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PERA

Public Employees
Retirement Association
of New Mexico

INVESTED IN TOMORROW.

**Public Employees Retirement Association (PERA)
of New Mexico
Annual Actuarial Valuation
as of June 30, 2016**





Cavanaugh Macdonald

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The experience and dedication you deserve

November 17, 2016

The Retirement Board
Public Employees Retirement Association
Santa Fe, New Mexico

Members of the Board:

We have conducted the annual actuarial valuation of the Public Employees Retirement Association (PERA) of New Mexico as of June 30, 2016; the results of the valuation are contained in the following report. The annual valuation is used to determine the sufficiency of the statutory contribution rates and, if necessary, the amount required to fund the annual normal cost and amortize the unfunded actuarial accrued liability over a 30-year period. The results of this valuation apply to the fiscal year beginning July 1, 2016 and ending June 30, 2017 (FY 2017). Information contained in our report for plan years prior to June 30, 2010 is based upon valuations performed by the association's prior actuary.

In performing the valuation, we relied on data supplied by the Public Employees Retirement Association (PERA) and performed limited tests on the data for consistency and reasonableness. In determining the Fund's liabilities, future events, such as investment returns, deaths, retirements, etc., are anticipated based upon the set of actuarial assumptions as approved by the Board. New economic assumptions were adopted for the June 30, 2016 valuations as follows:

Assumption	Previous	First 10 Years	All Other Years
Rate of Inflation	3.00%	2.25%	2.75%
Investment Rate of Return	7.75%	7.25%	7.75%
Rate of Payroll Growth	3.50%	2.75%	3.25%

This year's valuation results also reflect a change to the member data used for annual compensation. In prior years, the valuation utilized the total compensation reported in the data as it was the most reliable data available for active member earnings. Due to ongoing improvements in PERA's data quality, we determined the pensionable earnings data reported for the valuation is sufficiently accurate to rely upon for the valuation. Pensionable earnings is the basis for both benefits and contributions of active members and therefore would provide more accurate valuation results.

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The impact of changing the basis for the active member’s earning is a both decrease in the accrued liability of PERA and a decrease in the expected dollar amount of future contributions. This change results in small increases to the funded ratios and slight changes to the calculated funding period for PERA. The table below provides the impact to PERA and each division of the change in valuation annual compensation.

Impact of Change in Valuation Compensation (Based on Prior Economic Assumptions)				
	Change in Funded Ratio (%)		Change to Funding Period (Yrs)	
	Before	After	Before	After
PERA Total	75.6%	77.5%	39.0	38.5
State General	68.3%	69.0%	Infinite	Infinite
State Police	122.4%	133.2%	0	0
Muni General	80.8%	82.4%	22.6	21.3
Muni Police	78.2%	82.0%	30.4	28.9
Muni Fire	62.1%	65.6%	Infinite	Infinite

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: fund experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

This actuarial valuation was performed to determine the adequacy of statutory contributions to fund the plan. The asset values used to determine unfunded liabilities and funded ratios are not market values but less volatile market related values. A smoothing technique is applied to market values to determine the market related values. The unfunded liability amounts and funded ratios using the market value of assets would be different. The interest rate used for determining liabilities is based on the expected return on assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation.

This is to certify that the undersigned are members of the American Academy of Actuaries and have experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the Fund.

Respectfully submitted,

John J. Garrett, ASA, FCA, MAAA
Principal and Consulting Actuary

Jonathan T. Craven, ASA, EA, FCA, MAAA
Senior Actuary



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Section I: Board Summary

The table below summarizes the results of the June 30, 2016 actuarial valuation as compared with the prior year.

Table I-1(a): Comparative Summary of Principal Results (All PERA Divisions)

Valuation Date	June 30, 2016	June 30, 2015
Total Annual Payroll	\$ 2,135,171,462	\$ 2,248,254,276
Total Valuation Payroll	\$ 2,193,888,677	\$ 2,326,943,176
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 6,275,078,080	\$ 6,549,111,175
Retired Members and Survivors	<u>13,199,163,304</u>	<u>12,237,375,375</u>
Total	\$ 19,474,241,384	\$ 18,786,486,550
Actuarial Value of Assets	\$ 14,654,814,373	\$ 14,074,919,042
Funded Ratio	75.3 %	74.9 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 4,819,427,011	\$ 4,711,567,508
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	14.86 %	15.08 %
Member Contribution Rate	<u>11.95 %</u>	<u>12.02 %</u>
Total	26.81 %	27.10 %
Less Normal Cost:		
Retirement	10.81 %	11.42 %
Termination	3.70 %	3.90 %
Pre-Retirement Survivors	0.58 %	0.48 %
Disability	<u>0.98 %</u>	<u>0.78 %</u>
Total Normal Cost	16.07 %	16.58 %
Less Administrative Expenses	0.45 %	0.45 %
Amount Remaining to Amortize UAAL	10.29 %	10.07 %
Amortization Period	56 years	41 years
Increase in Statutory Rate Necessary to Amortize UAAL over 30 Years	2.91 %	1.76 %



Section I: Board Summary

Summary of Key Findings – PERA

An objective of the Board's funding policy is to maximize the stability in the statutory contribution rates while maintaining the adequacy of funding necessary for the actuarial soundness of each Division in the Fund. The Board has set forth criteria for measuring actuarial soundness and making recommendations for adjustments to the statutory rates of each Division. The funding method for PERA determines the sufficiency of statutorily required contribution rates to fund the sum of the annual normal cost, administrative expenses and an amount to fully amortize the unfunded actuarial accrued liability (UAAL) over no more than 30 years for each Division.

The investment earnings of PERA is allocated on the basis of each Divisions' share of the total PERA Fund balance as of the valuation date. Therefore, each Division shares in the asset experience of the total Fund and will demonstrate similar experience.

- The total PERA Fund experienced an investment return of approximately \$47.4 million on the market value of assets. The actuarial value of assets smooth the unexpected portion of the market return over a four year period. The return on the actuarial value of assets was 7.65% compared to an expected return of 7.75%. As of June 30, 2016, the actuarial value of assets is 106.3% of market value. Table III-4 provides the development of the actuarial value of assets.
- The UAAL decreased \$373.3 million due to method changes, including the change to pensionable earnings. This represents a 1.5% increase to the funded ratio.
- As a result of the change in the assumed inflation rate and investment rate of return, plan liabilities increased by \$468.0. This represents a 1.9% decrease to the funded ratio.
- The total actuarial loss due to the investment experience of the total PERA Fund is \$14.2 million. The gain on non-investment related items totaled \$154.6 million. The net gain due to the plan's experience was \$140.4 million.
- The total increase to the UAAL of PERA is \$107.9 million since the previous valuation and the funded ratio increased from 74.9% to 75.3%.
- Based on the current statutory rates and actuarial assumptions, the UAAL is projected to be fully amortized in 56 years.

The summary of results and discussion of key findings for each Division begins on the following page.

Section I: Board Summary



Table I-1(b): Comparative Summary of Principal Results (State General Division)

Valuation Date	June 30, 2016	June 30, 2015
Total Annual Payroll	\$ 904,829,688	\$ 938,168,776
Total Valuation Payroll	\$ 929,712,504	\$ 971,004,683
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 2,710,277,993	\$ 2,759,790,183
Retired Members and Survivors	<u>5,818,644,574</u>	<u>5,441,215,570</u>
Total	\$ 8,528,922,567	\$ 8,201,005,753
Actuarial Value of Assets	\$ 5,720,834,981	\$ 5,549,137,149
Funded Ratio	67.1 %	67.7 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 2,808,087,586	\$ 2,651,868,604
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	16.99 %	16.99 %
Member Contribution Rate	<u>8.92 %</u>	<u>8.92 %</u>
Total	25.91 %	25.91 %
Less Normal Cost:		
Retirement	10.09 %	10.50 %
Termination	3.55 %	3.73 %
Pre-Retirement Survivors	0.60 %	0.45 %
Disability	<u>1.06 %</u>	<u>0.86 %</u>
Total Normal Cost	15.30 %	15.54 %
Less Administrative Expenses	0.45 %	0.45 %
Amount Remaining to Amortize UAAL	10.16 %	9.92 %
Amortization Period	Infinite	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 30 Years	7.99 %	6.03 %



Section I: Board Summary

Summary of Key Findings – State General Division

The UAAL increased from \$2.65 billion to \$2.81 billion. The change in the assumed rate of return assumption and the reduction in valuation compensation contributed to a 2.2% of payroll increase to the annual amount necessary to amortize the UAAL over a 30-year period. The funded ratio decreased from 67.7% to 67.1%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The State General Division experienced a net actuarial gain of \$103.1 million during the plan year ended June 30, 2016. The non-investment related gain of \$110.2 million is primarily due to lower than expected salary increases and service credit changes. These gains are offset by a \$7.1 million loss due to investment related experience. Table IV-4 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The UAAL decreased \$53.0 million due to method changes, including the change to pensionable earnings. This represents a 0.4% increase to the funded ratio.
- As a result of the change in the assumed inflation rate and investment rate of return, plan liabilities increased by \$204.5. This represents a 1.6% decrease to the funded ratio.
- The financing period for the unfunded liability based upon the statutory contribution rates is an infinite period for the eighth consecutive year.



Section I: Board Summary

Table I-1(c): Comparative Summary of Principal Results (State Police/Corrections Division)

Valuation Date	June 30, 2016	June 30, 2015
Total Annual Payroll	\$ 78,225,782	\$ 97,352,917
Total Valuation Payroll	\$ 80,376,991	\$ 100,760,269
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 246,170,322	\$ 301,393,813
Retired Members and Survivors	<u>629,189,411</u>	<u>589,740,952</u>
Total	\$ 875,359,733	\$ 891,134,765
Actuarial Value of Assets	\$1,136,076,589	\$1,075,204,637
Funded Ratio	129.8 %	120.7 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ (260,716,856)	\$ (184,069,872)
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	25.59 %	25.58 %
Member Contribution Rate	<u>8.70 %</u>	<u>8.72 %</u>
Total	34.29 %	34.30 %
Less Normal Cost:		
Retirement	15.25 %	15.33 %
Termination	3.77 %	3.61 %
Pre-Retirement Survivors	0.50 %	0.45 %
Disability	<u>1.83 %</u>	<u>1.48 %</u>
Total Normal Cost	21.35 %	20.87 %
Less Administrative Expenses	0.45 %	0.45 %
Amount Remaining to Amortize UAAL	12.49 %	12.98 %
Amortization Period	0	0
Increase in Statutory Rate Necessary to Amortize UAAL over 30 Years	N/A	N/A



Section I: Board Summary

Summary of Key Findings – State Police/Corrections Division

As of June 30, 2016, the actuarial value of assets exceeded accrued liabilities by \$260.7 million. As of June 30, 2015, the actuarial value of assets exceeded accrued liabilities by \$184.1 million. This represents a decrease in the UAAL of \$76.6 million from the previous year. The funded ratio increased from 120.7% to 129.8%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The State Police/Corrections Division experienced a net actuarial gain of \$3.7 million during the plan year ended June 30, 2016. The actuarial gain is comprised of a \$0.7 million investment related loss and a \$4.4 million gain due to non-investment related experience. Table IV-4 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The UAAL decreased \$75.3 million due method changes, including the change to pensionable earnings. This represents a 10.8% increase to the funded ratio.
- As a result of the change in the assumed inflation rate and investment rate of return, plan liabilities increased by \$22.6. This represents a 3.4% decrease to the funded ratio.

Section I: Board Summary



Table I-1(d): Comparative Summary of Principal Results (Municipal General Division)

Valuation Date	June 30, 2016	June 30, 2015
Total Annual Payroll	\$ 845,735,646	\$ 857,243,239
Total Valuation Payroll	\$ 868,993,376	\$ 887,246,752
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 2,225,312,415	\$ 2,222,277,828
Retired Members and Survivors	<u>3,935,143,789</u>	<u>3,637,317,927</u>
Total	\$ 6,160,456,204	\$ 5,859,595,755
Actuarial Value of Assets	\$ 4,916,985,846	\$ 4,696,871,223
Funded Ratio	79.8 %	80.2 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 1,243,470,358	\$ 1,162,724,532
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	9.81 %	9.86 %
Member Contribution Rate	<u>13.54 %</u>	<u>13.56 %</u>
Total	23.35 %	23.42 %
Less Normal Cost:		
Retirement	8.33 %	8.69 %
Termination	3.95 %	4.31 %
Pre-Retirement Survivors	0.58 %	0.51 %
Disability	<u>0.88 %</u>	<u>0.69 %</u>
Total Normal Cost	13.74 %	14.20 %
Less Administrative Expenses	0.45 %	0.45 %
Amount Remaining to Amortize UAAL	9.16 %	8.77 %
Amortization Period	26 years	24 years
Increase in Statutory Rate Necessary to Amortize UAAL over 30 Years	N/A	N/A



Section I: Board Summary

Summary of Key Findings – Municipal General Division

The UAAL increased from \$1.16 billion to \$1.24 billion. The current statutory rate will amortize the UAAL over a 26-year period and exceeds the minimum required contribution. The funded ratio decreased from 80.2% to 79.8%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The Municipal General Division experienced a net actuarial gain of \$13.3 million and a 0.4% decrease to the funded ratio during the plan year ended June 30, 2016. The actuarial gain is comprised of a \$4.1 million investment related loss and a \$17.4 million gain due to non-investment related experience.
- The UAAL decreased \$62.5 million due to method changes, including the change to pensionable earnings. This represents a 0.8% increase to the funded ratio.
- As a result of the change in the assumed inflation rate and investment rate of return, plan liabilities increased by \$140.1. This represents a 1.9% decrease to the funded ratio.
- The amortization period increased from 24 to 26 years.
- Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.

Section I: Board Summary



Table I-1(e): Comparative Summary of Principal Results (Municipal Police Division)

Valuation Date	June 30, 2016	June 30, 2015
Total Annual Payroll	\$ 192,670,656	\$ 222,085,818
Total Valuation Payroll	\$ 197,969,099	\$ 229,858,822
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 657,284,475	\$ 764,622,849
Retired Members and Survivors	<u>1,795,745,974</u>	<u>1,637,758,091</u>
Total	\$ 2,453,030,449	\$ 2,402,380,940
Actuarial Value of Assets	\$ 1,952,310,191	\$ 1,865,190,859
Funded Ratio	79.6 %	77.6 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 500,720,258	\$ 537,190,081
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	18.68 %	18.69 %
Member Contribution Rate	<u>17.22 %</u>	<u>17.27 %</u>
Total	35.90 %	35.96 %
Less Normal Cost:		
Retirement	17.07 %	17.69 %
Termination	3.74 %	3.77 %
Pre-Retirement Survivors	0.51 %	0.46 %
Disability	<u>0.93 %</u>	<u>0.75 %</u>
Total Normal Cost	22.25 %	22.67 %
Less Administrative Expenses	0.45 %	0.45 %
Amount Remaining to Amortize UAAL	13.20 %	12.84 %
Amortization Period	39 years	32 years
Increase in Statutory Rate Necessary to Amortize UAAL over 30 Years	2.00 %	0.81 %



Section I: Board Summary

Summary of Key Findings – Municipal Police Division

The UAAL decreased from \$537.2 million to \$500.7 million. The funded ratio increased from 77.6% to 79.6%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The Municipal Police Division experienced a net actuarial gain of \$12.6 million and a 2.0% increase to the funded ratio during the plan year ended June 30, 2016. The gain is comprised of a \$1.6 million investment related loss which is offset by a \$14.2 million gain due to non-investment related experience which was primarily due to lower than expected salary increases. Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The UAAL decreased \$107.5 million due to method changes, including the change to pensionable earnings. This represents a 3.5% increase to the funded ratio.
- As a result of the change in the assumed inflation rate and investment rate of return, plan liabilities increased by \$64.6. This represents a 2.2% decrease to the funded ratio.
- The financing period for the unfunded liability based upon the statutory contribution rates is 39 years compared to 32 years for the plan year ended June 30, 2015.

Section I: Board Summary



Table I-1(f): Comparative Summary of Principal Results (Municipal Fire Division)

Valuation Date	June 30, 2016	June 30, 2015
Total Annual Payroll	\$ 113,709,690	\$ 133,403,526
Total Valuation Payroll	\$ 116,836,706	\$ 138,072,649
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 436,032,875	\$ 501,026,502
Retired Members and Survivors	<u>1,020,439,556</u>	<u>931,342,835</u>
Total	\$ 1,456,472,431	\$ 1,432,369,337
Actuarial Value of Assets	\$ 928,606,766	\$ 888,515,174
Funded Ratio	63.8 %	62.0 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - Actuarial Value of Assets)	\$ 527,865,665	\$ 543,854,163
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	21.57 %	21.58 %
Member Contribution Rate	<u>17.56 %</u>	<u>17.58 %</u>
Total	39.13 %	39.16 %
Less Normal Cost:		
Retirement	21.43 %	21.99 %
Termination	2.92 %	2.93 %
Pre-Retirement Survivors	0.55 %	0.51 %
Disability	<u>0.50 %</u>	<u>0.43 %</u>
Total Normal Cost	25.40 %	25.86 %
Less Administrative Expenses	0.45 %	0.45 %
Amount Remaining to Amortize UAAL	13.28 %	12.85 %
Amortization Period	Infinite	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 30 Years	13.87 %	10.16 %



Section I: Board Summary

Summary of Key Findings – Municipal Fire Division

The UAAL decreased from \$543.9 million to \$527.9 million and the funded ratio increased from 62.0% to 63.8%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The Municipal Fire Division experienced a net actuarial gain of \$7.7 million. The gain is comprised of a \$0.8 million investment related loss offset by an \$8.5 million gain due to non-investment related experience which was primarily due to lower than expected salary increases. Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The UAAL decreased \$75.0 million due to method changes, including the change to pensionable earnings. This represents a 3.3% increase to the funded ratio.
- As a result of the change in the assumed inflation rate and investment rate of return, plan liabilities increased by \$36.2. This represents a 1.6% decrease to the funded ratio.
- The financing period for the unfunded liability based upon the statutory contribution rates is an infinite period for the eighth consecutive year.

Section II of the report provides summarized information on the membership data used in the valuation. Section III covers the Fund's assets and Section IV covers the Fund's liabilities. The results of the valuation are provided in Section V and the accounting information is in Section VI. The appendices provide additional information on A) the Fund members, B) the actuarial assumptions and methods, and C) the summary of the benefit provisions of the Fund. It is important to note that all information contained in this report for periods prior to June 30, 2010 were produced by a prior actuarial consulting firm.



Section II: Membership Data

Data regarding the membership of the Fund for use in the valuation were furnished by PERA. The following tables summarize the membership data as of June 30, 2016.

Table II-1: Summary of Membership Data as of June 30, 2016

Group	Count					Totals
	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	
Total Active Members	19,655	1,866	21,274	3,708	2,190	48,693
Inactive Members						
Deferred Vested	2,859	110	1,906	208	96	5,179
Other	3,742	350	5,285	381	138	9,896
Total Inactive Members	6,601	460	7,191	589	234	15,075
Retirees						
Service*	15,114	1,281	10,384	3,013	1,681	31,473
Disabled	636	43	493	51	13	1,236
Beneficiaries	2,085	185	1,741	308	178	4,497
Total Retirees	17,835	1,509	12,618	3,372	1,872	37,206
Totals	44,091	3,835	41,083	7,669	4,296	100,974

* Counts include Co-Payees as follows:

State General - 312

State Police – 85

Municipal General - 300

Municipal Police - 242

Municipal Fire - 140

Section II: Membership Data



Table II-2: Summary of Active Membership Valuation Data

Division	Number		Annual Payroll*		Average Salary	
	2016	2015	2016	2015	2016	2015
State Division						
General	19,655	20,253	\$ 904,829,688	\$ 938,168,776	\$46,036	\$46,322
Police	535	514	31,054,893	34,298,253	58,047	66,728
Adult Corrections	1,024	1,062	36,129,282	49,929,558	35,283	47,015
Juvenile Corrections	307	304	11,041,607	13,125,106	35,966	43,175
Total State Division	21,521	22,133	\$ 983,055,470	\$1,035,521,693	\$45,679	\$46,786
Municipal Division						
General Coverage Plans						
Plan 1	788	806	\$ 25,737,713	\$ 26,407,142	\$32,662	\$32,763
Plan 2	6,336	6,389	236,052,243	238,295,951	37,256	37,298
Plan 3	12,684	12,578	528,692,904	531,884,810	41,682	42,287
Plan 4	772	756	27,715,603	27,226,264	35,901	36,014
Detention Officers Plan 1	694	688	27,537,183	33,429,072	39,679	48,589
Total General	21,274	21,217	\$ 845,735,646	\$ 857,243,239	\$39,754	\$40,404
Police Coverage Plans						
Plan 1	98	107	\$ 4,135,901	\$ 4,685,825	\$42,203	\$43,793
Plan 2	56	55	2,332,602	2,185,679	41,654	39,740
Plan 3	69	68	3,121,272	3,199,971	45,236	47,058
Plan 4	129	134	5,821,797	6,282,101	45,130	46,881
Plan 5	3,356	3,283	177,259,084	205,732,242	52,819	62,666
Total Police	3,708	3,647	\$ 192,670,656	\$ 222,085,818	\$51,961	\$60,895
Fire Coverage Plans						
Plan 1	17	17	\$ 672,047	\$ 683,059	\$39,532	\$40,180
Plan 2	18	18	736,501	765,257	40,917	42,514
Plan 3	5	5	219,327	229,702	43,865	45,940
Plan 4	18	16	777,785	779,673	43,210	48,730
Plan 5	2,132	2,120	111,304,030	130,945,835	52,206	61,767
Total Fire	2,190	2,176	\$ 113,709,690	\$ 133,403,526	\$51,922	\$61,307
Total Municipal Division	27,172	27,040	\$1,152,115,992	\$1,212,732,583	\$42,401	\$44,850
Total PERA	48,693	49,173	\$2,135,171,462	\$2,248,254,276	\$43,850	\$45,721

* Beginning with the 2016 valuation, annual payroll reflects the change from total to pensionable earnings.

Section II: Membership Data



Table II-3: Summary of Deferred Vested Members as of June 30, 2016

Division	Number	Average Age	Average Service	Average Annual Benefit
State Division				
General	2,859	51.41	9.21	\$ 12,359
Police/Hazardous Duty	<u>110</u>	49.18	9.56	9,804
Total State Division	2,969	51.32	9.23	\$ 12,264
Municipal Division				
General	1,906	52.01	9.18	\$ 9,619
Police	208	44.73	8.93	13,334
Fire	<u>96</u>	43.23	7.60	12,359
Total Municipal Division	2,210	50.94	9.09	\$ 10,088
PERA Totals	5,179	51.16	9.17	\$ 11,335

Section II: Membership Data



Table II-4: Summary of Retirees and Survivors as of June 30, 2016

Type of Retirement	Division					
	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	Total
Service						
Number	15,114	1,281	10,384	3,013	1,681	31,473
Total Annual Benefits	\$436,841,235	\$ 41,993,973	\$279,454,586	\$118,180,015	\$68,861,471	\$ 945,331,280
Avg Annual Benefit	\$ 28,903	\$ 32,782	\$ 26,912	\$ 39,223	\$ 40,965	\$ 30,036
Avg Age	68.87	62.60	68.01	59.16	60.96	66.98
Disability						
Number	636	43	493	51	13	1,236
Total Annual Benefits	\$ 10,672,132	\$ 706,761	\$ 7,985,171	\$ 1,225,729	\$ 383,227	\$ 20,973,020
Avg Annual Benefit	\$ 16,780	\$ 16,436	\$ 16,197	\$ 24,034	\$ 29,479	\$ 16,968
Avg Age	57.06	55.72	56.00	49.71	53.25	56.25
Survivors						
Number	2,085	185	1,741	308	178	4,497
Total Annual Benefits	\$ 36,557,450	\$ 4,205,036	\$ 28,997,643	\$ 7,659,956	\$ 5,419,323	\$ 82,839,408
Avg Annual Benefit	\$ 17,534	\$ 22,730	\$ 16,656	\$ 24,870	\$ 30,446	\$ 18,421
Avg Age	69.97	66.10	69.10	64.73	70.90	69.15
Total						
Number	17,835	1,509	12,618	3,372	1,872	37,206
Total Annual Benefits	\$484,070,817	\$ 46,905,770	\$316,437,400	\$127,065,700	\$74,664,021	\$ 1,049,143,708
Avg Annual Benefit	\$ 27,142	\$ 31,084	\$ 25,078	\$ 37,683	\$ 39,885	\$ 28,198
Avg Age	68.58	62.83	67.69	59.53	61.85	66.88

Section II: Membership Data



Table II-5: Summary of Historical Active Membership Valuation Data by Division

Valuation Date	Number	Annual Payroll*	Average Annual Pay	% Change In Average Pay
State General Division				
6/30/2016	19,655	\$ 904,829,688	\$ 46,036	(0.62)%
6/30/2015	20,253	938,168,776	46,322	7.33 %
6/30/2014	20,015	863,797,166	43,157	3.17 %
6/30/2013	19,980	835,817,618	41,833	0.57 %
6/30/2012	19,325	803,873,875	41,598	(0.31)%
State Police/Corrections Division				
6/30/2016	1,866	\$ 78,225,782	\$ 41,922	(19.04)%
6/30/2015	1,880	97,352,917	51,783	10.35 %
6/30/2014	1,951	91,551,934	46,926	1.73 %
6/30/2013	1,956	90,225,253	46,127	1.43 %
6/30/2012	1,916	87,137,037	45,479	2.13 %
Municipal General Division				
6/30/2016	21,274	\$ 845,735,646	\$ 39,754	(1.61)%
6/30/2015	21,217	857,243,239	40,404	6.51 %
6/30/2014	21,480	814,827,128	37,934	4.46 %
6/30/2013	22,123	803,398,205	36,315	(1.66)%
6/30/2012	21,434	791,529,406	36,929	4.56 %
Municipal Police Division				
6/30/2016	3,708	\$ 192,670,656	\$ 51,961	(14.67)%
6/30/2015	3,647	222,085,818	60,895	7.32 %
6/30/2014	3,685	209,092,483	56,742	5.42 %
6/30/2013	3,744	201,525,064	53,826	0.28 %
6/30/2012	3,660	196,453,568	53,676	2.86 %
Municipal Fire Division				
6/30/2016	2,190	\$ 113,709,690	\$ 51,922	(15.31)%
6/30/2015	2,176	133,403,526	61,307	7.51 %
6/30/2014	2,157	122,996,614	57,022	6.05 %
6/30/2013	2,209	118,771,370	53,767	0.18 %
6/30/2012	2,148	115,286,221	53,671	4.45 %

Table II-6: Summary of Historical Active Membership Valuation Data for All Divisions

Valuation Date	Number	Annual Payroll*	Average Annual Pay	% Change In Average Pay
6/30/2016	48,693	\$ 2,135,171,462	\$ 43,850	(4.09)%
6/30/2015	49,173	2,248,254,276	45,721	7.19 %
6/30/2014	49,288	2,102,265,325	42,653	4.07 %
6/30/2013	50,012	2,049,737,510	40,985	(0.36)%
6/30/2012	48,483	1,994,280,107	41,134	2.16 %

* Beginning with the 2016 valuation, annual payroll reflects the change from total to pensionable earnings.



Section III: PERA Assets

The following tables provide a summary of PERA's market value and actuarial value of assets (excluding Legislative Division) as of June 30, 2016.

Table III-1: Market Value Summary as of June 30, 2016

Division	June 30, 2016	June 30, 2015
State General	\$ 5,382,688,209	\$ 5,605,660,155
State Police/Corrections	1,068,925,442	1,086,156,574
Municipal General	4,626,352,941	4,744,713,126
Municipal Police	1,836,913,157	1,884,189,523
Municipal Fire	<u>873,718,733</u>	<u>897,565,509</u>
Total Market Value of Assets	\$ 13,788,598,482	\$ 14,218,284,887

Table III-2: Actuarial Value Summary as of June 30, 2016

Division	June 30, 2016	June 30, 2015
State General	\$ 5,720,834,981	\$ 5,549,137,149
State Police/Corrections	1,136,076,589	1,075,204,637
Municipal General	4,916,985,846	4,696,871,223
Municipal Police	1,952,310,191	1,865,190,859
Municipal Fire	<u>928,606,766</u>	<u>888,515,174</u>
Total Actuarial Value of Assets	\$ 14,654,814,373	\$ 14,074,919,042



Section III: PERA Assets

The following tables provide information on PERA's assets at market value and cash flow.

Table III-3: Market Value Reconciliation (Total PERA with Legislature)

	June 30, 2016	June 30, 2015
Beginning of Year Market Value	\$ 14,255,528,543	\$ 14,428,500,519
Audit Adjustment	1,177,045	(3,707,780)
Revised Beginning of Year Market Value	\$ 14,256,705,588	\$ 14,424,792,739
Revenues:		
a. Member Contributions	\$ 257,624,761	\$ 251,237,811
b. Employer Contributions	322,351,997	317,163,961
c. Appropriations	2,400,000	-
d. Purchases of Service	7,904,417	7,681,968
e. Investment Income		
1. Interest, dividends, etc.	316,381,293	486,126,268
2. Realized/Unrealized gains (losses)	(249,588,439)	(205,270,228)
3. Security lending and other gains (losses)	2,551,424	(1,264,042)
f. Other Income	661,825	610,766
g. Settlement Award	11,655,695	24,685,547
h. Total Revenues	\$ 671,942,973	\$ 880,972,051
Expenditures :		
a. Benefit Payments	\$ 1,024,399,237	\$ 966,236,566
b. Refunds of Member Contributions	44,937,505	46,010,197
c. Investment Expenses	21,899,730	28,103,719
d. Administrative Expenses	10,753,722	9,885,765
e. Total Expenditures	\$ 1,101,990,194	\$ 1,050,236,247
End of Year Market Value	\$ 13,826,658,367	\$ 14,255,528,543

The market value rate of return for the plan year is 0.34% on an adjusted basis and 0.35% on an unadjusted basis. These returns are based on a simplified dollar-weighted basis which may not match more precise time-weighted return calculations. PERA's cash flow is (3.40)% as a percentage of average market value. A mature system such as PERA is expected to exhibit negative net cash flow as the number of members receiving benefit payments becomes a larger portion of total membership. There are 1.31 contributing active members for each member receiving a benefit as of June 30, 2016. We expect this measure to decline over future years and result in an increase in the percentage of negative cash flow.



Section III: PERA Assets

The actuarial value of assets represents a "smoothed" value developed with the purpose of dampening the impact of market volatility on the assets used in determining valuation results. The actuarial value of assets has been calculated by spreading the recognition of excess investment income over four years. The amount of excess investment income in each year is the difference between expected actuarial value investment income and actual market value investment income. Table III-4 provides the calculation of the amount of the current year excess investment income to be phased-in as well as the amount of deferred investment income from the prior years.

**Table III-4: Development of Actuarial Value of Assets as of June 30, 2016
(Total PERA with Legislative Division)**

A. Actuarial Value Beginning of Year		\$	14,111,787,163
B. Market Value End of Year			13,826,658,367
C. Revised Market Value Beginning of Year			14,256,705,588
D. Cash Flow			
D1. Contributions & Appropriations		\$	582,376,758
D2. Service Purchases			7,904,417
D3. Benefit Payments and Refunds			(1,069,336,742)
D4. Administrative Expenses			(10,753,722)
D5. Other			12,317,520
D6. Net		\$	(477,491,769)
E. Investment Income			
E1. Market Total (B - C - D6)		\$	47,444,548
E2. Assumed Rate			7.75%
E3. Amount for Immediate Recognition			1,075,160,699
E4. Amount for Phased-In Recognition			(1,027,716,151)
F. Phased-In Recognition of Investment Income			
F1. Current Year: 0.25 *E4		\$	(256,929,038)
F2. First Prior Year (2014/2015)	\$ (779,713,717) x 25%		(194,928,429)
F3. Second Prior Year (2013/2014)	1,168,148,463 x 25%		292,037,116
F4. Third Prior Year (2012/2013)	577,809,753 x 25%		144,452,438
F5. Total Recognized Investment Gain		\$	(15,367,913)
G. Audit Adjustment		\$	1,177,045
H. Actuarial Value End of Year			\$14,695,265,225
(A + D6 + E3 + F5 + G)			
I. Difference Between Market & Actuarial Values		\$	(868,606,858)
J. Rate of Return on Actuarial Value			7.65 %
K. Actuarial Value as a Percentage of Market Value			106.28 %

Section III: PERA Assets



Table III-5: Allocation of Actuarial Value by Division as of June 30, 2016

	State Division		PERA Totals w/o Legislative
	General	Police	
Member Contribution Fund	\$ 853,069,949	\$ 59,921,229	\$ 2,402,625,960
Employer Contribution Fund	1,675,580,661	409,570,466	4,019,255,335
Retirement Reserve Fund	2,854,037,599	599,433,747	7,366,717,187
Total Fund Balances	\$ 5,382,688,209	\$ 1,068,925,442	\$ 13,788,598,482
Approximate % of Total Fund Balance*	39.04%	7.75%	100%
Actuarial Value Adjustment*	338,146,772	67,151,147	866,215,891
Total Actuarial Value of Assets	\$ 5,720,834,981	\$ 1,136,076,589	\$ 14,654,814,373

	Municipal Division			PERA Totals w/o Legislative
	General	Police	Fire	
Member Contribution Fund	\$ 1,053,649,176	\$ 260,474,657	\$ 175,510,949	\$ 2,402,625,960
Employer Contribution Fund	1,238,818,165	510,512,765	184,773,278	4,019,255,335
Retirement Reserve Fund	2,333,885,600	1,065,925,735	513,434,506	7,366,717,187
Total Fund Balances	\$ 4,626,352,941	\$ 1,836,913,157	\$ 873,718,733	\$ 13,788,598,482
Approximate % of Total Fund Balance*	33.55%	13.32%	6.34%	100.00%
Actuarial Value Adjustment*	290,632,905	115,397,034	54,888,033	866,215,891
Total Actuarial Value of Assets	\$ 4,916,985,846	\$ 1,952,310,191	\$ 928,606,766	\$ 14,654,814,373

* The actuarial value adjustment is the difference between the actuarial value of assets derived in Table III-4 and the total fund balance at market value. It was allocated to each group in proportion to the Total PERA Fund Balance. Please note that the Legislature Division accounted for approximately 0.28% of the Total PERA Fund Balance and is detailed in a separate report.



Section III: PERA Assets

The actuarial valuation assumes the rate of investment return on the assets of the Plan is 7.25% annually for the first 10 years and 7.75% thereafter. This assumption is based upon the reasonable long-term expected return on the assets. In each year, the Fund will experience actuarial gains and losses due to the actual investment return of the assets. Table III-6 provides the calculation of the gain or loss due to the investment experience on the actuarial value of assets for the year ended June 30, 2016 (based on the 7.75% assumed rate of return in effect for the prior valuation).

Table III-6: Actuarial Investment Gain (Loss) for the Year Ending June 30, 2016
(Dollar Amounts in Millions)

	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	Total
1. Beginning of Year Actuarial Value of Assets (AVA)	\$ 5,549.1	\$ 1,075.2	\$ 4,696.9	\$ 1,865.2	\$ 888.5	\$ 14,074.9
2. Employee and Employer Contributions	244.4	26.6	196.4	73.7	46.8	587.9
3. Benefit Payments	(486.9)	(47.7)	(331.5)	(127.6)	(73.8)	(1,067.5)
4. Administrative Expenses	(4.2)	(0.8)	(3.6)	(1.4)	(0.7)	(10.7)
5. Other	4.8	1.0	4.1	1.6	0.8	12.3
6. Interest [1 x 7.75% + (2 + 3 + 4 + 5) x 7.75% x 0.5]	420.7	82.5	358.8	142.4	67.8	1,072.1
7. Expected End of Year AVA	\$ 5,727.9	\$ 1,136.8	\$ 4,921.1	\$ 1,953.9	\$ 929.4	\$ 14,669.0
8. Actual End of Year AVA	5,720.8	1,136.1	4,917.0	1,952.3	928.6	14,654.8
9. Actuarial Investment Gain (Loss) (8 - 7)	\$ (7.1)	\$ (0.7)	\$ (4.1)	\$ (1.6)	\$ (0.8)	\$ (14.2)



Statutory Reserve Transfers

Each year following receipt of the report of the annual actuarial valuation, the excess, if any, of the actuarial present value of pensions and refunds being paid or likely to be paid to members and survivors over the balance in the retirement reserve fund (RRF) shall be transferred to the retirement reserve fund from the employers accumulation fund (EAF). Table III-7 shows the necessary transfer amounts.

Table III-7: Statutory Reserve Transfers as of June 30, 2016

Division	Reported Fund Balances	Actuarial Present Value of Pensions Being Paid	Transfer
State General			
Members Contribution Fund	\$ 853,069,949		
Employers Accumulation Fund	1,675,580,661		\$ (2,964,606,975)
Retirement Reserve Fund	2,854,037,599	\$ 5,818,644,574	2,964,606,975
State Police/Corrections			
Members Contribution Fund	59,921,229		
Employers Accumulation Fund	409,570,466		(29,755,664)
Retirement Reserve Fund	599,433,747	629,189,411	29,755,664
Municipal General			
Members Contribution Fund	1,053,649,176		
Employers Accumulation Fund	1,238,818,165		(1,601,258,189)
Retirement Reserve Fund	2,333,885,600	3,935,143,789	1,601,258,189
Municipal Police			
Members Contribution Fund	260,474,657		
Employers Accumulation Fund	510,512,765		(729,820,239)
Retirement Reserve Fund	1,065,925,735	1,795,745,974	729,820,239
Municipal Fire			
Members Contribution Fund	175,510,949		
Employers Accumulation Fund	184,773,278		(507,005,050)
Retirement Reserve Fund	513,434,506	1,020,439,556	507,005,050
Total End of Year Market Value	\$ 13,788,598,482		



Section IV: PERA Liabilities

The total actuarial present value of benefits is the value as of the valuation date of all future benefits expected to be paid to current members of the Fund. An actuarial cost method allocates each individual's present value of benefits to past and future years of service. The actuarial accrued liability includes the portion of the active member present value of benefits allocated to past service as well as the entire present value of benefits for retirees, beneficiaries and inactive members. The portion of the actuarial present value allocated to the future service of active members is called the present value of future normal costs. Table IV-1 presents the calculation and allocation of the actuarial present value of benefits.

Table IV-1: Calculation and Allocation of the Actuarial Present Value as of June 30, 2016

	Actuarial Accrued Liability	Present Value of Future Normal Cost	Total Actuarial Present Value
Active Members			
Service Retirement	\$ 5,409,321,205	\$ 1,664,851,827	\$ 7,074,173,032
Termination Benefits	284,688,920	580,873,221	865,562,141
Survivor Benefits	85,832,369	84,850,316	170,682,685
Disability Retirement	<u>95,894,670</u>	<u>146,367,224</u>	<u>242,261,894</u>
Total for Active Members	\$ 5,875,737,164	\$ 2,476,942,588	\$ 8,352,679,752
Inactive Members	\$ 399,340,916		\$ 399,340,916
Retirees and Beneficiaries			
Service Retirements	\$ 12,015,253,270		\$ 12,015,253,270
Beneficiaries	862,940,273		862,940,273
Disability Retirements	<u>320,969,761</u>		<u>320,969,761</u>
Total for Retirees and Beneficiaries	\$ 13,199,163,304		\$ 13,199,163,304
Total	\$ 19,474,241,384	\$ 2,476,942,588	\$ 21,951,183,972

Under the valuation funding method, an unfunded actuarial accrued liability (UAAL) exists to the extent that the actuarial accrued liability exceeds the actuarial value of assets as presented in Section III. The calculation of the UAAL by Division as of the valuation date is shown in Table IV-2 on the following page.



Section IV: PERA Liabilities

Table IV-2: Calculation of the Unfunded Actuarial Accrued Liability and Funded Ratio
(Dollar Amounts in Millions)

	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire
1. Actuarial Accrued Liability	\$ 8,528.9	\$ 875.4	\$ 6,160.5	\$ 2,453.0	\$ 1,456.5
2. Actuarial Value of Assets	5,720.8	1,136.1	4,917.0	1,952.3	928.6
3. Unfunded Actuarial Accrued Liability (1-2)	2,808.1	(260.7)	1,243.5	500.7	527.9
Funded Ratio (2 / 1)	67.1%	129.8%	79.8%	79.6%	63.8%

Although the terminology used to describe the excess of PERA’s actuarial accrued liability over the actuarial value of assets is call the “unfunded” actuarial accrued liability, the calculated annual contribution rates in the valuation include an annual amortization payment required to fully amortize the UAAL within 30 years. In some cases, the current statutory rates are less than these calculated rates.

The funded ratio is the ratio of the actuarial value of assets (Table III-2) divided by the actuarial accrued liability (Table IV-1) as of the valuation date. As of June 30, 2016, the funded ratio of PERA is 75.3% as compared to a ratio of 74.9% as of June 30, 2015. The ratio is a commonly used measure of the funding progress and can be useful in reviewing the historical trend of a Fund’s funding progress. Such a review should also consider the impact to this measure over the historical period due to changes to fund benefits, changes to the actuarial assumptions and methods, and the significant impact that investment experience can have on the ratio over short-term periods. We caution that no single “point in time” measure can provide a universal basis for comparing one plan’s funded status to another.



Section IV: PERA Liabilities

The calculation of PERA’s actuarial assets and liabilities requires the use of several assumptions concerning the future experience of PERA and its members. In each annual valuation, the latest year of actual experience is compared to that expected by the prior valuation. The differences are actuarial gains and losses which decrease or increase the UAAL. Table IV-3 provides the reconciliation of the UAAL.

Table IV-3: Reconciliation of the UAAL
(Dollar Amounts in Millions)

	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire
1. Beginning of Year UAAL	\$ 2,651.9	\$ (184.1)	\$ 1,162.7	\$ 537.2	\$ 543.9
2. Normal Cost	150.9	21.0	126.0	52.1	35.7
3. Contributions	(244.4)	(26.6)	(196.4)	(73.7)	(46.8)
4. Other Income/Expense	(0.6)	(0.1)	(0.5)	(0.2)	(0.1)
5. Interest [(1 x 7.75%) + (2 + 3 + 4) x 7.75% x 0.5]	201.9	(14.5)	87.4	40.8	41.7
6. Expected End of Year	2,759.7	(204.3)	1,179.2	556.2	574.4
7. Assumption Changes	204.5	22.6	140.1	64.6	36.2
8. Other Changes	(53.0)	(75.3)	(62.5)	(107.5)	(75.0)
9. Expected UAAL after changes (6 + 7 + 8)	2,911.2	(257.0)	1,256.8	513.3	535.6
10. Actual UAAL	2,808.1	(260.7)	1,243.5	500.7	527.9
11. Total Actuarial Gain (Loss)	103.1	3.7	13.3	12.6	7.7

Tables IV-4 and IV-5 on the following pages provide details of the sources of actuarial gains and losses for state divisions and municipal divisions respectively.

Section IV: PERA Liabilities



Table IV-4: Actuarial Gains & Losses by Source for State Divisions
(Dollar Amounts in Millions)

Source	State General			State Police/Corrections		
	UAAL	Funded Ratio	Contribution Rate*	UAAL	Funded Ratio	Contribution Rate*
Expected Value	\$2,759.7	67.5 %	17.28 %	(\$204.3)	121.9 %	(11.68)%
Retirement	(\$32.0)	0.3 %	(0.38)%	(\$3.4)	0.5 %	0.18 %
Disability	\$1.3	0.0 %	0.02 %	(\$0.1)	0.0 %	0.01 %
Pre-Retirement Death	(\$0.1)	0.0 %	0.00 %	(\$0.1)	0.0 %	0.01 %
Withdrawal	(\$8.5)	0.1 %	(0.10)%	(\$0.5)	0.1 %	0.03 %
Pay Increases	(\$46.9)	0.4 %	(0.55)%	(\$2.2)	0.3 %	0.12 %
New Entrants	\$35.3	(0.3)%	0.41 %	\$5.4	(0.7)%	(0.29)%
Post-Retirement Death	\$6.5	(0.1)%	0.08 %	(\$2.3)	0.3 %	0.12 %
Data Adjustments	(\$63.5)	0.5 %	(0.75)%	(\$1.0)	0.1 %	0.05 %
Other	(\$2.3)	0.0 %	(0.03)%	(\$0.2)	0.0 %	0.01 %
Investment Return	\$7.1	(0.1)%	0.08 %	\$0.7	(0.1)%	(0.04)%
Total (Gain) or Loss	(\$103.1)	0.8 %	(1.22)%	(\$3.7)	0.5 %	0.20 %
Assumption Changes	\$204.5	(1.6)%	1.91 %	\$22.6	(3.4)%	0.95 %
Other Changes	(\$53.0)	0.4 %	0.18 %	(\$75.3)	10.8 %	(8.96)%
Actual Value	\$2,808.1	67.1 %	18.15 %	(\$260.7)	129.8 %	(19.49)%

* Impact on Contribution Rate based on 30 year period and valuation payroll.

Section IV: PERA Liabilities



Table IV-5: Actuarial Gains & Losses by Source for Municipal Divisions
(Dollar Amounts in Millions)

Source	Municipal General			Municipal Police			Municipal Fire		
	UAAL	Funded Ratio	Contribution Rate*	UAAL	Funded Ratio	Contribution Rate*	UAAL	Funded Ratio	Contribution Rate*
Expected Value	\$1,179.2	80.8 %	7.49 %	\$556.2	77.9 %	13.77 %	\$574.4	61.8 %	23.84 %
Retirement	(\$17.6)	0.2 %	(0.12)%	(\$4.0)	0.1 %	(0.10)%	(\$3.8)	0.1 %	(0.17)%
Disability	\$5.8	(0.1)%	0.04 %	\$0.7	0.0 %	0.02 %	\$1.1	0.0 %	0.05 %
Pre-Retirement Death	\$0.1	0.0 %	0.00 %	\$0.2	0.0 %	0.01 %	(\$0.2)	0.0 %	(0.01)%
Withdrawal	(\$2.2)	0.0 %	(0.01)%	\$6.1	(0.2)%	0.15 %	\$3.2	(0.1)%	0.14 %
Pay Increases	\$1.5	0.0 %	0.01 %	(\$21.4)	0.6 %	(0.53)%	(\$13.4)	0.5 %	(0.59)%
New Entrants	\$28.2	(0.3)%	0.19 %	\$10.8	(0.2)%	0.27 %	\$5.9	(0.2)%	0.26 %
Post-Retirement Death	\$4.6	(0.1)%	0.03 %	(\$1.4)	0.0 %	(0.04)%	(\$1.2)	0.0 %	(0.05)%
Data Adjustments	(\$36.7)	0.5 %	(0.25)%	(\$5.0)	0.1 %	(0.13)%	\$0.1	0.0 %	0.00 %
Other	(\$1.1)	0.0 %	(0.01)%	(\$0.2)	0.0 %	(0.01)%	(\$0.2)	0.0 %	(0.01)%
Investment Return	\$4.1	(0.1)%	0.03 %	\$1.6	0.0 %	0.04 %	\$0.8	0.0 %	0.04 %
Total (Gain) or Loss	(\$13.3)	0.1 %	(0.09)%	(\$12.6)	0.4 %	(0.32)%	(\$7.7)	0.3 %	(0.34)%
Assumption Changes	\$140.1	(1.9)%	1.24 %	\$64.6	(2.2)%	2.43 %	\$36.2	(1.6)%	2.75 %
Other Changes	(\$62.5)	0.8 %	(0.04)%	(\$107.5)	3.5 %	(0.68)%	(\$75.0)	3.3 %	0.90 %
Actual Value	\$1,243.5	79.8 %	8.60 %	\$500.7	79.6 %	15.20 %	\$527.9	63.8 %	27.15 %

* Impact on Contribution Rate based on 30 year period and valuation payroll.



Section V: Actuarial Funding Calculation

Section IV of this report presented PERA's actuarial accrued liability as the portion of the present value of benefits allocated to past years of service. The portion of the active members' present value of benefits allocated to future years of service is funded through annual normal cost contributions comprised of both active member and employer contributions.

The annual required contribution rate is the percentage of valuation payroll necessary to fund the annual normal cost of the Fund and fully amortize the UAAL over 30 years in accordance with the Board's funding objectives. The calculated rate is expected to remain constant over the remaining amortization period and is provided in Table V-1.

Table V-1(a): Valuation Results for State General Division

	June 30, 2016	June 30, 2015
1. Total Valuation Payroll	\$ 929,712,504	\$ 971,004,683
2. Present Value of Future Benefits	9,497,381,322	9,249,965,799
3. Present Value of Future Normal Costs	968,458,755	1,048,960,046
4. Actuarial Accrued Liability (2 - 3)	\$8,528,922,567	\$8,201,005,753
5. Actuarial Value of Assets	5,720,834,981	5,549,137,149
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$2,808,087,586	\$2,651,868,604
7. UAAL Amortization Payment (30 year funding)	\$ 168,729,503	\$ 154,889,938
a. Amortization Payment as a Percent of Payroll (7 / 1)	18.15 %	15.95 %
8. Total Normal Cost	\$ 142,237,570	\$ 150,897,734
a. Normal Cost as a Percent of Payroll (8 / 1)	15.30 %	15.54 %
9. Expected Administrative Expenses	\$ 4,183,706	\$ 4,369,521
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.45 %	0.45 %
10. Actuarially Determined Contribution (ADC)	\$ 315,150,779	\$ 310,157,193
a. ADC Rate (7a + 8a + 9a)	33.90 %	31.94 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	16.99 %	16.99 %
b. Member Contribution Rate	8.92 %	8.92 %
c. Total Statutory Contribution Rate (a + b)	25.91 %	25.91 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	7.99 %	6.03 %

Section V: Actuarial Funding Calculation



Table V-1(b): Valuation Results for State Police/Correction Division

	June 30, 2016	June 30, 2015
1. Total Valuation Payroll	\$ 80,376,991	\$ 100,760,269
2. Present Value of Future Benefits	1,008,652,260	1,054,337,120
3. Present Value of Future Normal Costs	<u>133,292,527</u>	<u>163,202,355</u>
4. Actuarial Accrued Liability (2 - 3)	\$ 875,359,733	\$ 891,134,765
5. Actuarial Value of Assets	<u>1,136,076,589</u>	<u>1,075,204,637</u>
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$(260,716,856)	\$(184,069,872)
7. UAAL Amortization Payment (30 year funding)	\$ (15,665,689)	\$ (10,751,125)
a. Amortization Payment as a Percent of Payroll (7 / 1)	(19.49)%	(10.67)%
8. Total Normal Cost	\$ 17,158,015	\$ 21,027,382
a. Normal Cost as a Percent of Payroll (8 / 1)	21.35 %	20.87 %
9. Expected Administrative Expenses	\$ 361,696	\$ 453,421
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.45 %	0.45 %
10. Actuarially Determined Contribution (ADC)	\$ 1,854,022	\$ 10,729,678
a. ADC Rate (7a + 8a + 9a)	2.31 %	10.65 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	25.59 %	25.58 %
b. Member Contribution Rate	<u>8.70 %</u>	<u>8.72 %</u>
c. Total Statutory Contribution Rate (a + b)	34.29 %	34.30 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	(31.98)%	(23.65)%

Section V: Actuarial Funding Calculation



Table V-1(c): Valuation Results for Municipal General Division

	June 30, 2016	June 30, 2015
1. Total Valuation Payroll	\$ 868,993,376	\$ 887,246,752
2. Present Value of Future Benefits	6,951,916,531	6,720,619,699
3. Present Value of Future Normal Costs	791,460,327	861,023,944
4. Actuarial Accrued Liability (2 - 3)	\$6,160,456,204	\$5,859,595,755
5. Actuarial Value of Assets	4,916,985,846	4,696,871,223
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$1,243,470,358	\$1,162,724,532
7. UAAL Amortization Payment (30 year funding)	\$ 74,716,379	\$ 67,912,238
a. Amortization Payment as a Percent of Payroll (7 / 1)	8.60 %	7.65 %
8. Total Normal Cost	\$ 119,367,784	\$ 125,957,765
a. Normal Cost as a Percent of Payroll (8 / 1)	13.74 %	14.20 %
9. Expected Administrative Expenses	\$ 3,910,470	\$ 3,992,610
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.45 %	0.45 %
10. Actuarially Determined Contribution (ADC)	\$ 197,994,633	\$ 197,862,613
a. ADC Rate (7a + 8a + 9a)	22.79 %	22.30 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	9.81 %	9.86 %
b. Member Contribution Rate	<u>13.54 %</u>	<u>13.56 %</u>
c. Total Statutory Contribution Rate (a + b)	23.35 %	23.42 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	(0.56)%	(1.12)%

Section V: Actuarial Funding Calculation



Table V-1(d): Valuation Results for Municipal Police Division

	June 30, 2016	June 30, 2015
1. Total Valuation Payroll	\$ 197,969,099	\$ 229,858,822
2. Present Value of Future Benefits	2,788,847,148	2,807,653,334
3. Present Value of Future Normal Costs	<u>335,816,699</u>	<u>405,272,394</u>
4. Actuarial Accrued Liability (2 - 3)	\$2,453,030,449	\$2,402,380,940
5. Actuarial Value of Assets	<u>1,952,310,191</u>	<u>1,865,190,859</u>
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 500,720,258	\$ 537,190,081
7. UAAL Amortization Payment (30 year funding)	\$ 30,086,768	\$ 31,376,117
a. Amortization Payment as a Percent of Payroll (7 / 1)	15.20 %	13.65 %
8. Total Normal Cost	\$ 44,039,213	\$ 52,113,084
a. Normal Cost as a Percent of Payroll (8 / 1)	22.25 %	22.67 %
9. Expected Administrative Expenses	\$ 890,861	\$ 1,034,365
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.45 %	0.45 %
10. Actuarially Determined Contribution (ADC)	\$ 75,016,842	\$ 84,523,566
a. ADC Rate (7a + 8a + 9a)	37.90 %	36.77 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	18.68 %	18.69 %
b. Member Contribution Rate	<u>17.22 %</u>	<u>17.27 %</u>
c. Total Statutory Contribution Rate (a + b)	35.90 %	35.96 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	2.00 %	0.81 %

Section V: Actuarial Funding Calculation



Table V-1(e): Valuation Results for Municipal Fire Division

	June 30, 2016	June 30, 2015
1. Total Valuation Payroll	\$ 116,836,706	\$ 138,072,649
2. Present Value of Future Benefits	1,704,386,711	1,739,595,879
3. Present Value of Future Normal Costs	247,914,280	307,226,542
4. Actuarial Accrued Liability (2 - 3)	\$1,456,472,431	\$1,432,369,337
5. Actuarial Value of Assets	928,606,766	888,515,174
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 527,865,665	\$ 543,854,163
7. UAAL Amortization Payment (30 year funding)	\$ 31,717,854	\$ 31,765,351
a. Amortization Payment as a Percent of Payroll (7 / 1)	27.15 %	23.01 %
8. Total Normal Cost	\$ 29,671,708	\$ 35,708,904
a. Normal Cost as a Percent of Payroll (8 / 1)	25.40 %	25.86 %
9. Expected Administrative Expenses	\$ 525,765	\$ 621,327
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.45 %	0.45 %
10. Actuarially Determined Contribution (ADC)	\$ 61,915,327	\$ 68,095,582
a. ADC Rate (7a + 8a + 9a)	53.00 %	49.32 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	21.57 %	21.58 %
b. Member Contribution Rate	17.56 %	17.58 %
c. Total Statutory Contribution Rate (a + b)	39.13 %	39.16 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	13.87 %	10.16 %

Section V: Actuarial Funding Calculation



Table V-1(f): Valuation Results for All PERA Divisions

	June 30, 2016	June 30, 2015
1. Total Valuation Payroll	\$ 2,193,888,677	\$ 2,326,943,176
2. Present Value of Future Benefits	21,951,183,972	21,572,171,831
3. Present Value of Future Normal Costs	2,476,942,588	2,785,685,281
4. Actuarial Accrued Liability (2 - 3)	\$19,474,241,384	\$18,786,486,550
5. Actuarial Value of Assets	14,654,814,373	14,074,919,042
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 4,819,427,011	\$ 4,711,567,508
7. UAAL Amortization Payment (30 year funding)	\$ 289,584,815	\$ 275,192,519
a. Amortization Payment as a Percent of Payroll (7 / 1)	13.20 %	11.83 %
8. Total Normal Cost	\$ 352,474,289	\$ 385,704,870
a. Normal Cost as a Percent of Payroll (8 / 1)	16.07 %	16.58 %
9. Expected Administrative Expenses	\$ 9,872,499	\$ 10,471,244
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.45 %	0.45 %
10. Actuarially Determined Contribution (ADC)	\$ 651,931,603	\$ 671,368,633
a. ADC Rate (7a + 8a + 9a)	29.72 %	28.85 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	14.86 %	15.08 %
b. Member Contribution Rate	11.95 %	12.02 %
c. Total Statutory Contribution Rate (a + b)	26.81 %	27.10 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	2.91 %	1.75 %

Table V-2: Contribution Rate Summary

Division	Employer Only		
	Current Statutory Rate	30-year Rate	(Excess)/ Shortfall
State General	16.99 %	24.98 %	7.99 %
State Police/Corrections	25.59 %	(6.39)%	(31.98)%
Municipal General	9.81 %	9.25 %	(0.56)%
Municipal Police	18.68 %	20.68 %	2.00 %
Municipal Fire	21.57 %	35.44 %	13.87 %
PERA Total	14.86 %	17.77 %	2.91 %

Section V: Actuarial Funding Calculation



Table V-3: Statutory Contribution Rate Summary

Division and Coverage Plan	Contribution Rates	
	Member	Employer
State Division		
General Coverage Plan 3	8.92 %	16.99 %
Police and Adult Corrections Plan 1	9.10 %	25.50 %
Hazardous Duty (Juvenile Correctional Officers) Plan 2	6.28 %	26.12 %
Weighted Average for Police/Corrections*	8.70 %	25.59 %
Municipal Division		
General Coverage Plans		
Plan 1	8.50 %	7.40 %
Plan 2	10.65 %	9.55 %
Plan 3	14.65 %	9.55 %
Plan 4	17.15 %	12.05 %
Detention Officers Plan 1	18.15 %	17.05 %
Weighted Average*	13.54 %	9.81 %
Police Coverage Plans		
Plan 1	8.50 %	10.40 %
Plan 2	8.50 %	15.40 %
Plan 3	8.50 %	18.90 %
Plan 4	13.85 %	18.90 %
Plan 5	17.80 %	18.90 %
Weighted Average*	17.22 %	18.68 %
Fire Coverage Plans		
Plan 1	9.50 %	11.40 %
Plan 2	9.50 %	17.90 %
Plan 3	9.50 %	21.65 %
Plan 4	14.30 %	21.65 %
Plan 5	17.70 %	21.65 %
Weighted Average*	17.56 %	21.57 %

* PERA financial records do not provide an asset breakdown by coverage plan which necessitates the use of a weighted average contribution rate for the purpose of comparing assets to the actuarial accrued liability and determining the financing period for the unfunded actuarial accrued liability. Contribution rates are weighted by payroll.



Section VI: Accounting Information

The tables provided in this section present information relevant for the annual financial reporting of PERA. GASB Statement No. 67 required disclosure information will be provided in a separate supplemental report. GASB Statement No. 25 information is provided below.

Table VI-1: GASB Statement No. 25 Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Plan Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Annual Payroll* (c)	UAAL as a Percentage of Annual Payroll ((b - a) / c)
6/30/2016	\$ 14,654,814,373	\$ 19,474,241,384	\$4,819,427,011	75.3 %	\$2,135,171,462	225.7 %
6/30/2015	14,074,919,042	18,786,486,550	4,711,567,508	74.9 %	2,248,254,276	209.6 %
6/30/2014	13,482,815,522	17,784,376,686	4,301,561,164	75.8 %	2,102,265,325	204.6 %
6/30/2013	12,438,151,665	17,057,380,022	4,619,228,357	72.9 %	2,049,737,510	225.4 %
6/30/2012	11,612,047,019	17,788,043,847	6,175,996,828	65.3 %	1,994,280,107	309.7 %
6/30/2011	11,855,217,373	16,826,392,409	4,971,175,036	70.5 %	1,935,013,761	256.9 %
6/30/2010	12,243,712,850	15,601,461,460	3,357,748,610	78.5 %	1,993,516,921	168.4 %
6/30/2009	12,553,985,916	14,908,279,200	2,354,293,284	84.2 %	2,081,259,498	113.1 %
6/30/2008	12,816,218,012	13,740,335,321	924,117,309	93.3 %	1,965,064,160	47.0 %
6/30/2007	12,032,214,874	12,962,480,229	930,265,355	92.8 %	1,908,519,615	48.7 %
6/30/2006	10,850,217,103	11,781,722,238	931,505,135	92.1 %	1,774,918,446	52.5 %

* Beginning with the 2016 valuation, annual payroll reflects the change from total to pensionable earnings.



Section VI: Accounting Information

Table VI-2: Solvency Test by Division
State General

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)			(1)	(2)	(3)
6/30/2016	\$ 853,069,949	\$ 6,055,630,306	\$ 1,620,222,312	\$ 5,720,834,981	100.00%	80.38%	0.00%	
6/30/2015	849,806,169	5,646,053,464	1,705,146,120	5,549,137,149	100.00	83.23	0.00	
6/30/2014	826,785,813	5,390,816,297	1,568,388,787	5,334,025,804	100.00	83.61	0.00	
6/30/2013	841,174,061	5,064,595,209	1,617,991,066	4,996,425,681	100.00	82.05	0.00	
6/30/2012	787,435,758	5,117,428,346	1,914,051,334	4,724,562,943	100.00	76.94	0.00	

State Police/Corrections

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)			(1)	(2)	(3)
6/30/2016	\$ 59,921,229	\$ 635,036,352	\$ 180,402,152	\$ 1,136,076,589	100.00%	100.00%	100.00%	
6/30/2015	58,543,902	595,623,306	236,967,557	1,075,204,637	100.00	100.00	100.00	
6/30/2014	57,705,918	569,659,307	222,557,567	1,016,533,008	100.00	100.00	100.00	
6/30/2013	58,260,570	525,211,454	246,248,914	926,108,695	100.00	100.00	100.00	
6/30/2012	54,156,044	561,452,471	278,404,119	851,976,386	100.00	100.00	84.90	

Section VI: Accounting Information



Municipal General

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Actuarial Value of Assets	(1)	(2)	(3)
6/30/2016	\$1,053,649,176	\$ 4,071,034,047	\$ 1,035,772,981	\$ 4,916,985,846	100.00%	94.90%	0.00%
6/30/2015	1,033,953,619	3,756,083,836	1,069,558,300	4,696,871,223	100.00	97.52	0.00
6/30/2014	1,023,202,668	3,548,792,552	965,182,192	4,515,120,417	100.00	98.40	0.00
6/30/2013	1,000,561,795	3,309,385,678	1,005,890,251	4,108,957,408	100.00	93.93	0.00
6/30/2012	949,311,379	3,336,286,064	1,192,111,747	3,808,143,673	100.00	85.69	0.00

Municipal Police

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Actuarial Value of Assets	(1)	(2)	(3)
6/30/2016	\$ 260,474,657	\$ 1,810,426,144	\$ 382,129,648	\$ 1,952,310,191	100.00%	93.45%	0.00%
6/30/2015	258,992,011	1,649,950,363	493,438,566	1,865,190,859	100.00	97.35	0.00
6/30/2014	249,816,375	1,551,716,281	462,032,152	1,772,210,104	100.00	98.11	0.00
6/30/2013	247,882,167	1,413,249,313	485,163,146	1,627,455,783	100.00	97.62	0.00
6/30/2012	231,924,646	1,488,001,979	566,994,541	1,504,516,513	100.00	85.52	0.00

Municipal Fire

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Actuarial Value of Assets	(1)	(2)	(3)
6/30/2016	\$ 175,510,949	\$ 1,026,377,371	\$ 254,584,111	\$ 928,606,766	100.00%	73.37%	0.00%
6/30/2015	171,569,805	934,914,512	325,885,020	888,515,174	100.00	76.69	0.00
6/30/2014	162,999,130	893,055,155	291,666,492	844,926,189	100.00	76.36	0.00
6/30/2013	163,287,521	822,738,793	255,740,084	779,204,098	100.00	74.86	0.00
6/30/2012	147,973,606	875,612,944	286,898,869	722,847,504	100.00	65.65	0.00



Table VI-2: Solvency Test for All PERA Divisions

PERA Totals

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Actuarial Value of Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)			(1)	(2)	(3)
6/30/2016	\$2,402,625,960	\$ 13,598,504,220	\$ 3,473,111,204	\$ 14,654,814,373	100.00%	90.10%	0.00%	
6/30/2015	2,372,865,506	12,582,625,481	3,830,995,563	14,074,919,042	100.00	93.00	0.00	
6/30/2014	2,320,509,904	11,954,039,592	3,509,827,190	13,482,815,522	100.00	93.38	0.00	
6/30/2013	2,311,166,114	11,135,180,447	3,611,033,461	12,438,151,665	100.00	90.95	0.00	
6/30/2012	2,170,801,433	11,378,781,804	4,238,460,610	11,612,047,019	100.00	82.97	0.00	



Section VI: Accounting Information

**Table VI-3: Schedule of Retirants Added to and Removed from Rolls by Division
State General**

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2016	1,105	\$30,796,909	440	\$ 9,067,427	17,835	\$484,070,817	4.70%	\$ 27,142
6/30/2015	1,499	32,859,803	418	8,741,632	17,170	462,341,335	5.50	26,927
6/30/2014	1,150	37,217,020	379	7,574,003	16,089	438,223,164	7.26	27,237
6/30/2013	1,285	43,656,998	358	7,006,726	15,318	408,580,147	9.85	26,673
6/30/2012	1,075	35,697,983	323	5,911,795	14,391	371,929,875	8.71	25,845

State Police/Corrections

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2016	65	\$ 2,479,773	26	\$ 578,925	1,509	\$46,905,770	4.22%	\$ 31,084
6/30/2015	108	3,301,453	40	1,047,237	1,470	45,004,922	5.27	30,616
6/30/2014	110	4,049,560	34	937,729	1,402	42,750,706	7.85	30,493
6/30/2013	60	2,706,075	23	725,085	1,326	39,638,875	5.26	29,894
6/30/2012	83	3,323,294	21	561,598	1,289	37,657,885	7.91	29,215



Section VI: Accounting Information

Municipal General

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2016	933	\$24,135,156	342	\$ 6,564,419	12,618	\$316,437,400	5.88%	\$ 25,078
6/30/2015	1,066	24,563,648	331	6,177,685	12,027	298,866,663	6.56	24,850
6/30/2014	849	24,476,772	268	4,923,518	11,292	280,480,700	7.49	24,839
6/30/2013	933	29,438,538	281	4,828,481	10,711	260,927,446	10.41	24,361
6/30/2012	761	23,166,131	240	3,984,904	10,059	236,317,389	8.83	23,493

Municipal Police

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2016	211	\$ 9,918,243	49	\$ 1,493,127	3,372	\$127,065,700	7.10%	\$ 37,683
6/30/2015	204	8,516,186	37	994,098	3,210	118,640,584	6.77	36,960
6/30/2014	222	10,277,993	34	988,805	3,043	111,118,496	9.12	36,516
6/30/2013	177	8,276,701	46	1,276,954	2,855	101,829,308	7.38	35,667
6/30/2012	183	8,670,002	33	967,953	2,724	94,829,561	8.84	34,813

Municipal Fire

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2016	110	\$ 5,799,234	33	\$ 1,012,932	1,872	\$74,664,021	6.85%	\$ 39,885
6/30/2015	93	4,762,883	34	1,134,858	1,795	69,877,719	5.48	38,929
6/30/2014	112	5,738,384	29	946,274	1,736	66,249,694	7.80	38,162
6/30/2013	70	4,239,651	20	590,379	1,653	61,457,584	6.31	37,179
6/30/2012	86	4,861,646	31	901,384	1,603	57,808,312	7.35	36,063



Table VI-3: Schedule of Retirants Added to and Removed from Rolls for All PERA Divisions

PERA Totals

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number Added	Annual Allowances	Number Removed	Annual Allowances	Number	Annual Allowances		
6/30/2016	2,424	\$73,129,315	890	\$18,716,830	37,206	\$ 1,049,143,708	5.47%	\$ 28,198
6/30/2015	2,970	74,003,973	860	18,095,510	35,672	994,731,223	5.96	27,885
6/30/2014	2,443	81,759,729	744	15,370,329	33,562	938,822,760	7.61	27,973
6/30/2013	2,525	88,317,964	728	14,427,625	31,863	872,433,360	9.25	27,381
6/30/2012	2,188	75,719,055	648	12,327,634	30,066	798,543,022	8.62	26,560

Table VI-4: Summary of Actuarial Methods and Assumptions

Valuation date	June 30, 2016
Actuarial cost method	Entry Age Normal
Amortization method	Level Percent of Payroll, Open
Payroll growth rate	2.75%
Remaining amortization period	30 years
Asset valuation method	4-year Smoothed Market
Actuarial assumptions:	
Investment rate of return*	7.25% for 1st 10 years, 7.75% thereafter
Administrative expenses	0.45% of payroll
Projected salary increases*	3.25% – 13.50%
Post-retirement benefit increases	2.00% compounded annually (2.50% for certain retirees and disabled participants with annual benefits less than \$20,000)

* Includes inflation at 2.25% for the first 10 years and 2.75% thereafter



Appendix A: Additional Membership Data

Table A-1: Schedule of Active Participant Data as of June 30, 2016 by Division

State General

Nearest Age	Completed Years of Service								Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+			
Under 20	22								22	\$ 704,416
20 to 24	472	5							477	14,190,709
25 to 29	1,349	198	7						1,554	54,530,788
30 to 34	1,370	615	270	12					2,267	92,091,822
35 to 39	1,103	572	521	233	8				2,437	107,677,353
40 to 44	931	453	579	457	157	1			2,578	122,201,633
45 to 49	879	442	537	485	407	37			2,787	137,291,102
50 to 54	760	424	524	425	441	71	5		2,650	128,578,373
55 to 59	642	414	513	441	394	72	8		2,484	122,039,496
60	103	69	115	81	63	13	2		446	22,647,136
61	95	62	107	93	47	20	5		429	22,049,028
62	88	55	84	55	38	10	1		331	16,307,555
63	55	51	72	34	30	11	3		256	13,095,344
64	65	46	50	41	28	16	6		252	14,169,281
65	39	31	50	31	16	5	2		174	9,403,856
66	29	18	24	18	22	3	3		117	6,336,500
67	32	22	16	7	12	2	2		93	5,129,407
68	18	12	16	15	9	1			71	3,819,118
69	14	11	17	8	3	2			55	3,170,516
70	14	10	8	3	2	2	1		40	2,197,703
71	7	8	4	2	1	1			23	1,277,463
72	9	5	3	5					22	1,595,959
73	10	7	6	3	3		1		30	1,533,495
74	1	3	8	2		1			15	630,798
75	2	4	2	2			1		11	540,719
76	2		2	1	1				6	274,124
77	4	1		2					7	389,930
78	2	1	1	1		1	1		7	337,068
79	2	2		2					6	326,193
80 & Over	3		1	2	1		1		8	292,802
Total	8,122	3,541	3,537	2,461	1,683	269	42	19,655	\$ 904,829,688	

Average Age: 45.15

Average Service: 9.02



Appendix A: Additional Membership Data

State Police/Corrections

Nearest Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	10							10	\$ 443,946
20 to 24	180	10	2					192	6,846,493
25 to 29	270	80	24					374	14,073,422
30 to 34	124	67	96	27				314	12,468,329
35 to 39	63	57	56	86	15			277	12,167,794
40 to 44	36	33	34	77	58	3		241	11,959,506
45 to 49	30	35	35	52	46	20		218	10,367,660
50 to 54	14	19	22	21	27	7	1	111	4,582,996
55 to 59	8	11	21	24	15	3	2	84	3,506,849
60	2		3	2	1		2	10	429,701
61	1		1	4	3		1	10	423,217
62	3	2	2		2		1	10	363,785
63	1	1						2	69,340
64						1		1	48,211
65		1	1	2	1	2		7	273,984
66			1					1	36,992
67									
68				3				3	123,620
69									
70									
71									
72									
73									
74									
75						1		1	39,936
76									
77									
78									
79									
80 & Over									
Total	742	316	298	298	168	37	7	1,866	\$ 78,225,782

Average Age: 36.72

Average Service: 9.53



Appendix A: Additional Membership Data

Municipal General

Nearest Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	156							156	\$ 4,761,546
20 to 24	1,129	21						1,150	33,183,243
25 to 29	1,559	414	27					2,000	63,419,071
30 to 34	1,234	703	252	10				2,199	77,623,522
35 to 39	1,056	624	523	222	8			2,433	95,510,596
40 to 44	942	614	470	334	212	6		2,578	108,128,476
45 to 49	890	544	477	420	389	53	2	2,775	121,337,238
50 to 54	831	547	476	381	336	84	11	2,666	114,678,401
55 to 59	703	562	463	424	341	121	24	2,638	114,131,673
60	143	95	84	82	70	27	8	509	22,063,408
61	96	102	80	60	42	14	3	397	17,491,084
62	99	66	82	47	32	14	5	345	14,812,461
63	74	68	50	38	25	10	4	269	11,316,958
64	61	69	49	45	13	7	3	247	10,711,741
65	49	42	40	26	20	7	6	190	8,300,300
66	43	37	27	17	10	4	2	140	6,143,581
67	43	29	19	15	11	4	1	122	5,266,002
68	48	24	18	11	4	4	2	111	4,481,313
69	34	16	12	9	8	2	1	82	3,455,282
70	26	9	8	3	6	4		56	2,218,415
71	23	10	3	2				38	1,100,723
72	15	7	10	5	5		1	43	1,600,482
73	8	9	4	1	2	3		27	909,606
74	10		5	2	3			20	590,005
75	8	4	3		1			16	552,305
76	6	2	4	1	2			15	516,146
77	3	2		3				8	225,070
78	4		1		1			6	133,882
79	8	1	1	2				12	307,607
80 & Over	12	6	3	1	3	1		26	765,509
Total	9,313	4,627	3,191	2,161	1,544	365	73	21,274	\$ 845,735,646

Average Age: 44.30

Average Service: 8.24



Appendix A: Additional Membership Data

Municipal Police

Nearest Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	2							2	\$ 87,342
20 to 24	253	7						260	10,490,572
25 to 29	519	142	6					667	30,121,177
30 to 34	263	301	125	4				693	34,805,402
35 to 39	158	182	231	89	0	0	0	660	35,386,827
40 to 44	84	91	146	260	22			603	34,742,777
45 to 49	40	66	97	149	71	3		426	24,841,905
50 to 54	25	40	50	72	26	9		222	12,629,351
55 to 59	18	17	24	32	10	2	2	105	5,675,064
60	2	3	5	3				13	608,011
61	2	3	3	5	1			14	724,959
62	3	2	4	3	2	1		15	862,672
63		1		1	1	1		4	279,336
64	3	2	1	1	1	1		9	540,130
65	1			1	2		1	5	269,952
66				3			1	4	247,711
67							1	1	89,313
68	1							1	50,000
69			1	1				2	115,460
70	1							1	57,339
71									
72									
73									
74									
75									
76									
77									
78									
79		1						1	45,355
80 & Over									
Total	1,375	858	693	624	136	17	5	3,708	\$ 192,670,656

Average Age: 37.14

Average Service: 8.76



Appendix A: Additional Membership Data

Municipal Fire

Nearest Age	Completed Years of Service								Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+			
Under 20	2								2	\$ 53,528
20 to 24	110	4							114	4,168,951
25 to 29	227	94	1						322	13,413,426
30 to 34	153	223	105	3					484	23,561,703
35 to 39	90	149	213	53	1				506	26,431,940
40 to 44	32	57	126	129	16	1			361	20,937,089
45 to 49	20	33	52	87	36	4			232	14,261,529
50 to 54	3	9	23	40	18	2			95	6,077,499
55 to 59	2	5	7	19	11	3	3		50	3,292,504
60	2		1	2	3				8	510,811
61		2		1	1		1		5	309,085
62							1		1	116,856
63				2				1	3	199,961
64								1	1	70,664
65										
66							1		1	97,824
67	2		1		1				4	147,109
68										
69										
70										
71										
72										
73										
74										
75										
76			1						1	59,210
77										
78										
79										
80 & Over										
Total	643	576	530	336	87	12	6	2,190	\$ 113,709,690	

Average Age: 36.90
 Average Service: 9.43



Appendix A: Additional Membership Data

All PERA Divisions

Nearest Age	Completed Years of Service								Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+			
Under 20	192							192	\$ 6,050,779	
20 to 24	2,144	47	2					2,193	68,879,968	
25 to 29	3,924	928	65					4,917	175,557,885	
30 to 34	3,144	1,909	848	56				5,957	240,550,778	
35 to 39	2,470	1,584	1,544	683	32			6,313	277,174,510	
40 to 44	2,025	1,248	1,355	1,257	465	11		6,361	297,969,481	
45 to 49	1,859	1,120	1,198	1,193	949	117	2	6,438	308,099,434	
50 to 54	1,633	1,039	1,095	939	848	173	17	5,744	266,546,620	
55 to 59	1,373	1,009	1,028	940	771	201	39	5,361	248,645,586	
60	252	167	208	170	137	40	12	986	46,259,066	
61	194	169	191	163	94	34	10	855	40,997,374	
62	193	125	172	105	74	26	7	702	32,463,329	
63	130	121	122	75	56	22	8	534	24,960,939	
64	129	117	100	87	42	25	10	510	25,540,026	
65	89	74	91	60	39	14	9	376	18,248,092	
66	72	55	52	38	32	8	6	263	12,862,608	
67	77	51	36	22	24	6	4	220	10,631,831	
68	67	36	34	29	13	5	2	186	8,474,051	
69	48	27	30	18	11	4	1	139	6,741,258	
70	41	19	16	6	8	6	1	97	4,473,457	
71	30	18	7	4	1	1		61	2,378,186	
72	24	12	13	10	5		1	65	3,196,442	
73	18	16	10	4	5	3	1	57	2,443,101	
74	11	3	13	4	3	1		35	1,220,803	
75	10	8	5	2	1	1	1	28	1,132,960	
76	8	2	7	2	3			22	849,481	
77	7	3		5				15	615,000	
78	6	1	2	1	1	1	1	13	470,950	
79	10	4	1	4				19	679,155	
80 & Over	15	6	4	3	4	1	1	34	1,058,311	
Total	20,195	9,918	8,249	5,880	3,618	700	133	48,693	\$ 2,135,171,462	

Average Age: 43.48

Average Service: 8.70



Appendix A: Additional Membership Data

Table A-2: Number of Annual Retirement Allowances of Benefit Recipients as of June 30, 2016

Type of Pension	Number	Total Annual Benefits	Average Annual Pension
Service Retirement Pensions			
Single Life Pension Terminating Upon Death*	13,881	\$ 403,515,797	\$ 29,070
Two Life 100% Survivor Pension			
Retired Member Recipient*	12,634	382,969,455	30,313
Survivor Recipient	2,257	49,696,593	22,019
Two Life 50% Survivor Pension			
Retired Member Recipient*	4,711	149,963,318	31,833
Survivor Recipient	879	11,220,862	12,765
Single Life with Temporary Child Survivor Pension			
Retired Member Recipient*	229	8,771,533	38,304
Child Recipient	3	88,412	29,471
Total Service Retirement Pensions	34,594	\$ 1,006,225,970	\$ 29,087
Disability Retirement Pensions			
Single Life Pension Terminating Upon Death*	379	\$ 6,324,090	\$ 16,686
Two Life 100% Survivor Pension			
Retired Member Recipient*	720	11,926,212	16,564
Survivor Recipient	190	2,890,866	15,215
Two Life 50% Survivor Pension			
Retired Member Recipient*	147	2,714,216	18,464
Survivor Recipient	22	190,295	8,650
Single Life with Temporary Child Survivor Pension			
Retired Member Recipient*	8	119,679	14,960
Child Recipient	1	6,238	6,238
Total Disability Retirement Pensions	1,467	\$ 24,171,596	\$ 16,477
Pre-Retirement Survivor Pensions			
Spouse Recipient	1,096	\$ 18,259,199	16,660
Child Recipient	49	486,943	9,938
Total Pre-Retirement Survivor Pensions	1,145	\$ 18,746,142	\$ 16,372
Total Pensions Being Paid	37,206	\$ 1,049,143,708	\$ 28,198

* Includes Co-Payees

Appendix A: Additional Membership Data



Table A-3: Distribution of Participants Receiving Benefits as of June 30, 2016

Attained Age	Retired Member		Disabled Member		Survivor Beneficiaries		Totals	
	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions
Under 40	13	\$ 370,406	42	\$ 743,821	255	\$ 3,689,124	310	\$ 4,803,351
40 to 44	281	11,092,914	72	1,404,984	102	1,612,989	455	14,110,887
45 to 49	1,270	48,578,087	139	2,739,825	160	2,685,619	1,569	54,003,531
50 to 54	2,733	104,646,448	206	3,868,526	229	4,054,635	3,168	112,569,609
55 to 59	3,640	136,313,037	330	5,802,446	340	6,525,927	4,310	148,641,410
60 to 64	5,036	167,298,053	334	5,319,079	462	9,352,045	5,832	181,969,177
65 to 69	7,127	200,303,736	110	1,042,829	580	12,122,843	7,817	213,469,408
70 to 74	4,816	126,689,332	3	51,510	584	11,877,810	5,403	138,618,652
75 to 79	3,167	75,878,751			597	11,221,647	3,764	87,100,398
80 to 84	1,919	44,900,578			529	9,557,263	2,448	54,457,841
85 to 89	1,006	20,927,559			384	6,391,027	1,390	27,318,586
90 to 94	360	7,129,743			215	3,039,824	575	10,169,567
95 to 99	83	1,034,439			52	630,408	135	1,664,847
100 & Over	22	168,197			8	78,247	30	246,444
Total	31,473	\$945,331,280	1,236	\$ 20,973,020	4,497	\$ 82,839,408	37,206	\$ 1,049,143,708



Appendix A: Additional Membership Data

**Table A-4: Distribution of Retirees by Years of Service at Retirement
(not including Disabled Members, Beneficiaries, and Co-Payees)**

Division	Years of Credited Service at Retirement							Total
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	
State General								
Average Monthly Benefit*	\$ 475	\$ 831	\$ 1,390	\$ 2,005	\$ 2,776	\$ 3,261	\$3,203	\$2,449
Number of Retirees*	539	1,577	1,686	1,658	2,222	6,057	660	14,399
State Police/Corrections								
Average Monthly Benefit*	\$ 1,339	\$1,701	\$ 1,556	\$ 2,255	\$ 2,857	\$ 3,315	\$3,816	\$2,885
Number of Retirees*	35	54	66	86	252	476	67	1,036
Municipal General								
Average Monthly Benefit*	\$ 714	\$ 723	\$ 1,171	\$ 1,837	\$ 2,630	\$ 3,147	\$3,261	\$2,289
Number of Retirees*	296	1,148	1,282	1,253	1,514	3,945	377	9,815
Municipal Police								
Average Monthly Benefit*	\$ 2,020	\$1,573	\$ 2,125	\$ 3,190	\$ 3,635	\$ 4,081	\$3,781	\$3,475
Number of Retirees*	42	50	81	462	1,869	143	36	2,683
Municipal Fire								
Average Monthly Benefit*	\$ 2,308	\$2,116	\$ 2,760	\$ 3,341	\$ 3,756	\$ 3,981	\$3,419	\$3,625
Number of Retirees*	11	24	50	225	1,089	62	36	1,497
Totals for All Divisions								
Average Monthly Benefit*	\$ 677	\$ 828	\$ 1,345	\$ 2,184	\$ 3,132	\$ 3,236	\$3,281	\$2,565
Number of Retirees*	923	2,853	3,165	3,684	6,946	10,683	1,176	29,430

* Does not include the following number of retirees with missing years of service at retirement

- State General – 403
- State Police/Corrections – 160
- Municipal General – 269
- Municipal Police – 88
- Municipal Fire – 44



Appendix A: Additional Membership Data

**Table A-5: Distribution of Recent Retiree Ages at Retirement
(not including Disabled Members, Beneficiaries, and Co-Payees)**

Division	2011-12 Retirees	2012-13 Retirees	2013-14 Retirees	2014-15 Retirees	2015-16 Retirees	All Current Retirees
State General						
Number	825	926	893	782	868	14,802
Average Monthly Benefit at Retirement	\$ 2,261	\$ 2,317	\$ 2,312	\$ 2,262	\$ 2,401	\$ 1,965
Average Age at Retirement	59.80	59.45	59.02	60.10	59.85	57.39
State Police/Corrections						
Number	64	55	69	59	48	1,196
Average Monthly Benefit at Retirement	\$ 2,619	\$ 2,600	\$ 2,899	\$ 2,765	\$ 2,615	\$ 2,322
Average Age at Retirement	52.61	52.52	50.55	50.26	51.54	51.16
Municipal General						
Number	552	634	692	625	694	10,084
Average Monthly Benefit at Retirement	\$ 2,140	\$ 2,152	\$ 2,199	\$ 2,106	\$ 2,092	\$ 1,888
Average Age at Retirement	59.16	59.72	59.60	60.07	60.85	57.78
Municipal Police						
Number	142	150	160	146	165	2,771
Average Monthly Benefit at Retirement	\$ 3,332	\$ 3,298	\$ 3,614	\$ 3,392	\$ 3,669	\$ 2,825
Average Age at Retirement	47.59	48.44	48.62	48.95	49.11	47.62
Municipal Fire						
Number	62	59	87	60	88	1,541
Average Monthly Benefit at Retirement	\$ 3,944	\$ 3,604	\$ 3,828	\$ 4,141	\$ 3,912	\$ 2,878
Average Age at Retirement	48.70	48.58	48.87	50.36	49.11	47.84
Totals for All Current Retirees						
Number	1,645	1,824	1,901	1,672	1,863	30,394
Average Monthly Benefit at Retirement	\$ 2,390	\$ 2,390	\$ 2,471	\$ 2,388	\$ 2,475	\$ 2,078
Average Age at Retirement	57.84	58.08	57.58	58.42	58.55	55.90



Appendix B: Summary of Actuarial Assumptions and Methods

Actuarial Cost Methods Used for the Valuation

An actuarial cost method is a procedure for allocating the actuarial present value of benefits and expenses to time periods. The method used for this valuation is known as the individual entry-age actuarial cost method and has the following characteristics:

- (i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at the time of retirement.
- (ii) Each annual normal cost is a constant percentage of the member's year-by-year projected compensation.

The individual entry-age actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's compensation between the entry-age of the member and the expected exit ages. The expected annual administrative expenses are included in the determination of the actuarially determined contributions.

The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future costs is called the actuarial accrued liability. Deducting actuarial value of assets from the actuarial accrued liability determines the unfunded actuarial accrued liability. Unfunded actuarial accrued liability was amortized as a level percent of payroll over 30 years to determine the actuarial determined contribution. This period is consistent with the policy established by the Retirement Board in October 1996.

Active member payroll was projected to increase 2.75% per year (3.5% prior to the June 30, 2016 valuation and 4.0% prior to the June 30, 2014 valuation) for the purpose of determining the contribution needed to amortize the unfunded actuarial accrued liability. This estimate is consistent with the base rate of increase in salaries used to calculate actuarial present values.

The actuarial value of assets used for funding purposes is derived as follows: prior year actuarial value of assets is increased by contributions and expected investment income and reduced by refunds, benefit payments and expenses. To this amount 25% of the difference between expected and actual investment income for each of the previous four years is added.



Appendix B: Summary of Actuarial Assumptions and Methods

Actuarial Assumptions Used for the Valuation (effective with June 30, 2014 Valuation, except as otherwise noted)

Assumed Rate of Investment Return (effective June 30, 2016). 7.25% per annum net of investment expenses for the first 10 years, 7.75% thereafter.

Administrative Expenses. 0.45% of payroll.

Price Inflation (effective June 30, 2016). 2.25% per annum for the first 10 years, 2.75% thereafter.

Real Investment Return (effective June 30, 2016). 5.0% over price inflation (4.5% over wage growth). This is the expected rate of return (net of investment expenses) above the rate of price inflation.

Salary Increases (effective June 30, 2016). Salary increases occur in recognition of (i) individual merit and longevity, (ii) inflation-related depreciation of the purchasing power of salaries, and (iii) other factors such as productivity gains and competition from other employers for personnel. Sample rates follow:

Attributable to:	Annual Rates of Salary Increase for Sample Years of Service				
	1	5	10	15	20
General Increase in Wage Level Due to:					
Inflation	2.25%	2.25%	2.25%	2.25%	2.25%
Other Factors	0.50	0.50	0.50	0.50	0.50
Increase Due to Merit/Longevity:					
State General	7.75	1.75	0.50	0.50	0.50
State Police	10.75	6.25	1.75	1.75	1.75
State Corrections	9.75	2.75	1.75	1.75	1.75
Municipal General*	2.25	1.75	0.50	0.50	0.50
Municipal Police	8.25	3.25	2.00	1.25	1.25
Municipal Fire	8.25	3.25	2.00	2.00	2.00

* Includes Municipal Detention Officers



Appendix B: Summary of Actuarial Assumptions and Methods

In the following schedules, State Corrections includes Adult Corrections Officers, Juvenile Corrections Officers and Municipal Detention Officers unless otherwise noted.

Mortality Assumption. The mortality assumptions are based on the RP-2000 Mortality Tables (Combined table for healthy post-retirement, Employee table for active members, and Disabled table for disabled retirees before retirement age) with projection to 2018 using Scale AA. For non-public safety groups, 25% of in-service deaths are assumed to be duty related and 35% are assumed to be duty-related for public safety groups.

Rates are shown for sample ages in the following schedule. Note that sex distinct mortality rates are used solely for determining the funded status and contribution rate adequacy. All benefit amounts are based on merged gender mortality rates.

Sample Mortality Rates								
Pre-Retirement			Post-Retirement			Disabled		
Age	Male	Female	Age	Male	Female	Age	Male	Female
25	0.03%	0.02%	45	0.12%	0.08%	45	1.78%	0.56%
30	0.04	0.02	50	0.15	0.12	50	2.09	0.85
35	0.07	0.04	55	0.26	0.24	55	2.51	1.43
40	0.09	0.05	60	0.50	0.46	60	3.14	2.00
45	0.12	0.08	65	0.99	0.89	65	Uses healthy post-retirement rates upon surviving to normal retirement age.	
50	0.15	0.12	70	1.69	1.53	70		
55	0.21	0.22	75	2.94	2.43	75		
60	0.36	0.36	80	5.37	4.04	80		
65	0.59	0.53	85	9.76	6.95	85		



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Retirement.

First Eligibility Rates: These rates are used to measure the probability of members retiring in the first year eligible for retirement at the indicated ages.

Sample Percent Retiring at First Eligibility by Age								
Ages	State General		State	State	Municipal General		Municipal	Municipal
	Male	Female	Police	Corrections	Male	Female	Police	Fire
40	55%	60%	60%	60%	55%	55%	60%	45%
45	55	60	60	60	55	55	50	35
50	55	60	50	50	55	55	50	30
55	55	60	50	50	55	55	50	50
60	35	40	50	50	30	30	50	50
65	25	30	100	50	30	35	50	50
70	25	30		100	25	25	100	100
75	25	30			25	25		
80	100	100			100	100		

Subsequent Eligibility Rates: These rates are used to measure the probability of members retiring after the first year eligible for retirement at the indicated ages.

Sample Percent Retiring After First Eligibility by Age								
Ages	State General		State	State	Municipal General		Municipal	Municipal
	Male	Female	Police	Corrections	Male	Female	Police	Fire
40	40%	35%	40%	50%	35%	35%	30%	40%
45	40	35	40	50	35	35	30	35
50	40	35	50	50	40	40	30	30
55	40	35	35	50	30	25	30	30
60	30	40	35	50	30	30	30	20
65	30	35	100	40	35	35	50	50
70	25	30		100	25	25	100	100
75	25	25			25	25		
80	100	100			100	100		



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Withdrawal from Active Membership. The rates are used to measure probabilities of active members terminating for a reason other than disability or death. The rates do not apply to members who are within the retirement rate range. Assumptions for State General and Municipal General are gender distinct and both based on age and service. Assumptions for all other plans are not gender distinct and are service related only. These rates do not vary by age.

State General Males					
Rates of Active Members Terminating During Year					
Sample Ages	Sample Service (Yr):				
	2	4	6	8	10+
20	18.76%	10.86%	8.21%	7.78%	5.11%
25	17.72	11.06	8.10	7.07	4.65
30	16.45	11.27	7.97	6.18	4.13
35	15.31	10.81	7.59	5.58	3.89
40	14.30	9.97	7.08	5.40	3.86
45	13.55	9.06	6.63	5.40	3.86
50	13.26	8.45	6.49	5.40	3.86
55	13.26	8.37	6.49	5.40	3.86
60	13.26	8.37	6.49	5.40	3.86
65	13.26	8.37			
70	13.26	8.37			

State General Females					
Rates of Active Members Terminating During Year					
Sample Ages	Sample Service (Yr):				
	2	4	6	8	10+
20	18.13%	11.95%	8.22%	6.05%	4.83%
25	17.76	11.95	8.02	5.81	4.25
30	17.28	11.89	7.81	5.54	3.55
35	16.34	11.23	7.45	5.28	3.46
40	15.22	10.24	6.99	5.06	3.46
45	14.19	9.20	6.58	4.95	3.46
50	13.52	8.55	6.45	4.80	3.46
55	13.37	8.50	6.45	4.70	3.46
60	13.37	8.50	6.45	4.70	3.46
65	13.37	8.50			
70	13.37	8.50			



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Withdrawal from Active Membership (cont.)

Municipal General Males					
Rates of Active Members Terminating During Year					
Sample Ages	Sample Service (Yr):				
	2	4	6	8	10+
20	21.70%	14.59%	11.29%	8.93%	8.54%
25	20.00	13.52	10.26	8.05	7.32
30	17.73	12.04	8.96	6.94	5.69
35	15.77	10.65	8.01	6.20	4.61
40	14.06	9.37	7.29	5.73	3.92
45	12.80	8.39	6.87	5.58	3.65
50	12.20	8.01	6.79	5.58	3.65
55	12.18	8.01	6.79	5.58	3.65
60	12.18	8.01	6.79	5.58	3.65
65	12.18	8.01			
70	12.18	8.01			

Municipal General Females					
Rates of Active Members Terminating During Year					
Sample Ages	Sample Service (Yr):				
	2	4	6	8	10+
20	24.40%	17.77%	14.41%	11.94%	7.51%
25	21.96	16.06	12.80	10.32	6.38
30	18.85	13.77	10.63	8.16	4.94
35	16.69	11.96	9.08	6.70	4.09
40	15.16	10.49	7.84	5.74	3.67
45	14.28	9.49	6.50	5.31	3.62
50	14.01	9.14	6.50	5.30	3.62
55	14.01	9.14	6.50	5.30	3.62
60	14.01	9.14	6.50	5.30	3.62
65	14.01	9.14			
70	14.01	9.14			



Appendix B: Summary of Actuarial Assumptions & Methods

Rates of Withdrawal from Active Membership (cont.)

Service Based Rates of Active Members Terminating During Year					
All Ages	Sample Service (Yr):				
	1	3	5	7	10+
State Police	8.00%	7.00%	4.00%	4.00%	4.00%
State Corrections	20.00	16.00	9.00	8.00	6.00
Municipal Detention	22.00	16.00	10.00	10.00	6.00
Municipal Police	14.00	9.50	6.80	5.15	3.80
Municipal Fire	10.00	7.50	5.00	3.30	3.00

Rates of Disability. The rates are used to measure the probabilities of active members becoming disabled. Rates for sample ages follow. For non-public safety groups, 25% disabilities are assumed to be duty related and 35% are assumed to be duty-related for public safety groups.

Rates Becoming Disabled at Indicated Ages (State Division)				
Sample Ages	State General		State	State
	Male	Female	Police	Corrections
25	0.02%	0.02%	0.05%	0.14%
30	0.04	0.03	0.09	0.16
35	0.08	0.06	0.14	0.21
40	0.13	0.12	0.35	0.27
45	0.24	0.20	0.42	0.46
50	0.41	0.39	0.69	0.90
55	0.57	0.61	1.59	1.40
60	0.74	0.73	2.31	1.88
65	0.75	0.73	2.31	1.88

Rates Becoming Disabled at Indicated Ages (Municipal Division)					
Sample Ages	Municipal General		Municipal	Municipal	Municipal
	Male	Female	Detention	Police	Fire
25	0.05%	0.04%	0.06%	0.07%	0.02%
30	0.08	0.04	0.10	0.08	0.02
35	0.12	0.04	0.15	0.12	0.02
40	0.17	0.06	0.22	0.17	0.08
45	0.25	0.14	0.32	0.26	0.08
50	0.40	0.25	0.51	0.42	0.33
55	0.65	0.39	0.85	0.73	0.33
60	0.80	0.51	1.04	1.22	1.17
65	0.82	0.59	1.07	1.22	1.17



Appendix B: Summary of Actuarial Assumptions & Methods

Miscellaneous and Technical Assumptions

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses. It is assumed that spouses have no eligible children for purposes of death-in-service benefits.
Pay Increase Timing:	Beginning of plan year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Decrement Timing:	All decrements are assumed to occur at the beginning of the plan year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	Neither disability nor withdrawal decrements operate during retirement eligibility.
Loads:	Retiree liabilities were increased by 1% to account for the pop-up provision.
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report and the actual payroll payable at the time contributions are made.
Benefit Service:	Exact fractional service is used to determine the amount of benefit payable.
Data Changes:	For missing dates of birth for active members, we assumed to enter the system at the average entry age. For retiree records with a joint and survivor option and a missing beneficiary date of birth, the beneficiary was assumed to be 3 years younger if the member was male and 3 years older if the member was female.



Appendix B: Summary of Actuarial Assumptions & Methods

Definitions of Technical Terms

Actuarial Accrued Liability. The difference between the actuarial present value of future benefits payments and the actuarial present value of future normal costs.

Actuarial Cost Method. A mathematical procedure for allocating the dollar amount of the “actuarial present value of future benefit payments” between future normal cost and actuarial accrued liability.

Actuarial Present Value. The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.

Amortization. Paying off an interest-discounted amount with periodic payments of interest and principal – as opposed to paying off with a lump sum payment.

Experience Gain (Loss). The difference between actual actuarial costs and anticipated actuarial costs – during the period between two valuation dates.

Normal Cost. The actuarial cost allocated to the current year by the actuarial cost method.

Unfunded Actuarial Accrued Liability. The difference between the actuarial accrued liability and the actuarial value of assets. Sometimes referred to as “unfunded accrued liability.”



Appendix C: Summary of Plan Provisions

Benefit Tier

Effective July 1, 2013, Senate Bill 27 establishes two tiers of benefits under each PERA coverage plan:

Tier 1

- Current active members employed by a PERA affiliate on June 30, 2013
- Inactive members who did not receive a refund and have employee contributions on account on June 30, 2013
- Currently retired or will retire on or before June 30, 2013

Note: State and Municipal General members hired between July 1, 2010 and June 30, 2013 are grandfathered into Tier 1 coverage plans.

Tier 2

- Active members first hired on or after July 1, 2013
- Members who received a refund of employee contributions on or before June 30, 2013 and return to work for a PERA affiliate on or after July 1, 2013

Normal Retirement Eligibility Conditions

Tier 1

Applicable to all members:

- Any age with 25 or more years of credited service; or
- Age 60 or older with 20 or more years of credited service; or
- Age 61 or older with 17 or more years of credited service; or
- Age 62 or older with 14 or more years of credited service; or
- Age 63 or older with 11 or more years of credited services or
- Age 64 or older with 8 or more years of credited service; or
- Age 65 or older with 5 or more years of credited service.

Applicable to Municipal Police (Plans 3, 4, & 5) and Municipal Fire (Plans 3, 4, & 5) members:

- Any age with 20 or more years of credited service



Appendix C: Summary of Plan Provisions

Normal Retirement Eligibility Conditions (cont.)

Tier 2

Applicable to State General and Municipal General (Plan 1-4) members:

- Age 65 or older with 8 or more years of credited service; or
- Any age if the sum of the member's age and years of credited service equals at least 85, provided member has at least 8 years of credited service.

Applicable to State Police Officers, Adult Correctional Officers, Peace Officers, Juvenile Correctional Officers, Municipal Police, Municipal Fire, and Municipal Detention Officers:

- Age 60 or older with 6 or more years of credited service; or
- Any age with 25 or more years of credited service

Normal Retirement Pension Amount

The amount of normal retirement pension is based on:

- Final average salary:
 - For Tier 1 members, the average of salary for the 36 consecutive months of credited service producing the largest average;
 - For Tier 2 members, the average of salary for the 60 consecutive months of credited service producing the largest average;
- Credited service (years and months); and the
- Coverage plan.



Appendix C: Summary of Plan Provisions

The pension accrual factor and maximum pension, as a percent of final average salary, under each coverage plan are shown below:

Coverage Plan	Pension Factor Per Year of Credited Service		Maximum Pension as Percent of Final Average Salary
	Tier 1	Tier 2	Tier 1 & Tier 2
State General Member Coverage Plan 3	3.0%	2.5%	90%
Peace Officers Coverage Plan 3	3.0	3.0	90
State Police and Adult Corrections Officers Member Coverage Plan 1	3.0	3.0	90
Hazardous Duty (Juvenile Corrections Officer) Coverage Plan 2	3.0	3.0	90
Municipal General Member Coverage Plan 1	2.0	2.0	90
Municipal General Member Coverage Plan 2	2.5	2.0	90
Municipal General Member Coverage Plan 3	3.0	2.5	90
Municipal General Member Coverage Plan 4	3.0	2.5	90
Municipal Detention Officer Coverage Plan 1	3.0	3.0	90
Municipal Police Member Coverage Plan 1	2.0	2.0	90
Municipal Police Member Coverage Plan 2	2.5	2.0	90
Municipal Police Member Coverage Plan 3	2.5	2.0	90
Municipal Police Member Coverage Plan 4	3.0	2.5	90
Municipal Police Member Coverage Plan 5	3.5	3.0	90
Municipal Fire Member Coverage Plan 1	2.0	2.0	90
Municipal Fire Member Coverage Plan 2	2.5	2.0	90
Municipal Fire Member Coverage Plan 3	2.5	2.0	90
Municipal Fire Member Coverage Plan 4	3.0	2.5	90
Municipal Fire Member Coverage Plan 5	3.5	3.0	90



Appendix C: Summary of Plan Provisions

Vested Termination of Membership (Employment)

Termination of employment and membership with at least 5 years of credited service for Tier 1 members. For Tier 2 State General and Municipal General (Non-Public Safety) members, vesting is 8 years. Tier 2 Public Safety members (State Police Officers, Adult Correctional Officers, Peace Officers, Juvenile Correctional Officers, Municipal Police, Fire, Detention Officers) are vested with at least 6 years of credited service. Accumulated member contributions must be left on deposit. Payment of the pension is available upon eligibility for normal retirement. In addition, certain disability and survivor pension provisions apply.

Normal and Optional Forms of Payment

The normal form of payment is for life. Optional contingent survivor beneficiary forms of payment are available on an actuarial equivalent basis. Total pension payments can never be less than the member's accumulated contributions.

Survivor Pensions – Death in the Line of Duty

Pensions are paid to the eligible spouse and eligible children if survivor coverage has not been elected under the Elective Survivor Pension Beneficiary provision. The amount of pension payable for life to an eligible spouse is the greater of 1) 50% of final average salary or 2) the accrued normal retirement pension reduced for option B election. The amount of pension payable to each eligible child is an equal share of 25% of final average salary. If there is not an eligible spouse or the eligible spouse dies, and if there are 2 or more eligible children, the amount of pension payable to each eligible child is an equal share of 50% of final average salary. An eligible child is an unmarried natural or adopted child who is under age 18. A child's pension terminates upon death, marriage or reaching age 18. The pension of any remaining eligible children is recalculated whenever a child's pension is terminated.



Appendix C: Summary of Plan Provisions

Survivor Pensions – Death Not in the Line of Duty

Requires 5 years of credited service for Tier 1 members, 6 years for Tier 2 Public Safety, and 8 years for Tier 2 Non-Public Safety. Benefit applies to members and vested former members who have not elected coverage under the Elective Survivor Pension Beneficiary provision. Pensions are paid to an eligible spouse OR eligible children. The amount of pension payable for the life of an eligible spouse is the greater of 1) 30% of final average salary or 2) accrued normal retirement pension reduced for option B election. An eligible child pension is paid if there is not an eligible spouse or following the death of an eligible spouse. The pension is payable to each child in equal shares. An eligible child is an unmarried natural or adopted child who is under age 18. A child's pension terminates upon death, marriage or reaching age 18. The pension of any remaining eligible children is recalculated whenever a child's pension is terminated.

Elective Survivor Beneficiary Pension

Applicable to Tier 1 members with 5 years of credited service, Tier 2 Public Safety with 6 years, and Tier 2 Non-Public Safety with 8 years. Also applicable to vested former members who have elected option B and designated a survivor pension beneficiary who has an insurable interest. The amount of pension is the amount of accrued normal retirement pension under optional form of payment B (100% continuation to beneficiary).

Disability Retirement

Applicable to Tier 1 members with 5 years of credited service, Tier 2 Public Safety with 6 years, and Tier 2 Non-Public Safety with 8 years. Also applicable to vested former members. The credited service requirement is waived if the disability is incurred in line of duty. The amount of disability pension is the accrued normal retirement pension at time of disability retirement. If the disability is in line of duty, the credited service used is the amount that would have been acquired when first eligible for normal retirement.



Appendix C: Summary of Plan Provisions

Cost-of-Living Increases

For Tier 1 Members, pensions are increased each July 1 by 2% subject to the following eligibility periods:

- If member retires prior to July 1, 2014, Cost-of-Living Adjustment (COLA) is payable after retirement has been in effect for at least 2 full calendar years.
- If member retires on or after July 1, 2014 but prior to July 1, 2015, COLA is payable after retirement has been in effect for at least 3 full calendar years.
- If member retires on or after July 1, 2015 but prior to July 1, 2016, COLA is payable after retirement has been in effect for at least 4 full calendar years.
- If member retires on or after July 1, 2016, COLA is payable after retirement has been in effect for at least 7 full calendar years.
- If retired on account of disability or if at least age 65, the waiting period is reduced to 1 full calendar year.

For Tier 2 Members, pensions are increased each July 1 by 2% subject to the following eligibility periods:

- COLA is payable after retirement has been in effect for at least 7 full calendar years.
- If retired on account of disability or if at least age 65, the waiting period is reduced to 1 full calendar year.

For certain Tier 1 and Tier 2 retirees, pensions are increased each July 1 by 2.5% subject the eligibility periods listed above, provided the conditions below are met:

- Retirees who retired with at least 25 years of service and whose annual pension is \$20,000 or less.
- Disabled retirees whose annual pension is \$20,000 or less.

Service Credit

Tier 1 Members in the State Police and Adult Corrections Officers Coverage Plan and members in the Municipal Detention Officers Coverage Plan receive 1.2 years of credited service for each year of service rendered. All other members receive 1.0 year of credited service for each year of service rendered.



Appendix C: Summary of Plan Provisions

Contributions by Members and Employers

Contributions by members and affiliated public employers are at the following rates shown below.

Coverage Plan	Percent of Salary Member*	Contribution Rate Employer
State General Member Coverage Plan 3	8.92%	16.99%
State Police Member and Adult Correctional Officer Member Coverage Plan 1	9.10	25.50
Hazardous Duty (Juvenile Corrections) Member Coverage Plan 2	6.28	26.12
Municipal General Member Coverage Plan 1	8.50	7.40
Municipal General Member Coverage Plan 2	10.65	9.55
Municipal General Member Coverage Plan 3	14.65	9.55
Municipal General Member Coverage Plan 4	17.15	12.05
Municipal Detention Officer Member Coverage Plan 1	18.15	17.05
Municipal Police Member Coverage Plan 1	8.50	10.40
Municipal Police Member Coverage Plan 2	8.50	15.40
Municipal Police Member Coverage Plan 3	8.50	18.90
Municipal Police Member Coverage Plan 4	13.85	18.90
Municipal Police Member Coverage Plan 5	17.80	18.90
Municipal Fire Member Coverage Plan 1	9.50	11.40
Municipal Fire Member Coverage Plan 2	9.50	17.90
Municipal Fire Member Coverage Plan 3	9.50	21.65
Municipal Fire Member Coverage Plan 4	14.30	21.65
Municipal Fire Member Coverage Plan 5	17.70	21.65

Interest is credited to member contributions on each June 30 at the rates set annually by the Retirement Board. Effective July 1, 2012, the interest crediting rate for member contributions is 2%.

* For employees whose annual salary is \$20,000 or less, the employee contribution rates shown above are reduced by 1.5%