GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

PUBLIC EMPLOYEES RETIREMENT ASSOCIATION OF MINNESOTA
GENERAL EMPLOYEES RETIREMENT PLAN
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2016

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December 9, 2016

Public Employees Retirement Association of Minnesota
Trustees of the General Employees Retirement Plan
St. Paul, Minnesota

Dear Trustees of the General Employees Retirement Plan:

The results of the July 1, 2016 annual actuarial valuation of the General Employees Retirement Plan are presented in this report. This report was prepared at the request of the Board and is intended for use by the Board and staff and those designated or approved by the Board. This report may be provided to parties other than the Plan only in its entirety. GRS is not responsible for the consequences of any unauthorized use of this report.

The purpose of the valuation is to measure the Plan's funding progress and to determine the required contribution rate for the fiscal year beginning July 1, 2016. Note that we have not attempted to quantify the impact of GASB Statements No. 67 and No. 68 in this report.

The required contribution rate shown on page one was designed to comply with Minnesota Statutes. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in the Actuarial Basis of this report. This report includes risk metrics on page five, but does not include a more robust assessment of the risks of future experience differing materially from the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

The valuation was based upon information furnished by the Public Employees Retirement Association of Minnesota (PERA), concerning benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by PERA.

Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Trustees. These parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis of this report. PERA is solely responsible for communicating to GRS any changes required thereto.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

This report should not be relied on for any purpose other than the purpose described herein. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

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

Brian B. Murphy and Bonita J. Wurst are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. In addition, Mr. Murphy meets the requirements of "approved actuary" under Minnesota Statutes Section 356.215, Subdivision 1, Paragraph (c).

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge and belief the information contained in this report is accurate and fairly presents the actuarial position of the General Employees Retirement Plan as of the valuation date and was performed in accordance with the requirements of Minnesota Statutes Section 356.215, and the requirements of the Standards for Actuarial Work established by the LCPR. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

We are available to answer any questions or provide further details.

Respectfully submitted,

Brian B. Murphy   Bonita J. Wurst

Brian B. Murphy, FSA, EA, FCA, MAAA   Bonita J. Wurst, ASA, EA, FCA, MAAA

BBM/BJW:mrb

Other Observations

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

Given the plan's contribution allocation procedure, if there are no changes in benefits or contributions and all actuarial assumptions are met (including the assumption of the plan earning 8.00% on the actuarial value of assets), it is expected that:

(1) The unfunded actuarial accrued liabilities will be fully amortized after 25 years, and
(2) The funded status of the plan will increase gradually towards a 100% funded ratio.
(3) The unfunded liability will grow initially as a dollar amount before beginning to decline.

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 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 market value of assets were used instead of the actuarial value of assets.

Limitations 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.

Other Observations

Discount Rate Assumption

In a 2015 analysis of long-term rate of investment return and inflation assumptions, GRS suggested that an investment return assumption in the range of 7.00% to 8.00% would be reasonable. The current assumed rate, which is mandated by Minnesota Statutes, is 8.00% and is at the upper end of the reasonable range. This report also concluded that the probability of exceeding the current 8.00% assumption over 20 years is only 37%. Please see the report, *General Employees Retirement Fund 6-Year Experience Study*, dated June 30, 2015 for additional information.

Professional standards require GRS to evaluate this assumption each year. If an assumption is deemed unreasonable based on current information, we would have to qualify the work that we do for PERA.

In May 2016, the Minnesota State Board of Investment (SBI) affirmed that the 8.00% return rate is attainable in the long-term, while acknowledging short term challenges. Also in May 2016, the LCPR's Actuary supported the reasonableness of the current rate by reviewing historical returns by investment class, projected returns from other investment consultants, and considering the SBI's projections. GRS believes the 8.00% return rate is within the reasonable range for this valuation as of July 1, 2016, but cautions PERA that declining capital market and inflation expectations may result in 8.00% being deemed unreasonable for future valuations. In such an instance we would still comply with statutes and produce the valuation based upon 8.00%, but Actuarial Standards would require us to issue a "qualified" report.

If a discount rate of 7.50% were used in this valuation instead of 8.00%, we estimate that the unfunded liability would be approximately $1.3 billion higher than estimated herein. This estimate incorporates lower salary scale rates due to lower inflation expectations as well as a delay in the assumed payment of 2.50% postretirement benefit increases.

Contents

Summary of Valuation Results

Contributions

The following table summarizes important contribution information as described in the Development of Costs section.

Contributions	Actuarial Valuation as of July 1, 2016	Actuarial Valuation as of July 1, 2015
Statutory Contributions - Chapter 353 (% of Payroll)	14.62%	14.66%
Required Contributions - Chapter 356 (% of Payroll)	16.49%	15.89%
Sufficiency/(Deficiency)	(1.87)%	(1.23)%

The statutory contribution deficiency increased from (1.23)% of payroll to (1.87)% of payroll. The primary reasons for the increased contribution deficiency are the changes in assumptions described in the Effects of Changes section. On a market value of assets basis, contributions are deficient by 2.97% of payroll.

Based on the actuarial value of assets and scheduled contribution rates, statutory contributions are not sufficient to fully amortize the unfunded actuarial accrued liability over the statutory amortization period of 17 years. Based on current statutory contributions, the actuarial value of assets, and other methods and assumptions described in this report, the unfunded liability will be eliminated in approximately 25 years.

The Plan Assets section provides detail on the plan assets used for the valuation including a development of the Actuarial Value of Assets (AVA). The Market Value of Assets (MVA) earned approximately -0.2% for the plan year ending June 30, 2016. The AVA earned approximately 7.60% for the plan year ending June 30, 2016 as compared to the assumed rate of 8.00%. The assumed rate is mandated by Minnesota Statutes, and is at the very upper end of the reasonable range. According to the NASRA survey, the most common assumption for statewide plans is currently 7.50%. Use of a 7.50% return assumption would produce a deficiency greater than shown above.

Participant reconciliation and statistics are detailed in the Membership Data section. The Actuarial Basis section includes a summary of plan provisions and actuarial methods and assumptions used for the calculations in this report.

Accounting information prepared according to GASB Statements No. 67 and No. 68 will be provided in a separate report.

Summary of Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows. Any changes in Plan provisions, actuarial assumptions or valuation methods and procedures between the two valuations are described after the summary.

	Actuarial Valuation as of	
	July 1, 2016	**July 1, 2015**
Contributions (*% of Payroll*)		
Statutory - Chapter 353	14.62%	14.66%
Required - Chapter 356	16.49%	15.89%
Sufficiency/(Deficiency)	(1.87)%	(1.23)%
Funding Ratios (*dollars in thousands*)		
Accrued Benefit Funding Ratio		
- Current assets (AVA)	$ 18,765,863	$ 17,974,439
- Current benefit obligations	23,661,661	22,503,855
- Funding ratio	79.31%	79.87%
Accrued Liability Funding Ratio		
- Current assets (AVA)	$ 18,765,863	$ 17,974,439
- Market value of assets (MVA)	17,994,909	18,581,795
- Actuarial accrued liability	24,848,409	23,560,951
- Funding ratio (AVA)	75.52%	76.29%
- Funding ratio (MVA)	72.42%	78.87%
Projected Benefit Funding Ratio		
- Current and expected future assets	$ 26,825,926	$ 25,830,668
- Current and expected future benefit obligations	28,133,869	26,678,663
- Projected benefit funding ratio	95.35%	96.82%
Participant Data		
Active members		
- Number	148,745	145,650
- Annual valuation earnings *(000s)*	$ 5,620,479	$ 5,357,881
- Projected annual earnings *(000s)*	$ 5,906,821	$ 5,616,092
- Average projected annual earnings	$ 39,711	$ 38,559
- Average age	46.5	46.7
- Average service	10.1	10.4
Service retirements	81,911	78,372
Survivors	8,547	8,419
Disability retirements	3,830	3,801
Deferred retirements	52,516	51,605
Terminated other non-vested	132,416	125,366
Total	**427,965**	**413,213**

Summary of Valuation Results

Effects of Changes

The following changes in plan provisions, actuarial assumptions and methods were recognized as of July 1, 2016:

- Assumed increases in member salaries were changed.
- Assumed rates of retirement were reduced. In addition, distinct rates for reduced (Early) retirements were adopted for members hired prior to July 1, 1989, and members hired after June 30, 1989.
- Assumed rates of termination were increased.
- Assumed rates of disability were reduced.
- The percent married assumption for active male members was changed from 75% to 80%.
- The base mortality table for annuitants and employees was changed from RP-2000 to RP-2014, fully generational, white collar adjustments with age adjustments. The mortality improvement scale was changed from Scale AA to Scale MP-2015.
- Form of payment assumptions were modified.
- The assumed post-retirement benefit increase rate was changed from 1.00% per year through 2034 and 2.50% thereafter to 1.00% through 2052 and 2.50% thereafter.

Refer to the Actuarial Basis section of this report for a complete description of these changes.

The combined impact of the above changes was to increase the accrued liability by $416 million and increase the required contribution by 0.50% of pay, as follows:

	Before Assumption Changes	Reflecting Assumption Changes
Normal Cost Rate, % of Pay	7.7%	7.6%
Amortization of Unfunded Accrued Liability, % of Pay	8.1%	8.7%
Expenses (% of Pay)	0.2%	0.2%
Total Required Contribution, % of Pay	16.0%	16.5%
Accrued Liability Funding Ratio	76.8%	75.5%
Projected Benefit Funding Ratio	96.7%	95.4%
Unfunded Accrued Liability (in billions)	$5.7	$6.1

Summary of Valuation Results

Valuation of Future Post-Retirement Benefit Increases

Benefit recipients receive a future annual 1.00% post-retirement benefit increase. If the funding ratio reaches 90% (based on a 2.50% post-retirement benefit increase assumption) for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% 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 1.00%. Benefit increases already granted, however, will not be affected.

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

- Future investment returns of 8.00%;
- Open group; stable active population (new member profile based on average new members hired in recent years);
- The post-retirement benefit increase rate is assumed to be 1.00% per year until the funding ratio threshold required to pay a 2.50% post-retirement benefit increase is reached; and
- Current statutory contributions (i.e., not including potential contribution increases under the contribution stabilizer statutes).

Based on these assumptions and methods, the projection indicates that this plan is expected to attain the funding ratio threshold required to pay a 2.50% post-retirement benefit increase in the year 2052, and that the plan would begin paying 2.50% benefit increases on January 1, 2053. This assumption is reflected in our calculations.

Summary of Valuation Results

Risk Measures Summary *(Dollars in Thousands)*

Valuation Date (6/30)	(1) Accrued Liabilities (AAL)	(2) Market Value of Assets	(3) Market Value Unfunded AAL	(4) Valuation Payroll	(5) Market Value Funded Ratio (2)/(1)	(6) Retiree Liabilities	(7) RetLiab/ AAL (6)/(1)	(8) AAL/ Payroll (1)/(4)	(9) Assets/ Payroll (2)/(4)
2010	$17,180,956	$11,338,582	$5,842,374	$4,804,627	66.0%	$7,900,020	46.0%	357.6%	236.0%
2011	17,898,849	13,616,622	4,282,227	5,079,429	76.1%	8,315,059	46.5%	352.4%	268.1%
2012	18,598,897	13,577,653	5,021,244	5,142,592	73.0%	8,870,045	47.7%	361.7%	264.0%
2013	19,379,769	15,084,608	4,295,161	5,246,928	77.8%	9,351,606	48.3%	369.4%	287.5%
2014	21,282,504	17,404,822	3,877,682	5,351,920	81.8%	10,229,051	48.1%	397.7%	325.2%
2015	23,560,951	18,581,795	4,979,156	5,549,255	78.9%	12,092,665	51.3%	424.6%	334.9%
2016	24,848,409	17,994,909	6,853,500	5,773,708	72.4%	13,066,753	52.6%	430.4%	311.7%

Valuation Date (6/30)	(10) Portfolio Std Dev	(11) Std Dev % of Pay (9) x (10)	(12) Unfunded/ Payroll	(13) Non-Investment Cash Flow (NICF)	(14) NICF/ Assets (13)/(2)	(15) Market Rate of Return	(16) 5-Year Trailing Average
2010			121.6%	$(298,297)	-2.6%	15.7%	N/A
2011			84.3%	(329,963)	-2.4%	23.0%	N/A
2012			97.6%	(359,950)	-2.7%	2.3%	2.3%
2013			81.9%	(396,791)	-2.6%	14.2%	6.2%
2014			72.5%	(441,245)	-2.5%	18.5%	14.5%
2015	14.1%	47.2%	89.7%	(492,445)	-2.7%	4.4%	12.2%
2016	14.1%	43.9%	118.7%	(566,466)	-3.1%	-0.2%	7.6%

(5) The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

(6) and (7) The ratio of Retiree liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and the liquidity needs of the portfolio change. A ratio on the order of 50% indicates a maturing system.

(8) and (9) The ratios of liabilities and assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.

(10) and (11) The portfolio standard deviation measures the volatility of investment return. When multiplied by the ratio of assets to payroll it gives the effect of a one standard deviation asset move as a percent of payroll. This figure helps users understand the difficulty of dealing with investment volatility and the challenges volatility brings to sustainability.

(12) The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

(13) and (14) The ratio of Non-Investment Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.

(15) and (16) Investment return is probably the largest single risk that most systems face. The year by year return and the 5 year geometric average give an indicator of the realism of the systems assumed return. Of course, past performance is not a guarantee of future results.

Supplemental Information

The remainder of the report includes information supporting the results presented in the previous sections.

- **Plan assets** presents information about the Plan's assets as reported by the Public Employees Retirement Association of Minnesota. The assets represent the portion of total fund liabilities that has been funded.
- **Membership data** presents and describes the membership data used in the valuation.
- **Development of costs** shows the liabilities for Plan benefits and the derivation of the contribution amount.
- **Actuarial basis** describes the Plan provisions, as well as the methods and assumptions used to value the Plan. The valuation is based on the premise that the Plan is ongoing.
- **Additional schedules** shows the Schedule of Funding Progress and Schedule of Contributions.
- **Glossary** defines the terms used in this report.

Plan Assets

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

Assets in Trust	Market Value June 30, 2016		Market Value June 30, 2015	
Cash, equivalents, short term securities	$ 371,576		$ 355,041	
Fixed income	4,437,241		4,364,607	
Equity	10,849,195		11,528,261	
SBI Alternative	2,300,707		2,288,787	
Other	7,014		7,382	
Total Assets in Trust	**$ 17,965,733**		**$ 18,544,078**	
Assets Receivable	41,539	*	46,518	**
Amounts Payable	(12,363)		(8,801)	
Net Assets Held in Trust for Pension Benefits	**$ 17,994,909**		**$ 18,581,795**	

** Includes $31 million Employer Supplemental Contribution to be paid in July and December 2016.*
*** Includes $31 million Employer Supplemental Contribution paid September 2015.*

Plan Assets

Reconciliation of Plan Assets *(Dollars in Thousands)*

The following exhibits show the revenue, expenses and resulting assets of the Fund as reported by the Public Employees Retirement Association for the prior two fiscal years.

Change in Assets	**Market Value**	
Year Ending	**June 30, 2016**	**June 30, 2015**
1. Fund balance at market value at beginning of year	$ 18,581,795	$ 17,404,822
2. Contributions		
a. Member	375,291	353,765
b. Employer	459,978 *	435,115 **
c. Other sources	6,000	0
d. Total contributions	841,269	788,880
3. Investment income		
a. Investment income/(loss)	3,160	803,212
b. Investment expenses	(24,011)	(25,708)
c. Net subtotal	(20,851)	777,504
4. Other	431	278
5. Total income: *(2.d.) + (3.c.) + (4.)*	**$ 820,849**	**$ 1,566,662**
6. Benefits Paid		
a. Annuity benefits	(1,359,176)	(1,235,303)
b. Refunds	(37,209)	(35,655)
c. Total benefits paid	(1,396,385)	(1,270,958)
7. Expenses		
a. Other	0	0
b. Administrative	(11,350)	(10,367)
c. Total expenses	(11,350)	(10,367)
8. Total disbursements: *(6.c.) + (7.c.)*	**(1,407,735)**	**(1,281,325)**
9. Transfer between funds	**$ 0**	**$ 891,636**
10. Fund balance at market value at end of year	**$ 17,994,909**	**$ 18,581,795**
11. Approximate return on market value of assets	(0.2)%	4.4%

** Includes $31 million Employer Supplemental Contribution to be paid in July and December 2016.*
*** Includes $31 million Employer Supplemental Contribution paid September 2015.*

Plan Assets

Actuarial Asset Value *(Dollars in Thousands)*

		Original Amount	June 30, 2016	June 30, 2015
1.	Market value of assets available for benefits		$ 17,994,909	$ 18,581,795
2.	Determination of average balance			
	a. Total assets available at beginning of year		18,581,795	17,404,822
	b. Total assets available at end of year		17,994,909	18,581,795
	c. Net investment income for fiscal year		(20,851)	777,504
	d. Average balance *[a. + b. - c.] / 2*		18,298,777	17,604,557
3.	Expected return *[8.0% * 2.d.]*		1,463,902	1,408,365
4.	Actual return		(20,851)	777,504
5.	Current year asset gain/(loss) *[4. - 3.]*		(1,484,753)	(630,861)
6.	Unrecognized asset returns			
		Original Amount	**Unrecognized Amount**	
	a. Year ended June 30, 2016	$(1,484,753)	$ (1,187,802)	N/A
	b. Year ended June 30, 2015	(630,861)	(378,517)	$ (504,689)
	c. Year ended June 30, 2014	1,571,711	628,684	943,027
	d. Year ended June 30, 2013	833,405	166,681	333,362
	e. Year ended June 30, 2012	(821,722)	N/A	(164,344)
	f. Unrecognized return adjustment		(770,954)	607,356
7.	**Actuarial value at end of year** *(1. - 6.f.)*		**$ 18,765,863**	**$ 17,974,439**
8.	Approximate return on actuarial value of assets during fiscal year		7.6%	12.1%
9.	Ratio of actuarial value of assets to market value of assets		1.04	0.97

Membership Data

Distribution of Active Members (Total)

	Years of Service as of June 30, 2016									
Age	**<3***	**3 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35+**	**Total**
< 25	5,956	244	18							**6,218**
Avg. Earnings	15,277	23,346	25,357							**15,622**
25 - 29	8,804	2,173	964	18						**11,959**
Avg. Earnings	24,765	34,055	36,743	39,131						**27,440**
30 - 34	7,083	2,504	3,195	937	22					**13,741**
Avg. Earnings	28,321	40,491	44,650	48,290	42,411					**35,720**
35 - 39	5,986	2,222	3,215	2,452	835	8				**14,718**
Avg. Earnings	26,893	38,566	46,563	54,888	55,472	55,264				**39,253**
40 - 44	5,051	1,967	3,041	2,377	2,151	408	6			**15,001**
Avg. Earnings	24,842	33,877	39,839	53,256	61,365	58,021	51,563			**39,719**
45 - 49	4,390	2,011	3,779	3,018	2,717	1,650	537	17		**18,119**
Avg. Earnings	24,863	30,943	35,627	45,709	57,871	63,101	60,751	62,472		**40,786**
50 - 54	3,626	1,698	3,768	3,861	3,463	2,167	1,930	762	21	**21,296**
Avg. Earnings	24,224	30,798	33,569	38,194	47,204	58,693	64,946	62,700	53,291	**41,275**
55 - 59	3,199	1,406	3,045	3,579	4,235	2,975	2,482	1,674	845	**23,440**
Avg. Earnings	23,077	32,256	33,630	36,755	41,943	48,662	61,375	67,477	62,435	**42,388**
60 - 64	2,054	994	1,963	2,193	2,771	2,453	2,109	1,047	1,235	**16,819**
Avg. Earnings	20,915	26,593	34,108	38,467	40,581	44,091	53,153	63,329	67,007	**41,766**
65 - 69	1,074	450	839	660	724	570	457	219	284	**5,277**
Avg. Earnings	13,659	20,206	24,082	33,298	41,256	41,993	49,552	59,607	68,417	**33,140**
70+	570	247	447	362	208	107	84	46	86	**2,157**
Avg. Earnings	10,638	10,920	14,056	19,527	30,579	28,396	44,397	41,586	56,031	**19,459**
Total	**47,793**	**15,916**	**24,274**	**19,457**	**17,126**	**10,338**	**7,605**	**3,765**	**2,471**	**148,745**
Avg. Earnings	**23,656**	**33,395**	**37,338**	**43,043**	**48,246**	**51,782**	**59,051**	**64,560**	**65,107**	**37,786**

* *This exhibit does not reflect service earned in other PERA or Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.*

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is average valuation earnings for the fiscal year ending on the valuation date.

Membership Data

Distribution of Active Members (Basic)

	Years of Service as of June 30, 2016									
Age	**<3***	**3 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35+**	**Total**
< 25										
Avg. Earnings										
25 - 29										
Avg. Earnings										
30 - 34										
Avg. Earnings										
35 - 39										
Avg. Earnings										
40 - 44										
Avg. Earnings										
45 - 49										
Avg. Earnings										
50 - 54										
Avg. Earnings										
55 - 59										
Avg. Earnings										
60 - 64										
Avg. Earnings										
65 - 69									1	**1**
Avg. Earnings									86,824	**86,824**
70+									5	**5**
Avg. Earnings									62,300	**62,300**
Total									**6**	**6**
Avg. Earnings									**66,387**	**66,387**

* *This exhibit does not reflect service earned in other PERA or Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.*

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is average valuation earnings for the fiscal year ending on the valuation date.

Membership Data

Distribution of Active Members (Coordinated)

	Years of Service as of June 30, 2016									
Age	**<3***	**3 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35+**	**Total**
< 25	5,956	244	18							**6,218**
Avg. Earnings	15,277	23,346	25,357							**15,622**
25 - 29	8,804	2,173	964	18						**11,959**
Avg. Earnings	24,765	34,055	36,743	39,131						**27,440**
30 - 34	7,083	2,504	3,195	937	22					**13,741**
Avg. Earnings	28,321	40,491	44,650	48,290	42,411					**35,720**
35 - 39	5,986	2,222	3,215	2,452	835	8				**14,718**
Avg. Earnings	26,893	38,566	46,563	54,888	55,472	55,264				**39,253**
40 - 44	5,051	1,967	3,041	2,377	2,151	408	6			**15,001**
Avg. Earnings	24,842	33,877	39,839	53,256	61,365	58,021	51,563			**39,719**
45 - 49	4,390	2,011	3,779	3,018	2,717	1,650	537	17		**18,119**
Avg. Earnings	24,863	30,943	35,627	45,709	57,871	63,101	60,751	62,472		**40,786**
50 - 54	3,626	1,698	3,768	3,861	3,463	2,167	1,930	762	21	**21,296**
Avg. Earnings	24,224	30,798	33,569	38,194	47,204	58,693	64,946	62,700	53,291	**41,275**
55 - 59	3,199	1,406	3,045	3,579	4,235	2,975	2,482	1,674	843	**23,438**
Avg. Earnings	23,077	32,256	33,630	36,755	41,943	48,662	61,375	67,477	62,481	**42,388**
60 - 64	2,054	994	1,963	2,193	2,771	2,453	2,109	1,047	1,224	**16,808**
Avg. Earnings	20,915	26,593	34,108	38,467	40,581	44,091	53,153	63,329	66,943	**41,745**
65 - 69	1,074	450	839	660	724	570	457	219	281	**5,274**
Avg. Earnings	13,659	20,206	24,082	33,298	41,256	41,993	49,552	59,607	68,528	**33,126**
70+	570	247	447	362	208	107	84	46	77	**2,148**
Avg. Earnings	10,638	10,920	14,056	19,527	30,579	28,396	44,397	41,586	55,247	**19,278**
Total	**47,793**	**15,916**	**24,274**	**19,457**	**17,126**	**10,338**	**7,605**	**3,765**	**2,446**	**148,720**
Avg. Earnings	**23,656**	**33,395**	**37,338**	**43,043**	**48,246**	**51,782**	**59,051**	**64,560**	**65,102**	**37,781**

* *This exhibit does not reflect service earned in other PERA or Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.*

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is average valuation earnings for the fiscal year ending on the valuation date.

Membership Data

Distribution of Active Members (MERF)

	Years of Service as of June 30, 2016									
Age	**<3***	**3 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35+**	**Total**
< 25										
Avg. Earnings										
25 - 29										
Avg. Earnings										
30 - 34										
Avg. Earnings										
35 - 39										
Avg. Earnings										
40 - 44										
Avg. Earnings										
45 - 49										
Avg. Earnings										
50 - 54										
Avg. Earnings										
55 - 59									2	**2**
Avg. Earnings									43,246	**43,246**
60 - 64									11	**11**
Avg. Earnings									74,161	**74,161**
65 - 69									2	**2**
Avg. Earnings									43,635	**43,635**
70+									4	**4**
Avg. Earnings									63,291	**63,291**
Total									**19**	**19**
Avg. Earnings									**65,405**	**65,405**

* *This exhibit does not reflect service earned in other PERA or Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.*

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is average valuation earnings for the fiscal year ending on the valuation date.

Membership Data

Distribution of Service Retirements (Total)

	Years Retired as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<50	1							**1**
Avg. Benefit	16,124							**16,124**
50 - 54	10	19						**29**
Avg. Benefit	11,291	10,927						**11,053**
55 - 59	663	1,553	46	10				**2,272**
Avg. Benefit	14,826	13,414	13,728	34,991				**13,928**
60 - 64	2,232	5,815	2,454	184	14			**10,699**
Avg. Benefit	16,102	15,738	12,862	32,279	37,234			**15,467**
65 - 69	1,962	10,293	6,657	2,723	208	8		**21,851**
Avg. Benefit	14,782	14,215	14,637	14,164	38,757	38,314		**14,631**
70 - 74	291	3,013	6,768	5,014	2,332	44	3	**17,465**
Avg. Benefit	11,777	11,772	12,893	13,615	15,436	48,305	44,741	**13,322**
75 - 79	81	622	1,683	4,450	4,277	1,183	22	**12,318**
Avg. Benefit	7,848	7,621	10,349	10,759	14,271	19,786	39,119	**12,662**
80 - 84	23	222	451	975	3,679	2,662	651	**8,663**
Avg. Benefit	4,706	5,942	6,293	9,172	12,198	20,305	22,579	**14,641**
85 - 89	7	47	157	239	716	2,508	1,719	**5,393**
Avg. Benefit	6,492	7,003	5,269	5,084	9,925	17,329	22,645	**17,042**
90+	1	7	16	75	128	468	2,525	**3,220**
Avg. Benefit	1,274	7,551	5,318	6,438	7,459	15,770	20,260	**18,669**
Total	**5,271**	**21,591**	**18,232**	**13,670**	**11,354**	**6,873**	**4,920**	**81,911**
Avg. Benefit	**15,010**	**13,931**	**13,057**	**12,556**	**13,964**	**19,021**	**21,499**	**14,463**

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Service Retirements (Basic)

	Years Retired as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<50								
Avg. Benefit								
50 - 54								
Avg. Benefit								
55 - 59								
Avg. Benefit								
60 - 64								
Avg. Benefit								
65 - 69	1	4	8	62	6			**81**
Avg. Benefit	55,474	12,576	27,850	43,369	25,862			**39,169**
70 - 74		11	43	120	286	4		**464**
Avg. Benefit		19,089	36,537	34,849	42,656	32,867		**39,427**
75 - 79			18	74	449	253	7	**801**
Avg. Benefit			28,305	29,415	41,539	48,541	26,921	**42,205**
80 - 84			4	27	224	552	208	**1,015**
Avg. Benefit			62,962	33,780	30,952	46,565	44,446	**42,410**
85 - 89		1	1	3	43	392	549	**989**
Avg. Benefit		54,025	1,039	28,272	30,643	37,219	39,919	**38,385**
90+				1	7	68	857	**933**
Avg. Benefit				27,159	40,900	39,994	33,690	**34,197**
Total	**1**	**16**	**74**	**287**	**1,015**	**1,269**	**1,621**	**4,283**
Avg. Benefit	**55,474**	**19,644**	**34,544**	**35,093**	**38,959**	**43,677**	**37,151**	**39,269**

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Service Retirements (Coordinated)

	Years Retired as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<50	1							**1**
Avg. Benefit	16,124							**16,124**
50 - 54	10	19						**29**
Avg. Benefit	11,291	10,927						**11,053**
55 - 59	661	1,545	41	1				**2,248**
Avg. Benefit	14,720	13,265	9,856	11,313				**13,629**
60 - 64	2,221	5,786	2,381	53				**10,441**
Avg. Benefit	16,005	15,603	12,127	12,619				**14,881**
65 - 69	1,957	10,233	6,514	2,455	29			**21,188**
Avg. Benefit	14,786	14,135	14,247	11,077	13,691			**13,875**
70 - 74	291	2,987	6,660	4,724	1,854	2		**16,518**
Avg. Benefit	11,777	11,628	12,559	12,392	7,953	16,908		**11,813**
75 - 79	81	616	1,650	4,308	3,648	851	3	**11,157**
Avg. Benefit	7,848	7,168	9,978	10,224	9,929	8,154	21,515	**9,750**
80 - 84	23	221	441	922	3,364	1,949	387	**7,307**
Avg. Benefit	4,706	5,861	5,637	7,765	10,586	11,693	6,161	**9,831**
85 - 89	7	46	156	229	648	1,987	1,001	**4,074**
Avg. Benefit	6,492	5,981	5,296	3,973	7,680	12,390	9,993	**10,225**
90+	1	7	16	71	117	372	1,402	**1,986**
Avg. Benefit	1,274	7,551	5,318	5,390	4,881	10,516	9,939	**9,536**
Total	**5,253**	**21,460**	**17,859**	**12,763**	**9,660**	**5,161**	**2,793**	**74,949**
Avg. Benefit	**14,955**	**13,812**	**12,632**	**10,884**	**9,578**	**11,295**	**9,447**	**12,230**

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Service Retirements (MERF)

	Years Retired as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<50								
Avg. Benefit								
50 - 54								
Avg. Benefit								
55 - 59	2	8	5	9				**24**
Avg. Benefit	50,162	42,273	45,472	37,622				**41,852**
60 - 64	11	29	73	131	14			**258**
Avg. Benefit	35,791	42,585	36,832	40,233	37,234			**39,183**
65 - 69	4	56	135	206	173	8		**582**
Avg. Benefit	3,074	28,887	32,669	42,166	43,406	38,314		**38,732**
70 - 74		15	65	170	192	38	3	**483**
Avg. Benefit		35,196	31,482	32,602	47,146	51,583	44,741	**39,882**
75 - 79		6	15	68	180	79	12	**360**
Avg. Benefit		54,175	29,643	24,347	34,249	52,996	50,636	**37,179**
80 - 84		1	6	26	91	161	56	**341**
Avg. Benefit		23,723	16,741	33,494	25,604	34,524	54,814	**35,052**
85 - 89				7	25	129	169	**330**
Avg. Benefit				31,491	32,493	32,961	41,462	**37,248**
90+				3	4	28	266	**301**
Avg. Benefit				24,332	24,332	26,745	31,391	**30,795**
Total	**17**	**115**	**299**	**620**	**679**	**443**	**506**	**2,679**
Avg. Benefit	**29,783**	**35,370**	**33,170**	**36,544**	**39,009**	**38,403**	**37,882**	**37,259**

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Survivors (Total)

	Years Since Death as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<45	22	71	54	16	15	4	3	**185**
Avg. Benefit	3,336	6,860	4,629	3,251	7,899	12,852	11,164	**5,761**
45 - 49	9	37	26	11	10	3	7	**103**
Avg. Benefit	2,862	7,038	6,175	7,204	6,957	5,735	13,115	**6,840**
50 - 54	13	60	40	16	9	3	6	**147**
Avg. Benefit	7,737	7,272	7,559	8,359	9,176	8,370	9,551	**7,742**
55 - 59	38	137	81	40	23	18	2	**339**
Avg. Benefit	11,626	11,128	10,186	8,609	16,133	11,382	6,934	**10,990**
60 - 64	56	207	191	93	46	25	15	**633**
Avg. Benefit	12,591	11,315	10,000	11,250	11,950	22,194	15,958	**11,608**
65 - 69	114	323	236	138	58	34	27	**930**
Avg. Benefit	10,259	12,517	11,395	11,553	19,236	20,547	19,073	**12,715**
70 - 74	85	285	233	150	87	58	69	**967**
Avg. Benefit	11,905	13,532	11,746	12,602	13,388	19,895	21,296	**13,737**
75 - 79	93	339	242	187	142	87	99	**1,189**
Avg. Benefit	17,864	13,980	15,410	13,631	15,658	23,639	24,099	**16,270**
80 - 84	77	304	285	201	171	131	189	**1,358**
Avg. Benefit	15,617	19,088	15,105	18,333	19,242	19,511	23,704	**18,646**
85 - 89	68	298	264	213	170	153	292	**1,458**
Avg. Benefit	20,309	22,491	19,203	19,208	20,788	21,038	24,663	**21,398**
90+	33	147	205	191	141	143	378	**1,238**
Avg. Benefit	19,180	21,702	16,210	18,430	19,665	18,118	23,277	**20,055**
Total	**608**	**2,208**	**1,857**	**1,256**	**872**	**659**	**1,087**	**8,547**
Avg. Benefit	**13,825**	**15,120**	**13,624**	**15,116**	**17,537**	**19,921**	**23,262**	**16,355**

In each cell, the top number is the count of survivors for the age/years since death combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Survivors (Basic)

	Years Since Death as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<45		1			1	1		**3**
Avg. Benefit		7,676			5,733	20,622		**11,344**
45 - 49		1				1	3	**5**
Avg. Benefit		38,379				7,901	24,521	**23,968**
50 - 54		1			1			**2**
Avg. Benefit		29,697			4,746			**17,221**
55 - 59	1			3		2		**6**
Avg. Benefit	19,024			6,193		23,101		**13,967**
60 - 64	1	1	6	1	3	1	5	**18**
Avg. Benefit	20,984	7,944	13,900	13,514	9,989	71,897	27,229	**20,214**
65 - 69	1	9	10	6	7	3	10	**46**
Avg. Benefit	62,293	23,682	15,806	25,096	25,867	39,839	27,932	**25,304**
70 - 74	6	30	18	21	12	17	27	**131**
Avg. Benefit	27,372	29,928	22,801	32,280	30,596	31,357	29,290	**29,324**
75 - 79	19	60	57	38	33	23	41	**271**
Avg. Benefit	34,054	26,377	30,248	32,440	31,804	33,151	28,709	**30,168**
80 - 84	18	85	91	66	60	35	62	**417**
Avg. Benefit	32,932	33,363	28,994	32,894	35,260	34,036	30,009	**32,148**
85 - 89	19	120	93	71	84	75	121	**583**
Avg. Benefit	24,628	34,465	34,241	37,338	33,295	30,688	27,937	**32,449**
90+	15	55	87	87	72	69	170	**555**
Avg. Benefit	32,381	33,613	26,700	29,901	29,073	24,897	21,670	**26,583**
Total	**80**	**363**	**362**	**293**	**273**	**227**	**439**	**2,037**
Avg. Benefit	**30,750**	**31,950**	**29,066**	**32,480**	**31,663**	**29,835**	**25,927**	**29,894**

In each cell, the top number is the count of survivors for the age/years since death combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Survivors (Coordinated)

	Years Since Death as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<45	22	70	54	16	14	3	3	**182**
Avg. Benefit	3,336	6,849	4,629	3,251	8,054	10,262	11,164	**5,669**
45 - 49	9	35	25	11	10	2	4	**96**
Avg. Benefit	2,862	5,360	5,657	7,204	6,957	4,652	4,561	**5,533**
50 - 54	13	58	39	16	8	3	6	**143**
Avg. Benefit	7,737	6,854	6,911	8,359	9,730	8,370	9,551	**7,424**
55 - 59	35	131	80	36	19	15	2	**318**
Avg. Benefit	10,333	10,576	9,915	7,894	9,626	8,507	6,934	**9,902**
60 - 64	52	202	184	87	36	16	8	**585**
Avg. Benefit	12,068	11,079	9,708	9,734	10,123	13,412	9,285	**10,516**
65 - 69	109	296	222	124	39	22	11	**823**
Avg. Benefit	9,143	10,724	10,757	9,802	12,654	14,080	8,518	**10,536**
70 - 74	75	238	215	132	69	34	19	**782**
Avg. Benefit	9,328	9,698	10,592	8,946	8,561	11,770	10,601	**9,855**
75 - 79	67	259	178	146	102	43	30	**825**
Avg. Benefit	10,826	9,439	9,653	8,640	10,042	9,201	8,437	**9,482**
80 - 84	56	199	193	133	110	78	64	**833**
Avg. Benefit	8,775	11,017	8,357	10,630	10,435	10,187	8,458	**9,837**
85 - 89	37	149	168	141	86	69	80	**730**
Avg. Benefit	11,589	9,721	10,503	10,147	8,571	8,922	9,243	**9,815**
90+	16	74	115	100	68	72	77	**522**
Avg. Benefit	8,027	9,090	8,368	8,745	9,871	10,772	10,765	**9,393**
Total	**491**	**1,711**	**1,473**	**942**	**561**	**357**	**304**	**5,839**
Avg. Benefit	**9,489**	**9,894**	**9,480**	**9,350**	**9,754**	**10,361**	**9,392**	**9,657**

In each cell, the top number is the count of survivors for the age/years since death combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Survivors (MERF)

	Years Since Death as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<45								
Avg. Benefit								
45 - 49		1	1					**2**
Avg. Benefit		34,408	19,127					**26,768**
50 - 54		1	1					**2**
Avg. Benefit		9,111	32,821					**20,966**
55 - 59	2	6	1	1	4	1		**15**
Avg. Benefit	30,547	23,187	31,868	41,598	47,042	31,061		**32,861**
60 - 64	3	4	1	5	7	8	2	**30**
Avg. Benefit	18,863	24,108	40,318	37,188	22,188	33,547	14,473	**27,730**
65 - 69	4	18	4	8	12	9	6	**61**
Avg. Benefit	27,657	36,415	35,766	28,547	36,757	29,923	23,659	**32,621**
70 - 74	4	18	1	1	6	7	23	**60**
Avg. Benefit	37,028	36,157	50,547	40,382	34,485	31,527	20,746	**29,910**
75 - 79	7	20	7	3	7	21	28	**93**
Avg. Benefit	41,285	35,584	40,977	18,316	21,381	42,784	34,127	**35,980**
80 - 84	3	20	1	2	1	18	63	**108**
Avg. Benefit	39,438	38,725	53,511	50,147	26,901	31,672	32,986	**34,460**
85 - 89	12	29	3	1		9	91	**145**
Avg. Benefit	40,357	38,552	40,229	9,629		33,508	33,866	**35,283**
90+	2	17	2		1	2	131	**155**
Avg. Benefit	9,387	39,330	18,150		8,206	48,654	32,715	**32,999**
Total	**37**	**134**	**22**	**21**	**38**	**75**	**344**	**671**
Avg. Benefit	**34,778**	**36,255**	**37,049**	**31,484**	**30,954**	**35,425**	**32,120**	**33,537**

In each cell, the top number is the count of survivors for the age/years since death combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Disability Retirements (Total)

	Years Disabled* as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
< 45	4	18	7	2				**31**
Avg. Benefit	5,126	7,201	4,735	1,890				**6,033**
45 - 49	4	25	18	9	1			**57**
Avg. Benefit	12,448	8,537	6,858	5,967	954			**7,742**
50 - 54	14	75	42	36	7	4		**178**
Avg. Benefit	13,189	9,859	8,692	6,246	4,842	4,655		**8,801**
55 - 59	34	179	146	85	37	15	5	**501**
Avg. Benefit	17,215	14,541	11,448	8,734	6,742	7,729	5,959	**11,971**
60 - 64	52	244	269	156	87	43	8	**859**
Avg. Benefit	17,615	16,255	12,683	11,738	9,943	9,261	4,833	**13,303**
65 - 69	186	583	60	47	19	12	13	**920**
Avg. Benefit	13,318	13,822	12,595	9,976	14,229	25,108	23,616	**13,738**
70 - 74		120	457	10	6	4	11	**608**
Avg. Benefit		10,641	12,716	10,598	31,383	30,293	30,686	**12,897**
75+			57	305	177	76	61	**676**
Avg. Benefit			10,623	14,692	16,208	18,282	22,332	**15,839**
Total	**294**	**1,244**	**1,056**	**650**	**334**	**154**	**98**	**3,830**
Avg. Benefit	**14,399**	**13,655**	**12,100**	**12,172**	**13,404**	**15,225**	**21,176**	**13,265**

** Based on effective date as provided by PERA; "Years Disabled" may reflect years since age 65 for members over age 65.*

In each cell, the top number is the count of disabled participants for the age/years disabled combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Disability Retirements (Basic)

	Years Disabled* as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
< 45								
Avg. Benefit								
45 - 49								
Avg. Benefit								
50 - 54								
Avg. Benefit								
55 - 59								
Avg. Benefit								
60 - 64								
Avg. Benefit								
65 - 69		5						**5**
Avg. Benefit		49,940						**49,940**
70 - 74		1	11					**12**
Avg. Benefit		68,319	34,715					**37,515**
75+			1	21	30	17	19	**88**
Avg. Benefit			10,398	44,137	39,015	35,816	30,710	**37,501**
Total		**6**	**12**	**21**	**30**	**17**	**19**	**105**
Avg. Benefit		**53,004**	**32,688**	**44,137**	**39,015**	**35,816**	**30,710**	**38,095**

** Based on effective date as provided by PERA; "Years Disabled" may reflect years since age 65 for members over age 65.*

In each cell, the top number is the count of disabled participants for the age/years disabled combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Disability Retirements (Coordinated)

	Years Disabled* as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
< 45	4	18	7	2				**31**
Avg. Benefit	5,126	7,201	4,735	1,890				**6,033**
45 - 49	4	25	18	9	1			**57**
Avg. Benefit	12,448	8,537	6,858	5,967	954			**7,742**
50 - 54	14	75	42	36	7	4		**178**
Avg. Benefit	13,189	9,859	8,692	6,246	4,842	4,655		**8,801**
55 - 59	34	179	146	85	37	15	5	**501**
Avg. Benefit	17,215	14,541	11,448	8,734	6,742	7,729	5,959	**11,971**
60 - 64	50	236	269	156	87	43	8	**849**
Avg. Benefit	17,734	15,952	12,683	11,738	9,943	9,261	4,833	**13,188**
65 - 69	186	576	60	47	14	7	2	**892**
Avg. Benefit	13,318	13,496	12,595	9,976	10,890	11,092	4,997	**13,134**
70 - 74		119	446	9				**574**
Avg. Benefit		10,156	12,174	7,636				**11,684**
75+			56	283	143	56	14	**552**
Avg. Benefit			10,627	12,552	11,404	12,229	7,004	**11,886**
Total	**292**	**1,228**	**1,044**	**627**	**289**	**125**	**29**	**3,634**
Avg. Benefit	**14,398**	**13,381**	**11,863**	**11,078**	**10,147**	**10,362**	**6,087**	**12,210**

** Based on effective date as provided by PERA; "Years Disabled" may reflect years since age 65 for members over age 65.*

In each cell, the top number is the count of disabled participants for the age/years disabled combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Disability Retirements (MERF)

	Years Disabled* as of June 30, 2016							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
< 45								
Avg. Benefit								
45 - 49								
Avg. Benefit								
50 - 54								
Avg. Benefit								
55 - 59								
Avg. Benefit								
60 - 64	2	8						**10**
Avg. Benefit	14,643	25,192						**23,082**
65 - 69		2			5	5	11	**23**
Avg. Benefit		17,543			23,579	44,730	27,001	**29,289**
70 - 74				1	6	4	11	**22**
Avg. Benefit				37,255	31,383	30,293	30,686	**31,103**
75+				1	4	3	28	**36**
Avg. Benefit				2,089	16,892	31,911	24,311	**23,503**
Total	**2**	**10**		**2**	**15**	**12**	**50**	**91**
Avg. Benefit	**14,643**	**23,662**		**19,672**	**24,917**	**36,713**	**26,305**	**26,756**

** Based on effective date as provided by PERA; "Years Disabled" may reflect years since age 65 for members over age 65.*

In each cell, the top number is the count of disabled participants for the age/years disabled combination and the bottom number is the average annual benefit amount.

Membership Data

Reconciliation of Members

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
GERP Members on 7/1/2015	**145,650**	**51,605**	**125,366**	**78,372**	**3,801**	**8,419**	**413,213**
New members	19,390	0	0	0	0	0	**19,390**
Return to active	2,918	(980)	(1,938)	0	0	0	**0**
Terminated non-vested	(8,810)	0	8,810	0	0	0	**0**
Service retirements	(2,956)	(2,657)	0	5,613	0	0	**0**
Terminated deferred	(4,952)	4,952	0	0	0	0	**0**
Terminated refund/transfer	(2,154)	(838)	(1,170)	0	0	0	**(4,162)**
Deaths	(201)	(140)	(316)	(2,145)	(156)	(509)	**(3,467)**
New beneficiary	0	0	0	0	0	583	**583**
Disabled	(112)	0	0	0	112	0	**0**
Data adjustments	(28)	574	1,664	71	73	54	**2,408**
Net change	3,095	911	7,050	3,539	29	128	**14,752**
GERP Members on 6/30/2016	**148,745**	**52,516**	**132,416**	**81,911**	**3,830**	**8,547**	**427,965**

Terminated Member Statistics	Deferred Retirement	Other Non-Vested	Total
Number*	52,516	132,416	184,932
Average age	51.0	47.2	48.3
Average service	7.5	1.0	2.9
Average annual benefit, with augmentation to Normal Retirement Date and 60% CSA load**	$ 9,500	N/A	$ 9,500
Average refund value, with 60% CSA load	$15,911	$1,091	$ 5,299

** Includes 29 deferred MERF members.*

*** 30% CSA load for deferred MERF members.*

Development of Costs

Actuarial Valuation Balance Sheet *(Dollars in Thousands)*

The actuarial balance sheet is based on the principle that the long-term projected benefit obligations of the plan should be ideally equal to the long-term resources available to fund those obligations. **A Projected Benefit Funding Ratio less than 100% indicates that contributions are insufficient.** The resources available to meet projected obligations for current members consist of current fund assets plus the present value of anticipated future contributions intended to fund benefits for current members. In the exhibit below, B.2 is the estimated present value of contributions to fund the normal cost rate for current members until their respective termination dates. Item B.1 is the present value of the total 14.62% statutory contribution net of normal cost and anticipated plan expenses during the period from the valuation date to the statutory unfunded amortization date.

The contributions made in excess of amounts required for current benefit payments are accumulated as a reserve to help meet benefit payments in later years. It is this reserve system which permits the establishment of a level rate of contribution each year.

	Non-Vested	Vested	June 30, 2016
A. Actuarial Value of Assets			$ 18,765,863
B. Expected Future Assets			
1. Present value of expected future statutory supplemental contributions*			4,774,603
2. Present value of future normal cost contributions			3,285,460
3. Total expected future assets: *(1.) + (2.)*			$ 8,060,063
C. Total Current and Expected Future Assets *(A.+ B.3)*			$ 26,825,926
D. Current Benefit Obligations**			
1. Benefit recipients	**Non-Vested**	**Vested**	**Total**
a. Service retirements	$ 0	$ 11,555,262	$ 11,555,262
b. Disability retirements	0	469,681	469,681
c. Survivors	0	1,041,810	1,041,810
2. Deferred retirements with augmentation	0	2,571,824	2,571,824
3. Former members without vested rights	67,794	0	67,794
4. Active members	237,806	7,717,484	7,955,290
5. Total Current Benefit Obligations	$ 305,600	$ 23,356,061	$ 23,661,661
E. Expected Future Benefit Obligations			$ 4,472,208
F. Total Current and Expected Future Benefit Obligations***			$ 28,133,869
G. Unfunded Current Benefit Obligations: *(D.5.) - (A.)*			$ 4,895,798
H. Unfunded Current and Future Benefit Obligations: *(F.) - (C.)*			$ 1,307,943
I. Accrued Benefit Funding Ratio: *(A.)/(D.)*			79.31%
J. Projected Benefit Funding Ratio: *(C.)/(F.)*			95.35%

* *Per the LCPR Standards for Actuarial Work, calculated assuming the current contribution toward the unfunded liability continues for the entire amortization period.*

** *Present value of credited projected benefits (projected compensation, current service).*

*** *Present value of projected benefits (projected compensation, projected service).*

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate (*Dollars in Thousands)*

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
A. Determination of Actuarial Accrued Liability (AAL)			
1. Active members			
a. Retirement annuities	$ 11,340,567	$ 2,244,854	$ 9,095,713
b. Disability benefits	299,202	101,011	198,191
c. Survivor's benefits	156,582	41,743	114,839
d. Deferred retirements	546,546	657,601	(111,055)
e. Refunds*	84,601	240,251	(155,650)
f. Total	$ 12,427,498	$ 3,285,460	$ 9,142,038
2. Deferred retirements with future augmentation	2,571,824	0	2,571,824
3. Former members without vested rights	67,794	0	67,794
4. Annuitants	13,066,753	0	13,066,753
5. Total	$ 28,133,869	$ 3,285,460	$ 24,848,409
B. Determination of Unfunded Actuarial Accrued Liability (UAAL)			
1. Actuarial accrued liability			$ 24,848,409
2. Current assets (AVA)			18,765,863
3. Unfunded actuarial accrued liability			$ 6,082,546
C. Determination of Supplemental Contribution Rate			
1. Present value of future payrolls through the amortization date of June 30, 2033			$ 70,008,838
2. Supplemental contribution rate: *(B.3.) / (C.1.)*			8.69 % **

* *Includes non-vested refunds and non-married survivor benefits only.*

** *The amortization factor as of June 30, 2016 is 11.8522.*

Development of Costs

Changes in Unfunded Actuarial Accrued Liability (UAAL) *(Dollars in Thousands)*

	Year Ending June 30, 2016		
	Actuarial Accrued Liability	**Current Assets**	**Unfunded Actuarial Accrued Liability**
A. At beginning of year	$ 23,560,951	$ 17,974,439	$ 5,586,512
B. Changes due to interest requirements and current rate of funding			
1. Normal cost, including expenses	$ 439,360	$ 0	$ 439,360
2. Benefit payments	(1,396,385)	(1,396,385)	0
3. Contributions	0	841,269	(841,269)
4. Interest on A., B.1., B.2., and B.3.	1,846,595	1,415,750	430,845
5. Total *(B.1. + B.2. + B.3. + B.4.)*	889,570	860,634	28,936
C. Expected unfunded actuarial accrued liability at end of year *(A. + B.5.)*			$ 5,615,448
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected			
1. Age and service retirements			$ 5,127
2. Disability retirements			(194)
3. Death-in-service benefits			(8,912)
4. Withdrawals			(42,502)
5. Salary increases			$ 27,757
6. Investment income			69,210
7. Mortality of annuitants			(6,294)
8. Other items			7,083
9. Total			$ 51,275
E. Unfunded actuarial accrued liability at end of year before plan amendments and changes in actuarial assumptions *(C. + D.9.)*			$ 5,666,723
F. Change in unfunded actuarial accrued liability due to changes in plan provisions			$ 0
G. Change in unfunded actuarial accrued liability due to changes in actuarial assumptions			$ 415,823
H. Change in unfunded actuarial accrued liability due to changes in miscellaneous methodology			$ 0
I. Unfunded actuarial accrued liability at end of year *(E. + F. + G. + H.)**			$ 6,082,546

** The unfunded actuarial accrued liability on a market value of assets basis is $6,853,500.*

Development of Costs

Determination of Contribution Sufficiency/(Deficiency) – Total *(Dollars in Thousands)*

The required contribution is defined in Minnesota statutes as the sum of normal cost, a supplemental contribution to amortize the UAAL, and an allowance for expenses. The dollar amounts shown are for illustration purposes and equal percent of payroll multiplied by projected annual payroll.

	Percent-of-Payroll	Dollar Amount
A. Statutory Contributions - Chapter 353		
1. Employee contributions	6.50%	$ 383,996
2. Employer contributions	7.50%	443,059
3. Employer supplemental contributions	0.52%	31,000
4. State contributions	0.10%	6,000
5. Total	14.62%	$ 864,055
B. Required Contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	5.37%	$ 317,176
b. Disability benefits	0.22%	13,022
c. Survivors	0.10%	5,908
d. Deferred retirement benefits	1.37%	80,945
e. Refunds*	0.54%	31,904
f. Total	7.60%	$ 448,955
2. Supplemental Contribution amortization of Unfunded	8.69%	$ 513,303
3. Allowance for Expenses	0.20%	11,814
4. Total	16.49% **	$ 974,072
C. Contribution Sufficiency/(Deficiency) *(A.3. - B.4.)*	(1.87)%	$ (110,017)

Note: Projected annual payroll for fiscal year beginning on the valuation date: $5,906,821.

* *Includes non-vested refunds and non-married survivor benefits only.*

** *The required contribution on a market value of assets basis is 17.59% of payroll.*

Development of Costs

Determination of Normal Cost – Basic *(Dollars in Thousands)*

This exhibit compares statutory contributions to normal cost for the group of Basic Plan active members. This closed plan includes members not covered under the Social Security Act.

	Percent-of-Payroll	Dollar Amount
A. Statutory contributions - Chapter 353		
1. Employee contributions	9.10%	$ 37
2. Employer contributions	11.78%	49
3. Total	20.88%	$ 86
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	2.87%	$ 12
b. Disability benefits	0.20%	1
c. Survivors	0.08%	0
d. Deferred retirement benefits	2.66%	11
e. Refunds*	0.61%	3
f. Total	6.42%	$ 27

* *Includes non-vested refunds and non-married survivor benefits only.*

Note: Projected annual payroll for fiscal year beginning on the valuation date: $412.

Development of Costs

This exhibit compares statutory contributions to normal cost for the group of Coordinated Plan active members.

Determination of Normal Cost – Coordinated *(Dollars in Thousands)*

	Percent-of-Payroll	Dollar Amount
A. Statutory contributions - Chapter 353		
1. Employee contributions	6.50%	$ 383,833
2. Employer contributions	7.50%	442,884
3. Total	14.00%	$ 826,717
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	5.37%	$ 317,105
b. Disability benefits	0.22%	12,991
c. Survivors	0.10%	5,905
d. Deferred retirement benefits	1.37%	80,900
e. Refunds*	0.54%	31,888
f. Total	7.60%	$ 448,789

** Includes non-vested refunds and non-married survivor benefits only.*

Note: Projected annual payroll for fiscal year beginning on the valuation date: $5,905,120.

Development of Costs

This exhibit compares statutory contributions to normal cost for the MERF Plan active members.

Determination of Normal Cost – MERF *(Dollars in Thousands)*

	Percent-of-Payroll	Dollar Amount
A. Statutory contributions - Chapter 353		
1. Employee contributions	9.75%	$ 126
2. Employer contributions	9.75%	126
3. Employer supplemental contributions	2404.97%	31,000
4. State contributions	465.48%	6,000
5. Total	2889.95%	$ 37,252
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	4.57%	$ 59
b. Disability benefits	2.32%	30
c. Survivors	0.21%	3
d. Deferred retirement benefits	2.66%	34
e. Refunds*	0.97%	13
f. Total	10.73%	$ 139

** Includes non-vested refunds and non-married survivor benefits only.*

Note: Projected annual payroll for fiscal year beginning on the valuation date: $1,289.

Development of Costs

Special Groups – Minneapolis Employees Retirement Fund (MERF)

The MERF Division merged with PERA on January 1, 2015. Former members of the MERF Division are now members of this plan.

Year Ending June 30, 2016

Group	Number	Average Annual Benefits	Average Age	Actuarial Accrued Liability (000's)
Active Members	19	N/A	64.4	$ 12,898
Deferred Retirements	29	N/A	63.7	6,943
Service Retirements	2,679	$ 37,259	76.0	916,960
Disability Retirements	91	26,756	73.8	20,582
Survivors	671	33,537	81.2	163,571
Total	**3,489**	**$36,256**	**76.8**	**$1,120,954**

Actuarial Basis

Actuarial Methods

All actuarial methods are prescribed by Minnesota Statutes, the Legislative Commission on Pensions and Retirement, or the Board of Trustees. Different methodologies may also be reasonable and results based on other methodologies would be different.

Actuarial Cost Method

Actuarial Accrued Liability and required contributions in this report are computed using the Entry Age Normal Cost Method. This method is prescribed by Minnesota Statute. Under this method, a normal cost is developed by amortizing the actuarial value of benefits expected to be received by each active participant (as a level percentage-of-pay) over the total working lifetime of that participant, from hire to termination. Age as of the valuation date was calculated based on the dates of birth provided by the Fund. Entry age for valuation purposes was calculated as the age on the valuation date minus the provided years of service on the valuation date.

To the extent that current assets and future normal costs do not support participants' expected future benefits, an Unfunded Actuarial Accrued Liability ("UAAL") develops. The UAAL is amortized over the statutory amortization period using level percent-of-payroll assuming payroll increases. The total contribution developed under this method is the sum of normal cost, expenses, and the payment toward the UAAL.

Valuation of Future Post-Retirement Benefit Increases

If the plan has reached the funding ratio threshold required to pay a 2.50% benefit increase, Minnesota statutes require the 2.50% benefit increase rate to be reflected in the liability calculations. If the plan has not yet reached the funding ratio threshold required to pay a 2.50% benefit increase, Minnesota statutes require a projection to be performed to determine the expected attainment of the funding ratio threshold, and the expected reversion to a 2.50% benefit increase rate must be reflected in the liability calculations.

Funding Objective

The fundamental financing objective of the fund is to establish contribution rates which, when expressed as a percentage of active member payroll, will remain approximately level from generation to generation and meet the required deadline for full funding.

Actuarial Basis

Actuarial Methods (Concluded)

Asset Valuation Method

The assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value) determined as follows:

- At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year;
- The investment gain or (loss) is taken as the excess of actual investment income over the expected investment income based on the average asset value as calculated above;
- The investment gain or (loss) so determined is recognized over five years at 20% per year; and
- The asset value is the sum of the market asset value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.

Payment on the Unfunded Actuarial Accrued Liability

Payment equals a level percentage-of-payroll each year to the statutory amortization date of June 30, 2033 assuming payroll increases of 3.50% per annum. If there is a negative Unfunded Actuarial Accrued Liability, the surplus amount is amortized over 30 years as a level percentage-of-payroll. If the unfunded liability increases due to changes in benefits, assumptions, or methods, the statutory amortization date will be re-determined. Projected payroll is multiplied by 0.959 in the determination of the present value of future payroll to account for timing differences (as required by the Standards for Actuarial Work).

Changes in Methods since Prior Valuation

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

Actuarial Basis

Summary of Actuarial Assumptions – Basic and Coordinated

The following assumptions were used in valuing the liabilities and benefits under the plan. All actuarial assumptions are prescribed by Minnesota Statutes, the Legislative Commission on Pensions and Retirement (LCPR), or the Board of Trustees. These parties are responsible for selecting the assumptions used for this valuation. The assumptions prescribed are based on the last experience study dated June 30, 2015.

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. We note that the LCPR has recently completed a review of this assumption. This review recommended changes to this assumption, expected to be effective at a future date.

Investment return	8.00% per annum.
Benefit increases after retirement	1.00% per annum through 2052 and 2.50% per annum thereafter.
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	2.75% per year.
Payroll growth	3.50% per year.
Mortality rates	
Healthy pre-retirement	RP-2014 Employee Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2015, from a base year of 2014. Rates are set forward one year for males and set back one year for females.
Healthy post-retirement	RP-2014 Healthy Annuitant Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2015, from a base year of 2014. Rates are set forward two years for males. Female rates are multiplied by a factor of 0.90.
Disabled retirees	RP-2014 Disabled Mortality Table, adjusted for mortality improvements using projection scale MP-2015, from a base year of 2014. Rates are set forward one year for males and set forward six years for females.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the tables. Members who have attained the highest assumed retirement age are assumed to retire in one year.
Withdrawal	Service-related rates based on experience; see table of sample rates.
Disability	Age-related rates based on experience; see table of sample rates.
Allowance for combined service annuity	Liabilities for active members are increased by 0.80% and liabilities for former members are increased by 60.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	Prior year administrative expenses expressed as percentage of prior year projected payroll.

Actuarial Basis

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

Refund of contributions	Account balances accumulate interest until normal retirement dates at the rates described in the Summary of Plan Provisions 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 Normal Retirement.
Percentage married	80% of male and 70% of female active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Males are assumed to have a beneficiary three years younger, while females are assumed to have a beneficiary two years older. 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: 10% elect 25% Joint & Survivor option 15% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 35% elect 100% Joint & Survivor option Females: 10% elect 25% Joint & Survivor option 10% elect 50% Joint & Survivor option 5% elect 75% Joint & Survivor option 15% 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.

Actuarial Basis

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

Pay increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.
Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: <u>Data for active members:</u> There were 2,889 members reported with a salary less than $100. We used prior year salary (1,796 members), if available; otherwise high five salary with a 10% load to account for salary increases (993 members). If neither prior year salary or high five salary was available, we assumed a value of $35,000. There were also 2,074 members reported without a gender and 84 members reported with an invalid date of birth. We assumed a date of birth based on an entry age of 38 (the average age of new entrants in the 2015 valuation) and female gender. <u>Data for terminated members:</u> We calculated benefits for these members using the reported Average Salary and credited service. If Average Salary was not reported (221 members), we assumed a value of $24,000. If credited service was not reported (133 members), we assumed credited service was elapsed time from hire to termination date (88 members); otherwise nine years. If termination date was invalid or not reported (115 members), we assumed the termination date was equal to hire date plus credited service; otherwise the valuation date unless they are noted as a pre-July 1, 1989 hire, then June 30, 1989. If reported termination date occurs prior to reported hire date, the two dates were swapped. There were 42 members reported with an invalid date of birth and 255 members reported without a gender. We assumed a date of birth of July 1, 1967 and female gender. <u>Data for retired members:</u> There were 95 members reported without a gender. We assumed retirees are female and beneficiaries are male. There were six members reported with an invalid date of birth. We assumed a date of birth of July 1, 1945.

Actuarial Basis

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

Changes in actuarial assumptions	Assumed salary increase rates were changed as recommended in the June 30, 2015 experience study. The net effect is proposed rates that average 0.1% lower than the previous rates. Assumed rates of retirement were changed as recommended in the June 30, 2015 experience study. The changes result in fewer unreduced (Normal) retirements and fewer Rule of 90 retirements. In addition, distinct rates for reduced (Early) retirements were adopted for members hired prior to July 1, 1989, and members hired after June 30, 1989. Assumed rates of termination were changed as recommended in the June 30, 2015 experience study. The new rates are based on service and are generally greater than the previous rates for years 2 – 11 for males and years 2 – 15 for females. Assumed rates of disability were changed as recommended in the June 30, 2015 experience study. The new rates are 60 – 75% of previous rates. The base mortality table for healthy annuitants and employees was changed from the RP-2000 fully generational table to the RP-2014 fully generational table (with a base year of 2014), white collar adjustments, with age adjustments. The mortality improvement scale was changed from Scale AA to Scale MP-2015. The base mortality table for disabled annuitants was changed from the RP-2000 disabled mortality table (no projection for future mortality improvement) to the RP-2014 disabled annuitant mortality table (with future mortality improvement according to Scale MP-2015), with age adjustments. The percent married assumption for males was changed from 75% to 80% of active members. The assumed number of married male new retirees electing the 25% and 100% Joint & Survivor options changed from 5% to 10% and from 30% to 35%, respectively. The assumed number of married female new retirees electing the 25% and 50% Joint & Survivor options changed from 5% to 10%. The corresponding number of married new retirees electing the Life annuity option was adjusted accordingly. The assumed post-retirement benefit increase rate was changed from 1.00% per year through 2034 and 2.50% per year thereafter to 1.00% per year through 2052 and 2.50% per year thereafter.

Actuarial Basis

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

	Rate (%) *					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality**	
Age in 2014	Male	Female	Male	Female	Male	Female
20	0.03%	0.01%	0.03%	0.01%	0.07%	0.11%
25	0.05	0.02	0.03	0.01	0.25	0.26
30	0.07	0.04	0.03	0.02	0.56	0.47
35	0.10	0.07	0.04	0.02	0.94	0.71
40	0.15	0.10	0.05	0.03	1.36	0.97
45	0.22	0.14	0.08	0.05	1.76	1.25
50	0.32	0.19	0.13	0.08	2.10	1.50
55	0.44	0.24	0.22	0.13	2.40	1.76
60	0.60	0.35	0.37	0.19	2.74	2.20
65	0.91	0.59	0.65	0.29	3.31	3.03
70	1.54	0.95	1.15	0.49	4.26	4.44

* *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.*

** *The rates shown are RP-2014 mortality with age setbacks, multipliers, and white collar adjustments, if applicable. Rates are further adjusted for mortality improvements using projection scale MP-2015 (from a base year of 2014).*

	Disability Retirement	
Age	Male	Female
20	0.01%	0.01%
25	0.01	0.01
30	0.01	0.01
35	0.03	0.02
40	0.05	0.04
45	0.08	0.05
50	0.15	0.10
55	0.34	0.16
60	0.53	0.28
65	0.00	0.00
70	0.00	0.00

Actuarial Basis

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

	Retirement		
Age	**Rule of 90 Eligible**	**Tier 1**	**Tier 2**
55	20.0%	5.0%	5.0%
56	15.0%	5.0%	5.0%
57	15.0%	5.0%	5.0%
58	15.0%	6.0%	5.0%
59	15.0%	7.0%	6.0%
60	15.0%	8.0%	7.0%
61	18.0%	10.0%	9.0%
62	35.0%	20.0%	15.0%
63	25.0%	20.0%	15.0%
64	25.0%	25.0%	15.0%
65	32.5%	32.5%	25.0%
66	25.0%	25.0%	25.0%
67	20.0%	20.0%	20.0%
68	17.5%	17.5%	17.5%
69	15.0%	15.0%	15.0%
70	17.5%	17.5%	17.5%
71+	100.0%	100.0%	100.0%

Actuarial Basis

Summary of Actuarial Assumptions – Basic and Coordinated (Concluded)

Salary Scale	
Year	**Increase**
1	11.50%
2	8.50
3	7.00
4	6.00
5	5.50
6	5.20
7	4.90
8	4.80
9	4.70
10	4.50
11	4.25
12	4.10
13	4.00
14	3.90
15	3.90
16	3.85
17	3.80
18	3.75
19	3.75
20	3.75
21	3.75
22	3.70
23	3.60
24	3.60
25	3.60
26+	3.50

	% Withdrawals	
Year	**Male**	**Female**
1	25.00%	25.00%
2	20.00	20.00
3	15.00	15.00
4	10.00	11.00
5	9.00	10.00
6	7.00	9.00
7	5.50	7.50
8	5.00	6.50
9	4.50	5.50
10	4.00	5.00
11	3.25	4.25
12	3.00	4.00
13	2.75	3.75
14	2.50	3.50
15	2.50	3.25
16	2.25	3.00
17	2.00	2.75
18	1.75	2.50
19	1.50	2.50
20	1.50	2.25
21	1.50	2.25
22	1.50	2.25
23	1.00	2.00
24	1.00	2.00
25	1.00	1.75
26	1.00	1.75
27	1.00	1.50
28	1.00	1.50
29	1.00	1.50
30	1.00	1.50

Actuarial Basis

Summary of Actuarial Assumptions - MERF

The following assumptions were used in valuing the liabilities and benefits under the plan for MERF members only. Assumptions regarding investment return, mortality, and benefit increases are the same as shown in the Basic and Coordinated Plan assumption summary.

Salary increases	Total reported pay for prior calendar year increased 1.86% (half year of 3.75%, compounded) to prior fiscal year and 3.75% annually for each future year.
Retirement	Active members are assumed to retire at age 61, or immediately if currently age 61 or older.
Withdrawal	Rates are shown in rate table.
Disability	Age-related rates based on experience; see table of sample rates.
Allowance for combined service annuity	Liabilities for active members are increased 0.20% and liabilities for former members are increased by 30.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 60.
Percentage married	66.67% 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	Members are assumed to elect a life annuity.
Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: There were no members with missing or invalid dates of birth. <u>Data for active members:</u> There were no active members with missing salary or service. <u>Data for terminated members:</u> Benefits were provided by PERA for seven members. For the remaining members, we calculated benefits using the reported Average Salary, credited service and termination date from the 2015 valuation data file. <u>Data for Retired members:</u> There were no members reported with missing benefits. There was one member reported without a gender. We assumed male gender.

Actuarial Basis

Summary of Actuarial Assumptions – MERF (Concluded)

	Withdrawal		Disability Retirement	
Age	Male	Female	Male	Female
20	21.00%	21.00%	0.21%	0.21%
25	11.00	11.00	0.21	0.21
30	5.00	5.00	0.23	0.23
35	1.50	1.50	0.30	0.30
40	1.00	1.00	0.41	0.41
45	1.00	1.00	0.61	0.61
50	1.00	1.00	0.93	0.93
55	1.00	1.00	1.60	1.60
60	1.00	1.00	0.00	0.00
65	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00

Actuarial Basis

Summary of Plan Provisions - Basic

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	A public employee who is not covered under the Social Security Act. General exceptions are employees covered by other public funds, certain part-time employees and full-time students under age 23.
Contributions	Shown as a percent of salary: Member 9.10% of salary Employer 11.78% of salary 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 leaves of absence and military service.
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 and employer-paid deferred compensation deposits, 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 annual 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: 100% vested after 5 years of Allowable Service. (Not applicable since all Basic members were hired before 1968.)
Retirement	
Normal retirement benefit	
Age/service requirement	Age 65 and vested. Proportionate retirement annuity is available at age 65 and one year of Allowable Service.
Amount	2.70% of Average Salary for each year of Allowable Service.
Early retirement benefit	
Age/service requirement	(a.) Age 55 and vested. (b.) Any age with 30 years of Allowable Service. (c.) Rule of 90: Age plus Allowable Service totals 90.

Actuarial Basis

Summary of Plan Provisions – Basic (Continued)

Retirement (Continued)

Early retirement benefit
(Continued)

Age/service requirement	The greater of (a) or (b):
Amount	(a.) 2.20% of Average Salary for each of the first ten years of Allowable Service and 2.70% of Average Salary for each subsequent year with reduction of 0.25% for each month if the Member is under age 65 at time of retirement and has less than 30 years of Allowable Service or if the Member is under age 62 and has 30 or more years of Allowable Service. No reduction if age plus years of Allowable Service totals 90. (b.) 2.70% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3.00% per year and actuarial reduction for each month the Member is under age 65.
Form of payment	Life annuity with return on death of any balance of contributions over aggregate monthly payments. 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 recipients receive a future annual 1.00% post-retirement benefit increase. If the funding ratio reaches 90% for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% 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 1.00%. 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. Members retired under laws in effect before July 1, 1973 receive an additional lump sum payment each year. In 1989, this lump sum payment is the greater of $25 times each full year of Allowable Service or the difference between $400 times each full year of Allowable Service and the sum of benefits paid from any Minnesota public pension plan plus cash payments from the Social Security Administration for the preceding fiscal year July 1, 1988 through June 30, 1989. In each following year, the lump sum payment will increase by the same percentage increase that is applied to regular annuities paid from the fund. Effective January 1, 2002, annual lump sum payment is divided by 12 and paid as a monthly life annuity in the annuity form elected.

Actuarial Basis

Summary of Plan Provisions – Basic (Continued)

Disability	
Disability benefit	
Age/service requirement	Total and permanent disability before normal retirement age if vested. Since all remaining active Basic members are over normal retirement age, none are eligible for disability benefits.
Amount	Normal Retirement benefit based on Allowable Service and Average Salary at disability without reduction for commencement before Normal Retirement Age. Supplemental benefit of $25 per month payable to the later of the normal retirement age or the five-year anniversary of commencement of disability. The disability benefit is reduced to that amount which, when added to Workers' Compensation, does not exceed the salary the disabled Member received as of the date of the disability or the salary currently payable for the same employment position substantially similar to the one the person held as of the date of the disability, whichever is greater. If a member becomes disabled prior to July 1, 1997 but did not commence his or her benefit before July 1, 1997, the benefit payable is calculated under the laws in effect at the time the Member became disabled and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%. Payments stop earlier if disability ceases. If death occurs prior to age 65, or within five years of disability, the surviving spouse can receive a refund or a survivor benefit. Dependent children are entitled to dependent child benefits subject to the 70.00% family maximum. Payments revert to a retirement annuity at normal retirement age. Benefits may be reduced on resumption of partial employment.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.
Retirement after disability	
Age/service requirement	Normal retirement age
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before normal retirement age or the normal retirement benefit available at normal retirement age, or an actuarially equivalent optional annuity.
Benefit increases	Same as for retirement.

Actuarial Basis

Summary of Plan Provisions - Basic (Continued)

Death	
Surviving spouse benefit	
Age/service requirement	Active Member with 18 months of Allowable Service or while Member is receiving a disability benefit.
Amount	50.00% of salary averaged over last six months. Family benefit is maximum of 70.00% and minimum of 50.00% of average salary. Benefit paid until spouse's death but no payments while spouse is remarried prior to July 1, 1991. If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit as of July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%. Surviving spouse optional annuity may be elected in lieu of this benefit.
Benefit increases	Same as for retirement.
Surviving dependent children's benefit	
Age/service requirement	Active Member with 18 months of Allowable Service or while Member is receiving a disability benefit.
Amount	10.00% of salary averaged over last six months for each child. Family benefit minimum (including spouse's benefit) of 50.00% of salary and maximum of 70.00% of average salary. Benefits paid until child marries, dies, or attains age 18 (age 22 if full-time student). If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Benefit increases	Same as for retirement.

Actuarial Basis

Summary of Plan Provisions - Basic (Continued)

Death (Continued)	
Surviving spouse optional annuity	
Age/service requirement	Member or former Member who dies before retirement benefits commence and other survivor annuity is waived by spouse.
Amount	Survivor's payment of the 100% joint and survivor benefit the Member could have elected if terminated or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced the same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer. If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit as of July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Benefit increases	Same as for retirement.
Refund of contributions with interest	
Age/service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	The excess of the Member's contributions with 6.00% interest until June 30, 2011; 4.00% interest thereafter over any disability or survivor benefits paid.
Termination	
Refund of contributions	
Age/service requirement	Termination of public service.
Amount	If member terminated before July 1, 2011, member's contributions credited with 6% interest compounded annually prior to July 1, 2011 and 4% interest thereafter. If member terminated after June 30, 2011, member's contributions credited with 4% interest compounded annually. A deferred annuity may be elected in lieu of a refund if three or more years of Allowable Service.

Actuarial Basis

Summary of Plan Provisions - Basic (Continued)

Termination (Continued)

Deferred benefit

Age/service requirement	Fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following "augmentation" percentage compounded annually for terminations prior to 2012: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% thereafter until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (d.) 5.00% thereafter until the earlier of the date the annuity begins and January 1, 2012; and (e.) 1.00% from January 1, 2012 thereafter. Members who terminate after 2011 will receive no future augmentation. Members active with a public employer the day prior to the privatization of the employer become vested immediately and receive enhanced augmentation (unless the enhancement results in a net loss to the Plan). Amount is payable at a normal or early retirement. Augmentation equals 2.00% compounded annually, unless the enhancement results in a net loss to the Plan, in which case augmentation equals 1.00% compounded annually. If privatization occurred prior to January 1, 2011, augmentation occurs at the rate of 4.00% compounded annually through the year the Member turns age 55 and 6.00% thereafter until the annuity begins. If privatization occurred prior to January 1, 2007 (or January 1, 2008 for Hutchinson Area Health Care), augmentation occurs at the rate of 5.50% compounded annually through the year the Member turns age 55 and 7.50% thereafter until the annuity begins. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997 and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Form of payment	Same as for retirement.
Optional form conversion factors	Actuarially equivalent factors based on the RP-2000 mortality table for healthy annuitants, white collar adjustment, projected to 2025, females set back two years and no setback for males, blended 45% males, 7.50% post-retirement interest, and 8.50% pre-retirement interest.

Actuarial Basis

Summary of Plan Provisions - Basic (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 are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Changes in plan provisions	There have been no changes in plan provisions since the previous valuation.

Actuarial Basis

Summary of Plan Provisions - Coordinated

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	A public employee who is covered under the Social Security Act. General exceptions are employees covered by other public funds, certain part-time employees and full-time students under age 23. City managers and persons holding certain elective office positions may choose to become Members.	
Contributions	Shown as a percent of salary:	
Effective date	**Member**	**Employer**
January 1, 2015	6.50%	7.50%
	Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).	
Allowable service	Service during which member contributions are deducted. May also include certain leaves of absence and military service.	
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 leave and sick leave payments, severance payments, Workers' Compensation benefits and employer-paid flexible spending accounts and employer-paid deferred compensation deposits, 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 annual salary. Average salary is based on all Allowable Service if less than five years.	
Vesting	Hired before July 1, 2010: 100% vested after three years of Allowable Service. Hired after June 30, 2010: 100% vested after five years of Allowable Service.	
Retirement		
Normal retirement benefit		
Age/service requirement	First hired before July 1, 1989: (a.) Age 65 and vested. (b.) Proportionate retirement annuity is available at age 65 and one year of Allowable Service.	
Amount	1.70% of Average Salary for each year of Allowable Service.	

Actuarial Basis

Summary of Plan Provisions – Coordinated (Continued)

Retirement (Continued)	
Normal retirement benefit (Continued)	
Age/service requirement	First hired after June 30, 1989: (a.) The greater of age 65 or the age eligible for full Social Security retirement benefits but no later than age 66 and vested. (b.) Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service.
Amount	1.70% of Average Salary for each year of Allowable Service.
Early retirement benefit	
Age/service requirement	First hired before July 1, 1989: (a.) Age 55 and vested. (b.) Any age with 30 years of Allowable Service. (c.) Rule of 90: Age plus Allowable Service totals 90. First hired after June 30, 1989: (a.) Age 55 and vested.
Amount	First hired before July 1, 1989: The greater of (a) or (b): (a.) 1.20% of Average Salary for each of the first ten years of Allowable Service and 1.70% of Average Salary for each subsequent year with reduction of 0.25% for each month the Member is under age 65 at time of retirement or under age 62 if 30 years of Allowable Service. No reduction if age plus years of Allowable Service totals 90. (b.) 1.70% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3.00% per year and actuarial reduction for each month the Member is under age 65. First hired after June 30, 1989: (a.) 1.70% of Average Salary for each year of Allowable Service assuming augmentation to normal retirement age at 3.00% per year (2.50% if hired after June 30, 2006) and actuarial reduction for each month the Member is under normal retirement age.
Form of payment	Life annuity with return on death of any balance of contributions over aggregate monthly payments. 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.

Actuarial Basis

Summary of Plan Provisions – Coordinated (Continued)

Retirement (Continued)	
Benefit increases	Benefit recipients receive a future annual 1.00% post-retirement benefit increase. If the funding ratio reaches 90% for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% 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 1.00%. 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. Members retired under laws in effect before July 1, 1973 receive an additional lump sum payment each year. In 1989, this lump sum payment is $25 times each full year of Allowable Service. In each following year, the lump sum payment will increase by the same percentage increase that is applied to regular annuities paid from the fund.
Disability	
Disability benefit	
Age/service requirement	Total and permanent disability before normal retirement age if vested.
Amount	Normal Retirement benefit based on Allowable Service and Average Salary at disability without reduction for commencement before normal retirement age. The disability benefit is reduced to that amount which, when added to Workers' Compensation, does not exceed the salary the disabled Member received as of the date of the disability or the salary currently payable for the same employment position substantially similar to the one the person held as of the date of the disability, whichever is greater. If a Member becomes disabled prior to July 1, 1997 but did not commence his or her benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%. Payments stop if disability ceases or death occurs. Payments change to a retirement annuity at normal retirement age. Benefits may be reduced on resumption of partial employment.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.

Actuarial Basis

Summary of Plan Provisions – Coordinated (Continued)

Disability (Continued)	
Retirement after disability	
Age/service requirement	Normal retirement age.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before normal retirement age or the normal retirement benefit available at normal retirement age, or an actuarially equivalent optional annuity.
Benefit increases	Same as for retirement.
Death	
Surviving spouse optional annuity	
Age/service requirement	Member or former Member who dies before retirement or disability benefits commence.
Amount	Survivor's payment of the 100% joint and survivor benefit the Member could have elected if terminated or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced the same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer. If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Benefit increases	Same as for retirement.
Refund of contributions	
Age/service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	The excess of the Member's contributions with 6.00% interest until June 30, 2011; 4.00% interest thereafter over any disability or survivor benefits paid.
Termination	
Refund of contributions	
Age/service requirement	Termination of public service.
Amount	If member terminated before July 1, 2011, member's contributions credited with 6% interest compounded annually prior to July 1, 2011 and 4% interest thereafter. If member terminated after June 30, 2011, member's contributions credited with 4% interest compounded annually. A deferred annuity may be elected in lieu of a refund if vested.

Actuarial Basis

Summary of Plan Provisions – Coordinated (Continued)

Termination (Continued)	
Deferred benefit	
Age/service requirement	Fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation) compounded annually for terminations prior to 2012: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (d.) 5.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of the date the annuity begins and January 1, 2012; or (e.) 1.00% from January 1, 2012 to when the benefit begins. Members who terminate after 2011 will receive no future augmentation. Members active with a public employer the day prior to the privatization of the employer become vested immediately and receive enhanced augmentation (unless the enhancement results in a net loss to the Plan). Amount is payable at a normal or early retirement. Augmentation equals 2% compounded annually, unless the enhancement results in a net loss to the Plan, in which case augmentation equals 1.00% compounded annually. If privatization occurred prior to January 1, 2011, augmentation occurs at the rate of 4.00% compounded annually through the year the Member turns age 55 and 6.00% thereafter until the annuity begins. If privatization occurred prior to January 1, 2007 (or January 1, 2008 for Hutchinson Area Health Care), augmentation occurs at the rate of 5.50% compounded annually through the year the Member turns age 55 and 7.50% thereafter until the annuity begins. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997 and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Form of payment	Same as for retirement.
Actuarial equivalent factors	Actuarially equivalent factors based on the RP-2000 mortality table for healthy annuitants, white collar adjustment, projected to 2025, females set back two years and no setback for males, blended 45% males, 7.50% post-retirement interest and 8.50% pre-retirement interest. The post-retirement interest rate will change to 6.50% on the earlier of the effective date of the next mortality adjustment or July 1, 2017.

Actuarial Basis

Summary of Plan Provisions – Coordinated (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; (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 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
Contribution stabilizer	The following is a summary of contribution stabilizer provisions in Minnesota Statute 353.27: • If a contribution sufficiency of more than 1.00% exists, member and employer contributions may be adjusted by the Board of Directors to a level necessary to maintain a 1.00% sufficiency. Member and employer contributions may not be less than the sum of normal cost and administrative expenses. • If a contribution deficiency of at least 0.50% exists, the member and employer contribution rates may be increased by the Board of Directors to eliminate the deficiency. • 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 salary paid after the next January 1st.
Changes in plan provisions	There have been no changes in plan provisions since the previous valuation.

Actuarial Basis

Summary of Plan Provisions of Minneapolis Employees Retirement Fund (MERF)

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/employee rule	An employee of the City of Minneapolis, the Metropolitan Airports Commission, the Met Council/Environmental Services, the Municipal Employees Retirement Fund, and Special School District No. 1 if covered prior to July 1, 1978. Employees covered July 1, 1978 or later are covered by the Public Employees Retirement Association (PERA) Plan. Effective July 1, 1992, licensed peace officers and firefighters who are employed by the Metropolitan Airports Commission and covered by the Minneapolis Employees Retirement Fund will receive the greater of retirement, disability, or survivor benefits under: a) The Minneapolis Employees Retirement Fund; or b) The Public Employees Retirement Association (PERA) Police & Fire Plan.
Full consolidation	The MERF Division fully merged with PERA's General Employees Retirement Plan, effective January 1, 2015. Upon consolidation, state and employer contributions were revised as shown herein.
Contributions	
Member	9.75% of salary
Employer	9.75% of salary (Employer Regular Contributions) Employer Regular and Additional Contributions will be paid as long as there are active members. Employer Supplemental Contribution equals $31,000,000 in calendar years 2015 and 2016 and 21,000,000 in calendar years 2017 to 2031.
Contribution allocation	Employer Supplemental Contributions are allocated to the employers in proportion to their share of the actuarial accrued liability of MERF on July 1, 2009, as follows:

Employer	Allocation
City of Minneapolis	54.78%
Minneapolis Park Board	10.33%
Met Council	1.74%
Metropolitan Airport Commission	5.76%
Municipal Building Commission	1.08%
Minneapolis School District No. 1	23.04%
Hennepin County	3.17%
MnSCU	0.10%
Total	100.00%

Actuarial Basis

Summary of Plan Provisions of Minneapolis Employees Retirement Fund (MERF) (Continued)

State contributions	The State's contribution equals $6,000,000 in 2015 and 2016, and $16,000,000 thereafter. The State's contributions are payable by September 30 each year and end on September 15, 2031.
Allowable service	Service during which member contributions were made. Allowable Service may also include certain leaves of absence, military service and service prior to becoming a member. Allowable service also includes time on duty disability provided that the member returns to active service if the disability ceases.
Salary	All amounts of salary, wages or compensation.
Average salary	Average of the five highest calendar years of salary out of the last ten calendar years.
Retirement Normal retirement benefit	
Age/service requirement	Age 60 and 10 years of employment. Any age with 30 years of employment. Proportionate retirement annuity is available at age 65 and 1 year allowable service.
Amount	2.00% of average salary for the first 10 years of allowable service plus 2.50% of average salary for each subsequent year of allowable service.

Actuarial Basis

Summary of Plan Provisions of Minneapolis Employees Retirement Fund (MERF) (Continued)

Disability	
<u>Disability benefit</u>	
Age/service requirement	Total and permanent disability before age 60 with five years of allowable service, or no allowable service if a work-related disability.
Amount	2.00% of average salary for the first 10 years of disability service plus 2.50% of average salary for each subsequent year of disability service. Disability service is the greater of (a) or (b) where: (a.) equals allowable service plus service projected to age 60, subject to a maximum of 22 years, and (b.) equals allowable service. Benefit is reduced by Workers' Compensation benefits. Payments stop at age 60 or earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.
<u>Disability after separation</u>	
Age/service requirement	Total and permanent disability after electing to receive a retirement benefit but before age 60.
Amount	Actuarial equivalent of total credit to member's account.
<u>Retirement after disability</u>	
Age/service requirement	Total and permanent disability after electing to receive a retirement benefit but before age 60. Employee is still disabled after age 60.
Amount	Benefit continues according to the option selected.

Actuarial Basis

Summary of Plan Provisions of Minneapolis Employees Retirement Fund (MERF) (Continued)

Death

Pre-retirement survivor's spouse benefit

Age/service requirement	Active member with 18 months of allowable service.
Amount	30% of salary averaged over the last six months to the surviving spouse plus 10% of salary averaged over the last six months to each surviving child. Maximum benefit is $900 per month.

Pre-retirement survivor's spouse annuity

Age/service requirement	Active member or former member who dies before retirement with 20 years of allowable service.
Amount	Actuarial equivalent of a single life annuity which would have been paid as a retirement benefit on the date of death without regard to eligibility age for retirement benefit. If there is no surviving spouse, the designated beneficiary may be a dependent child or dependent parent.

Refund of accumulated city contributions

Age/service requirement	Active member or former member dies after 10 years of allowable service and prior to retirement.
Amount	Present value of the City's annual installments of $60 or, in the case of a former member, the net accumulation of city deposits. This benefit is not payable if survivor's benefits are paid.

Lump sum

Age/service requirement	Death prior to service or disability retirement without an eligible surviving beneficiary.
Amount	$750 with less than 10 years allowable service, or $1,500 with 10 or more years of allowable service.

Refund of member contributions at death

Age/service requirement	Active member or former member dies before retirement.
Amount	The excess of the member's contributions (exclusive of the contributions to the survivor's account) plus interest to the date of death.

Actuarial Basis

Summary of Plan Provisions of Minneapolis Employees Retirement Fund (MERF) (Concluded)

Termination	
Deferred benefit	
Age/service requirement	Three years of allowable service.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation), compounded annually: (a.) 0.00% prior to July 1, 1971, (b.) 5.00% from July 1, 1971 to January 1, 1981, and (c.) 3.00% thereafter until the annuity begins. Amount is payable at or after age 60.
Refund of member contributions upon termination	
Age/service requirement	Termination of public service.
Amount	Member's contributions with interest. A deferred annuity may be elected in lieu of a refund if vested.
Form of payment	▪ Life annuity. ▪ Life annuity with 3, 5, 10 or 15 years guaranteed. ▪ Life annuity with lump sum death benefit. ▪ Joint & Survivor (with or without bounce back feature).
Optional form conversion factors	1986 PET mortality table with a one-year setback, blended 50% male and 50% female, and 5% interest.
Two dollar bill and annuity	Optional Two Dollar Bill money purchase annuity available at age 55 with 20 years of service if member had service prior to June 28, 1973. According to PERA, this option is rarely utilized. We have assumed that remaining active members will not elect this optional benefit.
Benefit increases	Benefit recipients receive future annual 1.00% benefit increases. If the accrued liability funding ratio of the General Employees Retirement Plan reaches 90% (on a market value of assets basis) for two consecutive years, the benefit increase will change to 2.50%. If, after reverting to a 2.50% 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 1.00%.
Changes in plan provisions	There have been no changes in plan provisions since the previous valuation.

Additional Schedules

Schedule of Funding Progress[1] *(Dollars in Thousands)*

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a)/(b)	Actual Covered Payroll (Previous FY) (c)	UAAL as a Percentage of Covered Payroll [(b)-(a)]/(c)
7-1-1994	$ 4,747,128	$ 6,223,622	$ 1,476,494	76.28 %	$ 2,557,522	57.73 %
7-1-1995	5,138,461	6,622,069	1,483,608	77.60	2,679,069	55.38
7-1-1996	5,786,398	7,270,073	1,483,675	79.59	2,814,126	52.72
7-1-1997	6,658,410	8,049,666	1,391,256	82.72	2,979,260	46.70
7-1-1998	7,636,668	8,769,303	1,132,635	87.08	3,271,737	34.62
7-1-1999	8,489,177	9,443,678	954,501	89.89	3,302,808	28.90
7-1-2000	9,609,367	11,133,682	1,524,315	86.31	3,437,954	44.34
7-1-2001	10,527,270	12,105,337	1,578,067	86.96	3,466,587	45.52
7-1-2002	11,017,414	12,958,105	1,940,691	85.02	3,809,864	50.94
7-1-2003	11,195,902	13,776,198	2,580,296	81.27	4,387,649	58.81
7-1-2004	11,477,961	14,959,465	3,481,504	76.73	3,968,034	87.74
7-1-2005	11,843,936	15,892,555	4,048,619	74.53	4,096,138	98.84
7-1-2006	12,495,207	16,737,757	4,242,550	74.65	4,247,109	99.89
7-1-2007	12,985,324	17,705,627	4,720,303	73.34	4,448,954	106.10
7-1-2008	13,048,970	17,729,847	4,680,877	73.60	4,722,432	99.12
7-1-2009	13,158,490	18,799,416	5,640,926	69.99	4,778,708	118.04
7-1-2010	13,126,993	17,180,956	4,053,963	76.40	4,804,627	84.38
7-1-2011	13,455,753	17,898,849	4,443,096	75.18	5,079,429 [2]	87.47
7-1-2012	13,661,682	18,598,897	4,937,215	73.45	5,142,592 [3]	96.01
7-1-2013	14,113,295	19,379,769	5,266,474	72.82	5,246,928 [3]	100.37
7-1-2014	15,644,540	21,282,504	5,637,964	73.51	5,351,920 [3]	105.34
7-1-2015	17,974,439	23,560,951	5,586,512	76.29	5,549,255 [4]	100.67
7-1-2016	18,765,863	24,848,409	6,082,546	75.52	5,773,708 [5]	105.35

[1] *Information prior to 2012 provided by prior actuaries. See prior reports for additional detail.*
[2] *Assumed equal to actual member contributions divided by 6.125%.*
[3] *Assumed equal to actual member contributions divided by 6.25%.*
[4] *Assumed equal to actual member contributions divided by 6.375%.*
[5] *Assumed equal to actual member contributions divided by 6.500%.*

Additional Schedules

Schedule of Contributions from the Employer and Other Contributing Entities[1]

(Dollars in Thousands)

Plan Year Ended June 30	Actuarially Required Contribution Rate (a)	Actual Covered Payroll (b)	Actual Member Contributions (c)	Annual Required Contributions [(a)x(b)] - (c) = (d)	Actual Employer Contributions[2] (e)	Percentage Contributed (e)/(d)
1994	9.58 %	$ 2,557,522	$ 112,940	$ 132,071	$ 119,390	9039.86%
1995	9.76	2,679,069	115,986	145,491	123,984	85.22
1996	9.61	2,814,126	121,525	148,913	129,738	87.12
1997	9.75	2,979,260	128,234	162,244	136,686	84.25
1998	9.62	3,271,737	140,385	174,356	151,499	86.89
1999	9.63	3,302,808	158,475	159,585	173,370	108.64
2000	9.22	3,437,954	171,073	145,906	186,637	127.92
2001	11.84	3,466,587	173,380	237,064	188,208	79.39
2002	11.85	3,809,864	191,422	260,047	206,982	79.59
2003	11.52	4,387,649	205,963	299,494	221,689	74.02
2004	12.25	3,968,034	215,697	270,387	225,745	83.49
2005	12.72	4,096,138	216,701	304,328	232,963	76.55
2006	13.26	4,247,109	235,901	327,266	255,531	78.08
2007	13.41	4,448,954	260,907	335,698	283,419	84.43
2008	13.86	4,722,432	280,007	374,522	303,304	80.98
2009	14.22	4,778,708	298,381	381,151	328,603	86.21
2010	15.55	4,804,627	303,571	443,548	342,678	77.26
2011	12.46	5,079,429 [3]	311,115	321,782	357,596	111.13
2012	13.47	5,142,592 [4]	321,412	371,295	368,037	99.12
2013	14.46	5,246,928 [4]	327,933	430,773	372,652	86.51
2014	15.15	5,351,920 [4]	334,495	476,321	382,251	80.25
2015	15.80	5,549,255 [5]	353,765	523,017	435,115	83.19
2016	15.89	5,773,708 [6]	375,291	542,151	465,978	85.95
2017	16.49					

[1] *Information prior to 2012 provided by prior actuary. See prior reports for additional detail.*
[2] *Includes contributions from other sources (if applicable).*
[3] *Assumed equal to actual member contributions divided by 6.125%.*
[4] *Assumed equal to actual member contributions divided by 6.25%.*
[5] *Assumed equal to actual member contributions divided by 6.375%.*
[6] *Assumed equal to actual member contributions divided by 6.500%.*

Glossary of Terms

Accrued Benefit Funding Ratio	The ratio of assets to Current Benefit Obligations.
Accrued Liability Funding Ratio	The ratio of assets to Actuarial Accrued Liability.
Actuarial Accrued Liability (AAL)	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
Actuarial Assumptions	Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement, and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.
Actuarial Cost Method	A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.
Actuarial Equivalent	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV)	The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.
Actuarial Present Value of Projected Benefits	The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, non-retired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB No. 25, such as the Funded Ratio and the Annual Required Contribution (ARC).
Actuarial Value of Assets	The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the actuarially required contribution (ARC).

Glossary of Terms (Continued)

Amortization Method	A method for determining the Amortization Payment. Under the Level Percentage-of-Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. The stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase.
Amortization Payment	That portion of the plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Amortization Period	The period used in calculating the Amortization Payment.
Annual Required Contribution (ARC)	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under GASB No. 25. The ARC consists of the Employer Normal Cost and Amortization Payment.
Augmentation	Annual increases to deferred benefits.
Closed Amortization Period	A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc.
Current Benefit Obligations	The present value of benefits earned to the valuation date, based on current service and including future salary increases to retirement.
Employer Normal Cost	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Expected Assets	The present value of anticipated future contributions intended to fund benefits for current members.
Experience Gain/Loss	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience, e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience, i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.

Glossary of Terms (Concluded)

GASB	Governmental Accounting Standards Board.
GASB No. 25 and GASB No. 27	These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 25 sets the rules for the systems themselves.
GASB No. 50	The accounting standard governing a state or local governmental employer's accounting for pensions.
GASB No. 67 and GASB No. 68	Statements No. 67 and No. 68, issued in June 2012, replace the requirements of Statements No. 25 and No. 27, respectively. Statement No. 68, effective for the fiscal year beginning July 1, 2014, sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67, effective for the fiscal year beginning July 1, 2013, sets the rules for the systems themselves. Accounting information prepared according to Statements No. 67 and No. 68 will be provided in a separate report.
Normal Cost	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
Projected Benefit Funding Ratio	The ratio of the sum of Actuarial Value of Assets and Expected Assets to the Actuarial Present Value of Projected Benefits. A Ratio less than 100% indicates that contributions are insufficient.
Unfunded Actuarial Accrued Liability	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
Valuation Date	The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date.