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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, 2021**





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

October 28, 2021

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, 2021; 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 25-year period. The results of this valuation apply to the fiscal year beginning July 1, 2021 and ending June 30, 2022 (FY 2022). 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. Senate Bill 72 established a new COLA structure effective July 1, 2020. Under SB 72, future COLAs beginning at 7/1/2023 are provided through a profit-sharing mechanism using PERA's asset performance. Based on Asset Liability Model (ALM) output, we assume future COLA rates equal the 30-year average COLA rates under the median ALM output, currently 1.60% annually.

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.

Measuring pension obligations and actuarially determined contributions requires the use of assumptions regarding future economic and demographic experience. Whenever assumptions are made about future events, there is risk that actual experience will differ from expected. Appendix D of this report provides a discussion of the risk considerations for PERA in compliance with the guidance provided under Actuarial Standard of Practice Number 51, *Assessment and Disclosure of Risk in Measuring Pension Obligations*, (ASOP 51),

Annual actuarial valuations are performed for PERA which re-measure the assets and liabilities and compute a new actuarially determined contribution. PERA also has experience studies performed every four to five years to analyze the discrepancies between actuarial assumptions and actual experience and determine if the actuarial assumptions need to be changed. Annual actuarial valuations and periodic experience studies are practical ways to monitor and reassess risk.

In order to prepare the results in this report, we have utilized appropriate actuarial models that were developed for this purpose. These models use assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

We note that as we are preparing this report, the world is in the midst of a pandemic. We have considered available information but do not believe that there is yet sufficient data to warrant the modification of any of our assumptions. We will continue to monitor the situation and advise in the future of any adjustments that we believe would be appropriate.

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,

A handwritten signature in blue ink, appearing to read 'John J. Garrett', written in a cursive style.

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

A handwritten signature in blue ink, appearing to read 'Bryan Hoge', written in a cursive style.

Bryan Hoge, FSA, EA, FCA, MAAA
Consulting Actuary



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Section I: Board Summary

The table below summarizes the results of the June 30, 2021 actuarial valuation as compared with the prior year.

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

Valuation Date	June 30, 2021	June 30, 2020
Total Annual Payroll	\$ 2,388,518,383	\$ 2,409,950,766
Total Valuation Payroll	\$ 2,460,173,934	\$ 2,482,249,289
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 7,628,431,322	\$ 7,542,860,001
Retired Members and Survivors	<u>15,414,038,507</u>	<u>14,846,010,868</u>
Total	\$ 23,042,469,829	\$ 22,388,870,869
Actuarial Value of Assets (AVA)	\$ 16,460,210,558	\$ 15,737,838,938
Funded Ratio	71.4 %	70.3 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - AVA)	\$ 6,582,259,271	\$ 6,651,031,931
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	15.73 %	15.50 %
Member Contribution Rate	<u>12.41 %</u>	<u>12.20 %</u>
Total	28.14 %	27.70 %
Less Normal Cost:		
Retirement	10.67 %	10.74 %
Termination	3.81 %	3.78 %
Pre-Retirement Survivors	0.85 %	0.85 %
Disability	<u>0.91 %</u>	<u>0.90 %</u>
Total Normal Cost	16.24 %	16.27 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	11.40 %	10.93 %
Amortization Period	72 years	106 years
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	5.87 %	6.37 %



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 25 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 investment earnings of approximately \$3.8 billion on the market value of assets. The actuarial value of assets smooths the unexpected portion of the market return over a four-year period. The return on the actuarial value of assets was 9.07% compared to an expected return of 7.25%. As of June 30, 2021, the actuarial value of assets is 92.66% of market value. Table III-4 provides the development of the actuarial value of assets.
- The total actuarial gain due to the investment experience of the total PERA Fund is \$280.7 million. The loss on non-investment related items totaled \$13.9 million. The net gain due to the plan’s experience was \$266.8 million.
- The total decrease to the UAAL of PERA is \$68.8 million since the previous valuation and the funded ratio increased from 70.3% to 71.4%.
- Based on the current statutory contribution rates and actuarial assumptions, the UAAL is projected to be fully amortized in 72 years. Under SB 72, there is expected to be further increases to both the employer and employee contributions.

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, 2021	June 30, 2020
Total Annual Payroll	\$ 989,784,230	\$ 1,002,475,715
Total Valuation Payroll	\$ 1,019,477,757	\$ 1,032,549,986
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 3,087,468,686	\$ 3,082,550,456
Retired Members and Survivors	<u>6,791,048,303</u>	<u>6,607,155,638</u>
Total	\$ 9,878,516,989	\$ 9,689,706,094
Actuarial Value of Assets (AVA)	\$ 5,981,582,669	\$ 5,807,551,328
Funded Ratio	60.6 %	59.9 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - AVA)	\$ 3,896,934,320	\$ 3,882,154,766
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	18.24 %	17.74 %
Member Contribution Rate	<u>9.92 %</u>	<u>9.42 %</u>
Total	28.16 %	27.16 %
Less Normal Cost:		
Retirement	9.50 %	9.66 %
Termination	3.65 %	3.62 %
Pre-Retirement Survivors	0.84 %	0.84 %
Disability	<u>1.09 %</u>	<u>1.08 %</u>
Total Normal Cost	15.08 %	15.20 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	12.58 %	11.46 %
Amortization Period	Infinite	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	12.10 %	12.81 %



Section I: Board Summary

Summary of Key Findings – State General Division

The UAAL increased from \$3.88 billion to \$3.90 billion. The funded ratio increased from 59.9% to 60.6%. Table IV-3 provides the reconciliation of the UAAL. In the course of preparing the valuation report, we note the following key findings:

- The State General Division experienced a net actuarial gain of \$139.1 million during the plan year ended June 30, 2021. The non-investment related gain of \$46.6 million is primarily due to lower than expected salary increases, fewer than expected service retirements, and withdrawals. In addition, the plan experienced a \$92.5 million gain due to investment related experience. Table IV-4 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The financing period for the unfunded liability based upon the statutory contribution rates is an infinite period for the thirteenth consecutive year.



Section I: Board Summary

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

Valuation Date	June 30, 2021	June 30, 2020
Total Annual Payroll	\$ 116,842,280	\$ 113,842,830
Total Valuation Payroll	\$ 120,347,548	\$ 117,258,115
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 427,473,543	\$ 388,547,885
Retired Members and Survivors	<u>683,557,586</u>	<u>659,603,204</u>
Total	\$1,111,031,129	\$1,048,151,089
Actuarial Value of Assets (AVA)	\$1,434,367,187	\$1,332,772,683
Funded Ratio	129.1 %	127.2 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - AVA)	\$ (323,336,058)	\$ (284,621,594)
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	25.59 %	25.56 %
Member Contribution Rate	<u>9.01 %</u>	<u>8.99 %</u>
Total	34.60 %	34.55 %
Less Normal Cost:		
Retirement	16.06 %	14.96 %
Termination	4.30 %	4.29 %
Pre-Retirement Survivors	0.71 %	0.68 %
Disability	<u>1.74 %</u>	<u>1.69 %</u>
Total Normal Cost	22.81 %	21.62 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	11.29 %	12.43 %
Amortization Period	0	0
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	N/A	N/A



Section I: Board Summary

Summary of Key Findings – State Police/Corrections Division

As of June 30, 2021, the actuarial value of assets exceeded accrued liabilities by \$323.3 million. As of June 30, 2020, the actuarial value of assets exceeded accrued liabilities by \$284.6 million. This represents a decrease in the UAAL of about \$38.7 million from the previous year. The funded ratio increased from 127.2% to 129.1%. 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 Police/Corrections Division experienced a net actuarial gain of \$9.0 million during the plan year ended June 30, 2021. The actuarial gain is comprised of a \$28.5 million investment related gain and an \$19.5 million loss due to non-investment related experience, primarily due to new members. Table IV-4 provides the detailed information on the sources and magnitude of actuarial gains and losses.



Section I: Board Summary

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

Valuation Date	June 30, 2021	June 30, 2020
Total Annual Payroll	\$ 912,307,045	\$ 924,361,625
Total Valuation Payroll	\$ 939,676,256	\$ 952,092,474
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 2,576,082,656	\$ 2,548,387,539
Retired Members and Survivors	<u>4,705,461,568</u>	<u>4,506,418,609</u>
Total	\$ 7,281,544,224	\$ 7,054,806,148
Actuarial Value of Assets (AVA)	\$ 5,679,750,605	\$ 5,410,004,791
Funded Ratio	78.0 %	76.7 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - AVA)	\$ 1,601,793,619	\$ 1,644,801,357
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	10.01 %	10.03 %
Member Contribution Rate	<u>13.53 %</u>	<u>13.53 %</u>
Total	23.54 %	23.56 %
Less Normal Cost:		
Retirement	7.95 %	8.04 %
Termination	4.05 %	4.04 %
Pre-Retirement Survivors	0.93 %	0.93 %
Disability	<u>0.76 %</u>	<u>0.76 %</u>
Total Normal Cost	13.69 %	13.77 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	9.35 %	9.29 %
Amortization Period	34 years	35 years
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	1.65 %	1.86 %



Section I: Board Summary

Summary of Key Findings – Municipal General Division

The UAAL decreased from \$1.64 billion to \$1.60 billion. The current statutory rate will amortize the UAAL over a 34-year period. The funded ratio increased from 76.7% to 78.0%. 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 \$74.1 million during the plan year ended June 30, 2021. The actuarial gain is comprised of a \$99.0 million investment related gain and a \$24.9 million loss due to non-investment related experience.
- The amortization period decreased from 35 years to 34 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, 2021	June 30, 2020
Total Annual Payroll	\$ 229,410,194	\$ 229,730,475
Total Valuation Payroll	\$ 236,292,500	\$ 236,622,389
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 913,240,294	\$ 912,825,415
Retired Members and Survivors	<u>2,082,684,309</u>	<u>1,973,722,843</u>
Total	\$ 2,995,924,603	\$ 2,886,548,258
Actuarial Value of Assets (AVA)	\$ 2,283,030,585	\$ 2,161,723,690
Funded Ratio	76.2 %	74.9 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - AVA)	\$ 712,894,018	\$ 724,824,568
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	18.96 %	18.93 %
Member Contribution Rate	<u>17.30 %</u>	<u>17.28 %</u>
Total	36.26 %	36.21 %
Less Normal Cost:		
Retirement	17.51 %	17.75 %
Termination	3.77 %	3.73 %
Pre-Retirement Survivors	0.67 %	0.68 %
Disability	<u>0.54 %</u>	<u>0.54 %</u>
Total Normal Cost	22.49 %	22.70 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	13.27 %	13.01 %
Amortization Period	59 years	70 years
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	6.21 %	6.77 %



Section I: Board Summary

Summary of Key Findings – Municipal Police Division

The UAAL decreased from \$724.8 million to \$712.9 million. The funded ratio increased from 74.9% to 76.2%. 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 \$26.4 million during the plan year ended June 30, 2021. The gain is comprised of a \$41.3 million investment related gain and a \$14.9 million loss due to non-investment related experience. Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- Based upon the statutory contribution rates, the financing period for the unfunded liability is now 59 years.



Section I: Board Summary

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

Valuation Date	June 30, 2021	June 30, 2020
Total Annual Payroll	\$ 140,174,634	\$ 139,540,121
Total Valuation Payroll	\$ 144,379,873	\$ 143,726,325
Actuarial Accrued Liability (AAL)		
Active and Deferred Vested Members	\$ 624,166,143	\$ 610,548,706
Retired Members and Survivors	<u>1,151,286,741</u>	<u>1,099,110,574</u>
Total	\$ 1,775,452,884	\$ 1,709,659,280
Actuarial Value of Assets (AVA)	\$ 1,081,479,512	\$ 1,025,786,446
Funded Ratio	60.9 %	60.0 %
Unfunded Actuarial Accrued Liability (UAAL) (AAL - AVA)	\$ 693,973,372	\$ 683,872,834
Calculation of Required Contribution		
Statutory Contribution Rate		
Employer Contribution Rate	21.79 %	21.81 %
Member Contribution Rate	<u>17.57 %</u>	<u>17.57 %</u>
Total	39.36 %	39.38 %
Less Normal Cost:		
Retirement	21.08 %	21.31 %
Termination	2.98 %	2.92 %
Pre-Retirement Survivors	0.75 %	0.75 %
Disability	<u>0.55 %</u>	<u>0.53 %</u>
Total Normal Cost	25.36 %	25.51 %
Less Administrative Expenses	0.50 %	0.50 %
Amount Remaining to Amortize UAAL	13.50 %	13.37 %
Amortization Period	Infinite	Infinite
Increase in Statutory Rate Necessary to Amortize UAAL over 25 Years	17.53 %	17.35 %



Section I: Board Summary

Summary of Key Findings – Municipal Fire Division

The UAAL increased from \$683.9 million to \$694.0 million and the funded ratio increased from 60.0% to 60.9%. 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 \$18.1 million. The gain is comprised of a \$19.4 million investment related gain and a \$1.3 million loss due to non-investment related experience. Table IV-5 provides the detailed information on the sources and magnitude of actuarial gains and losses.
- The financing period for the unfunded liability based upon the statutory contribution rates is an infinite period for the thirteenth 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 additional disclosure 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: PERA 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, 2021.

Table II-1: Summary of Membership Data as of June 30, 2021

Group	Count					Totals
	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	
Total Active Members	18,672	2,277	20,592	3,724	2,414	47,679
Inactive Members						
Deferred Vested	3,415	156	2,547	298	149	6,565
Other	6,904	558	9,838	668	267	18,235
Total Inactive Members	10,319	714	12,385	966	416	24,800
Retirees						
Service*	17,290	1,353	12,149	3,412	1,844	36,048
Disabled	740	48	596	68	21	1,473
Beneficiaries	2,344	224	2,056	384	214	5,222
Total Retirees	20,374	1,625	14,801	3,864	2,079	42,743
Totals	49,365	4,616	47,778	8,554	4,909	115,222

* Counts include Co-Payees as follows:

- State General - 488
- State Police - 102
- Municipal General - 338
- Municipal Police - 265
- Municipal Fire - 157



Section II: PERA Membership Data

Table II-2: Summary of Active Membership Valuation Data

Division	Number		Annual Payroll		Average Salary	
	2021	2020	2021	2020	2021	2020
State Division						
General*	18,672	19,065	\$ 989,784,230	\$1,002,475,715	\$53,009	\$52,582
Police	652	579	44,018,271	37,374,302	67,513	64,550
Adult Corrections*	1,487	1,578	67,332,977	71,182,420	45,281	45,109
Juvenile Corrections*	138	137	5,491,032	5,286,108	39,790	38,585
Total State Division	20,949	21,359	\$1,106,626,510	\$1,116,318,545	\$52,825	\$52,265
Municipal Division						
General Coverage Plans						
Plan 1	921	949	\$ 33,354,529	\$ 33,996,613	\$36,216	\$35,824
Plan 2	6,017	6,209	245,259,356	249,740,077	40,761	40,222
Plan 3	12,361	12,598	579,809,810	583,894,391	46,906	46,348
Plan 4	692	715	27,464,130	27,242,753	39,688	38,102
Detention Officers Plan 1	601	666	26,419,220	29,487,791	43,959	44,276
Total General	20,592	21,137	\$ 912,307,045	\$ 924,361,625	\$44,304	\$43,732
Police Coverage Plans						
Plan 1	79	107	\$ 3,895,658	\$ 5,061,524	\$49,312	\$47,304
Plan 2	57	54	2,752,703	2,457,687	48,293	45,513
Plan 3	50	62	2,416,455	3,092,839	48,329	49,885
Plan 4	148	117	7,573,558	5,538,508	51,173	47,338
Plan 5	3,390	3,433	212,771,820	213,579,917	62,765	62,214
Total Police	3,724	3,773	\$ 229,410,194	\$ 229,730,475	\$61,603	\$60,888
Fire Coverage Plans						
Plan 1	23	19	\$ 1,192,011	\$ 978,757	\$51,827	\$51,514
Plan 2	17	16	809,562	748,303	47,621	46,769
Plan 3	1	7	37,440	297,536	37,440	42,505
Plan 4	12	6	621,567	254,135	51,797	42,356
Plan 5	2,361	2,383	137,514,054	137,261,390	58,244	57,600
Total Fire	2,414	2,431	\$ 140,174,634	\$ 139,540,121	\$58,067	\$57,400
Total Municipal Division	26,730	27,341	\$1,281,891,873	\$1,293,632,221	\$47,957	\$47,315
Total PERA	47,679	48,700	\$2,388,518,383	\$2,409,950,766	\$50,096	\$49,486

*Reflects members transferring from State General and State Juvenile Corrections to State Adult Corrections under the provisions of Senate Bill 72



Section II: PERA Membership Data

Table II-3: Summary of Deferred Vested Members as of June 30, 2021

Division	Number	Average Age	Average Service	Average Annual Benefit
State Division				
General	3,415	51.38	9.31	\$ 13,621
Police/Hazardous Duty	<u>156</u>	46.32	9.98	12,155
Total State Division	3,571	51.15	9.33	\$ 13,557
Municipal Division				
General	2,547	51.09	9.54	\$ 11,548
Police	298	42.94	8.93	15,717
Fire	<u>149</u>	44.29	8.37	15,683
Total Municipal Division	2,994	49.94	9.42	\$ 12,169
PERA Totals	6,565	50.60	9.37	\$ 12,924



Section II: PERA Membership Data

Table II-4: Summary of Retirees and Survivors as of June 30, 2021

Type of Retirement	Division					Total
	State General	State Police/ Corrections	Municipal General	Municipal Police	Municipal Fire	
Service						
Number	17,290	1,353	12,149	3,412	1,844	36,048
Total Annual Benefits	\$ 542,196,116	\$ 48,110,915	\$ 354,744,244	\$ 145,533,059	\$ 82,982,419	\$ 1,173,566,753
Avg Annual Benefit	\$ 31,359	\$ 35,559	\$ 29,199	\$ 42,653	\$ 45,001	\$ 32,556
Avg Age	70.29	64.36	69.42	61.25	62.81	68.54
Disability						
Number	740	48	596	68	21	1,473
Total Annual Benefits	\$ 13,610,255	\$ 927,170	\$ 10,741,579	\$ 1,992,014	\$ 570,138	\$ 27,841,156
Avg Annual Benefit	\$ 18,392	\$ 19,316	\$ 18,023	\$ 29,294	\$ 27,149	\$ 18,901
Avg Age	60.34	60.20	59.13	52.26	50.81	59.34
Survivors						
Number	2,344	224	2,056	384	214	5,222
Total Annual Benefits	\$ 47,350,528	\$ 5,844,783	\$ 39,102,079	\$ 11,530,072	\$ 7,307,706	\$ 111,135,168
Avg Annual Benefit	\$ 20,201	\$ 26,093	\$ 19,019	\$ 30,026	\$ 34,148	\$ 21,282
Avg Age	70.62	68.67	69.95	67.40	72.13	70.09
Total						
Number	20,374	1,625	14,801	3,864	2,079	42,743
Total Annual Benefits	\$ 603,156,899	\$ 54,882,868	\$ 404,587,902	\$ 159,055,145	\$ 90,860,263	\$ 1,312,543,077
Avg Annual Benefit	\$ 29,604	\$ 33,774	\$ 27,335	\$ 41,163	\$ 43,704	\$ 30,708
Avg Age	69.96	64.83	69.08	61.71	63.65	68.41



Section II: PERA 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				
6/30/2021	18,672	\$ 989,784,230	\$ 53,009	0.81 %
6/30/2020	19,065	1,002,475,715	52,582	6.36 %
6/30/2019	18,923	935,478,450	49,436	4.93 %
6/30/2018	19,114	900,513,193	47,113	(2.55)%
6/30/2017	19,213	928,864,843	48,346	5.02 %
State Police/Corrections Division				
6/30/2021	2,277	\$ 116,842,280	\$ 51,314	3.40 %
6/30/2020	2,294	113,842,830	49,626	4.80 %
6/30/2019	1,863	88,220,403	47,354	7.60 %
6/30/2018	1,928	84,845,998	44,007	(4.57)%
6/30/2017	1,907	87,941,130	46,115	10.00 %
Municipal General Division				
6/30/2021	20,592	\$ 912,307,045	\$ 44,304	1.31 %
6/30/2020	21,137	924,361,625	43,732	2.82 %
6/30/2019	21,198	901,598,748	42,532	1.47 %
6/30/2018	21,511	901,617,649	41,914	4.22 %
6/30/2017	21,673	871,633,574	40,217	1.16 %
Municipal Police Division				
6/30/2021	3,724	\$ 229,410,194	\$ 61,603	1.17 %
6/30/2020	3,773	229,730,475	60,888	4.66 %
6/30/2019	3,687	214,508,600	58,180	5.39 %
6/30/2018	3,748	206,898,932	55,202	4.53 %
6/30/2017	3,726	196,767,735	52,809	1.63 %
Municipal Fire Division				
6/30/2021	2,414	\$ 140,174,634	\$ 58,067	1.16 %
6/30/2020	2,431	139,540,121	57,400	3.91 %
6/30/2019	2,389	131,964,078	55,238	0.27 %
6/30/2018	2,309	127,203,502	55,090	3.15 %
6/30/2017	2,232	119,207,608	53,408	2.86 %

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
6/30/2021	47,679	\$ 2,388,518,383	\$ 50,096	1.23 %
6/30/2020	48,700	2,409,950,766	49,486	4.69 %
6/30/2019	48,060	2,271,770,279	47,269	3.45 %
6/30/2018	48,610	2,221,079,274	45,692	1.05 %
6/30/2017	48,751	2,204,414,890	45,218	3.12 %



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, 2021.

Table III-1: Market Value Summary as of June 30, 2021

Division	June 30, 2021	June 30, 2020
State General	\$ 6,455,414,883	\$ 5,406,336,447
State Police/Corrections	1,547,990,858	1,240,698,037
Municipal General	6,129,673,134	5,036,254,426
Municipal Police	2,463,881,289	2,012,380,935
Municipal Fire	1,167,149,118	954,919,955
Total Market Value of Assets	\$ 17,764,109,282	\$ 14,650,589,800

Table III-2: Actuarial Value Summary as of June 30, 2021

Division	June 30, 2021	June 30, 2020
State General	\$ 5,981,582,669	\$ 5,807,551,328
State Police/Corrections	1,434,367,187	1,332,772,683
Municipal General	5,679,750,605	5,410,004,791
Municipal Police	2,283,030,585	2,161,723,690
Municipal Fire	1,081,479,512	1,025,786,446
Total Actuarial Value of Assets	\$ 16,460,210,558	\$ 15,737,838,938



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, 2021	June 30, 2020
Beginning of Year Market Value	\$ 14,691,984,206	\$ 15,507,545,549
Audit Adjustment	-	-
Revised Beginning of Year Market Value	\$ 14,691,984,206	\$ 15,507,545,549
Revenues:		
a. Member Contributions	\$ 298,572,637	\$ 289,776,597
b. Employer Contributions	379,184,992	367,524,721
c. Appropriations	-	55,900,000
d. Purchases of Service	10,979,261	7,376,041
e. Investment Income		
1. Interest, dividends, etc.	404,664,374	295,948,452
2. Realized/Unrealized gains (losses)	3,478,447,098	(457,794,648)
3. Security lending and other gains (losses)	2,016,817	3,072,416
f. Other Income	1,990,689	1,645,633
g. Settlement Award	-	-
h. Total Revenues	\$ 4,575,855,868	\$ 563,449,212
Expenditures :		
a. Benefit Payments	\$ 1,314,819,963	\$ 1,255,018,086
b. Refunds of Member Contributions	40,353,832	44,903,265
c. Investment Expenses	85,987,601	64,770,855
d. Administrative Expenses	12,730,398	14,318,349
e. Total Expenditures	\$ 1,453,891,794	\$ 1,379,010,555
End of Year Market Value	\$ 17,813,948,280	\$ 14,691,984,206

The market value rate of return for the plan year is 26.47% on both an adjusted basis and an unadjusted basis. This return is based on a simplified dollar-weighted basis which may not match more precise time-weighted return calculations. PERA’s cash flow is (4.17)% 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 1.12 contributing active members for each member receiving a benefit as of June 30, 2021. 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, 2021
(Total PERA with Legislative Division)**

A. Actuarial Value Beginning of Year		\$ 15,782,305,304
B. Market Value End of Year		17,813,948,280
C. Revised Market Value Beginning of Year		14,691,984,206
D. Cash Flow		
D1. Contributions & Appropriations		\$ 677,757,629
D2. Service Purchases		10,979,261
D3. Benefit Payments and Refunds		(1,355,173,795)
D4. Administrative Expenses		(12,730,398)
D5. Other		1,990,689
D6. Net		\$ (677,176,614)
E. Investment Income		
E1. Market Total (B - C - D6)		\$ 3,799,140,688
E2. Assumed Rate		7.25%
E3. Amount for Immediate Recognition		1,119,669,482
E4. Amount for Phased-In Recognition		2,679,471,206
F. Phased-In Recognition of Investment Income		
F1. Current Year: 0.25 *E4		\$ 669,867,802
F2. First Prior Year (2019/2020)	\$(1,328,985,588) x 25%	(332,246,397)
F3. Second Prior Year (2018/2019)	(150,214,662) x 25%	(37,553,666)
F4. Third Prior Year (2017/2018)	(73,898,297) x 25%	(18,474,574)
F5. Total Recognized Investment Gain		\$ 281,593,165
G. Audit Adjustment		\$ -
H. Actuarial Value End of Year		\$16,506,391,337
(A + D6 + E3 + F5 + G)		
I. Difference Between Market & Actuarial Values		\$ 1,307,556,943
J. Rate of Return on Actuarial Value		9.07 %
K. Actuarial Value as a Percentage of Market Value		92.66 %



Table III-5: Allocation of Actuarial Value by Division as of June 30, 2021

	State Division		PERA Totals w/o Legislative
	General	Police	
Member Contribution Fund	\$ 963,306,737	\$ 75,673,068	\$ 2,850,634,376
Employer Contribution Fund	1,809,665,559	419,957,755	4,387,247,778
Retirement Reserve Fund	3,682,442,587	1,052,360,035	10,526,227,128
Total Fund Balances	\$ 6,455,414,883	\$ 1,547,990,858	\$ 17,764,109,282
Approximate % of Total Fund Balance*	36.34%	8.71%	100%
Actuarial Value Adjustment*	(473,832,214)	(113,623,671)	(1,303,898,724)
Total Actuarial Value of Assets	\$ 5,981,582,669	\$ 1,434,367,187	\$ 16,460,210,558

	Municipal Division			PERA Totals w/o Legislative
	General	Police	Fire	
Member Contribution Fund	\$ 1,232,683,304	\$ 340,676,470	\$ 238,294,797	\$ 2,850,634,376
Employer Contribution Fund	1,335,590,933	575,939,730	246,093,801	4,387,247,778
Retirement Reserve Fund	3,561,398,897	1,547,265,089	682,760,520	10,526,227,128
Total Fund Balances	\$ 6,129,673,134	\$ 2,463,881,289	\$ 1,167,149,118	\$ 17,764,109,282
Approximate % of Total Fund Balance*	34.51%	13.87%	6.57%	100.00%
Actuarial Value Adjustment*	(449,922,529)	(180,850,704)	(85,669,606)	(1,303,898,724)
Total Actuarial Value of Assets	\$ 5,679,750,605	\$ 2,283,030,585	\$ 1,081,479,512	\$ 16,460,210,558

* 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. 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, 2021.

Table III-6: Actuarial Investment Gain (Loss) for the Year Ending June 30, 2021
(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)	\$ 5,807.6	\$ 1,332.8	\$ 5,410.0	\$ 2,161.7	\$ 1,025.8	\$ 15,737.9
2. Employee and Employer Contributions	283.9	35.0	219.9	91.9	58.0	688.7
3. Benefit Payments	(607.7)	(56.8)	(430.0)	(164.4)	(94.0)	(1,352.9)
4. Administrative Expenses	(4.6)	(1.1)	(4.4)	(1.8)	(0.8)	(12.7)
5. Other	0.7	0.2	0.7	0.3	0.1	2.0
6. Interest [1 x 7.25% + (2 + 3 + 4 + 5) x 7.25% x 0.5]	409.2	95.8	384.5	154.0	73.0	1,116.5
7. Expected End of Year AVA	\$ 5,889.1	\$ 1,405.9	\$ 5,580.7	\$ 2,241.7	\$ 1,062.1	\$ 16,179.5
8. Actual End of Year AVA	5,981.6	1,434.4	5,679.7	2,283.0	1,081.5	16,460.2
9. Actuarial Investment Gain (Loss) (8 - 7)	\$ 92.5	\$ 28.5	\$ 99.0	\$ 41.3	\$ 19.4	\$ 280.7



Section III: PERA Assets

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, 2021

Division	Reported Fund Balances	Actuarial Present Value of Pensions Being Paid	Transfer
State General			
Members Contribution Fund	\$ 963,306,737		
Employers Accumulation Fund	1,809,665,559		\$ (3,108,605,716)
Retirement Reserve Fund	3,682,442,587	\$ 6,791,048,303	3,108,605,716
State Police/Corrections			
Members Contribution Fund	75,673,068		
Employers Accumulation Fund	419,957,755		-
Retirement Reserve Fund	1,052,360,035	683,557,586	-
Municipal General			
Members Contribution Fund	1,232,683,304		
Employers Accumulation Fund	1,335,590,933		(1,144,062,671)
Retirement Reserve Fund	3,561,398,897	4,705,461,568	1,144,062,671
Municipal Police			
Members Contribution Fund	340,676,470		
Employers Accumulation Fund	575,939,730		(535,419,220)
Retirement Reserve Fund	1,547,265,089	2,082,684,309	535,419,220
Municipal Fire			
Members Contribution Fund	238,294,797		
Employers Accumulation Fund	246,093,801		(468,526,221)
Retirement Reserve Fund	682,760,520	1,151,286,741	468,526,221
Total End of Year Market Value	\$ 17,764,109,282		



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, 2021

	Actuarial Accrued Liability	Present Value of Future Normal Cost	Total Actuarial Present Value
Active Members			
Service Retirement	\$ 6,451,636,877	\$ 1,897,378,605	\$ 8,349,015,482
Termination Benefits	310,379,671	710,955,953	1,021,335,624
Survivor Benefits	157,939,758	143,849,957	301,789,715
Disability Retirement	102,382,759	163,287,240	265,669,999
Total for Active Members	\$ 7,022,339,065	\$ 2,915,471,755	\$ 9,937,810,820
Inactive Members	\$ 606,092,257		\$ 606,092,257
Retirees and Beneficiaries			
Service Retirements	\$ 13,915,504,373		\$ 13,915,504,373
Beneficiaries	1,084,318,564		1,084,318,564
Disability Retirements	414,215,570		414,215,570
Total for Retirees and Beneficiaries	\$ 15,414,038,507		\$ 15,414,038,507
Total	\$ 23,042,469,829	\$ 2,915,471,755	\$ 25,957,941,584

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	\$ 9,878.5	\$ 1,111.0	\$ 7,281.5	\$ 2,995.9	\$ 1,775.5
2. Actuarial Value of Assets	5,981.6	1,434.4	5,679.8	2,283.0	1,081.5
3. Unfunded Actuarial Accrued Liability (1-2)	3,896.9	(323.4)	1,601.8	712.9	694.0
Funded Ratio (2 / 1)	60.6%	129.1%	78.0%	76.2%	60.9%

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 25 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, 2021, the funded ratio of PERA is 71.4% as compared to a ratio of 70.3% as of June 30, 2020. 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	\$ 3,882.1	\$ (284.6)	\$ 1,644.8	\$ 724.8	\$ 683.9
2. Normal Cost	156.9	25.3	131.1	53.7	36.7
3. Contributions	(283.9)	(35.0)	(219.9)	(91.9)	(58.0)
4. Other Income/Expense	3.9	0.9	3.7	1.5	0.7
5. Interest [(1 x 7.25%) + (2 + 3 + 4) x 7.25% x 0.5]	277.0	(21.0)	116.2	51.2	48.8
6. Expected End of Year	4,036.0	(314.4)	1,675.9	739.3	712.1
7. Assumption Changes	0	0	0	0	0
8. Other Changes	0	0	0	0	0
9. Expected UAAL after changes (6 +7 + 8)	4,036.0	(314.4)	1,675.9	739.3	712.1
10. Actual UAAL	3,896.9	(323.4)	1,601.8	712.9	694.0
11. Total Actuarial Gain (Loss)	139.1	9.0	74.1	26.4	18.1

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	\$4,036.0	59.3 %	25.56 %	(\$314.4)	128.8 %	(16.86)%
Retirement	(\$41.7)	0.2 %	(0.26)%	\$0.3	(0.0)%	0.02 %
Disability	(\$4.0)	0.0 %	(0.03)%	(\$1.0)	0.1 %	(0.05)%
Pre-Retirement Death	(\$3.7)	0.0 %	(0.02)%	(\$0.3)	0.0 %	(0.02)%
Withdrawal	(\$37.6)	0.2 %	(0.24)%	(\$0.6)	0.1 %	(0.03)%
Pay Increases	(\$49.6)	0.3 %	(0.31)%	(\$11.5)	1.4 %	(0.61)%
New Entrants	\$25.1	(0.1)%	0.16 %	\$40.9	(4.8)%	2.18 %
Post-Retirement Death	\$20.6	(0.1)%	0.13 %	(\$2.0)	0.2 %	(0.11)%
Data Adjustments	\$47.8	(0.3)%	0.30 %	(\$6.0)	0.7 %	(0.32)%
Other	(\$3.5)	0.1 %	(0.02)%	(\$0.3)	0.0 %	(0.02)%
Investment Return	(\$92.5)	1.0 %	(0.59)%	(\$28.5)	2.6 %	(1.52)%
Total (Gain) or Loss	(\$139.1)	1.3 %	(0.88)%	(\$9.0)	0.3 %	(0.48)%
Assumption Changes	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %
Other Changes	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %
Actual Value	\$3,896.9	60.6 %	24.68 %	(\$323.4)	129.1 %	(17.34)%

* Impact on Contribution Rate based on 25 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	\$1,675.9	76.9 %	11.51 %	\$739.3	75.2 %	20.20 %	\$712.1	59.9 %	31.84 %
Retirement	(\$18.9)	0.2 %	(0.13)%	(\$0.2)	0.0 %	(0.01)%	\$1.5	(0.2)%	0.07 %
Disability	(\$2.2)	0.0 %	(0.02)%	(\$0.3)	0.0 %	(0.01)%	\$0.0	0.0 %	0.00 %
Pre-Retirement Death	(\$4.3)	0.1 %	(0.03)%	(\$0.6)	0.0 %	(0.02)%	(\$0.3)	0.0 %	(0.01)%
Withdrawal	\$0.2	(0.0)%	0.00 %	\$1.8	(0.0)%	0.05 %	\$3.0	(0.4)%	0.13 %
Pay Increases	(\$14.8)	0.2 %	(0.10)%	(\$12.6)	0.3 %	(0.32)%	(\$12.4)	1.8 %	(0.55)%
New Entrants	\$27.3	(0.3)%	0.19 %	\$11.1	(0.3)%	0.30 %	\$4.5	(0.6)%	0.20 %
Post-Retirement Death	(\$6.7)	0.1 %	(0.05)%	\$0.8	(0.0)%	0.02 %	(\$2.3)	0.3 %	(0.10)%
Data Adjustments	\$46.1	(0.6)%	0.32 %	\$15.2	(0.4)%	0.41 %	\$7.6	(1.0)%	0.33 %
Other	(\$1.8)	0.0 %	(0.01)%	(\$0.3)	0.0 %	(0.01)%	(\$0.3)	0.0 %	(0.01)%
Investment Return	(\$99.0)	1.4 %	(0.68)%	(\$41.3)	1.4 %	(1.13)%	(\$19.4)	1.1 %	(0.87)%
Total (Gain) or Loss	(\$74.1)	1.1 %	(0.51)%	(\$26.4)	1.0 %	(0.72)%	(\$18.1)	1.0 %	(0.81)%
Assumption Changes	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %
Other Changes	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %	\$0.0	0.0 %	0.00 %
Actual Value	\$1,601.8	78.0 %	11.00 %	\$712.9	76.2 %	19.48 %	\$694.0	60.9 %	31.03 %

* Impact on Contribution Rate based on 25 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 25 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, 2021	June 30, 2020
1. Total Valuation Payroll	\$1,019,477,757	\$1,032,549,986
2. Present Value of Future Benefits	10,964,683,608	10,794,082,980
3. Present Value of Future Normal Costs	<u>1,086,166,619</u>	<u>1,104,376,886</u>
4. Actuarial Accrued Liability (2 - 3)	\$9,878,516,989	\$9,689,706,094
5. Actuarial Value of Assets	<u>5,981,582,669</u>	<u>5,807,551,328</u>
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$3,896,934,320	\$3,882,154,766
7. UAAL Amortization Payment (25 year funding)	\$ 251,572,427	\$ 250,618,311
a. Amortization Payment as a Percent of Payroll (7 / 1)	24.68 %	24.27 %
8. Total Normal Cost	\$ 153,738,441	\$ 156,917,411
a. Normal Cost as a Percent of Payroll (8 / 1)	15.08 %	15.20 %
9. Expected Administrative Expenses	\$ 5,097,389	\$ 5,162,750
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 410,408,257	\$ 412,698,472
a. ADC Rate (7a + 8a + 9a)	40.26 %	39.97 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	18.24 %	17.74 %
b. Member Contribution Rate	<u>9.92 %</u>	<u>9.42 %</u>
c. Total Statutory Contribution Rate (a + b)	28.16 %	27.16 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	12.10 %	12.81 %

Note that the (Excess) Shortfall of Statutory Rates is only as of the valuation date and does not reflect future members entering the lower cost Tier 2 benefit structure or the full increase in contributions from SB 72.

Section V: Actuarial Funding Calculation



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

	June 30, 2021	June 30, 2020
1. Total Valuation Payroll	\$ 120,347,548	\$ 117,258,115
2. Present Value of Future Benefits	1,322,195,505	1,249,400,733
3. Present Value of Future Normal Costs	211,164,376	201,249,644
4. Actuarial Accrued Liability (2 - 3)	\$1,111,031,129	\$1,048,151,089
5. Actuarial Value of Assets	1,434,367,187	1,332,772,683
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ (323,336,058)	\$ (284,621,594)
7. UAAL Amortization Payment (25 year funding)	\$ (20,873,443)	\$ (18,374,173)
a. Amortization Payment as a Percent of Payroll (7 / 1)	(17.34)%	(15.67)%
8. Total Normal Cost	\$ 27,447,921	\$ 25,347,154
a. Normal Cost as a Percent of Payroll (8 / 1)	22.81 %	21.62 %
9. Expected Administrative Expenses	\$ 601,738	\$ 586,291
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 7,176,216	\$ 7,559,272
a. ADC Rate (7a + 8a + 9a)	5.97 %	6.45 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	25.59 %	25.56 %
b. Member Contribution Rate	<u>9.01 %</u>	<u>8.99 %</u>
c. Total Statutory Contribution Rate (a + b)	34.60 %	34.55 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	(28.63)%	(28.10)%

Note that the (Excess) Shortfall of Statutory Rates is only as of the valuation date and does not reflect future members entering the lower cost Tier 2 benefit structure or the full increase in contributions from SB 72.

Section V: Actuarial Funding Calculation



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

	June 30, 2021	June 30, 2020
1. Total Valuation Payroll	\$ 939,676,256	\$ 952,092,474
2. Present Value of Future Benefits	8,197,500,980	7,989,795,233
3. Present Value of Future Normal Costs	915,956,756	934,989,085
4. Actuarial Accrued Liability (2 - 3)	\$7,281,544,224	\$7,054,806,148
5. Actuarial Value of Assets	5,679,750,605	5,410,004,791
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$1,601,793,619	\$1,644,801,357
7. UAAL Amortization Payment (25 year funding)	\$ 103,406,184	\$ 106,182,613
a. Amortization Payment as a Percent of Payroll (7 / 1)	11.00 %	11.15 %
8. Total Normal Cost	\$ 128,597,090	\$ 131,105,944
a. Normal Cost as a Percent of Payroll (8 / 1)	13.69 %	13.77 %
9. Expected Administrative Expenses	\$ 4,698,381	\$ 4,760,462
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 236,701,655	\$ 242,049,019
a. ADC Rate (7a + 8a + 9a)	25.19 %	25.42 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	10.01 %	10.03 %
b. Member Contribution Rate	13.53 %	13.53 %
c. Total Statutory Contribution Rate (a + b)	23.54 %	23.56 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	1.65 %	1.86 %

Note that the (Excess) Shortfall of Statutory Rates is only as of the valuation date and does not reflect future members entering the lower cost Tier 2 benefit structure or the full increase in contributions from SB 72.

Section V: Actuarial Funding Calculation



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

	June 30, 2021	June 30, 2020
1. Total Valuation Payroll	\$ 236,292,500	\$ 236,622,389
2. Present Value of Future Benefits	3,395,465,151	3,289,742,056
3. Present Value of Future Normal Costs	399,540,548	403,193,798
4. Actuarial Accrued Liability (2 - 3)	\$2,995,924,603	\$2,886,548,258
5. Actuarial Value of Assets	2,283,030,585	2,161,723,690
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 712,894,018	\$ 724,824,568
7. UAAL Amortization Payment (25 year funding)	\$ 46,021,940	\$ 46,792,135
a. Amortization Payment as a Percent of Payroll (7 / 1)	19.48 %	19.78 %
8. Total Normal Cost	\$ 53,136,489	\$ 53,704,774
a. Normal Cost as a Percent of Payroll (8 / 1)	22.49 %	22.70 %
9. Expected Administrative Expenses	\$ 1,181,463	\$ 1,183,112
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 100,339,892	\$ 101,680,021
a. ADC Rate (7a + 8a + 9a)	42.47 %	42.98 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	18.96 %	18.93 %
b. Member Contribution Rate	17.30 %	17.28 %
c. Total Statutory Contribution Rate (a + b)	36.26 %	36.21 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	6.21 %	6.77 %

Note that the (Excess) Shortfall of Statutory Rates is only as of the valuation date and does not reflect future members entering the lower cost Tier 2 benefit structure or the full increase in contributions from SB 72.

Section V: Actuarial Funding Calculation



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

	June 30, 2021	June 30, 2020
1. Total Valuation Payroll	\$ 144,379,873	\$ 143,726,325
2. Present Value of Future Benefits	2,078,096,340	2,015,346,021
3. Present Value of Future Normal Costs	302,643,456	305,686,741
4. Actuarial Accrued Liability (2 - 3)	\$1,775,452,884	\$1,709,659,280
5. Actuarial Value of Assets	1,081,479,512	1,025,786,446
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 693,973,372	\$ 683,872,834
7. UAAL Amortization Payment (25 year funding)	\$ 44,800,490	\$ 44,148,434
a. Amortization Payment as a Percent of Payroll (7 / 1)	31.03 %	30.72 %
8. Total Normal Cost	\$ 36,619,914	\$ 36,663,987
a. Normal Cost as a Percent of Payroll (8 / 1)	25.36 %	25.51 %
9. Expected Administrative Expenses	\$ 721,899	\$ 718,632
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 82,142,303	\$ 81,531,053
a. ADC Rate (7a + 8a + 9a)	56.89 %	56.73 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	21.79 %	21.81 %
b. Member Contribution Rate	17.57 %	17.57 %
c. Total Statutory Contribution Rate (a + b)	39.36 %	39.38 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	17.53 %	17.35 %

Note that the (Excess) Shortfall of Statutory Rates is only as of the valuation date and does not reflect future members entering the lower cost Tier 2 benefit structure or the full increase in contributions from SB 72.

Section V: Actuarial Funding Calculation



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

	June 30, 2021	June 30, 2020
1. Total Valuation Payroll	\$ 2,460,173,934	\$ 2,482,249,289
2. Present Value of Future Benefits	25,957,941,584	25,338,367,023
3. Present Value of Future Normal Costs	2,915,471,755	2,949,496,154
4. Actuarial Accrued Liability (2 - 3)	\$23,042,469,829	\$22,388,870,869
5. Actuarial Value of Assets	16,460,210,558	15,737,838,938
6. Unfunded Actuarial Accrued Liability (UAAL) (4 - 5)	\$ 6,582,259,271	\$ 6,651,031,931
7. UAAL Amortization Payment (25 year funding)	\$ 424,927,598	\$ 429,367,320
a. Amortization Payment as a Percent of Payroll (7 / 1)	17.27 %	17.30 %
8. Total Normal Cost	\$ 399,539,855	\$ 403,739,270
a. Normal Cost as a Percent of Payroll (8 / 1)	16.24 %	16.27 %
9. Expected Administrative Expenses	\$ 12,300,870	\$ 12,411,246
a. Administrative Expense as a Percent of Payroll (9 / 1)	0.50 %	0.50 %
10. Actuarially Determined Contribution (ADC)	\$ 836,768,323	\$ 845,517,836
a. ADC Rate (7a + 8a + 9a)	34.01 %	34.07 %
11. Expected Statutory Contribution Rates		
a. Employer Contribution Rate	15.73 %	15.50 %
b. Member Contribution Rate	<u>12.41 %</u>	<u>12.20 %</u>
c. Total Statutory Contribution Rate (a + b)	28.14 %	27.70 %
12. (Excess) Shortfall of Statutory Rates (10a - 11c)	5.87 %	6.37 %

Note that the (Excess) Shortfall of Statutory Rates is only as of the valuation date and does not reflect future members entering the lower cost Tier 2 benefit structure or the full increase in contributions from SB 72.



Table V-2: Contribution Rate Summary

Division	Employer Only		
	Current Statutory Rate	25-year Rate	(Excess)/ Shortfall
State General	18.24 %	30.34 %	12.10 %
State Police/Corrections	25.59 %	(3.04)%	(28.63)%
Municipal General	10.01 %	11.66 %	1.65 %
Municipal Police	18.96 %	25.17 %	6.21 %
Municipal Fire	21.79 %	39.32 %	17.53 %
PERA Total	15.73 %	21.60 %	5.87 %

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	9.92 %	18.24 %
Police and Adult Corrections Plan 1	9.10 %	25.50 %
Hazardous Duty (Juvenile Correctional Officers) Plan 2	7.28 %	27.37 %
Weighted Average for Police/Corrections*	9.01 %	25.59 %
Municipal Division		
General Coverage Plans		
Plan 1	8.50 %	7.65 %
Plan 2	10.65 %	9.80 %
Plan 3	14.65 %	9.80 %
Plan 4	17.15 %	12.30 %
Detention Officers Plan 1	18.15 %	17.30 %
Weighted Average*	13.53 %	10.01 %
Police Coverage Plans		
Plan 1	8.50 %	10.65 %
Plan 2	8.50 %	15.65 %
Plan 3	8.50 %	19.15 %
Plan 4	13.85 %	19.15 %
Plan 5	17.80 %	19.15 %
Weighted Average*	17.30 %	18.96 %
Fire Coverage Plans		
Plan 1	9.50 %	11.65 %
Plan 2	9.50 %	18.15 %
Plan 3	9.50 %	21.90 %
Plan 4	14.30 %	21.90 %
Plan 5	17.70 %	21.90 %
Weighted Average*	17.57 %	21.79 %

* 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: Additional Disclosure 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. Additional disclosure information is provided below.

Table VI-1: Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Plan Assets (a)	Actuarial 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)
6/30/2021	\$ 16,460,210,558	\$ 23,042,469,829	\$6,582,259,271	71.4 %	\$2,388,518,383	275.6 %
6/30/2020	15,737,838,938	22,388,870,869	6,651,031,931	70.3 %	2,409,950,766	276.0 %
6/30/2019	15,500,330,667	22,162,998,348	6,662,667,681	69.9 %	2,271,770,279	293.3 %
6/30/2018	15,252,860,672	21,313,451,183	6,060,590,511	71.6 %	2,221,079,274	272.9 %
6/30/2017	15,124,167,297	20,194,698,290	5,070,530,993	74.9 %	2,204,414,890	230.0 %
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 %

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



Section VI: Additional Disclosure 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)	
6/30/2021	\$ 963,306,737	\$ 7,114,191,110	\$ 1,801,019,142	\$ 5,981,582,669	100.00%	70.54%	0.00%	
6/30/2020	924,990,774	6,884,617,226	1,880,098,094	5,807,551,328	100.00	70.92	0.00	
6/30/2019	896,762,967	6,893,274,726	1,746,565,214	5,805,041,751	100.00	71.20	0.00	
6/30/2018	892,279,750	6,620,228,801	1,682,936,866	5,799,854,720	100.00	74.13	0.00	
6/30/2017	878,994,137	6,218,179,179	1,714,643,642	5,831,916,099	100.00	79.65	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)	
6/30/2021	\$ 75,673,068	\$ 694,754,994	\$ 340,603,067	\$ 1,434,367,187	100.00%	100.00%	100.00%	
6/30/2020	72,530,634	666,980,924	308,639,531	1,332,772,683	100.00	100.00	100.00	
6/30/2019	69,799,978	695,901,232	219,280,926	1,282,058,570	100.00	100.00	100.00	
6/30/2018	67,111,945	677,224,121	201,630,652	1,231,975,474	100.00	100.00	100.00	
6/30/2017	64,332,242	645,636,929	199,904,014	1,196,338,715	100.00	100.00	100.00	

Section VI: Additional Disclosure Information



Municipal 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)
6/30/2021	\$ 1,232,683,304	\$ 4,939,793,901	\$ 1,109,067,019	\$ 5,679,750,605	100.00%	90.03%	0.00%	
6/30/2020	1,199,236,797	4,682,479,829	1,173,089,522	5,410,004,791	100.00	89.93	0.00	
6/30/2019	1,161,061,009	4,771,658,727	1,124,215,032	5,301,086,178	100.00	86.76	0.00	
6/30/2018	1,137,899,276	4,528,287,174	1,131,956,929	5,184,797,302	100.00	89.37	0.00	
6/30/2017	1,104,575,618	4,191,453,200	1,099,006,703	5,106,489,938	100.00	95.48	0.00	

Municipal Police

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)
6/30/2021	\$ 340,676,470	\$ 2,108,040,665	\$ 547,207,468	\$ 2,283,030,585	100.00%	92.14%	0.00%	
6/30/2020	327,110,526	1,993,453,153	565,984,579	2,161,723,690	100.00	92.03	0.00	
6/30/2019	303,167,527	2,095,697,284	485,333,068	2,109,268,722	100.00	86.18	0.00	
6/30/2018	289,967,593	2,011,087,857	449,322,578	2,058,403,842	100.00	87.93	0.00	
6/30/2017	275,702,207	1,882,156,157	404,904,171	2,027,593,334	100.00	93.08	0.00	

Municipal Fire

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)
6/30/2021	\$ 238,294,797	\$ 1,163,350,094	\$ 373,807,993	\$ 1,081,479,512	100.00%	72.48%	0.00%	
6/30/2020	227,986,295	1,107,995,694	373,677,291	1,025,786,446	100.00	72.00	0.00	
6/30/2019	214,452,786	1,158,090,653	327,737,219	1,002,875,446	100.00	68.08	0.00	
6/30/2018	205,989,875	1,099,223,887	318,303,879	977,829,334	100.00	70.22	0.00	
6/30/2017	194,507,068	1,033,070,516	287,632,507	961,829,211	100.00	74.28	0.00	



Section VI: Additional Disclosure Information

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)
6/30/2021	\$ 2,850,634,376	\$ 16,020,130,764	\$ 4,171,704,689	\$ 16,460,210,558	100.00%	84.95%	0.00%	
6/30/2020	2,751,855,026	15,335,526,826	4,301,489,017	15,737,838,938	100.00	84.68	0.00	
6/30/2019	2,645,244,267	15,614,622,622	3,903,131,459	15,500,330,667	100.00	82.33	0.00	
6/30/2018	2,593,248,439	14,936,051,840	3,784,150,904	15,252,860,672	100.00	84.76	0.00	
6/30/2017	2,518,111,272	13,970,495,981	3,706,091,037	15,124,167,297	100.00	90.23	0.00	



Section VI: Additional Disclosure 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		
6/30/2021	930	\$29,992,401	543	\$13,445,780	20,374	\$603,156,899	2.82%	\$ 29,604
6/30/2020	1,229	43,864,347	492	11,705,908	19,987	586,610,278	5.80	29,350
6/30/2019	1,017	38,014,119	537	12,503,719	19,250	554,451,839	4.82	28,803
6/30/2018	986	35,111,580	427	9,977,306	18,770	528,941,439	4.99	28,180
6/30/2017	912	31,124,051	536	11,387,703	18,211	503,807,165	4.08	27,665

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		
6/30/2021	87	\$ 2,998,169	52	\$ 1,425,116	1,625	\$54,882,868	2.95%	\$ 33,774
6/30/2020	52	2,615,081	29	809,380	1,590	53,309,815	3.51	33,528
6/30/2019	58	2,826,753	44	1,195,773	1,567	51,504,114	3.27	32,868
6/30/2018	62	2,532,699	31	992,132	1,553	49,873,134	3.19	32,114
6/30/2017	51	2,309,111	38	882,314	1,522	48,332,567	3.04	31,756



Section VI: Additional Disclosure 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		
6/30/2021	932	\$27,175,951	506	\$11,177,142	14,801	\$404,587,902	4.12%	\$ 27,335
6/30/2020	725	25,400,841	385	8,249,790	14,375	388,589,093	4.62	27,032
6/30/2019	946	29,052,180	426	8,634,982	14,035	371,438,042	5.82	26,465
6/30/2018	911	27,278,930	313	6,346,069	13,515	351,020,844	6.34	25,973
6/30/2017	717	21,257,836	418	7,607,253	12,917	330,087,983	4.31	25,555

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		
6/30/2021	209	\$ 9,736,112	69	\$ 2,271,953	3,864	\$159,055,145	4.92%	\$ 41,163
6/30/2020	71	5,531,990	52	1,634,353	3,724	151,590,986	2.64	40,706
6/30/2019	177	9,107,704	70	2,029,823	3,705	147,693,349	5.03	39,863
6/30/2018	165	8,523,713	44	1,491,360	3,598	140,615,468	5.26	39,082
6/30/2017	166	8,150,488	61	1,633,073	3,477	133,583,115	5.13	38,419

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		
6/30/2021	97	\$ 4,994,296	38	\$ 1,486,039	2,079	\$90,860,263	4.02%	\$ 43,704
6/30/2020	61	4,093,428	34	1,423,643	2,020	87,352,006	3.15	43,244
6/30/2019	95	5,867,307	40	1,447,080	1,993	84,682,221	5.51	42,490
6/30/2018	81	4,982,102	27	1,063,296	1,938	80,261,994	5.13	41,415
6/30/2017	34	2,496,048	22	816,881	1,884	76,343,188	2.25	40,522



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		
6/30/2021	2,255	\$74,896,929	1,208	\$29,806,030	42,743	\$ 1,312,543,077	3.56%	\$ 30,708
6/30/2020	2,138	81,505,687	992	23,823,074	41,696	1,267,452,178	4.77	30,397
6/30/2019	2,293	84,868,063	1,117	25,811,377	40,550	1,209,769,565	5.13	29,834
6/30/2018	2,205	78,429,024	842	19,870,163	39,374	1,150,712,879	5.36	29,225
6/30/2017	1,880	65,337,534	1,075	22,327,224	38,011	1,092,154,018	4.10	28,733

Table VI-4: Summary of Actuarial Methods and Assumptions

Valuation date	June 30, 2021
Actuarial cost method	Entry Age Normal
Amortization method	Level Percent of Payroll, Open
Payroll growth rate	3.00%
Remaining amortization period	25 years
Asset valuation method	4-year Smoothed Market
Actuarial assumptions:	
Investment rate of return*	7.25%
Administrative expenses	0.50% of payroll
Projected salary increases*	3.25% – 13.50%
Post-retirement benefit increases	1.60% compounded annually beginning 7/1/2023. (2.50% for certain retirees, beneficiaries, and disabled participants age 75 or older as of June 30, 2020; or with annual benefits less than \$25,000)

* Includes inflation at 2.50%



Appendix A: Additional Membership Data

Table A-1: Schedule of Active Participant Data as of June 30, 2021 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	\$ 687,146
20 to 24	475	8						483	16,492,403
25 to 29	1,299	181	1					1,481	60,804,843
30 to 34	1,355	689	142	7				2,193	101,231,735
35 to 39	1,091	706	435	208	14			2,454	124,218,889
40 to 44	842	614	408	414	207	2		2,487	135,675,481
45 to 49	696	526	336	464	390	42		2,454	139,546,011
50 to 54	611	526	344	433	410	84	7	2,415	139,525,428
55 to 59	500	453	330	420	344	111	14	2,172	121,240,219
60	77	85	70	114	65	19	4	434	24,281,506
61	60	103	56	70	44	18	2	353	19,837,073
62	71	72	52	77	39	14	5	330	19,711,639
63	68	63	55	46	31	11	2	276	16,439,760
64	50	51	47	39	26	17	2	232	13,977,239
65	41	56	32	37	27	10	3	206	12,762,689
66	33	36	19	32	24	9	5	158	10,617,894
67	21	37	18	17	12	7	1	113	6,886,571
68	25	17	17	16	6	5	2	88	5,358,716
69	16	29	8	12	7	3	8	83	5,496,843
70	11	14	10	8	6	4		53	3,446,393
71	9	13	4	7	4	4	1	42	2,879,200
72	8	5	7	7	2		1	30	1,624,624
73	9	6	4	3	6	3		31	1,676,083
74	9	3	3	4				19	1,150,125
75	3	5	6	4		1		19	1,311,884
76	1	1						2	86,827
77	2		3	1	2			8	812,655
78	4	3	2	4	2			15	806,711
79		2	1	1	1			5	322,712
80 & Over	5	3	1		3		2	14	874,931
Total	7,414	4,307	2,411	2,445	1,672	364	59	18,672	\$ 989,784,230

Average Age: 45.13

Average Service: 9.07



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	3							3	\$ 105,106
20 to 24	144	3						147	6,617,691
25 to 29	250	101	11	1				363	16,809,546
30 to 34	144	163	102	22				431	20,975,475
35 to 39	76	94	89	91	37			387	20,267,061
40 to 44	43	52	50	82	79	10		316	17,169,723
45 to 49	31	45	26	59	78	24	3	266	15,472,148
50 to 54	14	24	33	37	53	18	4	183	10,099,787
55 to 59	11	16	10	28	19	11	2	97	5,026,487
60		2	2	6	5	1	1	17	998,917
61		4	2	3	6		1	16	788,133
62		2	1	4	6			13	636,467
63	1		3	3	2			9	437,793
64	2		1	2	2	1		8	350,695
65				2	1	1		4	272,482
66		1			2	1	2	6	304,279
67	1		1			1	1	4	183,244
68		1		1				2	103,399
69									
70				1		1		2	84,962
71									
72		1						1	54,675
73						1		1	45,093
74									
75									
76									
77									
78									
79	1							1	39,117
80 & Over									
Total	721	509	331	342	290	70	14	2,277	\$116,842,280

Average Age: 38.39

Average Service: 10.60



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	285							285	\$ 8,952,645	
20 to 24	1,166	18						1,184	36,527,660	
25 to 29	1,408	343	7					1,758	61,536,750	
30 to 34	1,263	670	258	27				2,218	86,784,536	
35 to 39	1,020	649	492	225	8			2,394	104,091,367	
40 to 44	849	567	466	409	207	7		2,505	120,755,273	
45 to 49	685	489	445	391	294	58		2,362	116,320,422	
50 to 54	686	500	405	400	361	129	10	2,491	122,286,842	
55 to 59	650	479	388	398	327	114	32	2,388	115,018,830	
60	128	101	65	81	79	19	5	478	23,053,608	
61	98	87	103	70	56	32	9	455	21,734,092	
62	84	85	87	63	54	21	5	399	19,197,529	
63	94	72	54	55	27	13	4	319	14,604,748	
64	68	62	62	41	25	12	12	282	13,860,228	
65	60	61	44	35	24	7	8	239	11,158,223	
66	40	37	34	17	12	7	2	149	7,512,108	
67	42	31	16	24	11	4	1	129	5,874,741	
68	37	20	21	10	7	3	1	99	4,521,404	
69	29	19	13	14	5	2	2	84	3,981,470	
70	26	18	7	8	7	2	3	71	2,784,038	
71	19	11	16	8	2	2		58	2,378,189	
72	21	10	11	5	4	3	1	55	2,662,029	
73	13	15	5	2	3	2	3	43	1,677,389	
74	22	6		1	2	3	1	35	1,258,229	
75	10	4	3	3				20	760,133	
76	10	4	1	2				17	625,085	
77	7	2	1	1	1	1		13	297,841	
78	7	2	4	1			1	15	645,799	
79	8	1			1	2		12	289,782	
80 & Over	19	6	3	2	2	3		35	1,156,055	
Total	8,854	4,369	3,011	2,293	1,519	446	100	20,592	\$ 912,307,045	

Average Age: 44.37

Average Service: 8.52



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	\$ 53,641
20 to 24	234	9						243	\$ 10,501,126
25 to 29	468	207	9					684	35,226,906
30 to 34	266	375	131	6				778	44,905,382
35 to 39	103	176	230	123	3			635	41,333,511
40 to 44	61	85	151	211	42			550	37,396,508
45 to 49	27	58	68	118	109	6		386	28,290,669
50 to 54	26	13	54	86	52	14	1	246	17,861,838
55 to 59	20	14	32	33	17	7	5	128	9,294,417
60	1	1	2	3		1		8	598,464
61	3	2	1	3	3			12	699,116
62	1		2	5	3			11	611,737
63	3	1	6	3				13	816,553
64			1		1	1	1	4	298,930
65	1	1	1	3	1			7	403,782
66	2		2	2				6	382,311
67			2					2	125,817
68	1							1	65,494
69	2	1		1				4	281,293
70							1	1	73,819
71							1	1	92,815
72									
73									
74		1						1	35,663
75									
76									
77									
78									
79									
80 & Over			1					1	60,402
Total	1,221	944	693	597	231	29	9	3,724	\$ 229,410,194

Average Age: 37.12

Average Service: 9.35



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	7								7	\$ 276,577
20 to 24	152								152	5,820,258
25 to 29	267	71	3						341	15,542,736
30 to 34	166	192	82	1					441	22,997,760
35 to 39	74	120	208	99	2				503	30,229,365
40 to 44	38	67	131	198	33	2			469	30,297,245
45 to 49	13	24	47	109	65	6	1		265	18,598,958
50 to 54	14	19	31	43	38	6	1		152	10,417,773
55 to 59	4	3	9	17	16	4	1		54	3,841,420
60				3	1	2	1		7	501,905
61	1		1	1	1		1		5	348,946
62			4		1		1		6	432,012
63				1					1	91,553
64										
65					1	1			2	174,323
66			2				1		3	214,149
67	1								1	84,678
68					1		1		2	152,148
69							1		1	79,572
70										
71										
72		1							1	41,355
73										
74										
75										
76		1							1	31,900
77										
78										
79										
80 & Over										
Total	737	498	518	472	159	21	9	2,414	\$ 140,174,634	

Average Age: 37.48

Average Service: 10.19



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	319							319	\$ 10,075,115	
20 to 24	2,171	38						2,209	75,959,139	
25 to 29	3,692	903	31	1				4,627	189,920,781	
30 to 34	3,194	2,089	715	63				6,061	276,894,889	
35 to 39	2,364	1,745	1,454	746	64			6,373	320,140,193	
40 to 44	1,833	1,385	1,206	1,314	568	21		6,327	341,294,232	
45 to 49	1,452	1,142	922	1,141	936	136	4	5,733	318,228,207	
50 to 54	1,351	1,082	867	999	914	251	23	5,487	300,191,668	
55 to 59	1,185	965	769	896	723	247	54	4,839	254,421,371	
60	206	189	139	207	150	42	11	944	49,434,400	
61	162	196	163	147	110	50	13	841	43,407,361	
62	156	159	146	149	103	35	11	759	40,589,384	
63	166	136	118	108	60	24	6	618	32,390,407	
64	120	113	111	82	54	31	15	526	28,487,091	
65	102	118	77	77	54	19	11	458	24,771,499	
66	75	74	57	51	38	17	10	322	19,030,741	
67	65	68	37	41	23	12	3	249	13,155,049	
68	63	38	38	27	14	8	4	192	10,201,161	
69	47	49	21	27	12	5	11	172	9,839,178	
70	37	32	17	17	13	7	4	127	6,389,211	
71	28	24	20	15	6	6	2	101	5,350,204	
72	29	17	18	12	6	3	2	87	4,382,683	
73	22	21	9	5	9	6	3	75	3,398,564	
74	31	10	3	5	2	3	1	55	2,444,017	
75	13	9	9	7		1		39	2,072,017	
76	11	6	1	2				20	743,812	
77	9	2	4	2	3	1		21	1,110,496	
78	11	5	6	5	2		1	30	1,452,511	
79	9	3	1	1	2	2		18	651,611	
80 & Over	24	9	5	2	5	3	2	50	2,091,388	
Total	18,947	10,627	6,964	6,149	3,871	930	191	47,679	\$ 2,388,518,383	

Average Age: 43.47

Average Service: 8.99



Appendix A: Additional Membership Data

Table A-2: Number of Annual Retirement Allowances of Benefit Recipients as of June 30, 2021

Type of Pension	Number	Total Annual Benefits	Average Annual Pension
Service Retirement Pensions			
Single Life Pension Terminating Upon Death*	16,601	\$ 524,964,669	\$ 31,622
Two Life 100% Survivor Pension			
Retired Member Recipient*	14,085	461,789,561	32,786
Survivor Recipient	2,721	69,831,668	25,664
Two Life 50% Survivor Pension			
Retired Member Recipient*	5,164	178,929,585	34,649
Survivor Recipient	1,028	15,268,891	14,853
Single Life with Temporary Child Survivor Pension			
Retired Member Recipient*	181	7,760,638	42,876
Child Recipient	7	207,318	29,617
Total Service Retirement Pensions	39,787	\$ 1,258,752,330	\$ 31,637
Disability Retirement Pensions			
Single Life Pension Terminating Upon Death*	506	\$ 9,370,634	\$ 18,519
Two Life 100% Survivor Pension			
Retired Member Recipient*	786	14,495,893	18,443
Survivor Recipient	218	3,527,785	16,183
Two Life 50% Survivor Pension			
Retired Member Recipient*	189	3,937,191	20,832
Survivor Recipient	28	243,286	8,689
Single Life with Temporary Child Survivor Pension			
Retired Member Recipient*	9	159,737	17,749
Child Recipient	1	10,401	10,401
Total Disability Retirement Pensions	1,737	\$ 31,744,927	\$ 18,276
Pre-Retirement Survivor Pensions			
Spouse Recipient	1,187	\$ 21,732,573	18,309
Child Recipient	32	313,247	9,789
Total Pre-Retirement Survivor Pensions	1,219	\$ 22,045,820	\$ 18,085
Total Pensions Being Paid	42,743	\$ 1,312,543,077	\$ 30,708

* Includes Co-Payees



Appendix A: Additional Membership Data

Table A-3: Distribution of Participants Receiving Benefits as of June 30, 2021

Attained Age	Retired Member		Disabled Member		Survivor Beneficiaries		Totals	
	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions	Number	Annual Pensions
Under 40	15	\$ 253,026	20	\$ 482,856	253	\$ 4,222,524	288	\$ 4,958,406
40 to 44	198	8,327,483	53	1,104,714	133	2,340,646	384	11,772,843
45 to 49	984	41,490,142	118	2,605,299	147	2,663,433	1,249	46,758,874
50 to 54	2,335	96,199,912	223	4,604,904	254	4,709,459	2,812	105,514,275
55 to 59	3,670	147,819,051	282	5,821,840	325	6,724,556	4,277	160,365,447
60 to 64	5,384	196,249,709	398	7,461,248	513	11,397,542	6,295	215,108,499
65 to 69	7,417	224,120,721	286	4,794,081	669	15,445,156	8,372	244,359,958
70 to 74	7,262	215,669,807	92	964,133	763	17,822,902	8,117	234,456,842
75 to 79	4,366	126,733,673	1	2,081	741	16,784,445	5,108	143,520,199
80 to 84	2,576	69,307,900			653	13,561,713	3,229	82,869,613
85 to 89	1,235	33,285,321			448	9,592,889	1,683	42,878,210
90 to 94	495	11,613,608			244	4,670,571	739	16,284,179
95 to 99	100	2,301,759			71	1,112,576	171	3,414,335
100 & Over	11	194,641			8	86,756	19	281,397
Total	36,048	\$ 1,173,566,753	1,473	\$ 27,841,156	5,222	\$ 111,135,168	42,743	\$ 1,312,543,077



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*	\$ 963	\$ 913	\$ 1,547	\$ 2,227	\$ 3,028	\$ 3,560	\$3,687	\$2,658
Number of Retirees*	809	1,920	2,003	1,933	2,406	6,976	582	16,629
State Police/Corrections								
Average Monthly Benefit*	\$ 1,804	\$1,641	\$ 1,764	\$ 2,390	\$ 2,952	\$ 3,501	\$4,091	\$3,107
Number of Retirees*	35	53	55	77	346	611	67	1,244
Municipal General								
Average Monthly Benefit*	\$ 1,217	\$ 776	\$ 1,291	\$ 2,013	\$ 2,837	\$ 3,406	\$3,748	\$2,475
Number of Retirees*	518	1,409	1,555	1,469	1,700	4,649	482	11,782
Municipal Police								
Average Monthly Benefit*	\$ 2,779	\$1,689	\$ 2,184	\$ 3,404	\$ 3,890	\$ 4,638	\$4,600	\$3,755
Number of Retirees*	82	61	85	432	2,261	172	42	3,135
Municipal Fire								
Average Monthly Benefit*	\$ 3,561	\$2,463	\$ 2,824	\$ 3,591	\$ 4,064	\$ 4,932	\$3,809	\$3,974
Number of Retirees*	29	27	47	193	1,270	76	38	1,680
Totals for All Divisions								
Average Monthly Benefit*	\$ 1,225	\$ 894	\$ 1,475	\$ 2,341	\$ 3,393	\$ 3,523	\$3,769	\$2,775
Number of Retirees*	1,473	3,470	3,745	4,104	7,983	12,484	1,211	34,470

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

State General - 173

State Police/Corrections - 7

Municipal General - 29

Municipal Police - 12

Municipal Fire - 7



Appendix A: Additional Membership Data

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

Division	2016-17 Retirees	2017-18 Retirees	2018-19 Retirees	2019-20 Retirees	2020-21 Retirees	All Current Retirees
State General						
Number	680	729	800	697	696	16,802
Average Monthly Benefit at Retirement	\$ 2,188	\$ 2,393	\$ 2,557	\$ 2,525	\$ 2,504	\$ 2,150
Average Age at Retirement	61.19	60.70	60.56	59.93	61.05	57.78
State Police/Corrections						
Number	26	43	37	53	59	1,251
Average Monthly Benefit at Retirement	\$ 3,082	\$ 2,757	\$ 3,489	\$ 3,144	\$ 3,146	\$ 2,519
Average Age at Retirement	51.75	54.05	51.47	53.03	52.72	51.05
Municipal General						
Number	492	650	716	677	709	11,811
Average Monthly Benefit at Retirement	\$ 1,950	\$ 2,196	\$ 2,178	\$ 2,337	\$ 2,387	\$ 2,055
Average Age at Retirement	61.85	60.57	61.27	60.79	61.25	58.33
Municipal Police						
Number	110	119	136	106	161	3,147
Average Monthly Benefit at Retirement	\$ 3,478	\$ 3,871	\$ 3,711	\$ 3,745	\$ 4,248	\$ 3,073
Average Age at Retirement	49.04	50.48	49.39	50.17	50.15	47.81
Municipal Fire						
Number	18	61	76	62	72	1,687
Average Monthly Benefit at Retirement	\$ 3,570	\$ 4,137	\$ 4,434	\$ 3,913	\$ 4,679	\$ 3,164
Average Age at Retirement	51.16	49.27	49.89	50.59	48.31	47.92
Totals for All Current Retirees						
Number	1,326	1,602	1,765	1,595	1,697	34,698
Average Monthly Benefit at Retirement	\$ 2,243	\$ 2,499	\$ 2,593	\$ 2,601	\$ 2,735	\$ 2,264
Average Age at Retirement	60.10	59.27	59.34	59.05	59.27	56.34



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 25 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 3.00% per year for the purpose of determining the contribution needed to amortize the unfunded actuarial accrued liability.

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, 2018 Valuation, except as otherwise noted)

Assumed Rate of Investment Return. 7.25% per annum net of investment expenses. The administrative expenses are loaded to the normal cost developed in each annual valuation.

Administrative Expenses. 0.50% of payroll.

Price Inflation. 2.50% per annum, compounded annually.

Real Investment Return. 4.75% over price inflation (4.00% over wage growth). This is the expected rate of return (net of investment expenses) above the rate of price inflation.

Annual Post-retirement Cost of Living Adjustment Rate. 1.60% per year beginning 7/1/2023.

Payroll Growth. 3.00% per year.

Salary Increases. 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	2.50%	2.50%	2.50%	2.50%	2.50%
Other Factors	0.75	0.75	0.75	0.75	0.75
Increase Due to Merit/Longevity:					
State General	5.00	1.25	0.50	0.00	0.00
State Police	10.25	5.75	1.25	1.25	1.25
State Corrections	9.75	3.50	2.00	1.50	1.50
Municipal General*	2.50	1.50	0.50	0.00	0.00
Municipal Police	7.75	2.75	1.50	0.75	0.75
Municipal Fire	7.75	2.75	1.50	1.25	1.25

* 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 RPH-2014 Blue Collar mortality table with female ages set forward one year. Future improvement in mortality rates is assumed using 60% of the MP-2017 projection scale generationally. 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 (Base Rates)								
Pre-Commencement			Post-Commencement			Post-Commencement		
Age	Male	Female	Age	Male	Female	Age	Male	Female
25	0.000733	0.000244	35	0.001793	0.001169	80	0.053460	0.042932
30	0.000717	0.000317	40	0.002156	0.001611	85	0.088524	0.072752
35	0.000797	0.000417	45	0.003275	0.002671	90	0.146859	0.125111
40	0.000958	0.000598	50	0.005604	0.004235	95	0.223428	0.197901
45	0.001455	0.001013	55	0.007342	0.005165	100	0.313988	0.291040
50	0.002490	0.001685	60	0.009893	0.006890	105	Disabled retirees use the same assumption as healthy lives.	
55	0.004071	0.002510	65	0.014089	0.010092	110		
60	0.006743	0.003606	70	0.021101	0.016038	115		
65	0.011612	0.005456	75	0.032952	0.026199	120		



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 Police		State	Municipal General		Municipal	Municipal
	Male	Female	Tier 1	Tier 2	Corrections	Male	Female	Police	Fire
40	25%	25%	25%	40%	40%	20%	25%	30%	30%
45	25	25	25	40	40	20	25	30	25
50	25	25	25	40	40	20	25	30	20
55	25	25	25	40	40	20	25	30	25
60	30	25	50	40	35	15	25	30	20
65	25	25	100	100	35	15	25	30	20
70	25	20			100	20	15	100	100
75	25	20				20	15		
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 Police**		State	Municipal General		Municipal Police***		Municipal
	Male	Female	Tier 1	Tier 2	Corrections	Male	Female	Tier 1	Tier 2	Fire
40	25%	25%	35%	20%	20%	20%	25%	35%	40%	30%
45	25	25	35	20	20	20	25	35	40	25
50	25	25	35	20	20	20	25	35	40	20
55	25	25	35	20	20	20	25	35	40	25
60	20	35	50	20	20	15	15	35	30	20
65	30	35	100	100	20	15	10	30	30	20
70	25	20			100	20	15	100	100	100
75	25	20				20	15			
80	100	100				100	100			

* Rates are 70% at 30 years of service for all ages except State General and Municipal General Tier 2 uses 75% at 36 years of service and Municipal Police Tier 1 uses 75% at 26 years of service.

** Rates for State Police Tier 1 are 45% at 27 years of service, 55% at 28 years of service, and 65% at 29 years of service.

*** Rates for Municipal Police Tier 1 are 35% at 21 years of service, 40% at 22 years of service, and 45% at 23 years of service, 55% at 24 years of service, and 65% at 25 years of service.

*** Rates for Municipal Police Tier 2 are 35% at 25 years of service, 40% at 26 years of service, and 45% at 27 years of service, 55% at 28 years of service, and 65% at 29 years of service.



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 Service (Yr):				
Sample Ages	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 Service (Yr):				
Sample Ages	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	8+
State Police	8.00%	7.00%	4.00%	4.00%	4.00%
State Corrections	20.00	16.00	9.00	8.00	5.75
Municipal Detention	22.00	16.00	10.00	10.00	6.00
Municipal Police	14.00	9.50	6.80	5.15	3.50
Municipal Fire	10.00	7.50	5.00	3.30	2.75

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%	0.03%	0.14%
30	0.04	0.03	0.06	0.16
35	0.08	0.06	0.08	0.21
40	0.13	0.12	0.21	0.27
45	0.24	0.20	0.25	0.46
50	0.41	0.39	0.41	0.90
55	0.57	0.61	0.95	1.40
60	0.74	0.73	1.39	1.88
65	0.75	0.73	1.39	1.88

Rates Becoming Disabled at Indicated Ages (Municipal Division)					
Sample Ages	Municipal General		Municipal	Municipal	Municipal
	Male	Female	Detention	Police	Fire
25	0.03%	0.04%	0.06%	0.01%	0.02%
30	0.06	0.04	0.10	0.01	0.02
35	0.09	0.04	0.15	0.05	0.02
40	0.13	0.06	0.22	0.11	0.08
45	0.18	0.14	0.32	0.18	0.08
50	0.30	0.25	0.51	0.28	0.33
55	0.49	0.39	0.85	0.46	0.33
60	0.60	0.51	1.04	0.74	1.17
65	0.62	0.59	1.07	1.08	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 5 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 5 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 5 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
Coverage Plan 2	2.5	2.0	90
Coverage Plan 3	3.0	2.5	90
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
Coverage Plan 2	2.5	2.0	90
Coverage Plan 3	2.5	2.0	90
Coverage Plan 4	3.0	2.5	90
Coverage Plan 5	3.5	3.0	90
Municipal Fire Member Coverage Plan 1	2.0	2.0	90
Coverage Plan 2	2.5	2.0	90
Coverage Plan 3	2.5	2.0	90
Coverage Plan 4	3.0	2.5	90
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. 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.

Survivor Pensions – Death Not in the Line of Duty

Requires 5 years of credited service. 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.



Appendix C: Summary of Plan Provisions

Elective Survivor Beneficiary Pension

Applicable to members with 5 years of credited service. 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 members with 5 years of credited service. 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.

Cost-of-Living Increases

Effective July 1, 2020, there will be no COLA increases for fiscal years 2021, 2022, and 2023 (July 1, 2020, July 1, 2021, and July 1, 2022). In lieu of these COLAs, an annual non-compounding additional payment equal to 2% of annual benefit as of June 30, 2020 (inclusive of all past COLAs) will be payable.

Beginning July 1, 2023 and each July 1 thereafter, the COLA increase will be determined as an amount equal to the smoothed investment rate of return on the actuarial value of assets on June 30 of the preceding calendar year, less the COLA “hurdle rate,*” multiplied by the funded ratio on June 30 of the preceding calendar year; or 0.5%, whichever is greater, subject to the following:

- If the funded ratio of the fund is less than 100% on June 30 of the preceding calendar year, the COLA amount shall not exceed 3.0%.
- If the funded ratio of the fund is greater than or equal to 100% on June 30 of the preceding calendar year, the COLA amount shall not exceed 5.0%.
- The minimum COLA amount for any year will be 0.5%.

*The COLA “hurdle rate” is the investment rate of return required to fund a COLA in excess of 0.5% as determined by the fund’s actuaries.



Appendix C: Summary of Plan Provisions

Pensions are increased by the COLA amount determined above each July 1 subject to the following eligibility periods:

- Retirees who have been retired for at least 2 full calendar years.
- Retirees who attained at least age 65 and have been retired for at least 1 full calendar year.
- Disabled retirees who have been retired for at least 1 full calendar year.
- Survivor beneficiaries who have received a survivor pension for at least 2 full calendar years.
- Survivor beneficiaries of a deceased retiree who otherwise would have been retired for at least 2 full calendar years.

For certain retirees, pensions are increased each July 1 by 2.5% subject to 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 \$25,000 or less.
- Disabled retirees whose annual pension is \$25,000 or less.
- Retirees and survivor beneficiaries who attained at least age 75 prior to July 1, 2021.

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. The table reflects the changes resulting from the passage of Senate Bill 72.

Coverage Plan	Percent of Salary Member	Contribution Rate Employer
State Division¹		
State General Member Coverage Plan 3 ²	9.92%	18.24%
State Police Member and Adult Correctional Officer Member Coverage Plan 1	9.10	25.50
Hazardous Duty (Juvenile Corrections) Member Coverage Plan 2 ²	7.28	27.37
Municipal Division^{3,4}		
Municipal General Member Coverage Plan 1	8.50	7.65
Municipal General Member Coverage Plan 2	10.65	9.80
Municipal General Member Coverage Plan 3	14.65	9.80
Municipal General Member Coverage Plan 4	17.15	12.30
Municipal Detention Officer Member Coverage Plan 1	18.15	17.30
Municipal Police Member Coverage Plan 1	8.50	10.65
Municipal Police Member Coverage Plan 2	8.50	15.65
Municipal Police Member Coverage Plan 3	8.50	19.15
Municipal Police Member Coverage Plan 4	13.85	19.15
Municipal Police Member Coverage Plan 5	17.80	19.15
Municipal Fire Member Coverage Plan 1	9.50	11.65
Municipal Fire Member Coverage Plan 2	9.50	18.15
Municipal Fire Member Coverage Plan 3	9.50	21.90
Municipal Fire Member Coverage Plan 4	14.30	21.90
Municipal Fire Member Coverage Plan 5	17.70	21.90

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%.

¹For employees whose annual salary is \$25,000 or less, the employee contribution rates shown above are reduced by 2.0%.

²Employee and employer rates will increase by 0.5% of payroll effective July 1, 2022, with another 0.5% increase each July 1 through FY 2024.

³For employees whose annual salary is \$25,000 or less, the employee contribution rates shown above are reduced by 1.50%.

⁴For all Municipal Coverage Plans, employee and employer rates will increase by 0.5% of payroll effective July 1, 2022, with another 0.5% increase each July 1 through FY 2026.



Appendix D: Risk Considerations

Actuarial Standards of Practice are issued by the Actuarial Standards Board and are binding on credentialed actuaries practicing in the United States. These standards generally identify what the actuary should consider, document and disclose when performing an actuarial assignment. In September, 2017, Actuarial Standard of Practice Number 51, *Assessment and Disclosure of Risk in Measuring Pension Obligations*, (ASOP 51) was issued as final with application to measurement dates on or after November 1, 2018. This ASOP, which applies to funding valuations, actuarial projections, and actuarial cost studies of proposed plan changes, was first applicable for the June 30, 2019 actuarial valuation.

A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. The term “risk” is most commonly associated with an outcome with undesirable results. However, in the actuarial world, risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages;
- external risks such as the regulatory and political environment.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates. The following discussion includes a few exhibits which summarize some historical information to help indicate how certain key risk metrics have changed over time. Many are due to the maturing of the retirement system.

The investment return on assets is the most obvious risk – and usually the primary risk – to funding a pension plan. To illustrate the magnitude of this risk, the following chart shows the Asset Volatility Ratio (AVR), defined as the fair value of assets divided by covered payroll.



Appendix D: Risk Considerations

HISTORICAL ASSET VOLATILITY RATIOS

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In other words, it will be harder to recover from investment losses with increased contributions.

Actuarial Valuation Date	Market Value of Assets (\$ Millions)	Covered Payroll (\$ Millions)	Asset Volatility Ratio	Increase in ACR with a Return 10% Lower than Assumed*
6/30/2010	\$9,997.9	\$1,993.5	5.02	3.24%
6/30/2011	11,970.7	1,935.0	6.19	4.00%
6/30/2012	11,574.9	1,994.3	5.80	3.74%
6/30/2013	12,678.2	2,049.7	6.19	4.00%
6/30/2014	14,392.9	2,102.3	6.85	4.42%
6/30/2015	14,218.3	2,248.3	6.32	4.08%
6/30/2016	13,788.6	2,135.2	6.46	4.17%
6/30/2017	14,757.5	2,204.4	6.69	4.32%
6/30/2018	15,168.1	2,221.1	6.83	4.41%
6/30/2019	15,464.5	2,271.8	6.81	4.40%
6/30/2020	14,650.6	2,410.0	6.08	3.93%
6/30/2021	17,764.1	2,388.5	7.44	4.80%

*The impact of asset smoothing is not reflected in the impact on the Actuarial Contribution Rate (ACR). Current year assumptions are used for all years shown.

The assets as of June 30, 2021 are about 7.4 times the amount of covered payroll. Consequently, underperforming the investment return assumption by 10.00% (i.e., earn -2.75% for one year) is equivalent to about 74% of payroll. While the actual impact of this experience in the first year is mitigated by the asset smoothing method and amortization of the UAL, this table illustrates the risk associated with volatile investment returns. Such an event in one year would be expected to increase the actuarial contribution rate by 4.80% of payroll.



Appendix D: Risk Considerations

HISTORICAL CASH FLOWS

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. This is a metric the investment consultants usually focus on when evaluating the asset allocation. The maturity of the system is the main contributor to the situation.

<u>Fiscal</u> <u>Year End</u>	<u>Market Value</u> <u>of Assets</u> <u>(MVA)</u>	<u>Contributions</u>	<u>Benefit Payments</u> <u>and Expenses</u>	<u>Net Cash Flow</u>	<u>Net Cash Flow</u> <u>as a Percent</u> <u>of MVA</u>
6/30/2010	\$ 9,997,858,552	531,740,943	685,224,059	(153,483,116)	-1.54%
6/30/2011	\$ 11,970,717,468	509,693,877	758,505,175	(248,811,298)	-2.08%
6/30/2012	\$ 11,574,935,613	527,945,980	824,595,317	(296,649,337)	-2.56%
6/30/2013	\$ 12,678,243,074	516,919,500	886,346,073	(369,426,573)	-2.91%
6/30/2014	\$ 14,392,853,706	544,249,023	961,424,665	(417,175,642)	-2.90%
6/30/2015	\$ 14,218,284,887	573,621,240	995,202,195	(421,580,955)	-2.97%
6/30/2016	\$ 13,788,598,482	587,817,775	1,065,994,548	(478,176,773)	-3.47%
6/30/2017	\$ 14,757,468,488	604,244,744	1,138,351,604	(534,106,860)	-3.62%
6/30/2018	\$ 15,168,116,441	602,297,355	1,192,333,605	(590,036,250)	-3.89%
6/30/2019	\$ 15,464,506,140	621,222,546	1,257,796,912	(636,574,366)	-4.12%
6/30/2020	\$ 14,650,589,800	719,405,773	1,310,406,573	(591,000,800)	-4.03%
6/30/2021	\$ 17,764,109,282	688,625,690	1,363,606,673	(674,980,983)	-3.80%



Appendix D: Risk Considerations

There is a direct correlation between healthy, well-funded retirement plans and consistent contributions equal to the full actuarial contribution rate each year. Historically, PERA has been funded with fixed contribution rates by both employees and the employer. In 2020, Senate Bill 72 implemented contribution increases to both employer and employee contribution rates. However, the combined statutory contribution rates have failed to meet the actuarial required contribution in each of the past ten years, when looking to fund the System over 25 years. We would also note that with the adoption of SB 72 and as more members enter the new lower cost Tier 2 benefit structures, the System is expected to be fully funded in the future, if all assumptions are met.

Funding a retirement system with fixed contribution rates creates some unique funding challenges. Given the extreme volatility associated with the underlying investments of the portfolio, wide variations in the actual return on the market value of assets is expected. However, when it occurs it can change the long-term funding outlook from positive to negative or vice versa. By the time a trend has been identified, it is possible for the funded status of the System to have seriously declined, requiring more substantive resources to compensate for the investment losses. A key change in the provisions is the addition of the COLA increase that is dependent on the funded ratio and actual investment returns of the System. This provision, which is effective July 1, 2023, should help mitigate some contribution rate risk and funded ratio volatility.

A key demographic risk for all retirement systems, including PERA, is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect small, continuous improvements in mortality experience over time and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, as experienced with the COVID-19 pandemic. This type of event is also significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.