Public Employees Retirement Association of Minnesota

Local Government Correctional Service Retirement Plan

GASB Statements No. 67 and No. 68 Accounting and Financial Reporting for Pensions

June 30, 2018

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November 28, 2018

Public Employees Retirement Association of Minnesota
Local Government Correctional Service Retirement Plan
St. Paul, Minnesota

Dear Trustees of the Local Government Correctional Service Retirement Plan:

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 Local Government Correctional Service Retirement Plan ("LGCSRP"), as amended by Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

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

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing 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 obligations. 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. PERA 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 the Public Employees Retirement Association (PERA) only in its entirety and only with the permission of PERA. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by PERA, 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 Plan and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2018 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 Local Government Correctional Service Retirement Plan as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The signing actuaries are independent of the plan sponsor.

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

Respectfully submitted,

Brian B. Murphy

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

Bonita J. Wurst

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

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SECTION A

EXECUTIVE SUMMARY

Executive Summary
as of June 30, 2018 (Dollars in Thousands)

		2018
Actuarial Valuation Date		June 30, 2018
Measurement Date of the Net Pension Liability		June 30, 2018
Employer's Fiscal Year Ending Date (Reporting Date)		Varies by Employer
Membership		
Number of		
- Service Retirements		942
- Survivors		61
- Disability Retirements		190
- Deferred Retirements		3,165
- Terminated other non-vested		2,811
- Active Members		3,981
- Total		11,150
Covered Payroll	$	205,077
Net Pension Liability		
Total Pension Liability	$	696,842
Plan Fiduciary Net Position		680,395
Net Pension Liability	$	16,447
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		97.64%
Net Pension Liability as a Percentage of Covered Payroll		8.02%
Development of the Single Discount Rate		
Single Discount Rate		7.50%
Long-Term Expected Rate of Investment Return		7.50%
Long-Term Municipal Bond Rate*		3.62%
Last year ending June 30 in the 2019 to 2118 projection period for which projected benefit payments are fully funded		2118
Total Pension Expense/(Income)	**$**	**(27,116)**

Deferred Outflows and Inflows 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	$	857	$	1,758
Changes in assumptions	$	77,583	$	190,166
Net difference between projected and actual earnings on pension plan investments	$	18,910	$	37,573
Total	$	97,350	$	229,497

* *Source:* *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. Governmental Accounting Standards Board (GASB) Statement No. 82, Pension Issues, is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

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

Financial Statements

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

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to LGCSRP subsequent to the measurement date of June 30, 2018.

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 liability 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 to 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.

Both GASB Statements No. 67 and No. 68 require the notes to 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 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.

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
- comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to 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, 2018 and a measurement date of June 30, 2018.

Measurement of the Net Pension Liability

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

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

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50%), then the following outcomes are expected:

(1) The 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 30 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.

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 7.50%; the municipal bond rate is 3.62 % (based on the weekly rate closest to but not later than the measurement date of Fidelity's "20-Year Municipal GO AA Index"); and the resulting single discount rate is 7.50%.

SECTION B

FINANCIAL STATEMENTS

Statement of Pension Expense Under GASB Statement No. 68
Fiscal Year Ended June 30, 2018 (Dollars in Thousands)

A. Expense

1.	Service Cost	$	45,378
2.	Interest on the Total Pension Liability	$	53,811
3.	Current-Period Benefit Changes	$	(66,822)
4.	Employee Contributions (made negative for addition here)	$	(11,956)
5.	Projected Earnings on Plan Investments (made negative for addition here)	$	(45,746)
6.	Pension Plan Administrative Expense	$	308
7.	Other Changes in Plan Fiduciary Net Position	$	(1)
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	$	255
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period	$	(52,364)
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.50%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period	$	(3,443)
11.	**Increase/(Decrease) from Experience in the Current Reporting Period**	**$**	**(80,580)**
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	$	(2,755)
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods	$	61,046
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods	$	(4,827)
15.	**Total Pension Expense / (Income)**	**$**	**(27,116)**

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2018 (Dollars in Thousands)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	1,018
2. Assumption Changes (gains) or losses	$	(209,457)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		4.0000
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	$	255
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(52,364)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(52,109)
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	$	763
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	(157,093)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(156,330)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(17,216)
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	$	(3,443)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(13,773)

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30, 2018 (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 of Resources
1. Due to Liabilities	$ 77,934	$ 71,752	$ 6,182
2. Due to Assets	$ 11,067	$ 19,337	$ (8,270)
3. Total	$ 89,001	$ 91,089	$ (2,088)

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

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	$ 351	$ 2,851	$ (2,500)
2. Assumption Changes	$ 77,583	$ 68,901	$ 8,682
3. Net Difference between projected and actual earnings on pension plan investments	$ 11,067	$ 19,337	$ (8,270)
4. Total	$ 89,001	$ 91,089	$ (2,088)

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 of Resources
1. Differences between expected and actual experience	$ 857	$ 1,758	$ (901)
2. Assumption Changes	$ 77,583	$ 190,166	$ (112,583)
3. Net Difference between projected and actual earnings on pension plan investments	$ 18,910	$ 37,573	$ (18,663)
4. Total	$ 97,350	$ 229,497	$ (132,147)

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

Year Ending June 30	Net Deferred Outflows of Resources
2019	$ 7,841
2020	$ (73,058)
2021	$ (63,486)
2022	$ (3,444)
2023	$ -
Thereafter	$ -
Total	$ (132,147)

Statement of Fiduciary Net Position
(Dollars in Thousands)

	Market Value	
Assets in Trust	**June 30, 2018**	**June 30, 2017**
Cash, equivalents, short term securities	$ 8,046	$ 15,461
Fixed income	$ 165,171	$ 116,764
Equity	$ 412,840	$ 390,993
SBI Alternative	$ 93,990	$ 79,019
Other	$ -	$ -
Total Assets in Trust	**$ 680,047**	**$ 602,237**
Assets Receivable	$ 846	$ 718
Amounts Payable	$ (498)	$ (495)
Net Position Restricted for Pensions	**$ 680,395**	**$ 602,460**

Statement of Changes in Fiduciary Net Position
(Dollars in Thousands)

Change in Assets	Market Value	
Year Ending	**June 30, 2018**	**June 30, 2017**
1. Fund balance at market value at beginning of year	$ 602,460	$ 507,783
2. Adjustment to match beginning of year asset statement	$ -	$ -
3. Fund balance at market value at beginning of year	$ 602,460	$ 507,783
4. Contributions		
a. Member	$ 11,956	$ 11,666
b. Employer	$ 17,871	$ 17,489
c. Other sources	$ -	$ -
d. Total contributions	$ 29,827	$ 29,155
5. Investment income		
a. Investment income/(loss)	$ 63,662	$ 78,973
b. Investment expenses	$ (700)	$ (610)
c. Net subtotal	$ 62,962	$ 78,363
6. Other	$ 1	$ -
7. Total additions: *(4.d.) + (5.c.) + (6.)*	**$ 92,790**	**$ 107,518**
8. Benefits Paid		
a. Annuity benefits	$ (13,183)	$ (11,033)
b. Refunds	$ (1,364)	$ (1,478)
c. Total benefits paid	$ (14,547)	$ (12,511)
9. Expenses		
a. Other	$ -	$ -
b. Administrative	$ (308)	$ (330)
c. Total expenses	$ (308)	$ (330)
10. Total deductions: *(8.c.) + (9.c.)*	**$ (14,855)**	**$ (12,841)**
11. Net increase (decrease) in net position: *(7.) + (10.)*	$ 77,935	$ 94,677
12. Net position restricted for pensions	**$ 680,395**	**$ 602,460**
13. Approximate return on market value of assets	10.3%	15.1%

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Changes in Net Pension Liability and Related Ratios
Current Period
Fiscal Year Ended June 30, 2018 (Dollars in Thousands)

A. Total pension liability		
1. Service Cost	$	45,378
2. Interest on the Total Pension Liability	$	53,811
3. Changes of benefit terms	$	(66,822)
4. Difference between expected and actual experience of the Total Pension Liability	$	1,018
5. Changes of assumptions	$	(209,457)
6. Benefit payments, including refunds of employee contributions	$	(14,547)
7. Net change in total pension liability	$	(190,619)
8. Total pension liability – beginning	$	887,461
9. Total pension liability – ending	**$**	**696,842**
B. Plan fiduciary net position		
1. Contributions – employer	$	17,871
2. Contributions – employee	$	11,956
3. Net investment income	$	62,962
4. Benefit payments, including refunds of employee contributions	$	(14,547)
5. Pension Plan Administrative Expense	$	(308)
6. Other	$	1
7. Net change in plan fiduciary net position	$	77,935
8. Plan fiduciary net position – beginning	$	602,460
9. Plan fiduciary net position – ending	**$**	**680,395**
C. Net pension liability	**$**	**16,447**
D. Plan fiduciary net position as a percentage of the total pension liability		**97.64%**
E. Covered-employee payroll*	**$**	**205,077**
F. Net pension liability as a percentage of covered employee payroll		**8.02%**

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

Schedules of Required Supplementary Information
Schedule of Changes in Net Pension Liability and Related Ratios Multiyear
(Dollars in Thousands)

Last 10 Fiscal Years (which may be built prospectively)

Fiscal year ending June 30,	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Pension Liability										
Service Cost	$ 45,378	$ 49,202	$ 25,950	$ 25,098	$ 26,488					
Interest on the Total Pension Liability	$ 53,811	$ 47,336	$ 40,605	$ 37,043	$ 33,955					
Benefit Changes	$ (66,822)	$ -	$ -	$ -	$ -					
Experience	$ 1,018	$ (3,516)	$ 382	$ (7,892)	$ (5,327)					
Assumption Changes	$ (209,457)	$ (66,147)	$ 310,332	$ -	$ (34,168)					
Benefit Payments	$ (13,183)	$ (11,033)	$ (9,381)	$ (7,777)	$ (6,711)					
Refunds	$ (1,364)	$ (1,478)	$ (982)	$ (1,057)	$ (1,105)					
Net Change in Total Pension Liability	$ (190,619)	$ 14,364	$ 366,906	$ 45,415	$ 13,132					
Total Pension Liability - Beginning	$ 887,461	$ 873,097	$ 506,191	$ 460,776	$ 447,644					
Total Pension Liability - Ending (a)	$ 696,842	$ 887,461	$ 873,097	$ 506,191	$ 460,776					
Plan Fiduciary Net Position										
Employer Contributions	$ 17,871	$ 17,489	$ 16,490	$ 15,736	$ 15,054					
Employee Contributions	$ 11,956	$ 11,666	$ 11,008	$ 10,472	$ 10,030					
Pension Plan Net Investment Income	$ 62,962	$ 78,363	$ 209	$ 20,373	$ 69,451					
Benefit Payments	$ (13,183)	$ (11,033)	$ (9,381)	$ (7,777)	$ (6,711)					
Refunds	$ (1,364)	$ (1,478)	$ (982)	$ (1,057)	$ (1,105)					
Pension Plan Administrative Expense	$ (308)	$ (330)	$ (290)	$ (247)	$ (236)					
Other	$ 1	$ -	$ (2)	$ (1)	$ (1)					
Net Change in Plan Fiduciary Net Position	$ 77,935	$ 94,677	$ 17,052	$ 37,499	$ 86,482					
Plan Fiduciary Net Position - Beginning	$ 602,460	$ 507,783	$ 490,731	$ 453,232	$ 366,750					
Plan Fiduciary Net Position - Ending (b)	$ 680,395	$ 602,460	$ 507,783	$ 490,731	$ 453,232					
Net Pension Liability - Ending (a) - (b)	$ 16,447	$ 285,001	$ 365,314	$ 15,460	$ 7,544					
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	97.64 %	67.89 %	58.16 %	96.95 %	98.36 %					
Covered Employee Payroll	$ 205,077	$ 200,103	$ 188,816	$ 179,623	$ 172,041					
Net Pension Liability as a Percentage of Covered Employee Payroll	8.02 %	142.43 %	193.48 %	8.61 %	4.39 %					

Notes to Schedule:

N/A

Schedules of Required Supplementary Information
Schedule of Net Pension Liability Multiyear
(Dollars in Thousands)

Last 10 Fiscal Years (which may be built prospectively)

FY Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a % of Covered Payroll
2009						
2010						
2011						
2012						
2013						
2014	$ 460,776	$ 453,232	$ 7,544	98.36%	$ 172,041	4.39%
2015	$ 506,191	$ 490,731	$ 15,460	96.95%	$ 179,623	8.61%
2016	$ 873,097	$ 507,783	$ 365,314	58.16%	$ 188,816	193.48%
2017	$ 887,461	$ 602,460	$ 285,001	67.89%	$ 200,103	142.43%
2018	$ 696,842	$ 680,395	$ 16,447	97.64%	$ 205,077	8.02%

Schedule of Contributions Multiyear (Dollars in Thousands)

Last 10 Fiscal Years

FY Ending June 30,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll	Actual Contribution as a % of Covered Payroll
2009	$ 11,469	$ 14,124	$ (2,655)	$ 154,650	9.13%
2010	$ 12,273	$ 14,170	$ (1,897)	$ 154,777	9.16
2011	$ 12,183	$ 14,289	$ (2,106)	$ 165,077	8.66
2012	$ 12,473	$ 14,320	$ (1,847)	$ 164,340	8.71
2013	$ 14,207	$ 14,498	$ (291)	$ 164,820	8.80
2014	$ 14,606	$ 15,054	$ (448)	$ 172,041	8.75
2015	$ 13,759	$ 15,736	$ (1,977)	$ 179,623	8.76
2016	$ 16,446	$ 16,490	$ (44)	$ 188,816	8.73
2017	$ 17,269	$ 17,489	$ (220)	$ 200,103	8.74
2018	$ 19,031	$ 17,871	$ 1,160	$ 205,077	8.71

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Contribution Rates for Fiscal Year Ending June 30, 2018:

Valuation Date:	June 30, 2017
Notes	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.
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	21 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.75%
Payroll Growth	3.50%
Salary Increases	3.75% to 8.75% 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.
Mortality	RP-2014 annuitant generational mortalty table projected with mortality improvement scale MP-2016, from a base year of 2006. Male rates adjusted by a factor of 0.96.

Other Information:

Notes	The plan is assumed to pay a 2.50% post-retirement benefit increase for all years. See separate funding report as of July 1, 2017 for additional detail.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

FY Ending June 30,	Annual Return[1]
2009	
2010	
2011	
2012	
2013	
2014	
2015	
2016	
2017	
2018	

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

It is our understanding that this exhibit will be prepared by PERA with assistance from the State Board of Investment. Please provide a copy of the final exhibit for our files.

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 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, 2018, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Final Target Allocation	Long-Term Expected Real Rate of Return (geometric)
Domestic Equity	33%	36%	5.10%
International Equity	16%	17%	5.30%
Private Markets	25%	25%	5.90%
Fixed Income	24%	20%	0.75%
Unallocated Cash	2%	2%	0.00%
Total	100%	100%	

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

For purposes of this valuation, the long-term expected rate of return assumption is 7.50%. This assumption is based on a review of inflation and investment return assumption dated September 11, 2017.

Single Discount Rate

A single discount rate of 7.50% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.50%. The projection of cash flows used to determine this single discount rate assumed that 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 7.50%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 6.50%	Current Single Discount Rate Assumption 7.50%	1% Increase 8.50%
Total Pension Liability	$ 821,153	$ 696,842	$ 597,397
Net Position Restricted for Pensions	$ 680,395	$ 680,395	$ 680,395
Net Pension Liability	**$ 140,758**	**$ 16,447**	**$ (82,998)**

Note that we believe the 8.5% interest rate assumption would not comply with Actuarial Standards of Practice.

GASB Statement No. 68 Reconciliation (Dollars in Thousands)
Current Reporting Period

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Current Period: Deferred Outflows	Current Period: Deferred Inflows	Current Period: Pension Expense*
Balance Beginning of Year	**$ 887,461**	**$ 602,460**	**$ 285,001**			
Changes for the Year:						
Service Cost	$ 45,378		$ 45,378			$ 45,378
Interest on Total Pension Liability	53,811		53,811			53,811
Interest on Fiduciary Net Position		$ 45,746	(45,746)			(45,746)
Changes in Benefit Terms	(66,822)		(66,822)			(66,822)
Liability Experience Gains and Losses	1,018		1,018	$ 763	$ -	255
Changes in Assumptions	(209,457)		(209,457)	-	157,093	(52,364)
Contributions - Employer		17,871	(17,871)			
Contributions - Employees		11,956	(11,956)			(11,956)
Asset Gain/(Loss)		17,216	(17,216)	-	13,773	(3,443)
Benefit Payouts	(14,547)	(14,547)				
Administrative Expenses		(308)	308			308
Other		1	(1)			(1)
Net Changes	**$ (190,619)**	**$ 77,935**	**$ (268,554)**	**$ 763**	**$ 170,866**	**$ (80,580)**
Balance End of Year	**$ 696,842**	**$ 680,395**	**$ 16,447**			

** Pension Expense from Experience in the Current Reporting Period.*

GASB Statement No. 68 Reconciliation (Dollars in Thousands)
Current and Prior Reporting Periods

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Net Deferred Outflows Prior Year	Total Pension Expense*
Balance Beginning of Year	**$ 887,461**	**$ 602,460**	**$ 285,001**				
Changes for the Year:							
Service Cost	$ 45,378		$ 45,378				$ 45,378
Interest on Total Pension Liability	53,811		53,811				53,811
Interest on Fiduciary Net Position		$ 45,746	(45,746)				(45,746)
Changes in Benefit Terms	(66,822)		(66,822)				(66,822)
Liability Experience Gains and Losses	1,018		1,018	$ 857	$ 1,758	$ (4,419)	(2,500)
Changes in Assumptions	(209,457)		(209,457)	77,583	190,166	105,556	8,682
Contributions - Employer		17,871	(17,871)				
Contributions - Employees		11,956	(11,956)				(11,956)
Asset Gain/(Loss)		17,216	(17,216)	18,910	37,573	(9,717)	(8,270)
Benefit Payouts	(14,547)	(14,547)					
Administrative Expenses		(308)	308				308
Other		1	(1)				(1)
Net Changes	**$ (190,619)**	**$ 77,935**	**$ (268,554)**				**$ (27,116)**
Balance End of Year	**$ 696,842**	**$ 680,395**	**$ 16,447**	**$ 97,350**	**$ 229,497**	**$ 91,420**	

** Pension Expense from Experience in the Current and Prior Reporting Periods.*

Summary of Population Statistics

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on July 1, 2017	**3,842**	**2,933**	**2,624**	**853**	**178**	**54**	**10,484**
New members	724	0	0	0	0	0	**724**
Return to active	49	(16)	(33)	0	0	0	**0**
Terminated non-vested	(317)	0	317	0	0	0	**0**
Service retirements	(69)	(35)	0	104	0	0	**0**
Terminated deferred	(171)	171	0	0	0	0	**0**
Terminated refund/transfer	(61)	(34)	(49)	0	0	0	**(144)**
Deaths	(7)	(2)	(3)	(15)	(4)	0	**(31)**
New beneficiary	0	0	0	0	0	8	**8**
Disabled	(9)	0	0	0	9	0	**0**
Data adjustments	0	148	(45)	0	7	(1)	**109**
Net change	139	232	187	89	12	7	**666**
Members on July 1, 2018	**3,981**	**3,165**	**2,811**	**942**	**190**	**61**	**11,150**

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. PERA 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	Local government employees in covered correctional service for a county administered jail or correctional facility or in a regional correctional facility administered by multiple counties, who are directly responsible for security, custody and control of persons confined in jail or facility, who are expected to respond to incidents within the jail or facility, and who are not members of the Public Employees Police and Fire Fund.
Contributions	Shown as a percent of salary: <u>Member</u> 5.83% <u>Employer</u> 8.75% Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
Allowable service	Local Government Correctional Service during which member contributions were made (effective July 1, 1999). May also include certain leaves of absence, military service and periods while temporary Worker's Compensation is paid.
Salary	Includes amounts deducted for deferred compensation or supplemental retirement plans, net income from fees and sick leave payments funded by the employer. Excludes unused annual leaves and sick leave payments, severance payments, Workers' Compensation benefits and employer-paid flexible spending accounts, cafeteria plans, healthcare expense accounts, day-care expenses, fringe benefits and the cost of insurance coverage.
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; and 100% vested after 10 years of Allowable Service.

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	1.9% of Average Salary for each year of Allowable Service, pro rata for completed months, adjusted for partial vesting if applicable.

Summary of Plan Provisions (Continued)

Retirement (Concluded)	
Early Retirement	
Age/service requirement	Age 50 and vested.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date with actuarial reduction to commencement age assuming 3% augmentation to age 55 (2.50% if hired after June 30, 2006). Augmentation adjustment is phased out over a five-year period starting July 1, 2019, resulting in no augmentation adjustment after June 30, 2024.
Form of payment	Life annuity. Actuarially equivalent options are: 25%, 50%, 75% or 100% Joint and Survivor. 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	Benefit increases after retirement will equal 100% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 2.5%, beginning January 1, 2019. If the funding status declines to 85% for two consecutive years or 80% for one year, the maximum increase will be lowered to 1.5%. A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase.
Disability	
Duty Disability	
Age/service requirement	Member who cannot perform his duties as a direct result of a disability relating to an act of duty specific to protecting the property and personal safety of others.
Amount	47.50% of Average Salary plus 1.90% of Average Salary for each year in excess of 25 years of Allowable Service (pro rata for completed months). Payment begins at disability and ends at age 65 or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.
Regular Disability	
Age/service requirement	At least one year of Allowable Service and a disability preventing member from performing normal duties that arise out of activities not related to covered employment or while at work, activities related to duties that do not present inherent dangers specific to occupation.

Summary of Plan Provisions (Continued)

Disability (Concluded)	
Amount	Normal Retirement Benefit based on Allowable Service (minimum of 10 years) and Average Salary at disability. Payment begins at disability and ends at age 65 or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.
Retirement benefit	
Age/service requirement	Age 65 with continued disability.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before age 65 or the normal retirement benefit available at age 65, or an actuarially equivalent optional annuity.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.
Death	
Surviving spouse benefit	
Age/service requirement	Vested active member at any age or vested former member age 50 or older who dies before retirement or disability benefit commences. If an active member dies, benefits may commence immediately, regardless of age.
Amount	Surviving spouse receives the 100% joint and survivor benefit 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. In lieu of this benefit, the surviving spouse may elect a refund of 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.

Summary of Plan Provisions (Continued)

Death (Concluded)	
<u>Refund of contributions</u>	
Age/service requirement	Active employee dies and survivor benefits paid are less than member's contributions or a former employee dies before annuity begins.
Amount	If no survivor benefits are paid, the member's contributions with 6.00% interest until June 30, 2011; 4.00% to June 30, 2018; 3.00% thereafter. If survivor benefits are paid and accumulated contributions exceed total payments to the surviving spouse and children, then the remaining contributions are paid out.
Termination	
<u>Refund of contributions</u>	
Age/service requirement	Termination of local government service.
Amount	Member's contributions with 6.00% interest through June 30, 2011, compounded daily. Beginning July 1, 2011, a member's contributions increase at 4.00% interest compounded daily. Beginning July 1, 2018, a member's contributions increase at 3.00% interest compounded daily. If a member is vested, a deferred annuity may be elected in lieu of a refund.
<u>Deferred benefit</u>	
Age/service requirement	Partially or fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation), compounded annually, if termination of employment is prior to January 1, 2012: (a.) 3.00% (2.50% if hired after June 30, 2006) until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (b.) 5.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of the date the annuity begins and January 1, 2012; (c.) 1.00% from January 1, 2012 through December 31, 2018; and (d.) 0.00% thereafter. If a member terminates employment after 2011, they are not eligible for augmentation.
<u>Form of payment</u>	Same as for retirement.
Actuarial equivalent factors	Effective July 1, 2019, actuarially equivalent factors based on the RP-2014 mortality table for healthy annuitants for a member turning age 55 in 2021, reflecting projected mortality improvements using Scale MP-2017, male rates multiplied by 0.96, blended 65% males, 4.88% post-retirement interest, and 7.5% pre-retirement interest. Reflecting statutory requirements, joint and survivor factors are based on an interest assumption of 6.50%.

Summary of Plan Provisions (Concluded)

Combined service annuity	Members are eligible for combined service benefits if they: (a.) Meet minimum retirement age for each plan participated in and total public service meets the vesting requirements of each plan; or (b.) Have three or more years of service under PERA and the covered fund(s) (if hired prior to July 1, 2010). Other requirements for combined service include: (a.) Member must have at least six months of allowable service credit in each plan worked under; and (b.) Member may not be in receipt of a benefit from another plan. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans is 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	The augmentation adjustment in early retirement factors is eliminated over a five-year period starting July 1, 2019, resulting in actuarial equivalence after June 30, 2024. Post-retirement benefit increases were changed from 2.5% per year with a provision to reduce to 1.0% if the funding status declines to a certain level, to 100% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 2.5%, beginning January 1, 2019. If the funding status declines to 85% for two consecutive years or 80% for one year, the maximum increase will be lowered to 1.5%. Deferred augmentation was changed to 0.0%, effective January 1, 2019. Augmentation that has already accrued for deferred members will still apply. Interest credited on member contributions decreased from 4.0% to 3.0%, beginning July 1, 2018. Actuarial equivalent factors were updated to reflect revised mortality and interest assumptions.

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.

Valuation of Future Post-Retirement Benefit Increases

Benefit increases after retirement will equal 100% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 2.5%, beginning January 1, 2019; if the funding status declines to 85% for two consecutive years or 80% for one year, the maximum increase will be lowered to 1.5%. Stochastic modeling was used to determine the assumption that benefit increases will equal 2.00% per year. This is only an assumption; actual increases will depend on actual experience.

Asset Valuation Method

Fair value of assets.

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

The following assumptions were used in valuing the liabilities and benefits under the plan. The assumptions are based on the last experience study dated February 2012, prepared by a former actuary, and a review of inflation and investment assumptions, dated September 11, 2017. The mortality assumption is based on the Public Employees' Police & Fire Plan experience study dated August 30, 2016. The Allowance for Combined Service Annuity assumptions are based on an analysis completed by the LCPR actuary and documented in a report dated October 2016.

Investment return	7.50% per annum.
Single Discount Rate	7.50% per annum.
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 earned during the year.
Inflation	2.50% per year.
Payroll growth	3.25% per year.
Mortality rates	
Healthy pre-retirement	RP-2014 employee generational mortality table projected with mortality improvement scale MP-2017, from a base year of 2006.
Healthy post-retirement	RP-2014 annuitant generational mortality table projected with mortality improvement scale MP-2017 from a base year of 2006. Male rates are adjusted by a factor of 0.96.
Disabled	RP-2014 annuitant generational mortality table projected with mortality improvement scale MP-2017 from a base year of 2006. Male rates are adjusted by a factor of 0.96.
Notes	The RP-2014 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 18 to 80 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have extended the annuitant mortality table as needed for members younger than age 50 who are receiving a benefit by deriving rates based on the employee table and the juvenile table. Similarly, we have extended the employee table as needed for members older than age 80 by deriving rates based on the annuitant table.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year. Note that plan changes reflected in this report may result in behavior changes that are not anticipated in the current retirement rates.
Withdrawal	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	25%
2	20%
3	15%

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 35.0% for vested members and 1.0% 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 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	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. For members in payment status, actual spouse date of birth is used, if provided.
Eligible children	Retiring members are assumed to have no dependent children.
Form of payment	Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows: Males: 5% elect 25% Joint & Survivor option 10% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 35% elect 100% Joint & Survivor option Females: 5% elect 25% Joint & Survivor option 5% elect 50% Joint & Survivor option 5% elect 75% Joint & Survivor option 5% 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.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year.
Service credit accruals	It is assumed that members accrue one year of service credit per year.
Pay Increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.

Summary of Actuarial Assumptions (Continued)

Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions, based on average results for applicable members, were applied: <u>Data for active members:</u> There were 111 members reported with a salary less than $100. We used prior year salary (80 members), if available; otherwise high five salary with a 10% load to account for salary increases (31 members). If neither prior year salary or high five salary was available, we assumed a value of $35,000. There were also 33 members reported without a gender and no members reported without a date of birth. We assumed an entry age of 31 and male gender. <u>Data for terminated members:</u> We calculated benefits for these members using the reported Average Salary and credited service. There were no members reported without Average Salary. If credited service was not reported (28 members), we used elapsed time from hire date to termination date (17 members), otherwise we assumed nine years of service. If termination date was not reported (12 members), we assumed the termination date was equal to the hire date plus credited service, otherwise the valuation date. If the reported termination date occurs prior to the reported hire date, the two dates were swapped. There were no members reported without a date of birth. There were 5 members reported without a gender; male was assumed. <u>Data for retired members:</u> There were no members reported without a date of birth, gender or benefit. There were 3 members that were active last year, and retirement eligible, and not on the retiree data file this year. At the direction of PERA, we included these members in the 2018 valuation as retirees with an estimated life only monthly benefit. Because PERA reclassifies disabled members as retirees once the member reaches Normal Retirement Age, we compare the members that PERA reports as retirees to our disabled group from the last valuation. If a member was disabled in the valuation, we reclassify that member as a disabled retiree in this year's valuation. We reclassified 61 retirees as disabled retirees in this valuation.

Summary of Actuarial Assumptions (Continued)

Changes in actuarial assumptions	The Single Discount Rate was changed from 5.96% per annum to 7.50% per annum. The mortality projection scale was changed from MP-2016 to MP-2017. The assumed post-retirement benefit increase was changed from 2.50% per year to 2.00% per year.

Summary of Actuarial Assumptions (Continued)

	Percentage of Members Dying Each Year*					
	Healthy Post-Retirement Mortality		Healthy Pre-Retirement Mortality		Disability Mortality	
Age in 2018	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
20	0.04%	0.02%	0.04%	0.02%	0.04%	0.02%
25	0.06	0.03	0.05	0.02	0.06	0.03
30	0.09	0.07	0.05	0.02	0.09	0.07
35	0.13	0.12	0.06	0.03	0.13	0.12
40	0.19	0.17	0.07	0.05	0.19	0.17
45	0.27	0.22	0.10	0.07	0.27	0.22
50	0.39	0.27	0.17	0.11	0.39	0.27
55	0.56	0.38	0.28	0.18	0.56	0.38
60	0.78	0.58	0.49	0.27	0.78	0.58
65	1.12	0.85	0.88	0.39	1.12	0.85
70	1.67	1.31	1.43	0.64	1.67	1.31
75	2.66	2.16	2.39	1.11	2.66	2.16
80	4.49	3.69	4.06	1.95	4.49	3.69
85	7.87	6.60	7.99	5.15	7.87	6.60
90	13.83	11.75	14.57	11.33	13.83	11.75

* *Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. If the rates were not adjusted as described, we would not expect the valuation results to be materially different.*

	Withdrawal Rates		Disability Retirement Rates	
Age	**Male**	**Female**	**Male**	**Female**
20	14.70%	14.20%	0.04%	0.04%
25	14.70%	14.20%	0.06%	0.06%
30	9.10%	11.40%	0.10%	0.08%
35	6.00%	8.60%	0.18%	0.11%
40	4.40%	6.90%	0.23%	0.18%
45	3.40%	4.30%	0.34%	0.39%
50	2.40%	3.10%	0.55%	0.70%
55	1.40%	2.20%	0.88%	1.18%
60	0.10%	0.20%	1.41%	2.41%
65	0.00%	0.00%	1.67%	2.67%

Summary of Actuarial Assumptions (Concluded)

Age	Retirement Rate
50	3%
51	2
52	2
53	2
54	5
55	20
56	8
57	8
58	8
59	8
60	15
61	15
62	30
63	30
64	30
65	40
66	40
67	40
68	40
69	40
70+	100

Salary Scale	
Age	Increase
20	8.50%
25	7.25
30	6.25
35	5.75
40	5.25
45	4.50
50	4.50
55	4.25
60	3.75
65	3.50
70+	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 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. 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 calculation, the expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 3.62%; and **the resulting single discount rate is 7.50%**.

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 (SDR). 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)

	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
2018	$ 205,077	$ -	$ 205,077				
2019	$ 217,805	$ -	$ 217,805	$ 12,698	$ 19,058	$ -	$ 31,756
2020	$ 205,713	$ 19,171	$ 224,884	$ 11,993	$ 18,000	$ 94	$ 30,087
2021	$ 196,696	$ 35,496	$ 232,192	$ 11,467	$ 17,211	$ 174	$ 28,852
2022	$ 189,322	$ 50,417	$ 239,739	$ 11,037	$ 16,566	$ 247	$ 27,850
2023	$ 182,584	$ 64,946	$ 247,530	$ 10,645	$ 15,976	$ 318	$ 26,939
2024	$ 176,130	$ 79,445	$ 255,575	$ 10,268	$ 15,411	$ 389	$ 26,068
2025	$ 169,686	$ 94,195	$ 263,881	$ 9,893	$ 14,848	$ 462	$ 25,203
2026	$ 163,502	$ 108,955	$ 272,457	$ 9,532	$ 14,306	$ 534	$ 24,372
2027	$ 157,486	$ 123,826	$ 281,312	$ 9,181	$ 13,780	$ 607	$ 23,568
2028	$ 151,546	$ 138,909	$ 290,455	$ 8,835	$ 13,260	$ 681	$ 22,776
2029	$ 145,779	$ 154,115	$ 299,894	$ 8,499	$ 12,756	$ 755	$ 22,010
2030	$ 140,114	$ 169,527	$ 309,641	$ 8,169	$ 12,260	$ 831	$ 21,260
2031	$ 134,372	$ 185,332	$ 319,704	$ 7,834	$ 11,758	$ 908	$ 20,500
2032	$ 128,528	$ 201,567	$ 330,095	$ 7,493	$ 11,246	$ 988	$ 19,727
2033	$ 122,676	$ 218,147	$ 340,823	$ 7,152	$ 10,734	$ 1,069	$ 18,955
2034	$ 116,865	$ 235,034	$ 351,899	$ 6,813	$ 10,226	$ 1,152	$ 18,191
2035	$ 111,116	$ 252,220	$ 363,336	$ 6,478	$ 9,723	$ 1,236	$ 17,437
2036	$ 105,430	$ 269,715	$ 375,145	$ 6,147	$ 9,225	$ 1,322	$ 16,694
2037	$ 99,771	$ 287,566	$ 387,337	$ 5,817	$ 8,730	$ 1,409	$ 15,956
2038	$ 94,106	$ 305,819	$ 399,925	$ 5,486	$ 8,234	$ 1,499	$ 15,219
2039	$ 88,382	$ 324,541	$ 412,923	$ 5,153	$ 7,733	$ 1,590	$ 14,476
2040	$ 82,607	$ 343,736	$ 426,343	$ 4,816	$ 7,228	$ 1,684	$ 13,728
2041	$ 76,907	$ 363,292	$ 440,199	$ 4,484	$ 6,729	$ 1,780	$ 12,993
2042	$ 71,296	$ 383,209	$ 454,505	$ 4,157	$ 6,238	$ 1,878	$ 12,273
2043	$ 65,727	$ 403,550	$ 469,277	$ 3,832	$ 5,751	$ 1,977	$ 11,560
2044	$ 60,140	$ 424,388	$ 484,528	$ 3,506	$ 5,262	$ 2,080	$ 10,848
2045	$ 54,546	$ 445,729	$ 500,275	$ 3,180	$ 4,773	$ 2,184	$ 10,137
2046	$ 48,972	$ 467,562	$ 516,534	$ 2,855	$ 4,285	$ 2,291	$ 9,431
2047	$ 43,405	$ 489,917	$ 533,322	$ 2,531	$ 3,798	$ 2,401	$ 8,730
2048	$ 38,012	$ 512,643	$ 550,655	$ 2,216	$ 3,326	$ 2,512	$ 8,054
2049	$ 32,930	$ 535,621	$ 568,551	$ 1,920	$ 2,881	$ 2,625	$ 7,426
2050	$ 28,159	$ 558,870	$ 587,029	$ 1,642	$ 2,464	$ 2,738	$ 6,844
2051	$ 23,742	$ 582,365	$ 606,107	$ 1,384	$ 2,077	$ 2,854	$ 6,315
2052	$ 19,712	$ 606,094	$ 625,806	$ 1,149	$ 1,725	$ 2,970	$ 5,844
2053	$ 16,042	$ 630,103	$ 646,145	$ 935	$ 1,404	$ 3,088	$ 5,427
2054	$ 12,726	$ 654,418	$ 667,144	$ 742	$ 1,113	$ 3,207	$ 5,062
2055	$ 9,787	$ 679,039	$ 688,826	$ 571	$ 856	$ 3,327	$ 4,754
2056	$ 7,286	$ 703,927	$ 711,213	$ 425	$ 637	$ 3,449	$ 4,511
2057	$ 5,230	$ 729,098	$ 734,328	$ 305	$ 458	$ 3,573	$ 4,336
2058	$ 3,604	$ 754,589	$ 758,193	$ 210	$ 315	$ 3,697	$ 4,222
2059	$ 2,394	$ 780,441	$ 782,835	$ 140	$ 209	$ 3,824	$ 4,173
2060	$ 1,528	$ 806,749	$ 808,277	$ 89	$ 134	$ 3,953	$ 4,176
2061	$ 935	$ 833,611	$ 834,546	$ 55	$ 82	$ 4,085	$ 4,222
2062	$ 546	$ 861,122	$ 861,668	$ 32	$ 48	$ 4,219	$ 4,299
2063	$ 302	$ 889,371	$ 889,673	$ 18	$ 26	$ 4,358	$ 4,402
2064	$ 157	$ 918,430	$ 918,587	$ 9	$ 14	$ 4,500	$ 4,523
2065	$ 75	$ 948,366	$ 948,441	$ 4	$ 7	$ 4,647	$ 4,658
2066	$ 31	$ 979,235	$ 979,266	$ 2	$ 3	$ 4,798	$ 4,803
2067	$ 11	$ 1,011,081	$ 1,011,092	$ 1	$ 1	$ 4,954	$ 4,956
2068	$ 3	$ 1,043,949	$ 1,043,952	$ -	$ -	$ 5,115	$ 5,115

**Contributions related to future employees in excess of normal cost and expenses of 14.09% of pay.*

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

	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
2069	$ 1	$ 1,077,880	$ 1,077,881	$ -	$ -	$ 5,282	$ 5,282
2070	$ -	$ 1,112,912	$ 1,112,912	$ -	$ -	$ 5,453	$ 5,453
2071	$ -	$ 1,149,081	$ 1,149,081	$ -	$ -	$ 5,630	$ 5,630
2072	$ -	$ 1,186,426	$ 1,186,426	$ -	$ -	$ 5,813	$ 5,813
2073	$ -	$ 1,224,985	$ 1,224,985	$ -	$ -	$ 6,002	$ 6,002
2074	$ -	$ 1,264,797	$ 1,264,797	$ -	$ -	$ 6,198	$ 6,198
2075	$ -	$ 1,305,903	$ 1,305,903	$ -	$ -	$ 6,399	$ 6,399
2076	$ -	$ 1,348,345	$ 1,348,345	$ -	$ -	$ 6,607	$ 6,607
2077	$ -	$ 1,392,166	$ 1,392,166	$ -	$ -	$ 6,822	$ 6,822
2078	$ -	$ 1,437,412	$ 1,437,412	$ -	$ -	$ 7,043	$ 7,043
2079	$ -	$ 1,484,128	$ 1,484,128	$ -	$ -	$ 7,272	$ 7,272
2080	$ -	$ 1,532,362	$ 1,532,362	$ -	$ -	$ 7,509	$ 7,509
2081	$ -	$ 1,582,164	$ 1,582,164	$ -	$ -	$ 7,753	$ 7,753
2082	$ -	$ 1,633,584	$ 1,633,584	$ -	$ -	$ 8,005	$ 8,005
2083	$ -	$ 1,686,675	$ 1,686,675	$ -	$ -	$ 8,265	$ 8,265
2084	$ -	$ 1,741,492	$ 1,741,492	$ -	$ -	$ 8,533	$ 8,533
2085	$ -	$ 1,798,091	$ 1,798,091	$ -	$ -	$ 8,811	$ 8,811
2086	$ -	$ 1,856,529	$ 1,856,529	$ -	$ -	$ 9,097	$ 9,097
2087	$ -	$ 1,916,866	$ 1,916,866	$ -	$ -	$ 9,393	$ 9,393
2088	$ -	$ 1,979,164	$ 1,979,164	$ -	$ -	$ 9,698	$ 9,698
2089	$ -	$ 2,043,487	$ 2,043,487	$ -	$ -	$ 10,013	$ 10,013
2090	$ -	$ 2,109,900	$ 2,109,900	$ -	$ -	$ 10,339	$ 10,339
2091	$ -	$ 2,178,472	$ 2,178,472	$ -	$ -	$ 10,675	$ 10,675
2092	$ -	$ 2,249,272	$ 2,249,272	$ -	$ -	$ 11,021	$ 11,021
2093	$ -	$ 2,322,374	$ 2,322,374	$ -	$ -	$ 11,380	$ 11,380
2094	$ -	$ 2,397,851	$ 2,397,851	$ -	$ -	$ 11,749	$ 11,749
2095	$ -	$ 2,475,781	$ 2,475,781	$ -	$ -	$ 12,131	$ 12,131
2096	$ -	$ 2,556,244	$ 2,556,244	$ -	$ -	$ 12,526	$ 12,526
2097	$ -	$ 2,639,322	$ 2,639,322	$ -	$ -	$ 12,933	$ 12,933
2098	$ -	$ 2,725,100	$ 2,725,100	$ -	$ -	$ 13,353	$ 13,353
2099	$ -	$ 2,813,665	$ 2,813,665	$ -	$ -	$ 13,787	$ 13,787
2100	$ -	$ 2,905,110	$ 2,905,110	$ -	$ -	$ 14,235	$ 14,235
2101	$ -	$ 2,999,526	$ 2,999,526	$ -	$ -	$ 14,698	$ 14,698
2102	$ -	$ 3,097,010	$ 3,097,010	$ -	$ -	$ 15,175	$ 15,175
2103	$ -	$ 3,197,663	$ 3,197,663	$ -	$ -	$ 15,669	$ 15,669
2104	$ -	$ 3,301,587	$ 3,301,587	$ -	$ -	$ 16,178	$ 16,178
2105	$ -	$ 3,408,889	$ 3,408,889	$ -	$ -	$ 16,704	$ 16,704
2106	$ -	$ 3,519,677	$ 3,519,677	$ -	$ -	$ 17,246	$ 17,246
2107	$ -	$ 3,634,067	$ 3,634,067	$ -	$ -	$ 17,807	$ 17,807
2108	$ -	$ 3,752,174	$ 3,752,174	$ -	$ -	$ 18,386	$ 18,386
2109	$ -	$ 3,874,120	$ 3,874,120	$ -	$ -	$ 18,983	$ 18,983
2110	$ -	$ 4,000,029	$ 4,000,029	$ -	$ -	$ 19,600	$ 19,600
2111	$ -	$ 4,130,030	$ 4,130,030	$ -	$ -	$ 20,237	$ 20,237
2112	$ -	$ 4,264,256	$ 4,264,256	$ -	$ -	$ 20,895	$ 20,895
2113	$ -	$ 4,402,844	$ 4,402,844	$ -	$ -	$ 21,574	$ 21,574
2114	$ -	$ 4,545,936	$ 4,545,936	$ -	$ -	$ 22,275	$ 22,275
2115	$ -	$ 4,693,679	$ 4,693,679	$ -	$ -	$ 22,999	$ 22,999
2116	$ -	$ 4,846,224	$ 4,846,224	$ -	$ -	$ 23,746	$ 23,746
2117	$ -	$ 5,003,726	$ 5,003,726	$ -	$ -	$ 24,518	$ 24,518
2118	$ -	$ 5,166,347	$ 5,166,347	$ -	$ -	$ 25,315	$ 25,315

**Contributions related to future employees in excess of normal cost and expenses of 14.09% of pay.*

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

Fiscal Year Ending	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2019	$ 680,395	$ 31,756	$ 18,799	$ 327	$ 51,495	$ 744,520
2020	$ 744,520	$ 30,087	$ 21,338	$ 309	$ 56,150	$ 809,110
2021	$ 809,110	$ 28,852	$ 23,944	$ 295	$ 60,853	$ 874,576
2022	$ 874,576	$ 27,850	$ 26,694	$ 284	$ 65,625	$ 941,073
2023	$ 941,073	$ 26,939	$ 29,689	$ 274	$ 70,469	$ 1,008,518
2024	$ 1,008,518	$ 26,068	$ 33,053	$ 264	$ 75,372	$ 1,076,641
2025	$ 1,076,641	$ 25,203	$ 36,795	$ 255	$ 80,312	$ 1,145,106
2026	$ 1,145,106	$ 24,372	$ 41,017	$ 245	$ 85,261	$ 1,213,477
2027	$ 1,213,477	$ 23,568	$ 45,278	$ 236	$ 90,203	$ 1,281,734
2028	$ 1,281,734	$ 22,776	$ 49,646	$ 227	$ 95,132	$ 1,349,769
2029	$ 1,349,769	$ 22,010	$ 54,332	$ 219	$ 100,034	$ 1,417,262
2030	$ 1,417,262	$ 21,260	$ 59,131	$ 210	$ 104,892	$ 1,484,073
2031	$ 1,484,073	$ 20,500	$ 64,231	$ 202	$ 109,688	$ 1,549,828
2032	$ 1,549,828	$ 19,727	$ 69,457	$ 193	$ 114,399	$ 1,614,304
2033	$ 1,614,304	$ 18,955	$ 75,071	$ 184	$ 119,000	$ 1,677,004
2034	$ 1,677,004	$ 18,191	$ 80,782	$ 175	$ 123,464	$ 1,737,702
2035	$ 1,737,702	$ 17,437	$ 86,445	$ 167	$ 127,780	$ 1,796,307
2036	$ 1,796,307	$ 16,694	$ 92,300	$ 158	$ 131,933	$ 1,852,476
2037	$ 1,852,476	$ 15,956	$ 98,292	$ 150	$ 135,898	$ 1,905,888
2038	$ 1,905,888	$ 15,219	$ 104,263	$ 141	$ 139,657	$ 1,956,360
2039	$ 1,956,360	$ 14,476	$ 110,261	$ 133	$ 143,195	$ 2,003,637
2040	$ 2,003,637	$ 13,728	$ 116,191	$ 124	$ 146,495	$ 2,047,545
2041	$ 2,047,545	$ 12,993	$ 122,108	$ 115	$ 149,544	$ 2,087,859
2042	$ 2,087,859	$ 12,273	$ 127,715	$ 107	$ 152,335	$ 2,124,645
2043	$ 2,124,645	$ 11,560	$ 133,095	$ 99	$ 154,869	$ 2,157,880
2044	$ 2,157,880	$ 10,848	$ 138,434	$ 90	$ 157,140	$ 2,187,344
2045	$ 2,187,344	$ 10,137	$ 143,736	$ 82	$ 159,128	$ 2,212,791
2046	$ 2,212,791	$ 9,431	$ 148,911	$ 73	$ 160,821	$ 2,234,059
2047	$ 2,234,059	$ 8,730	$ 154,057	$ 65	$ 162,201	$ 2,250,868
2048	$ 2,250,868	$ 8,054	$ 158,850	$ 57	$ 163,260	$ 2,263,275
2049	$ 2,263,275	$ 7,426	$ 163,096	$ 49	$ 164,012	$ 2,271,568
2050	$ 2,271,568	$ 6,844	$ 166,836	$ 42	$ 164,475	$ 2,276,009
2051	$ 2,276,009	$ 6,315	$ 169,952	$ 36	$ 164,674	$ 2,277,010
2052	$ 2,277,010	$ 5,844	$ 172,360	$ 30	$ 164,643	$ 2,275,107
2053	$ 2,275,107	$ 5,427	$ 174,182	$ 24	$ 164,418	$ 2,270,746
2054	$ 2,270,746	$ 5,062	$ 175,462	$ 19	$ 164,030	$ 2,264,357
2055	$ 2,264,357	$ 4,754	$ 176,213	$ 15	$ 163,512	$ 2,256,395
2056	$ 2,256,395	$ 4,511	$ 176,420	$ 11	$ 162,899	$ 2,247,374
2057	$ 2,247,374	$ 4,336	$ 176,088	$ 8	$ 162,228	$ 2,237,842
2058	$ 2,237,842	$ 4,222	$ 175,216	$ 5	$ 161,542	$ 2,228,385
2059	$ 2,228,385	$ 4,173	$ 173,805	$ 4	$ 160,882	$ 2,219,631
2060	$ 2,219,631	$ 4,176	$ 171,893	$ 2	$ 160,297	$ 2,212,209
2061	$ 2,212,209	$ 4,222	$ 169,523	$ 1	$ 159,829	$ 2,206,736
2062	$ 2,206,736	$ 4,299	$ 166,740	$ 1	$ 159,524	$ 2,203,818
2063	$ 2,203,818	$ 4,402	$ 163,584	$ -	$ 159,425	$ 2,204,061
2064	$ 2,204,061	$ 4,523	$ 160,089	$ -	$ 159,576	$ 2,208,071
2065	$ 2,208,071	$ 4,658	$ 156,288	$ -	$ 160,022	$ 2,216,463
2066	$ 2,216,463	$ 4,803	$ 152,207	$ -	$ 160,807	$ 2,229,866
2067	$ 2,229,866	$ 4,956	$ 147,864	$ -	$ 161,978	$ 2,248,936
2068	$ 2,248,936	$ 5,115	$ 143,282	$ -	$ 163,582	$ 2,274,351

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 Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2069	$ 2,274,351	$ 5,282	$ 138,478	$ -	$ 165,672	$ 2,306,827
2070	$ 2,306,827	$ 5,453	$ 133,470	$ -	$ 168,298	$ 2,347,108
2071	$ 2,347,108	$ 5,630	$ 128,275	$ -	$ 171,517	$ 2,395,980
2072	$ 2,395,980	$ 5,813	$ 122,912	$ -	$ 175,386	$ 2,454,267
2073	$ 2,454,267	$ 6,002	$ 117,402	$ -	$ 179,968	$ 2,522,835
2074	$ 2,522,835	$ 6,198	$ 111,766	$ -	$ 185,325	$ 2,602,592
2075	$ 2,602,592	$ 6,399	$ 106,025	$ -	$ 191,526	$ 2,694,492
2076	$ 2,694,492	$ 6,607	$ 100,204	$ -	$ 198,640	$ 2,799,535
2077	$ 2,799,535	$ 6,822	$ 94,328	$ -	$ 206,743	$ 2,918,772
2078	$ 2,918,772	$ 7,043	$ 88,424	$ -	$ 215,911	$ 3,053,302
2079	$ 3,053,302	$ 7,272	$ 82,517	$ -	$ 226,227	$ 3,204,284
2080	$ 3,204,284	$ 7,509	$ 76,635	$ -	$ 237,776	$ 3,372,934
2081	$ 3,372,934	$ 7,753	$ 70,807	$ -	$ 250,648	$ 3,560,528
2082	$ 3,560,528	$ 8,005	$ 65,062	$ -	$ 264,938	$ 3,768,409
2083	$ 3,768,409	$ 8,265	$ 59,430	$ -	$ 280,746	$ 3,997,990
2084	$ 3,997,990	$ 8,533	$ 53,944	$ -	$ 298,177	$ 4,250,756
2085	$ 4,250,756	$ 8,811	$ 48,635	$ -	$ 317,340	$ 4,528,272
2086	$ 4,528,272	$ 9,097	$ 43,535	$ -	$ 338,352	$ 4,832,186
2087	$ 4,832,186	$ 9,393	$ 38,671	$ -	$ 361,335	$ 5,164,243
2088	$ 5,164,243	$ 9,698	$ 34,070	$ -	$ 386,420	$ 5,526,291
2089	$ 5,526,291	$ 10,013	$ 29,751	$ -	$ 413,745	$ 5,920,298
2090	$ 5,920,298	$ 10,339	$ 25,733	$ -	$ 443,455	$ 6,348,359
2091	$ 6,348,359	$ 10,675	$ 22,029	$ -	$ 475,708	$ 6,812,713
2092	$ 6,812,713	$ 11,021	$ 18,648	$ -	$ 510,672	$ 7,315,758
2093	$ 7,315,758	$ 11,380	$ 15,597	$ -	$ 548,526	$ 7,860,067
2094	$ 7,860,067	$ 11,749	$ 12,876	$ -	$ 589,463	$ 8,448,403
2095	$ 8,448,403	$ 12,131	$ 10,483	$ -	$ 633,691	$ 9,083,742
2096	$ 9,083,742	$ 12,526	$ 8,408	$ -	$ 681,432	$ 9,769,292
2097	$ 9,769,292	$ 12,933	$ 6,638	$ -	$ 732,928	$ 10,508,515
2098	$ 10,508,515	$ 13,353	$ 5,153	$ -	$ 788,440	$ 11,305,155
2099	$ 11,305,155	$ 13,787	$ 3,930	$ -	$ 848,249	$ 12,163,261
2100	$ 12,163,261	$ 14,235	$ 2,943	$ -	$ 912,660	$ 13,087,213
2101	$ 13,087,213	$ 14,698	$ 2,161	$ -	$ 982,002	$ 14,081,752
2102	$ 14,081,752	$ 15,175	$ 1,556	$ -	$ 1,056,632	$ 15,152,003
2103	$ 15,152,003	$ 15,669	$ 1,098	$ -	$ 1,136,936	$ 16,303,510
2104	$ 16,303,510	$ 16,178	$ 759	$ -	$ 1,223,330	$ 17,542,259
2105	$ 17,542,259	$ 16,704	$ 515	$ -	$ 1,316,265	$ 18,874,713
2106	$ 18,874,713	$ 17,246	$ 343	$ -	$ 1,416,225	$ 20,307,841
2107	$ 20,307,841	$ 17,807	$ 225	$ -	$ 1,523,735	$ 21,849,158
2108	$ 21,849,158	$ 18,386	$ 145	$ -	$ 1,639,358	$ 23,506,757
2109	$ 23,506,757	$ 18,983	$ 93	$ -	$ 1,763,702	$ 25,289,349
2110	$ 25,289,349	$ 19,600	$ 60	$ -	$ 1,897,420	$ 27,206,309
2111	$ 27,206,309	$ 20,237	$ 39	$ -	$ 2,041,216	$ 29,267,723
2112	$ 29,267,723	$ 20,895	$ 25	$ -	$ 2,195,847	$ 31,484,440
2113	$ 31,484,440	$ 21,574	$ 17	$ -	$ 2,362,126	$ 33,868,123
2114	$ 33,868,123	$ 22,275	$ 11	$ -	$ 2,540,929	$ 36,431,316
2115	$ 36,431,316	$ 22,999	$ 8	$ -	$ 2,733,195	$ 39,187,502
2116	$ 39,187,502	$ 23,746	$ 6	$ -	$ 2,939,936	$ 42,151,178
2117	$ 42,151,178	$ 24,518	$ 4	$ -	$ 3,162,241	$ 45,337,933
2118	$ 45,337,933	$ 25,315	$ 3	$ -	$ 3,401,277	$ 48,764,522

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 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)
2019	$ 680,395	$ 18,799	$ 18,799	$ 0	$ 18,131	$ 0	$ 18,131
2020	744,520	21,338	21,338	0	19,145	0	19,145
2021	809,110	23,944	23,944	0	19,983	0	19,983
2022	874,576	26,694	26,694	0	20,724	0	20,724
2023	941,074	29,689	29,689	0	21,442	0	21,442
2024	1,008,519	33,053	33,053	0	22,206	0	22,206
2025	1,076,643	36,795	36,795	0	22,995	0	22,995
2026	1,145,107	41,017	41,017	0	23,845	0	23,845
2027	1,213,478	45,278	45,278	0	24,486	0	24,486
2028	1,281,734	49,646	49,646	0	24,975	0	24,975
2029	1,349,769	54,332	54,332	0	25,426	0	25,426
2030	1,417,262	59,131	59,131	0	25,740	0	25,740
2031	1,484,073	64,231	64,231	0	26,010	0	26,010
2032	1,549,828	69,457	69,457	0	26,164	0	26,164
2033	1,614,304	75,071	75,071	0	26,306	0	26,306
2034	1,677,003	80,782	80,782	0	26,332	0	26,332
2035	1,737,700	86,445	86,445	0	26,212	0	26,212
2036	1,796,305	92,300	92,300	0	26,035	0	26,035
2037	1,852,474	98,292	98,292	0	25,791	0	25,791
2038	1,905,886	104,263	104,263	0	25,449	0	25,449
2039	1,956,358	110,261	110,261	0	25,035	0	25,035
2040	2,003,636	116,191	116,191	0	24,541	0	24,541
2041	2,047,545	122,108	122,108	0	23,991	0	23,991
2042	2,087,858	127,715	127,715	0	23,342	0	23,342
2043	2,124,643	133,095	133,095	0	22,628	0	22,628
2044	2,157,879	138,434	138,434	0	21,894	0	21,894
2045	2,187,343	143,736	143,736	0	21,147	0	21,147
2046	2,212,790	148,911	148,911	0	20,379	0	20,379
2047	2,234,058	154,057	154,057	0	19,613	0	19,613
2048	2,250,866	158,850	158,850	0	18,812	0	18,812
2049	2,263,273	163,096	163,096	0	17,967	0	17,967
2050	2,271,565	166,836	166,836	0	17,097	0	17,097
2051	2,276,006	169,952	169,952	0	16,201	0	16,201
2052	2,277,006	172,360	172,360	0	15,285	0	15,285
2053	2,275,103	174,182	174,182	0	14,368	0	14,368
2054	2,270,742	175,462	175,462	0	13,464	0	13,464
2055	2,264,353	176,213	176,213	0	12,579	0	12,579
2056	2,256,392	176,420	176,420	0	11,715	0	11,715
2057	2,247,372	176,088	176,088	0	10,877	0	10,877
2058	2,237,840	175,216	175,216	0	10,068	0	10,068
2059	2,228,384	173,805	173,805	0	9,290	0	9,290
2060	2,219,631	171,893	171,893	0	8,547	0	8,547
2061	2,212,209	169,523	169,523	0	7,841	0	7,841
2062	2,206,734	166,740	166,740	0	7,174	0	7,174
2063	2,203,816	163,584	163,584	0	6,547	0	6,547
2064	2,204,059	160,089	160,089	0	5,960	0	5,960
2065	2,208,069	156,288	156,288	0	5,413	0	5,413
2066	2,216,460	152,207	152,207	0	4,904	0	4,904
2067	2,229,863	147,864	147,864	0	4,432	0	4,432
2068	2,248,932	143,282	143,282	0	3,995	0	3,995

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

Fiscal Year Ending	Projected Beginning Plan 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)
2069	$ 2,274,348	$ 138,478	$ 138,478	$ 0	$ 3,591	$ 0	$ 3,591
2070	2,306,823	133,470	133,470	0	3,220	0	3,220
2071	2,347,105	128,275	128,275	0	2,879	0	2,879
2072	2,395,977	122,912	122,912	0	2,566	0	2,566
2073	2,454,265	117,402	117,402	0	2,280	0	2,280
2074	2,522,833	111,766	111,766	0	2,019	0	2,019
2075	2,602,590	106,025	106,025	0	1,782	0	1,782
2076	2,694,490	100,204	100,204	0	1,566	0	1,566
2077	2,799,533	94,328	94,328	0	1,372	0	1,372
2078	2,918,769	88,424	88,424	0	1,196	0	1,196
2079	3,053,299	82,517	82,517	0	1,038	0	1,038
2080	3,204,281	76,635	76,635	0	897	0	897
2081	3,372,930	70,807	70,807	0	771	0	771
2082	3,560,524	65,062	65,062	0	659	0	659
2083	3,768,404	59,430	59,430	0	560	0	560
2084	3,997,985	53,944	53,944	0	473	0	473
2085	4,250,751	48,635	48,635	0	397	0	397
2086	4,528,266	43,535	43,535	0	330	0	330
2087	4,832,180	38,671	38,671	0	273	0	273
2088	5,164,237	34,070	34,070	0	224	0	224
2089	5,526,286	29,751	29,751	0	182	0	182
2090	5,920,292	25,733	25,733	0	146	0	146
2091	6,348,353	22,029	22,029	0	116	0	116
2092	6,812,707	18,648	18,648	0	92	0	92
2093	7,315,753	15,597	15,597	0	71	0	71
2094	7,860,062	12,876	12,876	0	55	0	55
2095	8,448,398	10,483	10,483	0	41	0	41
2096	9,083,737	8,408	8,408	0	31	0	31
2097	9,769,286	6,638	6,638	0	23	0	23
2098	10,508,509	5,153	5,153	0	16	0	16
2099	11,305,149	3,930	3,930	0	12	0	12
2100	12,163,254	2,943	2,943	0	8	0	8
2101	13,087,207	2,161	2,161	0	6	0	6
2102	14,081,745	1,556	1,556	0	4	0	4
2103	15,151,997	1,098	1,098	0	2	0	2
2104	16,303,503	759	759	0	2	0	2
2105	17,542,252	515	515	0	1	0	1
2106	18,874,706	343	343	0	1	0	1
2107	20,307,835	225	225	0	0	0	0
2108	21,849,152	145	145	0	0	0	0
2109	23,506,751	93	93	0	0	0	0
2110	25,289,342	60	60	0	0	0	0
2111	27,206,303	39	39	0	0	0	0
2112	29,267,718	25	25	0	0	0	0
2113	31,484,435	17	17	0	0	0	0
2114	33,868,118	11	11	0	0	0	0
2115	36,431,310	8	8	0	0	0	0
2116	39,187,496	6	6	0	0	0	0
2117	42,151,173	4	4	0	0	0	0
2118	45,337,928	3	3	0	0	0	0
				Totals	$ 931,405	$ 0	$ 931,405

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 (meets the statutory salary definition) and does not include pay above any pay cap.
Deferred Inflows and Outflows of Resources	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
Discount Rate or Single Discount Rate	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: 1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and 2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
Entry Age Actuarial Cost Method or Entry Age Normal (EAN)	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit 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

GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Fiduciary Net Position	The fiduciary net position is the value of the assets of the trust.
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 contribution entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contribution Entities	Non-employer contribution 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 contribution 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 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 in 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 pension liability of the plan. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.