post-retirement benefit increase will change to 2.0% until the plan again reaches a 90% funding ratio for two consecutive years.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

ACTUARIAL METHODS

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;

(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.

Valuation of Future Post-Retirement Benefit Increases

Benefit recipients receive a future annual 2.0% post-retirement benefit increase. If the funding ratio (determined on a market value of assets basis) reaches 90% (based on a 2.5% post-retirement benefit increase assumption) for two consecutive years, the benefit increase will revert to 2.5%. If, after reverting to a 2.5% benefit increase, the funding ratio declines to less than 80% for one year or less than 85% for two consecutive years, the benefit increase will decrease to 2.0%.

To determine an assumption regarding a future change in the post-retirement benefit increase, we performed a projection of liabilities and assets based on the following methods and assumptions:

- Future investment returns of 7.90%
- Liabilities and normal cost based on statutory funding assumptions
    - Discount rate of 8.00%
    - Statutory salary increases (rate of 5.75% at year 1 declining to 3.50% at years 19 and later)
- Open group; stable active population (new member profile based on average new members hired in recent years)
- The postretirement benefit increase rate is assumed to be 2.0% per year until the funding ratio threshold required to pay a 2.5% postretirement benefit increase is reached
- Current statutory contributions (i.e. not including potential contribution increases under the contribution stabilizer statutes) as directed by MSRS.

Based on these assumptions and methods, the projection indicates that this plan is not expected to attain the funding ratio threshold required to pay a 2.5% postretirement benefit. This assumption is reflected in our calculations.

Decrement Timing

All decrements are assumed to occur mid-year.

Asset Valuation Method

Fair value of assets.

SUMMARY OF ACTUARIAL ASSUMPTIONS

The following assumptions were used in valuing the liabilities and benefits under the plan. The demographic assumptions are based on the last experience study, dated February 2012, prepared by a former actuary. The economic assumptions are based on a review of inflation and investment return assumptions dated September 11, 2014.

The Allowance for Combined Service Annuity was also based on a recommendation by a former actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of the assignment.

Investment return	7.90% per annum
Single discount rate	6.25% per annum
Benefit increases after retirement	2.00% per annum
Salary increases	Reported salary at valuation date increased according to the rate table, to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for members with less than one year of service.
Payroll growth	3.50% per year.
Inflation	2.75% per year.
Mortality rates	
Healthy Pre-retirement	RP-2000 employee generational mortality table projected with mortality improvement scale AA, white collar adjustment.
Healthy Post-retirement	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set forward one year for males and set back one year for females. The RP-2000 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 15 to 70 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have applied the annuitant mortality table for active members beyond age 70 until the assumed retirement age and the employee mortality table for annuitants younger than age 50.
Disabled	RP-2000 disabled mortality 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.
Withdrawal	Select and Ultimate rates based on actual experience. Ultimate rates after the third year are shown in rate table. Select rates in the first three years are:

Year	Select Withdrawal Rates
1	20%
2	15%
3	8%

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

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 30.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	For purposes of the projection of the Plan Fiduciary Net Position, total prior year administrative expenses expressed as a percentage of prior year projected payroll are assumed to increase 3.50% per year and are allocated to the closed group based on the ratio of closed group payroll to total payroll.
Refund of contributions	Account balances accumulate interest until normal retirement date and are discounted back to the valuation date. All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 55.
Percentage married	85% of active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Females are assumed to be three 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: 10% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 40% elect 100% Joint & Survivor option Females: 10% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 30% elect 100% Joint & Survivor option Remaining married 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.
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.
Service credit accruals	It is assumed that members accrue one year of service credit per year.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by MSRS. 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 were 11 members reported with zero or invalid salary. We used prior year salary (11 members). There were 2 members reported with missing service. Due to the small number of members with zero service, and based on the direction from MSRS, we used service of 0 years for these members. There were 6 members reported without a gender and 2 members reported with a missing date of birth. We assumed members were hired at age 33 and male gender. <u>Data for terminated members</u>: There were 53 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 (23 members), we assumed a value of $30,000. If Credited Service was not reported (2 members), we assumed a value of 7.5 years. There were no members reported without a Termination Date. There were 61 members who terminated after June 30, 1997 and who were reported with a benefit in the Accelerated to Age 62 option. Based on direction from MSRS, we adjusted benefits for these members to reflect the assumed life annuity election. There were no members reported with missing or invalid gender or birth dates. <u>Data for members receiving benefits</u>: There were no members reported with missing gender or invalid birth dates. There were retired members reported with a survivor option and an invalid or missing survivor gender (366 members) and/or survivor date of birth (310 members). We used the valuation assumptions if the survivor gender or date of birth was missing or invalid. There were 2 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.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	Data for members receiving benefits: There were 18 retirees reported with a survivor option and a survivor date of death. We assumed no benefit was payable to the survivor, and the member benefit already reflected the increase to the life annuity value (i.e. "bounce back"), if applicable. There were 47 retirees reported with a bounce back annuity but were not reported with a reasonable reduction factor. A factor of 0.80, 0.85 and 0.90 was assumed for the 100%, 75% and 50% joint and survivor annuity, respectively. There were no survivors reported on the data file with an expired benefit.
Change in actuarial assumptions	The single discount rate changed from 6.82% as of July 1, 2014 to 6.25% as of July 1, 2015. The assumed post-retirement benefit increase rate was changed from 2.0% through 2065 and 2.5% thereafter to 2.0% indefinitely. For accounting purposes, this change was treated as a difference between expected and actual experience.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

	Rate (%)*					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality	
Age	Male	Female	Male	Female	Male	Female
20	0.04%	0.02%	0.03%	0.02%	2.26%	0.75%
25	0.04	0.02	0.04	0.02	2.26	0.75
30	0.04	0.02	0.04	0.03	2.26	0.75
35	0.06	0.04	0.06	0.05	2.26	0.75
40	0.10	0.06	0.09	0.06	2.26	0.75
45	0.15	0.09	0.13	0.10	2.26	0.75
50	0.60	0.15	0.20	0.16	2.90	1.15
55	0.54	0.32	0.27	0.24	3.54	1.65
60	0.73	0.51	0.43	0.38	4.20	2.18
65	1.30	0.82	0.67	0.59	5.02	2.80
70	2.14	1.37	0.98	0.88	6.26	3.76

** Generally, mortality rates are expected to increase as age increases. Due to the combination of pre-retirement rates, post-retirement rates, the white collar adjustment, and Projection Scale AA, the prescribed mortality tables have a few ages where assumed mortality decreases slightly instead of increases. We have used the rates as prescribed, but note that the prescribed assumption may not be reasonable at every age. If the rates were reasonably adjusted so that they decreased at all ages, we would not expect the valuation results to be materially different.*

*** These rates were adjusted for mortality improvements using projection scale AA.*

	Withdrawal Rates After Third Year		Disability Retirement	
Age	Male	Female	Male	Female
20	13.20%	8.80%	0.05%	0.05%
25	8.10	7.80	0.08	0.08
30	5.00	7.45	0.11	0.11
35	3.45	7.10	0.15	0.15
40	2.55	5.70	0.24	0.24
45	1.95	3.50	0.39	0.39
50	0.00	0.00	0.67	0.67
55	0.00	0.00	1.17	1.17
60	0.00	0.00	1.88	1.88
65	0.00	0.00	0.00	0.00

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONCLUDED)

Age	Percent Retiring
50	5%
51	3
52	3
53	3
54	5
55	55
56	12
57	12
58	10
59	10
60	10
61	10
62	30
63	30
64	30
65	50
66	50
67	50
68	50
69	50
70+	100

Salary Scale	
Year	Increase
1	5.75%
2	5.60
3	5.45
4	5.30
5	5.15
6	5.00
7	4.85
8	4.70
9	4.55
10	4.40
11	4.30
12	4.20
13	4.10
14	4.00
15	3.90
16	3.80
17	3.70
18	3.60
19+	3.50

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 "risk-free" 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 (which is published by the Federal Reserve Board (FRB)) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.90%; the municipal bond rate is 3.80% (based on the FRB rate as of June 25, 2015). **The resulting single discount rate as of July 1, 2015 is 6.25%.**

Benefit payments projected to occur up through June 30, 2053 were fully funded and benefit payments projected to occur in the year ended June 30, 2054 were partially funded. Assets were projected to be fully depleted by the fiscal year ending June 30, 2054. Benefit payments were discounted using 7.9%, the long-term expected rate of return on pension plan investments, as long as assets were sufficient to fund the benefit payments. Beginning in the July 1, 2053 to June 30, 2054 fiscal year, when benefit payments exceed the Plan's Fiduciary Net Position, benefit payments were discounted at 3.80%, the municipal bond rate. An equivalent single discount rate was determined that produced approximately the same present value of projected benefits when applied to all years of projected benefits as the present value of projected benefits using 7.90% through the point of asset depletion and 3.80% after. For more information on the calculation of the equivalent present value of projected benefits, see pages 37 through 38 of this report.

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			
Year	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 9.10%	(e) = (a) x 12.85%	(f)	(g) = (d) + (e) + (f)
0	$ 231,440		$ 231,440				
1	235,404		235,404	$ 21,422	$ 30,249		$ 51,671
2	224,509	$ 19,134	243,643	20,430	28,849	$ 930	50,209
3	215,216	36,955	252,171	19,585	27,655	1,796	49,036
4	206,594	54,403	260,997	18,800	26,547	2,644	47,991
5	198,195	71,937	270,132	18,036	25,468	3,496	47,000
6	189,492	90,094	279,586	17,244	24,350	4,379	45,973
7	180,648	108,724	289,372	16,439	23,213	5,284	44,936
8	171,716	127,784	299,500	15,626	22,066	6,210	43,902
9	163,231	146,751	309,982	14,854	20,975	7,132	42,961
10	155,456	165,376	320,832	14,146	19,976	8,037	42,159
11	147,407	184,654	332,061	13,414	18,942	8,974	41,330
12	139,329	204,354	343,683	12,679	17,904	9,932	40,515
13	132,036	223,676	355,712	12,015	16,967	10,871	39,853
14	124,954	243,208	368,162	11,371	16,057	11,820	39,248
15	117,843	263,204	381,047	10,724	15,143	12,792	38,659
16	110,928	283,456	394,384	10,094	14,254	13,776	38,124
17	103,981	304,206	408,187	9,462	13,362	14,784	37,608
18	97,102	325,372	422,474	8,836	12,478	15,813	37,127
19	90,311	346,949	437,260	8,218	11,605	16,862	36,685
20	83,279	369,286	452,565	7,578	10,701	17,947	36,226
21	75,699	392,705	468,404	6,889	9,727	19,085	35,701
22	68,065	416,733	484,798	6,194	8,746	20,253	35,193
23	60,905	440,861	501,766	5,542	7,826	21,426	34,794
24	54,023	465,305	519,328	4,916	6,942	22,614	34,472
25	47,128	490,377	537,505	4,289	6,056	23,832	34,177
26	40,558	515,759	556,317	3,691	5,212	25,066	33,969
27	34,652	541,137	575,789	3,153	4,453	26,299	33,905
28	29,216	566,725	595,941	2,659	3,754	27,543	33,956
29	24,278	592,521	616,799	2,209	3,120	28,797	34,126
30	19,891	618,496	638,387	1,810	2,556	30,059	34,425
31	15,966	644,765	660,731	1,453	2,052	31,336	34,841
32	12,593	671,263	683,856	1,146	1,618	32,623	35,387
33	9,944	697,847	707,791	905	1,278	33,915	36,098
34	7,770	724,794	732,564	707	998	35,225	36,930
35	5,935	752,269	758,204	540	763	36,560	37,863
36	4,466	780,275	784,741	406	574	37,921	38,901
37	3,273	808,934	812,207	298	421	39,314	40,033
38	2,314	838,320	840,634	211	297	40,742	41,250
39	1,563	868,493	870,056	142	201	42,209	42,552
40	1,014	899,494	900,508	92	130	43,715	43,937
41	625	931,401	932,026	57	80	45,266	45,403
42	359	964,288	964,647	33	46	46,864	46,943
43	197	998,212	998,409	18	25	48,513	48,556
44	103	1,033,251	1,033,354	9	13	50,216	50,238
45	49	1,069,472	1,069,521	4	6	51,976	51,986
46	22	1,106,932	1,106,954	2	3	53,797	53,802
47	8	1,145,690	1,145,698	1	1	55,680	55,682
48	3	1,185,794	1,185,797	0	0	57,630	57,630
49	1	1,227,299	1,227,300	0	0	59,647	59,647
50	0	1,270,255	1,270,255	0	0	61,734	61,734

**Contributions related to future employees in excess of normal cost and expenses of 17.09% of pay.*

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

	Projected Covered-Employee Payroll			Projected Contributions			
Year	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 9.10%	(e) = (a) x 12.85%	(f)	(g) = (d) + (e) + (f)
51	$ 0	$ 1,314,714	$ 1,314,714	$ 0	$ 0	$ 63,895	$ 63,895
52	0	1,360,729	1,360,729	0	0	66,131	66,131
53	0	1,408,355	1,408,355	0	0	68,446	68,446
54	0	1,457,647	1,457,647	0	0	70,842	70,842
55	0	1,508,665	1,508,665	0	0	73,321	73,321
56	0	1,561,468	1,561,468	0	0	75,887	75,887
57	0	1,616,120	1,616,120	0	0	78,543	78,543
58	0	1,672,684	1,672,684	0	0	81,292	81,292
59	0	1,731,228	1,731,228	0	0	84,138	84,138
60	0	1,791,821	1,791,821	0	0	87,082	87,082
61	0	1,854,534	1,854,534	0	0	90,130	90,130
62	0	1,919,443	1,919,443	0	0	93,285	93,285
63	0	1,986,624	1,986,624	0	0	96,550	96,550
64	0	2,056,155	2,056,155	0	0	99,929	99,929
65	0	2,128,121	2,128,121	0	0	103,427	103,427
66	0	2,202,605	2,202,605	0	0	107,047	107,047
67	0	2,279,696	2,279,696	0	0	110,793	110,793
68	0	2,359,486	2,359,486	0	0	114,671	114,671
69	0	2,442,068	2,442,068	0	0	118,684	118,684
70	0	2,527,540	2,527,540	0	0	122,838	122,838
71	0	2,616,004	2,616,004	0	0	127,138	127,138
72	0	2,707,564	2,707,564	0	0	131,588	131,588
73	0	2,802,329	2,802,329	0	0	136,193	136,193
74	0	2,900,410	2,900,410	0	0	140,960	140,960
75	0	3,001,925	3,001,925	0	0	145,894	145,894
76	0	3,106,992	3,106,992	0	0	151,000	151,000
77	0	3,215,737	3,215,737	0	0	156,285	156,285
78	0	3,328,287	3,328,287	0	0	161,755	161,755
79	0	3,444,778	3,444,778	0	0	167,416	167,416
80	0	3,565,345	3,565,345	0	0	173,276	173,276
81	0	3,690,132	3,690,132	0	0	179,340	179,340
82	0	3,819,286	3,819,286	0	0	185,617	185,617
83	0	3,952,961	3,952,961	0	0	192,114	192,114
84	0	4,091,315	4,091,315	0	0	198,838	198,838
85	0	4,234,511	4,234,511	0	0	205,797	205,797
86	0	4,382,719	4,382,719	0	0	213,000	213,000
87	0	4,536,114	4,536,114	0	0	220,455	220,455
88	0	4,694,878	4,694,878	0	0	228,171	228,171
89	0	4,859,199	4,859,199	0	0	236,157	236,157
90	0	5,029,271	5,029,271	0	0	244,423	244,423
91	0	5,205,295	5,205,295	0	0	252,977	252,977
92	0	5,387,481	5,387,481	0	0	261,832	261,832
93	0	5,576,043	5,576,043	0	0	270,996	270,996
94	0	5,771,204	5,771,204	0	0	280,481	280,481
95	0	5,973,196	5,973,196	0	0	290,297	290,297
96	0	6,182,258	6,182,258	0	0	300,458	300,458
97	0	6,398,637	6,398,637	0	0	310,974	310,974
98	0	6,622,589	6,622,589	0	0	321,858	321,858
99	0	6,854,380	6,854,380	0	0	333,123	333,123
100	0	7,094,283	7,094,283	0	0	344,782	344,782

**Contributions related to future employees in excess of normal cost and expenses of 17.09% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION (DOLLARS IN THOUSANDS)

Year	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.90%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
1	$ 909,002	$ 51,671	$ 62,902	$ 753	$ 71,347	$ 968,365
2	968,365	50,209	66,646	718	75,836	1,027,046
3	1,027,046	49,036	70,339	689	80,285	1,085,339
4	1,085,339	47,991	74,178	661	84,701	1,143,192
5	1,143,192	47,000	78,162	634	89,080	1,200,476
6	1,200,476	45,973	83,158	606	93,373	1,256,058
7	1,256,058	44,936	88,522	578	97,517	1,309,411
8	1,309,411	43,902	94,123	549	101,476	1,360,117
9	1,360,117	42,961	99,806	522	105,226	1,407,976
10	1,407,976	42,159	105,390	497	108,761	1,453,009
11	1,453,009	41,330	111,255	472	112,060	1,494,672
12	1,494,672	40,515	117,542	446	115,077	1,532,276
13	1,532,276	39,853	123,653	423	117,786	1,565,839
14	1,565,839	39,248	129,570	400	120,186	1,595,303
15	1,595,303	38,659	135,656	377	122,256	1,620,185
16	1,620,185	38,124	141,726	355	123,966	1,640,194
17	1,640,194	37,608	147,866	333	125,290	1,654,893
18	1,654,893	37,127	153,999	311	126,196	1,663,906
19	1,663,906	36,685	160,066	289	126,656	1,666,892
20	1,666,892	36,226	166,444	266	126,628	1,663,036
21	1,663,036	35,701	173,300	242	126,038	1,651,233
22	1,651,233	35,193	180,392	218	124,813	1,630,629
23	1,630,629	34,794	186,981	195	122,915	1,601,162
24	1,601,162	34,472	193,249	173	120,332	1,562,544
25	1,562,544	34,177	199,373	151	117,034	1,514,231
26	1,514,231	33,969	204,863	130	112,997	1,456,204
27	1,456,204	33,905	209,338	111	108,238	1,388,898
28	1,388,898	33,956	213,163	93	102,775	1,312,373
29	1,312,373	34,126	216,246	78	96,617	1,226,792
30	1,226,792	34,425	218,604	64	89,777	1,132,326
31	1,132,326	34,841	220,312	51	82,265	1,029,069
32	1,029,069	35,387	221,210	40	74,094	917,300
33	917,300	36,098	221,022	32	65,299	797,643
34	797,643	36,930	220,072	25	55,916	670,392
35	670,392	37,863	218,513	19	45,960	535,683
36	535,683	38,901	216,280	14	35,445	393,735
37	393,735	40,033	213,521	10	24,382	244,619
38	244,619	41,250	210,296	7	12,774	88,340
39	88,340	42,552	206,635	5	620	0
40	0	43,937	202,558	3	0	0
41	0	45,403	198,112	2	0	0
42	0	46,943	193,332	1	0	0
43	0	48,556	188,247	1	0	0
44	0	50,238	182,893	0	0	0
45	0	51,986	177,301	0	0	0
46	0	53,802	171,490	0	0	0
47	0	55,682	165,478	0	0	0
48	0	57,630	159,275	0	0	0
49	0	59,647	152,894	0	0	0
50	0	61,734	146,344	0	0	0

Contributions related to future employees in excess of normal cost and expenses of 17.09% of pay.

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

Year	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.90%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
51	$ 0	$ 63,895	$ 139,634	$ 0	$ 0	$ 0
52	0	66,131	132,773	0	0	0
53	0	68,446	125,769	0	0	0
54	0	70,842	118,636	0	0	0
55	0	73,321	111,393	0	0	0
56	0	75,887	104,064	0	0	0
57	0	78,543	96,679	0	0	0
58	0	81,292	89,278	0	0	0
59	0	84,138	81,912	0	0	0
60	0	87,082	74,630	0	0	0
61	0	90,130	67,489	0	0	0
62	0	93,285	60,546	0	0	0
63	0	96,550	53,861	0	0	0
64	0	99,929	47,487	0	0	0
65	0	103,427	41,479	0	0	0
66	0	107,047	35,881	0	0	0
67	0	110,793	30,730	0	0	0
68	0	114,671	26,050	0	0	0
69	0	118,684	21,851	0	0	0
70	0	122,838	18,135	0	0	0
71	0	127,138	14,889	0	0	0
72	0	131,588	12,089	0	0	0
73	0	136,193	9,707	0	0	0
74	0	140,960	7,706	0	0	0
75	0	145,894	6,048	0	0	0
76	0	151,000	4,694	0	0	0
77	0	156,285	3,603	0	0	0
78	0	161,755	2,733	0	0	0
79	0	167,416	2,051	0	0	0
80	0	173,276	1,521	0	0	0
81	0	179,340	1,116	0	0	0
82	0	185,617	808	0	0	0
83	0	192,114	578	0	0	0
84	0	198,838	408	0	0	0
85	0	205,797	284	0	0	0
86	0	213,000	195	0	0	0
87	0	220,455	132	0	0	0
88	0	228,171	87	0	0	0
89	0	236,157	57	0	0	0
90	0	244,423	37	0	0	0
91	0	252,977	23	0	0	0
92	0	261,832	14	0	0	0
93	0	270,996	9	0	0	0
94	0	280,481	5	0	0	0
95	0	290,297	3	0	0	0
96	0	300,458	2	0	0	0
97	0	310,974	1	0	0	0
98	0	321,858	0	0	0	0
99	0	333,123	0	0	0	0
100	0	344,782	0	0	0	0

**Contributions related to future employees in excess of normal cost and expenses of 17.09% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (DOLLARS IN THOUSANDS)

Year	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)
1	$ 909,002	$ 62,902	$ 62,902	$ 0	$ 60,555	$ 0	$ 61,024
2	968,365	66,646	66,646	0	59,462	0	60,854
3	1,027,046	70,339	70,339	0	58,163	0	60,450
4	1,085,339	74,178	74,178	0	56,846	0	60,000
5	1,143,192	78,162	78,162	0	55,514	0	59,505
6	1,200,476	83,158	83,158	0	54,738	0	59,586
7	1,256,058	88,522	88,522	0	54,002	0	59,699
8	1,309,411	94,123	94,123	0	53,215	0	59,744
9	1,360,117	99,806	99,806	0	52,297	0	59,625
10	1,407,976	105,390	105,390	0	51,179	0	59,258
11	1,453,009	111,255	111,255	0	50,072	0	58,878
12	1,494,672	117,542	117,542	0	49,028	0	58,547
13	1,532,276	123,653	123,653	0	47,801	0	57,969
14	1,565,839	129,570	129,570	0	46,421	0	57,170
15	1,595,303	135,656	135,656	0	45,043	0	56,336
16	1,620,185	141,726	141,726	0	43,613	0	55,395
17	1,640,194	147,866	147,866	0	42,171	0	54,397
18	1,654,893	153,999	153,999	0	40,705	0	53,321
19	1,663,906	160,066	160,066	0	39,211	0	52,163
20	1,666,892	166,444	166,444	0	37,788	0	51,052
21	1,663,036	173,300	173,300	0	36,463	0	50,029
22	1,651,233	180,392	180,392	0	35,177	0	49,014
23	1,630,629	186,981	186,981	0	33,792	0	47,816
24	1,601,162	193,249	193,249	0	32,368	0	46,513
25	1,562,544	199,373	199,373	0	30,949	0	45,165
26	1,514,231	204,863	204,863	0	29,473	0	43,680
27	1,456,204	209,338	209,338	0	27,911	0	42,009
28	1,388,898	213,163	213,163	0	26,340	0	40,261
29	1,312,373	216,246	216,246	0	24,765	0	38,441
30	1,226,792	218,604	218,604	0	23,202	0	36,576
31	1,132,326	220,312	220,312	0	21,671	0	34,694
32	1,029,069	221,210	221,210	0	20,166	0	32,786
33	917,300	221,022	221,022	0	18,674	0	30,832
34	797,643	220,072	220,072	0	17,232	0	28,894
35	670,392	218,513	218,513	0	15,858	0	27,002
36	535,683	216,280	216,280	0	14,546	0	25,155
37	393,735	213,521	213,521	0	13,309	0	23,374
38	244,619	210,296	210,296	0	12,149	0	21,667
39	88,340	206,635	88,340	118,295	4,729	28,144	20,038
40	0	202,558	0	202,558	0	46,425	18,487
41	0	198,112	0	198,112	0	43,744	17,018
42	0	193,332	0	193,332	0	41,126	15,631
43	0	188,247	0	188,247	0	38,578	14,325
44	0	182,893	0	182,893	0	36,109	13,099
45	0	177,301	0	177,301	0	33,723	11,952
46	0	171,490	0	171,490	0	31,424	10,880
47	0	165,478	0	165,478	0	29,212	9,881
48	0	159,275	0	159,275	0	27,088	8,952
49	0	152,894	0	152,894	0	25,051	8,088
50	0	146,344	0	146,344	0	23,100	7,286

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (CONTINUED)
(DOLLARS IN THOUSANDS)

Year	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)
51	$ 0	$ 139,634	$ 0	$ 139,634	$ 0	$ 21,234	$ 6,543
52	0	132,773	0	132,773	0	19,451	5,856
53	0	125,769	0	125,769	0	17,751	5,221
54	0	118,636	0	118,636	0	16,131	4,635
55	0	111,393	0	111,393	0	14,592	4,096
56	0	104,064	0	104,064	0	13,132	3,602
57	0	96,679	0	96,679	0	11,754	3,149
58	0	89,278	0	89,278	0	10,457	2,737
59	0	81,912	0	81,912	0	9,243	2,364
60	0	74,630	0	74,630	0	8,113	2,027
61	0	67,489	0	67,489	0	7,068	1,725
62	0	60,546	0	60,546	0	6,109	1,457
63	0	53,861	0	53,861	0	5,235	1,220
64	0	47,487	0	47,487	0	4,447	1,012
65	0	41,479	0	41,479	0	3,742	832
66	0	35,881	0	35,881	0	3,118	677
67	0	30,730	0	30,730	0	2,573	546
68	0	26,050	0	26,050	0	2,101	436
69	0	21,851	0	21,851	0	1,698	344
70	0	18,135	0	18,135	0	1,358	269
71	0	14,889	0	14,889	0	1,074	208
72	0	12,089	0	12,089	0	840	159
73	0	9,707	0	9,707	0	650	120
74	0	7,706	0	7,706	0	497	90
75	0	6,048	0	6,048	0	376	66
76	0	4,694	0	4,694	0	281	48
77	0	3,603	0	3,603	0	208	35
78	0	2,733	0	2,733	0	152	25
79	0	2,051	0	2,051	0	110	18
80	0	1,521	0	1,521	0	78	12
81	0	1,116	0	1,116	0	55	8
82	0	808	0	808	0	39	6
83	0	578	0	578	0	27	4
84	0	408	0	408	0	18	3
85	0	284	0	284	0	12	2
86	0	195	0	195	0	8	1
87	0	132	0	132	0	5	1
88	0	87	0	87	0	3	0
89	0	57	0	57	0	2	0
90	0	37	0	37	0	1	0
91	0	23	0	23	0	1	0
92	0	14	0	14	0	0	0
93	0	9	0	9	0	0	0
94	0	5	0	5	0	0	0
95	0	3	0	3	0	0	0
96	0	2	0	2	0	0	0
97	0	1	0	1	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
				Totals	$ 1,436,600	$ 587,467	$ 2,024,067

SECTION H

GLOSSARY OF TERMS

GLOSSARY OF TERMS

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.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
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 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 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 Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
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).
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 ages(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 post-employment 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.