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Actuarial Certification



October 2020

To the best of our knowledge, this report is complete and accurate and contains sufficient information to fully and fairly disclose the actuarial funded condition of the State plans. This valuation is based on the member and financial data as of June 30, 2019 provided by the various CalPERS databases and the benefits under these plans with CalPERS as of the date this report was produced. In our opinion, this valuation has been performed in accordance with generally accepted actuarial principles and in accordance with standards of practice prescribed by the Actuarial Standards Board. The assumptions and methods are internally consistent and reasonable for these plans, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned are actuaries for CalPERS, who are members of the American Academy of Actuaries and the Society of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

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Highlights and Executive Summary

Introduction

This is the actuarial valuation report as of June 30, 2019 for the State plans. This actuarial valuation was used to set the fiscal year 2020-21 required employer contribution rates.

The five plans included in this valuation provide retirement benefits to members employed by the State of California. This includes employees of the California State University system but generally does not include employees of the University of California system. It also does not cover school employees or employees of local governments that have elected to contract with CalPERS.

Purpose of Report

This actuarial valuation was performed by the CalPERS Actuarial Office using data as of June 30, 2019. The purpose of the report is to:

- Set forth the assets and accrued liabilities of the State plans as of June 30, 2019.
- Determine the required employer contribution rates of these plans for the fiscal year July 1, 2020 through June 30, 2021.
- Provide actuarial information as of June 30, 2019 to the CalPERS Board of Administration (“Board”) and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement Number 68 for an Agent Employer Defined Benefit Pension Plan.

The use of this report for any other purpose may be inappropriate.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; and changes in plan provisions or applicable law.

California Actuarial Advisory Panel Recommendations

This report includes all the basic disclosure elements as described in the *Model Disclosure Elements for Actuarial Valuation Reports* recommended in 2011 by the California Actuarial Advisory Panel (CAAP), except for the following:

- Due to the various employee contribution rates within the majority of State plans, we have shown the total normal cost for the plans and shown the average employee portion as “Employee Contribution.” Specific employee normal costs are shown in Appendix B.
- The “Schedule of Amortization Bases” does not give the original base amounts of the various components of the unfunded liabilities.

Additionally, this report includes the following “Enhanced Risk Disclosures” also recommended by the CAAP in the Model Disclosure Elements document:

- A “Deterministic Stress Test,” also called a Scenario Test, projecting future results under different investment income scenarios.
- A “Sensitivity Analysis,” showing the impact on current valuation results using alternate discount rates of 6% and 8%.

Highlights and Executive Summary

Required Employer Contribution Rates

The actuarially required employer contribution rates for fiscal year July 1, 2020 through June 30, 2021 are shown in the table below. For comparison purposes, the corresponding contribution rates for fiscal year July 1, 2019 through June 30, 2020 are also provided. The contribution amounts that these rates are expected to generate are also shown.

Plan	Fiscal Year 2019-20		Fiscal Year 2020-21	
	Expected Employer Contribution	Required Employer Rate ¹	Expected Employer Contribution	Required Employer Rate ¹
State Miscellaneous	\$4,006,671,712	30.977%	\$4,324,788,566	31.76%
State Industrial	153,724,045	20.823%	166,534,651	21.62%
State Safety	526,375,464	21.526%	553,298,093	21.66%
State Peace Officers & Firefighters	1,755,305,847	47.198%	1,871,841,492	48.93%
California Highway Patrol	532,158,559	57.811%	574,508,860	59.76%
Total State	\$6,974,235,627		\$7,490,971,662	

(1) Excludes supplanting payments under Government Code section 20825.1 and additional contributions pursuant to Government Code section 20683.2 For fiscal year 2020-21 rates reflecting these adjustments, see Appendix D. For fiscal year 2019-20 rate detail, see the June 30, 2018 State Actuarial Valuation report.

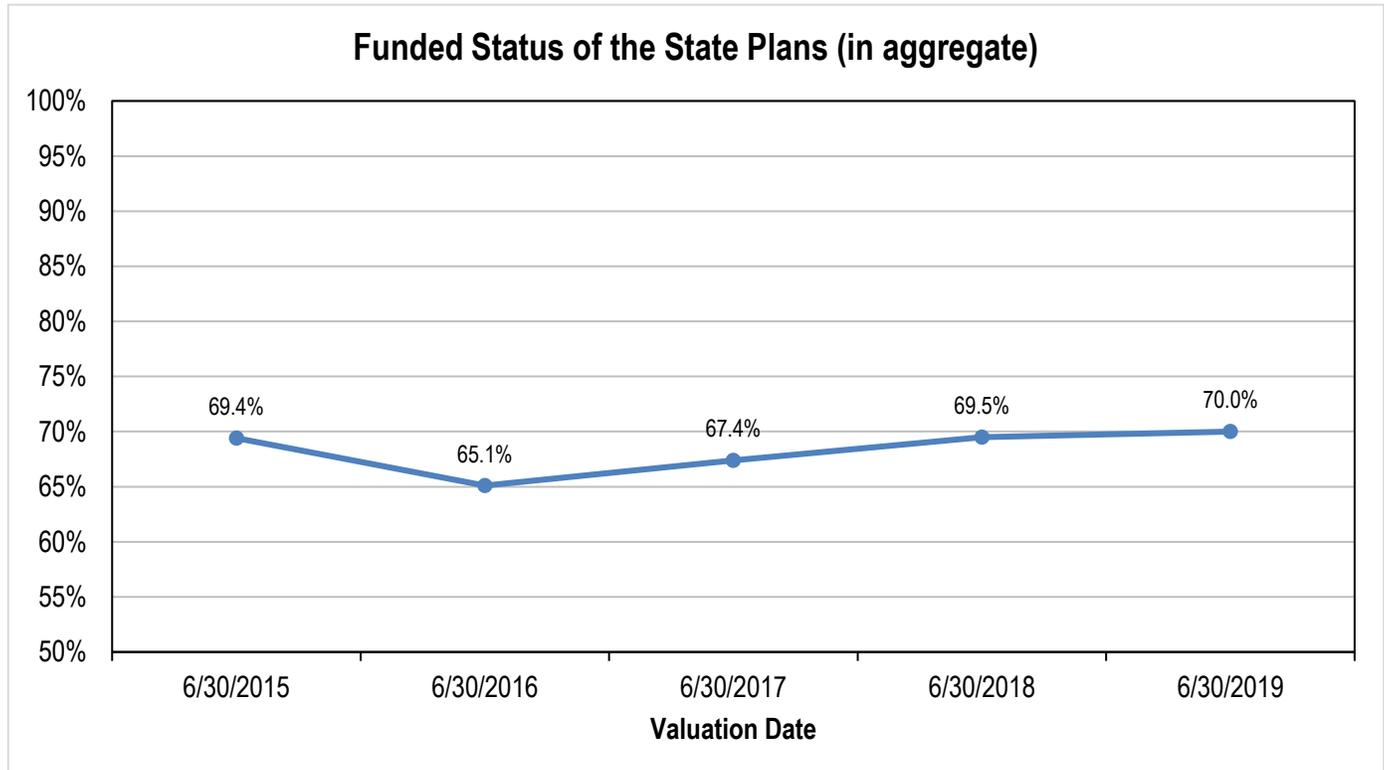
The payroll used to calculate the expected dollar contribution is payroll reported for the fiscal year ending on the valuation date projected forward two years using the annual payroll growth assumption in effect on the valuation date. For example, expected fiscal year 2020-21 contributions are based on fiscal year 2018-19 reported payroll increased by 2.75% per year for two years. Actual contribution amounts will be based on actual payroll during the associated fiscal year and will differ from the expected contributions shown in the table above. State Miscellaneous and State Industrial include both Tier 1 and Tier 2 benefit levels.

The supporting exhibits titled “Reconciliation of Employer Contribution Rates” and “Reconciliation of Employer Contributions” in the Liabilities and Employer Contributions section of this report explain the changes in required contribution rates and expected contribution amounts from fiscal year 2019-20 to fiscal year 2020-21.

Highlights and Executive Summary

Funded Status

The funded status of a pension plan is defined as the ratio of assets to accrued liabilities. Plans with a lower funded ratio are, all other things being equal, more at risk of not being able to meet their future benefit obligations. From June 30, 2018 to June 30, 2019 the funded status for the State plans in aggregate increased by 0.5%. The graph below shows the funded status for the past five years for the State plans in aggregate.



Unfunded Liability and Funded Status on June 30, 2019

Plan	Present Value of Benefits	Entry Age Normal Accrued Liability	Market Value of Assets	Unfunded Liability	Funded Status
State Miscellaneous	\$137,912,712,583	\$120,101,465,581	\$83,816,851,738	\$36,284,613,843	69.8%
State Industrial	6,067,437,245	4,945,680,604	3,822,261,757	1,123,418,847	77.3%
State Safety	18,788,878,108	14,482,873,130	11,386,348,364	3,096,524,766	78.6%
State Peace Officers & Firefighters	60,336,281,625	51,218,664,150	35,358,588,464	15,860,075,686	69.0%
California Highway Patrol	16,622,228,745	14,087,273,224	9,082,325,286	5,004,947,938	64.5%
Total for the State	\$239,727,538,306	\$204,835,956,689	\$143,466,375,609	\$61,369,581,080	70.0%

Funded Status History

Plan	June 30, 2015	June 30, 2016	June 30, 2017	June 30, 2018	June 30, 2019
State Miscellaneous	69.6%	65.0%	67.5%	69.5%	69.8%
State Industrial	78.6%	73.0%	76.4%	76.9%	77.3%
State Safety	76.6%	73.4%	76.4%	77.6%	78.6%
State Peace Officers & Firefighters	68.5%	64.2%	65.9%	68.3%	69.0%
California Highway Patrol	61.6%	58.5%	60.2%	63.8%	64.5%
Total for the State	69.4%	65.1%	67.4%	69.5%	70.0%

Highlights and Executive Summary

Changes Since the Prior Year's Valuation

Overall, the required contributions for the State plans increased by \$517 million between fiscal years 2019-20 and 2020-21, a 7.4% relative increase. The table below highlights major contributors to the change in required contributions.

Reason for Change	Change in Required Contribution (in millions)
Change due to normal progression of existing amortization bases	\$391.3
Change due to increase in overall payroll	112.2
Decrease in normal cost due to new hires in lower benefit levels	(76.3)
Impact of change in member contribution rates	8.2
First installment of the 20-year amortization of the following sources of experience gains and losses:	
• Investment experience (reflects five-year ramp)	18.7
• Impact of greater than expected contributions received due to higher than expected payroll	(31.6)
• Demographic gains and losses	94.2
Total Change in Required Contributions	\$516.7

Key changes are discussed in detail below.

Supplanting Payments Under Government Code Section 20825.1

Senate Bill 90 (SB 90), approved by the Governor on June 27, 2019 and amended by Assembly Bill 84 (AB 84) / Senate Bill 111 (SB 111), established Government Code section 20825.1 and directed the State to contribute an additional \$2.5 billion to the State plans to pay down Unfunded Accrued Liability (UAL). The contribution was made on July 29, 2019.

According to direction provided by the Department of Finance, these amounts will be treated as payments toward the required UAL contributions over a period of three fiscal years with the employer contribution rate for each fiscal year reduced accordingly. The allocation among plans and fiscal years is as follows:

Plan	FY 2019-20	FY 2020-21	FY 2021-22	Total
State Miscellaneous	\$32,384,208	\$339,222,800	\$476,449,992	\$848,057,000
State Industrial	3,166,795	33,172,000	46,591,205	82,930,000
State Safety	7,042,595	73,770,800	103,613,605	184,427,000
State Peace Officers & Firefighters	52,872,296	553,834,400	777,879,304	1,384,586,000
California Highway Patrol	0	0	0	0
Total for the State	\$95,465,894	\$1,000,000,000	\$1,404,534,106	\$2,500,000,000

As the \$2.5 billion additional contribution was made after June 30, 2019, it will not be recognized in market value of assets or funded status until the June 30, 2020 valuation.

Assumptions and Methods

On February 14, 2018, the Board adopted a new amortization policy effective with this actuarial valuation, first affecting State plan employer contributions for fiscal year 2020-21. The new policy generally accelerates the recognition of new sources of Unfunded Accrued Liability by amortizing experience gains/losses over 20 years instead of 30 years, determining payments as a level dollar amount instead of a level percentage of payroll, and eliminating the five-year ramps (phase-in and phase-out) for all amortization bases except the ramp-up for investment gains/losses. The new policy applies only to amortization bases established on or after June 30, 2019; it does not alter the payments for amortization bases already in existence upon implementation.

A complete description of the actuarial assumptions and methods used in this valuation is provided in Appendix A, including details of the new amortization policy.

Plan Provisions

No changes were made since the prior valuation. See Appendix B for a summary of the plan provisions used in this valuation.

Highlights and Executive Summary

Plan Experience

The return on plan assets for the year ending June 30, 2019 was approximately 6.7% reduced for administrative expenses. This was lower than the assumed return of 7.0%, leading to an investment experience loss that will be amortized over 20 years with a five-year ramp up.

Payroll across the State plans increased by 4.7% in total, compared with the payroll growth assumption of 2.75%. This led to a contribution increase of \$112.2 million. The payroll growth for the year ranges from a 2.9% increase for State Peace Officers & Firefighters to a 5.3% increase for State Miscellaneous.

The Public Employees' Pension Reform Act of 2013 (PEPRA) requires lower benefits for new members as defined by PEPRA who are hired on or after January 1, 2013. The normal cost for all plans is lower due to the enrollment of new hires into the lower benefit level. PEPRA membership ranges from a high of 42% of active members (38% by payroll) for State Safety to a low of 20% of active members (16% by payroll) for California Highway Patrol.

The plans in aggregate experienced a loss due to demographic sources and a gain due to actual contributions being greater than expected. The net effect was a non-investment experience loss that will be amortized over 20 years.

Additional Contributions per Government Code Section 20683.2

One of the provisions of pension reform added Government Code section 20683.2, which changed the contribution rates of many State members effective July 1, 2013, July 1, 2014, and July 1, 2015. Government Code section 20683.2 also stipulates that "savings realized by the state employer as a result of the employee contribution rate increases required by this section shall be allocated to any unfunded liability, subject to appropriation in the annual Budget Act." Under the California Constitution, the Board has plenary authority over the actuarial function at CalPERS consistent with the fiduciary duties of a trustee. This includes authority to set employer contribution rates. By statute, the State may pay additional contributions in addition to the actuarially required contribution rates set by the Board and CalPERS will generally accept these payments.

The table below shows the actuarially required contribution rate (set by the Board based on staff recommendation), the impact of the supplanting payment pursuant to Government Code section 20825.1, the additional contributions under Government Code section 20683.2, and the resulting total contribution rate for fiscal year 2020-21 to be paid by the State for each plan.

Plan	Actuarially Required Employer Contribution FY 2020-21	Impact of Supplanting Payment per GC 20825.1	Additional Statutory Contribution per GC 20683.2	Total Contribution FY 2020-21
State Miscellaneous	31.76%	(2.49%)	0.10%	29.37%
State Industrial	21.62%	(4.31%)	0.88%	18.19%
State Safety	21.66%	(2.89%)	1.18%	19.95%
State Peace Officers & Firefighters	48.93%	(14.48%)	1.65%	36.10%
California Highway Patrol	59.76%	-	1.32%	61.08%

In all cases, the savings are less than the actual increase in member contributions. This is because the additional member contributions increase the value of the benefit in some circumstances. One example is when a member terminates and takes a refund of his/her accumulated contributions with interest. Another example is Tier 2 members, who are assumed to elect to convert to a Tier 1 benefit with an actuarial equivalent reduction to offset missed Tier 1 contributions; because the members will make additional contributions, a smaller reduction will apply in the future.

The rates and information shown in the remainder of this report reflect the rates set by the Board at its September 2020 meeting (shown above as the actuarially required employer contribution). The additional contribution pursuant to Government Code section 20683.2 will be realized in future valuations as actuarial gains.

Highlights and Executive Summary

Subsequent Events

This actuarial valuation report reflects statutory and regulatory changes and fund investment return through July 2020 and Board actions through September 2020. To our knowledge, there have been no subsequent events that could materially affect current or future certifications rendered in this report.

Projected Future Rates

The table below shows the required and projected employer contribution rates for the next six fiscal years. Projected results reflect a 4.7% investment return reduced for estimated administrative expenses for fiscal year 2019-20 and the anticipated decrease in normal cost due to new hires entering lower benefit formulas under PEPRA. Projected rates also reflect the contribution of \$2.5 billion in July 2019 to serve as supplanting payments over a period of three fiscal years as well as the contributions of \$25 million and \$243 million to the California Highway Patrol plan in August 2020. Rates do not reflect additional contributions to offset increased member contributions pursuant to Government Code section 20683.2. It is assumed that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period.

Plan	2020-21 Rate		Projected Future Employer Contribution Rates				
	Before Supplanting Payment	After Supplanting Payment	2021-22	2022-23	2023-24	2024-25	2025-26
State Miscellaneous	31.76%	29.27%	29.4%	33.4%	34.1%	33.5%	33.6%
State Industrial	21.62%	17.31%	16.6%	22.8%	23.0%	21.5%	21.5%
State Safety	21.66%	18.77%	18.2%	22.4%	22.0%	22.0%	21.9%
State Peace Officers & Firefighters	48.93%	34.45%	30.9%	51.6%	52.7%	51.8%	52.0%
California Highway Patrol	59.76%	59.76%	61.3%	62.3%	61.5%	60.9%	61.3%

Under the amortization policy in effect for this valuation, changes in the Unfunded Accrued Liability (UAL) due to investment gains or losses (return relative to the 7% assumption) are amortized using a five-year ramp up. For more information, please see “Amortization of the Unfunded Actuarial Accrued Liability” under “Actuarial Methods” in Appendix A. This method attempts to mitigate employer cost volatility from year to year by phasing in the impact of investment experience over a five-year period. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is poor investment return, the relatively small amortization payments during the ramp-up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the investment loss is phased in.

A scenario analysis was performed to determine the effects of various investment returns on future employer contribution rates for three years beyond the estimated 2021-22 employer rates shown above. That information is available in the “Risk Analysis” section of this report.

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Assets

Reconciliation of Market Value of Assets

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
1) Market Value of Assets as of June 30, 2018 Including Receivables for Tier 1 Conversion and Service Buybacks	\$80,223,069,956	\$3,589,902,866	\$10,551,342,261	\$33,326,594,392	\$8,540,511,923
2) Receivables for Tier 1 Conversion and Service Buybacks as of June 30, 2018	236,054,009	12,891,514	16,003,164	69,355,098	10,529,078
3) Market Value of Assets as of June 30, 2018 [(1) - (2)]	\$79,987,015,947	\$3,577,011,352	\$10,535,339,097	\$33,257,239,294	\$8,529,982,845
4) Employer Contributions Received in 2018-19	3,777,483,950	148,494,457	523,076,605	1,665,872,026	507,055,469
5) Employee Contributions Received in 2018-19	898,463,993	58,809,121	254,605,175	423,028,532	97,097,752
6) Benefit Payments in 2018-19	(6,154,575,809)	(203,045,614)	(611,891,644)	(2,198,230,169)	(610,838,883)
7) Refunds in 2018-19	(36,162,122)	(2,498,853)	(14,559,338)	(11,326,636)	(1,459,255)
8) Transfers In/(Out)	(1,343,931)	(753,561)	1,481,826	349,822	265,843
9) SCP Payment and Interest	59,936,404	2,950,221	4,196,964	18,488,238	3,231,886
10) Miscellaneous Adjustments	185,347	8,262	24,273	76,874	19,714
11) Investment Return	5,160,266,035	232,911,164	691,670,003	2,174,796,204	556,295,976
12) Administrative Expense	(90,157,243)	(4,034,504)	(11,866,760)	(37,481,396)	(9,605,369)
13) Market Value of Assets as of June 30, 2019 [(3) + (4) + (5) + (6) + (7) + (8) + (9) + (10) + (11) + (12)]	\$83,601,112,571	\$3,809,852,044	\$11,372,076,201	\$35,292,812,789	\$9,072,045,977
14) Receivables for Tier 1 Conversion and Service Buybacks as of June 30, 2019	215,739,166	12,409,713	14,272,163	65,775,675	10,279,309
15) Market Value of Assets as of June 30, 2019 Including Receivables for Tier 1 Conversion and Service Buybacks	\$83,816,851,738	\$3,822,261,757	\$11,386,348,364	\$35,358,588,464	\$9,082,325,286

Assets

Asset Allocation

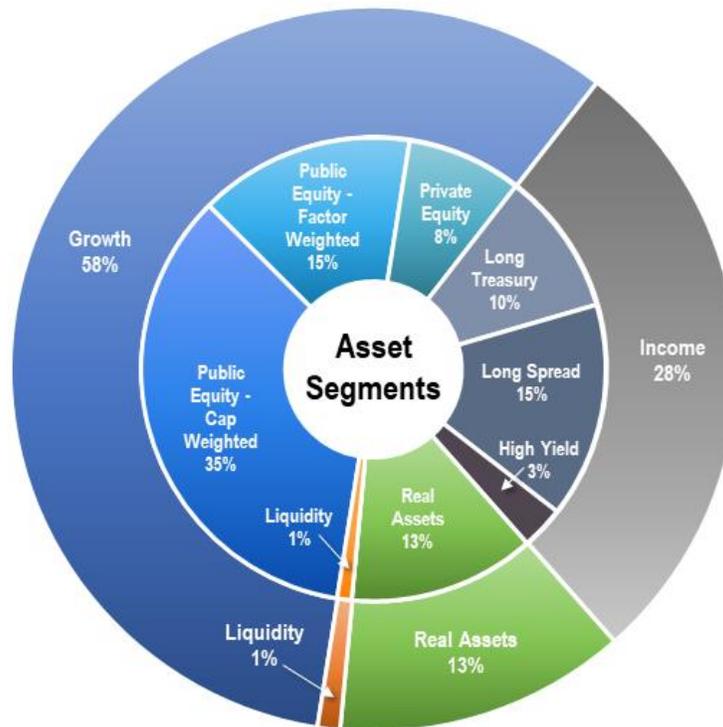
CalPERS adheres to an Asset Allocation Strategy that sets asset class allocation policy targets and ranges and manages those asset class allocations within their policy ranges. CalPERS Investment Belief No. 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return. On December 19, 2017, the CalPERS Board of Administration adopted changes to the current asset allocation as shown in the Policy Target Allocation below, expressed as a percentage of total assets.

The asset allocation and market value of assets shown below reflect the values of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2019. The assets of the State plans are part of the PERF and are invested accordingly.

Asset Class	Market Value (Dollars in Billions)	Actual Allocation	Policy Target Allocation
Public Equity	\$185.7	50.2%	50.0%
Private Equity	26.5	7.1%	8.0%
Global Fixed Income	106.3	28.7%	28.0%
Real Assets	40.9	11.0%	13.0%
Liquidity	3.7	1.0%	1.0%
Inflation Sensitive Assets	0	0.0%	0.0%
Trust Level ¹	7.1	2.0%	0.0%
Total Fund	\$370.3	100.0%	100.0%

¹ Trust Level includes Multi-Asset Class, Completion Overlay, Risk Mitigation, Absolute Return Strategies, Plan Level Transition and other Total Fund level portfolios.

Strategic Asset Allocation Policy Targets

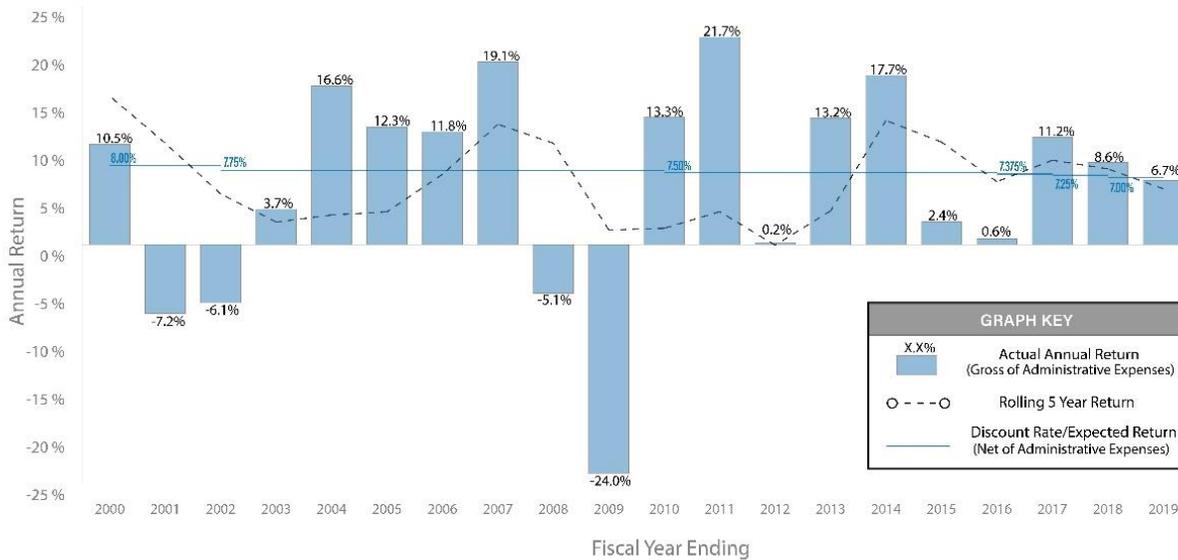


Assets

CalPERS History of Investment Returns

Following is a chart with the 20-year historical annual returns of the PERF for each fiscal year ending on June 30. Beginning in 2002, the figures are reported as gross of fees.

History of Investment Returns (2000 - 2019)



The table below shows historical geometric mean annual returns of the PERF for various time periods ending on June 30, 2019 (figures are reported as gross of fees). The geometric mean rate of return is the average rate per period compounded over multiple periods. It should be recognized that in any given year the rate of return is volatile. The portfolio has an expected volatility of 11.4% per year based on the most recent Asset Liability Modeling study. The volatility is a measure of the risk of the portfolio expressed in the standard deviation of the fund’s total return distribution, expressed as a percentage. Consequently, when looking at investment returns, it is more instructive to look at returns over longer time horizons.

History of CalPERS Geometric Rates of Return and Volatilities

	1 Year	5 Year	10 Year	20 Year	30 Year
Geometric Return	6.7%	5.8%	9.1%	5.8%	8.1%
Volatility	–	4.4%	6.9%	10.7%	9.8%

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Liabilities and Employer Contributions

Key Results

Key results of the current and prior valuations are shown below.

State Miscellaneous

Participant Information

	June 30, 2018	June 30, 2019
Members Included in the Valuation ¹		
Active Members	174,402	176,842
Transfers from State Miscellaneous	37,586	37,822
Vested Terminations ²	61,005	85,011
Receiving Payments	195,158	197,691
Total	468,151	497,366
Average Entry Age of Active Members	34.8	34.9
Average Age for Active Members	47.2	46.9
Average Age of Retired Members	72.2	72.3
Average Pay	\$70,249	\$ 72,935
Covered Payroll in Fiscal Year Ending on Valuation Date	\$12,251,583,453	\$12,898,034,530
Projected Payroll for Contribution Rate	\$12,934,685,803	\$13,617,180,568

(1) Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status

	June 30, 2018	June 30, 2019
Present Value of Benefits	\$132,446,673,597	\$137,912,712,583
Accrued Liability	115,469,058,970	120,101,465,581
Market Value of Assets	80,223,069,956	83,816,851,738
Unfunded Liability/(Surplus)	35,245,989,014	36,284,613,843
Funded Status	69.5%	69.8%

Employer Contribution

	June 30, 2018	June 30, 2019
Contribution Required in Dollars		
Total Normal Cost	\$2,174,670,866	\$2,263,175,410
Employee Contribution	893,164,372	953,202,640
Employer Normal Costs	1,281,506,494	1,309,972,770
Amortization of Unfunded Liability	2,725,165,218	3,014,815,796
Group Term Life Benefits	0	0
Total	\$4,006,671,712	\$ 4,324,788,566
Contribution Required (Percent of Payroll)		
Total Normal Cost	16.813%	16.62%
Employee Contribution	6.905%	7.00%
Employer Normal Costs	9.908%	9.62%
Amortization of Unfunded Liability	21.069%	22.14%
Group Term Life Benefits	0.000%	0.00%
Total	30.977%	31.76%

Liabilities and Employer Contributions

Key Results (continued)

State Industrial

Participant Information

	June 30, 2018	June 30, 2019
Members Included in the Valuation ¹		
Active Members	11,811	11,795
Transfers from State Industrial	8,909	8,974
Vested Terminations ²	3,566	3,730
Receiving Payments	14,642	15,345
Total	38,928	39,844
Average Entry Age of Active Members	35.7	35.7
Average Age for Active Members	45.2	45.1
Average Age of Retired Members	68.5	68.6
Average Pay	\$59,204	\$ 61,865
Covered Payroll in Fiscal Year Ending on Valuation Date	\$699,252,899	\$ 729,693,522
Projected Payroll for Contribution Rate	\$738,240,618	\$ 770,378,496

(1) Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status

	June 30, 2018	June 30, 2019
Present Value of Benefits	\$5,746,905,539	\$ 6,067,437,245
Accrued Liability	4,670,036,601	4,945,680,604
Market Value of Assets	3,589,902,866	3,822,261,757
Unfunded Liability/(Surplus)	1,080,133,735	1,123,418,847
Funded Status	76.9%	77.3%

Employer Contribution

	June 30, 2018	June 30, 2019
Contribution Required in Dollars		
Total Normal Cost	\$134,810,119	\$139,669,621
Employee Contribution	58,830,395	62,169,545
Employer Normal Costs	75,979,724	77,500,076
Amortization of Unfunded Liability	77,744,321	89,034,575
Group Term Life Benefits	0	0
Total	\$153,724,045	\$ 166,534,651
Contribution Required (Percent of Payroll)		
Total Normal Cost	18.261%	18.13%
Employee Contribution	7.969%	8.07%
Employer Normal Costs	10.292%	10.06%
Amortization of Unfunded Liability	10.531%	11.56%
Group Term Life Benefits	0.000%	0.00%
Total	20.823%	21.62%

Liabilities and Employer Contributions

Key Results (continued)

State Safety

Participant Information

	June 30, 2018	June 30, 2019
Members Included in the Valuation ¹		
Active Members	28,335	28,953
Transfers from State Safety	5,956	6,216
Vested Terminations ²	7,103	7,706
Receiving Payments	25,749	26,866
Total	67,143	69,741
Average Entry Age of Active Members	38.6	38.4
Average Age for Active Members	46.7	46.7
Average Age of Retired Members	68.7	69.0
Average Pay	\$81,741	\$83,555
Covered Payroll in Fiscal Year Ending on Valuation Date	\$2,316,124,913	\$2,419,167,291
Projected Payroll for Contribution Rate	\$2,445,263,353	\$2,554,050,987

(1) Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status

	June 30, 2018	June 30, 2019
Present Value of Benefits	\$17,751,712,839	\$18,788,878,108
Accrued Liability	13,590,778,296	14,482,873,130
Market Value of Assets	10,551,342,261	11,386,348,364
Unfunded Liability/(Surplus)	3,039,436,035	3,096,524,766
Funded Status	77.6%	78.6%

Employer Contribution

	June 30, 2018	June 30, 2019
Contribution Required in Dollars		
Total Normal Cost	\$566,958,761	\$584,877,677
Employee Contribution	256,385,863	269,707,784
Employer Normal Costs	310,572,898	315,169,893
Amortization of Unfunded Liability	215,802,566	238,128,200
Group Term Life Benefits	0	0
Total	\$526,375,464	\$553,298,093
Contribution Required (Percent of Payroll)		
Total Normal Cost	23.186%	22.90%
Employee Contribution	10.485%	10.56%
Employer Normal Costs	12.701%	12.34%
Amortization of Unfunded Liability	8.825%	9.32%
Group Term Life Benefits	0.000%	0.00%
Total	21.526%	21.66%

Liabilities and Employer Contributions

Key Results (continued)

State Peace Officers and Firefighters

Participant Information

	June 30, 2018	June 30, 2019
Members Included in the Valuation ¹		
Active Members	41,289	41,144
Transfers from State POFF	6,173	6,289
Vested Terminations ²	7,078	7,545
Receiving Payments	39,947	41,657
Total	94,487	96,635
Average Entry Age of Active Members	29.7	29.7
Average Age for Active Members	41.7	41.7
Average Age of Retired Members	63.9	64.4
Average Pay	\$85,317	\$88,060
Covered Payroll in Fiscal Year Ending on Valuation Date	\$3,522,647,266	\$3,623,159,227
Projected Payroll for Contribution Rate	\$3,719,056,868	\$3,825,172,999

(1) Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status

	June 30, 2018	June 30, 2019
Present Value of Benefits	\$57,779,361,435	\$ 60,336,281,625
Accrued Liability	48,792,433,542	51,218,664,150
Market Value of Assets	33,326,594,392	35,358,588,464
Unfunded Liability/(Surplus)	15,465,839,150	15,860,075,686
Funded Status	68.3%	69.0%

Employer Contribution

	June 30, 2018	June 30, 2019
Contribution Required in Dollars		
Total Normal Cost	\$1,111,774,860	\$1,130,721,137
Employee Contribution	426,055,155	440,277,412
Employer Normal Costs	685,719,705	690,443,725
Amortization of Unfunded Liability	1,069,586,142	1,181,397,767
Group Term Life Benefits	0	0
Total	\$1,755,305,847	\$ 1,871,841,492
Contribution Required (Percent of Payroll)		
Total Normal Cost	29.894%	29.56%
Employee Contribution	11.456%	11.51%
Employer Normal Costs	18.438%	18.05%
Amortization of Unfunded Liability	28.760%	30.88%
Group Term Life Benefits	0.000%	0.00%
Total	47.198%	48.93%

Liabilities and Employer Contributions

Key Results (continued)

California Highway Patrol

Participant Information

	June 30, 2018	June 30, 2019
Members Included in the Valuation ¹		
Active Members	7,311	7,267
Transfers from CHP	265	264
Vested Terminations ²	451	482
Receiving Payments	9,158	9,301
Total	17,185	17,314
Average Entry Age of Active Members	27.5	27.6
Average Age for Active Members	40.6	40.9
Average Age of Retired Members	68.5	68.8
Average Pay	\$119,258	\$125,307
Covered Payroll in Fiscal Year Ending on Valuation Date	\$871,895,121	\$910,605,298
Projected Payroll for Contribution Rate	\$920,508,723	\$961,377,235

(1) Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status

	June 30, 2018	June 30, 2019
Present Value of Benefits	\$15,894,543,442	\$16,622,228,745
Accrued Liability	13,383,782,393	14,087,273,224
Market Value of Assets	8,540,511,923	9,082,325,286
Unfunded Liability/(Surplus)	4,843,270,470	5,004,947,938
Funded Status	63.8%	64.5%

Employer Contribution

	June 30, 2018	June 30, 2019
Contribution Required in Dollars		
Total Normal Cost	\$274,753,444	\$284,279,248
Employee Contribution	96,865,133	101,617,574
Employer Normal Costs	177,888,311	182,661,674
Amortization of Unfunded Liability	354,215,017	391,558,773
Group Term Life Benefits	55,231	288,413
Total	\$532,158,559	\$574,508,860
Contribution Required (Percent of Payroll)		
Total Normal Cost	29.848%	29.57%
Employee Contribution	10.523%	10.57%
Employer Normal Costs	19.325%	19.00%
Amortization of Unfunded Liability	38.480%	40.73%
Group Term Life Benefits	0.006%	0.03%
Total	57.811%	59.76%

Liabilities and Employer Contributions

Accrued and Unfunded Liabilities

The following table shows the development of the accrued liabilities and unfunded liability.

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
1) Present Value of Benefits					
a) Actives and Inactives	\$65,982,962,293	\$3,518,824,868	\$10,773,504,953	\$28,290,536,778	\$7,988,300,478
b) Retired	71,929,750,290	2,548,612,377	8,015,373,155	32,045,744,847	8,633,928,267
c) Total	\$137,912,712,583	\$ 6,067,437,245	\$18,788,878,108	\$60,336,281,625	\$16,622,228,745
2) Present Value of Future Employee Contributions	\$8,173,434,024	\$548,702,807	\$2,143,398,485	\$3,855,310,797	\$ 954,642,483
3) Present Value of Future Employer Normal Costs	9,637,812,978	573,053,834	2,162,606,493	5,262,306,678	1,580,313,038
4) Accrued Liability [(1c) – (2) – (3)]	120,101,465,581	4,945,680,604	14,482,873,130	51,218,664,150	14,087,273,224
5) Market Value of Assets	\$83,816,851,738	3,822,261,757	11,386,348,364	35,358,588,464	9,082,325,286
6) Unfunded Liability/(Surplus) [(4) – (5)]	\$36,284,613,843	\$1,123,418,847	\$3,096,524,766	\$ 15,860,075,686	\$ 5,004,947,938
7) Funded Status [(5) ÷ (4)]	69.8%	77.3%	78.6%	69.0%	64.5%

Employer Contribution Rates

The following table shows the development of the employer contribution rates.

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
Employer Contribution Amount					
Normal Cost	\$1,309,972,770	\$77,500,076	\$315,169,893	\$690,443,725	\$182,661,674
Payment on the Unfunded Liability	3,014,815,796	89,034,575	238,128,200	1,181,397,767	391,558,773
Payment for Term Life Benefits ¹	0	0	0	0	288,413
Total Employer Contribution Amount	\$4,324,788,566	\$166,534,651	\$553,298,093	\$1,871,841,492	\$574,508,860
Projected Payroll	\$13,617,180,568	\$770,378,496	\$2,554,050,987	\$3,825,172,999	\$961,377,235
Employer Contribution (as a percent of payroll)					
Normal Cost	9.62%	10.06%	12.34%	18.05%	19.00%
Payment on the Unfunded Liability	22.14%	11.56%	9.32%	30.88%	40.73%
Payment for Term Life Benefits ¹	0.00%	0.00%	0.00%	0.00%	0.03%
Total Employer Contribution Rate	31.76%	21.62%	21.66%	48.93%	59.76%

(1) Government Code §§21600-21605

Liabilities and Employer Contributions

Schedule of Amortization Bases

The schedules below show the development of payments on the amortization bases used to determine employer contribution rates. Each row of each schedule gives a brief description of a base (or portion of the Unfunded Actuarial Liability), the date the base was established, the balance of the base on the valuation date, and the number of years remaining in the amortization period. The schedules also show the expected payment for the year immediately following the valuation date, the balance on the date a year after the valuation date, and the scheduled payment for fiscal year 2020-21. Please refer to Appendix A for an explanation of how amortization periods are determined.

There is a one-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date (June 30, 2019).
- The required employer contributions determined by the valuation are for the fiscal year beginning one year after the valuation date (fiscal year 2020-21).

This one-year lag is necessary due to the amount of time required to extract and test the membership and financial data as well as the need to provide employers with their required employer contribution in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward one year from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment on the UAL for a fiscal year is equal to the Expected Employer Contribution for the fiscal year, plus any additional discretionary payments made during the year, minus the Expected Normal Cost for the year. The Employer Contribution for the first fiscal year is determined by the actuarial valuation one year ago. The Normal Cost Rate for the fiscal year is assumed to be the same as the rate determined by the current valuation. Expected dollar amounts are determined by multiplying the rate by the expected payroll for the applicable fiscal year, based on payroll as of the valuation date.

State Miscellaneous

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2019	Expected Payment in 2019-20	Balance on 6/30/2020	Scheduled Payment for Fiscal Year 2020-21	Payment as Percentage of Payroll
Assumption Change	6/30/2003	4	487,653,675	109,225,522	408,805,674	112,229,223	0.82%
Assumption Change	6/30/2009	10	1,831,918,546	209,244,477	1,743,708,674	214,998,700	1.58%
Assumption Change	6/30/2011	12	1,600,352,528	160,543,824	1,546,309,382	164,958,779	1.21%
Assumption Change	6/30/2013	14	5,140,611,294	488,114,749	4,995,544,262	501,537,905	3.68%
Assumption Change	6/30/2018	19	3,178,106,328	59,254,620	3,339,280,316	121,768,243	0.89%
Method Change	6/30/2018	19	1,008,349,671	18,800,308	1,059,486,959	38,634,632	0.28%
Reclass of BU 7 Members	6/30/2005	6	(63,224,787)	(10,516,258)	(56,772,420)	(10,805,455)	(0.08%)
New Rate Stabilization Policies	6/30/2004	5	(122,347,337)	(23,286,283)	(106,824,132)	(23,926,656)	(0.18%)
Actuarial Equivalent Reduction Benefits	6/30/2004	5	169,704,369	32,299,714	148,172,591	33,187,956	0.24%
Benefit Change (SB 1801)	6/30/2003	4	(1,423,395)	(318,815)	(1,193,248)	(327,582)	0.00%
(Gain)/Loss Prior to 2009	Various	13	9,907,565,010	940,075,131	9,628,673,284	965,927,197	7.09%
(Gain)/Loss in 2009	6/30/2009	20	1,148,676,840	82,354,825	1,143,895,725	84,619,582	0.62%
(Gain)/Loss in 2010	6/30/2010	21	(44,676,724)	(3,111,056)	(44,585,993)	(3,196,610)	(0.02%)
(Gain)/Loss in 2011	6/30/2011	22	23,597,889	1,599,101	23,595,618	1,643,077	0.01%
(Gain)/Loss	Various	24	316,809,137	20,435,289	317,847,349	20,997,259	0.15%
Payment (Gain)/Loss	Various	24	370,392,701	23,891,615	371,606,511	24,548,634	0.18%
(Gain)/Loss	6/30/2014	25	4,844,317,397	320,339,633	4,852,057,722	329,148,973	2.42%
(Gain)/Loss	6/30/2015	26	4,045,632,783	211,603,112	4,109,943,117	271,777,747	2.00%
(Gain)/Loss	6/30/2016	27	4,016,257,066	157,833,518	4,134,130,800	216,231,920	1.59%
(Gain)/Loss	6/30/2017	28	(2,846,968,680)	(75,677,180)	(2,967,975,404)	(116,637,454)	(0.86%)
(Gain)/Loss	6/30/2018	29	180,070,516	2,459,373	190,131,457	5,054,012	0.04%
Investment (Gain)/Loss	6/30/2019	20	478,883,795	-	512,405,661	11,203,226	0.08%
Non-Investment (Gain)/Loss	6/30/2019	20	614,355,222	92,630,337	561,542,522	51,242,488	0.38%
Total			\$36,284,613,844	\$2,817,795,555	\$35,909,786,427	\$3,014,815,796	22.14%

Liabilities and Employer Contributions

Schedule of Amortization Bases (continued)

State Industrial

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2019	Expected Payment in 2019-20	Amount Remaining on 6/30/2020	Scheduled Payment for Fiscal Year 2020-21	Payment as Percentage of Payroll
Assumption Change	6/30/2003	4	52,237,091	11,700,155	43,790,953	12,021,909	1.56%
Assumption Change	6/30/2009	10	60,659,845	6,928,658	57,738,975	7,119,196	0.92%
Assumption Change	6/30/2011	12	58,762,783	5,894,952	56,778,392	6,057,064	0.79%
Assumption Change	6/30/2013	14	158,911,282	15,089,050	154,426,837	15,503,999	2.01%
Assumption Change	6/30/2017	18	11,173,287	407,439	11,533,959	627,965	0.08%
Assumption Change	6/30/2018	19	141,742,212	2,642,731	148,930,505	5,430,813	0.70%
New Rate Stabilization Policies	6/30/2004	5	(4,200,135)	(799,409)	(3,667,229)	(821,392)	(0.11%)
Actuarial Equivalent Reduction Benefits	6/30/2004	5	7,628,987	1,452,020	6,661,035	1,491,950	0.19%
(Gain)/Loss in 2009	6/30/2009	20	39,723,401	2,847,984	39,558,062	2,926,304	0.38%
(Gain)/Loss in 2010	6/30/2010	21	5,458,696	380,115	5,447,611	390,569	0.05%
(Gain)/Loss in 2011	6/30/2011	22	(7,386,089)	(500,515)	(7,385,378)	(514,279)	(0.07%)
(Gain)/Loss	Various	24	97,799,052	6,308,378	98,119,549	6,481,859	0.84%
Payment (Gain)/Loss	Various	24	(1,476,873)	(95,263)	(1,481,713)	(97,883)	(0.01%)
(Gain)/Loss	6/30/2014	25	151,531,381	10,020,299	151,773,500	10,295,857	1.34%
(Gain)/Loss	6/30/2015	26	170,085,813	8,896,182	172,789,538	11,426,034	1.48%
(Gain)/Loss	6/30/2016	27	252,038,964	9,904,793	259,436,094	13,569,567	1.76%
(Gain)/Loss	6/30/2017	28	(163,107,747)	(4,335,676)	(170,040,431)	(6,682,361)	(0.87%)
(Gain)/Loss	6/30/2018	29	5,946,084	81,211	6,278,305	166,888	0.02%
Method Change	6/30/2018	19	49,409,243	921,217	51,914,976	1,893,101	0.25%
Investment (Gain)/Loss	6/30/2019	20	21,650,530	-	23,166,067	506,502	0.07%
Non-Investment (Gain)/Loss	6/30/2019	20	14,831,040	2,195,100	13,598,584	1,240,913	0.16%
Total			\$1,123,418,847	\$79,939,421	\$1,119,368,191	\$89,034,575	11.56%

State Safety

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2019	Expected Payment in 2019-20	Amount Remaining on 6/30/2020	Scheduled Payment for Fiscal Year 2020-21	Payment as Percentage of Payroll
Assumption Change	6/30/2003	4	(1,894,121)	(424,249)	(1,587,863)	(435,915)	(0.02%)
Assumption Change	6/30/2009	10	234,532,856	26,788,694	223,239,715	27,525,383	1.08%
Assumption Change	6/30/2011	12	161,183,600	16,169,582	155,740,506	16,614,246	0.65%
Assumption Change	6/30/2013	14	503,520,098	47,810,576	489,310,860	49,125,367	1.92%
Assumption Change	6/30/2017	18	192,844,498	7,032,155	199,069,495	10,838,308	0.42%
Assumption Change	6/30/2018	19	413,653,435	7,712,416	434,631,390	15,849,014	0.62%
New Rate Stabilization Policies	6/30/2004	5	(4,738,677)	(901,909)	(4,137,442)	(926,711)	(0.04%)
Benefit Change (Arnett)	6/30/2002	3	51,307,092	14,085,311	40,328,629	14,472,657	0.57%
(Gain)/Loss in 2009	6/30/2009	20	149,497,531	10,718,283	148,875,280	11,013,035	0.43%
(Gain)/Loss in 2010	6/30/2010	21	(112,338,717)	(7,822,687)	(112,110,577)	(8,037,811)	(0.31%)
(Gain)/Loss in 2011	6/30/2011	22	(10,271,085)	(696,016)	(10,270,096)	(715,156)	(0.03%)
(Gain)/Loss	Various	24	844,741,506	54,488,759	847,509,801	55,987,200	2.19%
Payment (Gain)/Loss	Various	24	(43,782,725)	(2,824,138)	(43,926,205)	(2,901,801)	(0.11%)
(Gain)/Loss	6/30/2014	25	190,704,614	12,610,703	191,009,324	12,957,497	0.51%
(Gain)/Loss	6/30/2015	26	468,730,012	24,516,493	476,181,055	31,488,371	1.23%
(Gain)/Loss	6/30/2016	27	461,902,709	18,152,157	475,459,161	24,868,455	0.97%
(Gain)/Loss	6/30/2017	28	(495,852,344)	(13,180,583)	(516,927,907)	(20,314,574)	(0.80%)
(Gain)/Loss	6/30/2018	29	(89,489,432)	(1,222,232)	(94,489,406)	(2,511,686)	(0.10%)
Method Change	6/30/2018	19	149,600,792	2,789,252	157,187,623	5,731,912	0.22%
Investment (Gain)/Loss	6/30/2019	20	63,070,281	-	67,485,201	1,475,495	0.06%
Non-Investment (Gain)/Loss	6/30/2019	20	(30,397,157)	10,669,049	(43,561,108)	(3,975,086)	(0.16%)
Total			\$3,096,524,766	\$226,471,616	\$3,079,017,436	\$238,128,200	9.32%

Liabilities and Employer Contributions

Schedule of Amortization Bases (continued)

State Peace Officers and Firefighters

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2019	Expected Payment in 2019-20	Amount Remaining on 6/30/2020	Scheduled Payment for Fiscal Year 2020-21	Payment as Percentage of Payroll
Assumption Change	6/30/2003	4	204,602,837	45,827,301	171,520,907	47,087,551	1.23%
Assumption Change	6/30/2009	10	608,307,307	69,481,771	579,016,316	71,392,519	1.87%
Assumption Change	6/30/2011	12	678,545,417	68,070,175	655,631,260	69,942,105	1.83%
Assumption Change	6/30/2013	14	2,362,233,141	224,300,335	2,295,571,390	230,468,595	6.03%
Assumption Change	6/30/2017	18	155,011,805	5,652,570	160,015,567	8,712,023	0.23%
Assumption Change	6/30/2018	19	1,554,073,936	28,975,135	1,632,886,999	59,543,903	1.56%
Benefit Change (SB 65)	6/30/2006	7	211,621,990	31,397,747	193,957,447	32,261,185	0.84%
New Rate Stabilization Policies	6/30/2004	5	(35,050,074)	(6,671,056)	(30,602,985)	(6,854,510)	(0.18%)
Benefit Change (SB 183)	6/30/2004	5	11,438,048	2,176,996	9,986,809	2,236,863	0.06%
(Gain)/Loss in 2009	6/30/2009	20	372,432,393	26,701,683	370,882,225	27,435,979	0.72%
(Gain)/Loss in 2010	6/30/2010	21	44,325,448	3,086,595	44,235,431	3,171,476	0.08%
(Gain)/Loss in 2011	6/30/2011	22	299,949,049	20,325,926	299,920,181	20,884,889	0.55%
(Gain)/Loss	Various	24	4,692,844,876	302,704,781	4,708,223,757	311,029,162	8.13%
Payment (Gain)/Loss	Various	24	(2,598,516)	(167,613)	(2,607,032)	(172,223)	0.00%
(Gain)/Loss	6/30/2014	25	1,658,300,117	109,658,226	1,660,949,774	112,673,827	2.95%
(Gain)/Loss	6/30/2015	26	1,620,009,366	84,733,104	1,645,761,417	108,829,080	2.85%
(Gain)/Loss	6/30/2016	27	1,841,743,839	72,378,064	1,895,797,456	99,157,947	2.59%
(Gain)/Loss	6/30/2017	28	(928,898,419)	(24,691,671)	(968,380,045)	(38,056,037)	(0.99%)
(Gain)/Loss	6/30/2018	29	(186,916,167)	(2,552,870)	(197,359,589)	(5,246,147)	(0.14%)
Method Change	6/30/2018	19	439,748,316	8,198,945	462,049,643	16,848,832	0.44%
Investment (Gain)/Loss	6/30/2019	20	187,191,223	-	200,294,609	4,379,237	0.11%
Non-Investment (Gain)/Loss	6/30/2019	20	71,159,754	13,524,155	62,151,442	5,671,511	0.15%
Total			\$15,860,075,686	\$1,083,110,299	\$15,849,902,979	\$1,181,397,767	30.88%

Liabilities and Employer Contributions

Schedule of Amortization Bases (continued)

California Highway Patrol

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2019	Expected Payment in 2019-20	Amount Remaining on 6/30/2020	Scheduled Payment for Fiscal Year 2020-21	Payment as Percentage of Payroll
Assumption Change	6/30/2003	4	33,605,920	7,527,113	28,172,228	7,734,108	0.80%
Assumption Change	6/30/2009	10	148,708,683	16,985,728	141,548,118	17,452,836	1.82%
Assumption Change	6/30/2011	12	175,947,343	17,650,648	170,005,685	18,136,041	1.89%
Assumption Change	6/30/2013	14	839,865,538	79,747,472	816,164,699	81,940,528	8.52%
Assumption Change	6/30/2018	19	426,892,925	7,959,261	448,542,306	16,356,281	1.70%
Benefit Change (AB 2936)	6/30/2008	9	(171,640,819)	(21,163,256)	(161,764,235)	(21,745,246)	(2.26%)
Benefit Change (SB 439)	6/30/2005	6	119,242,390	19,833,736	107,073,181	20,379,163	2.12%
New Rate Stabilization Policies	6/30/2004	5	(11,952,625)	(2,274,935)	(10,436,098)	(2,337,495)	(0.24%)
Benefit Change (SB 1801)	6/30/2003	4	5,324,136	1,192,509	4,463,285	1,225,303	0.13%
Benefit Change (Arnett)	6/30/2002	3	953,310	261,712	749,325	268,909	0.03%
Benefit Change (AB 2621)	6/30/2001	2	1,078,055	386,880	753,327	397,518	0.04%
(Gain)/Loss Prior to 2009	Various	18	1,548,490,719	118,472,037	1,534,336,640	121,730,018	12.66%
(Gain)/Loss in 2009	6/30/2009	20	301,520,377	21,617,619	300,265,363	22,212,103	2.31%
(Gain)/Loss in 2010	6/30/2010	21	100,800,663	7,019,236	100,595,955	7,212,265	0.75%
(Gain)/Loss in 2011	6/30/2011	22	(44,718,970)	(3,030,363)	(44,714,666)	(3,113,698)	(0.32%)
(Gain)/Loss	Various	24	219,860,401	14,181,759	220,580,903	14,571,757	1.52%
Payment (Gain)/Loss	Various	24	(21,175,837)	(1,365,915)	(21,245,232)	(1,403,478)	(0.15%)
(Gain)/Loss	6/30/2014	25	479,111,578	31,682,158	479,877,109	32,553,417	3.39%
(Gain)/Loss	6/30/2015	26	547,717,702	28,647,872	556,424,353	36,794,611	3.83%
(Gain)/Loss	6/30/2016	27	352,128,346	13,838,172	362,463,014	18,958,296	1.97%
(Gain)/Loss	6/30/2017	28	(224,149,436)	(5,958,266)	(233,676,619)	(9,183,178)	(0.96%)
(Gain)/Loss	6/30/2018	29	(69,819,431)	(953,582)	(73,720,398)	(1,959,611)	(0.20%)
Method Change	6/30/2018	19	104,985,903	1,957,423	110,310,142	4,022,505	0.42%
Investment (Gain)/Loss	6/30/2019	20	50,248,970	-	53,766,398	1,175,547	0.12%
Non-Investment (Gain)/Loss	6/30/2019	20	91,922,098	8,423,024	89,643,801	8,180,273	0.85%
Total			\$5,004,947,938	\$362,638,042	\$4,980,178,584	\$391,558,773	40.73%

Liabilities and Employer Contributions

(Gain)/Loss Analysis

To calculate the required cost of the plan, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year, actual experience is compared to the expected experience based on the actuarial assumptions. Deviations between expected and actual experience result in actuarial gains or losses, as shown below.

	State Miscellaneous	State Industrial	State Safety
1) Total (Gain)/Loss for the Year			
a) Unfunded Liability/(Surplus) as of June 30, 2018	\$35,245,989,014	\$1,080,133,735	\$3,039,436,035
b) Expected Payment on Unfunded Liability During 2018-19	2,437,948,386	66,517,096	182,079,902
c) Interest through June 30, 2019 $[.07 \times (1a) - ((1.07)^{1/2} - 1) \times (1b)]$	2,383,334,198	73,320,638	206,495,509
d) Expected Unfunded Liability as of June 30, 2019 After All Changes $[(1a) - (1b) + (1c)]$	\$35,191,374,826	\$1,086,937,277	\$3,063,851,642
e) Change Due to Method Change	0	0	0
f) Change Due to Assumption Change	0	0	0
g) Expected Unfunded Liability After All Other Changes $[(1d) + (1e) + (1f)]$	\$35,191,374,826	\$1,086,937,277	\$3,063,851,642
h) Actual Unfunded Liability as of June 30, 2019	36,284,613,843	1,123,418,847	3,096,524,766
i) Total (Gain)/Loss for 2018-19 $[(1h) - (1g)]$	\$1,093,239,017	\$36,481,570	\$32,673,124
2) Contribution (Gain)/Loss for the Year			
a) Expected Contributions with Interest for 2018-19	\$4,695,215,518	\$203,935,157	\$758,204,598
b) Actual Contributions with Interest for 2018-19	4,836,838,161	214,436,487	804,440,288
c) Contribution (Gain)/Loss for 2018-19 $[(2a) - (2b)]$	\$(141,622,643)	\$(10,501,330)	\$(46,235,690)
3) Investment (Gain)/Loss for the Year			
a) Market Value of Assets as of June 30, 2018	\$80,223,069,956	\$3,589,902,866	\$10,551,342,261
b) Receivables as of June 30, 2018	(236,054,009)	(12,891,514)	(16,003,164)
c) Receivables as of June 30, 2019	215,739,166	12,409,713	14,272,163
d) Contributions Received During 2018-19	4,675,947,942	207,303,577	777,681,780
e) Benefits and Refunds Paid During 2018-19	(6,190,737,930)	(205,544,467)	(626,450,982)
f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments During 2018-19	58,777,820	2,204,922	5,703,063
g) Expected Interest for 2018-19 $[0.07 \times (3a + 3b) + ((1.07)^{1/2} - 1) \times ((3d) + (3e) + (3f))]$	5,548,992,587	250,527,189	742,873,524
h) Expected Assets as of June 30, 2019 $[(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]$	84,295,735,533	3,843,912,286	11,449,418,646
i) Actual Market Value of Assets as of June 30, 2019	83,816,851,738	3,822,261,757	11,386,348,364
j) Investment (Gain)/Loss for 2018-19 $[(3h) - (3i)]$	\$478,883,795	\$21,650,530	\$63,070,281
4) Liability (Gain)/Loss for the Year			
a) Total (Gain)/Loss for 2018-19 (1i)	\$1,093,239,017	\$36,481,570	\$32,673,124
b) Contribution (Gain)/Loss for 2018-19 (2c)	(141,622,643)	(10,501,330)	(46,235,690)
c) Asset (Gain)/Loss for 2018-19 (3j)	478,883,795	21,650,530	63,070,281
d) Liability (Gain)/Loss for 2018-19 $[(4a) - (4b) - (4c)]$	\$755,977,866	\$25,332,371	\$15,838,533

Liabilities and Employer Contributions

(Gain)/Loss Analysis (continued)

	State Peace Officers and Firefighters	California Highway Patrol
1) Total (Gain)/Loss for the Year		
a) Unfunded Liability/(Surplus) as of June 30, 2018	\$15,465,839,150	\$4,843,270,470
b) Expected Payment on Unfunded Liability During 2018-19	915,231,844	308,894,091
c) Interest through June 30, 2019 $[.07 \times (1a) - ((1.07)^{1/2} - 1) \times (1b)]$	1,051,117,403	328,400,491
d) Expected Unfunded Liability as of June 30, 2019 After All Changes $[(1a) - (1b) + (1c)]$	\$15,601,724,709	\$4,862,776,870
e) Change Due to Method Change	0	0
f) Change Due to Assumption Change	0	0
g) Expected Unfunded Liability After All Other Changes $[(1d) + (1e) + (1f)]$	\$15,601,724,709	\$4,862,776,870
h) Actual Unfunded Liability as of June 30, 2019	15,860,075,686	5,004,947,938
i) Total (Gain)/Loss for 2018-19 $[(1h) - (1g)]$	\$258,350,977	\$142,171,068
2) Contribution (Gain)/Loss for the Year		
a) Expected Contributions with Interest for 2018-19	\$2,064,325,290	\$595,838,658
b) Actual Contributions with Interest for 2018-19	2,160,775,539	624,940,950
c) Contribution (Gain)/Loss for 2018-19 $[(2a) - (2b)]$	\$(96,450,249)	\$(29,102,292)
3) Investment (Gain)/Loss for the Year		
a) Market Value of Assets as of June 30, 2018	\$33,326,594,392	\$8,540,511,923
b) Receivables as of June 30, 2018	(69,355,098)	(10,529,078)
c) Receivables as of June 30, 2019	65,775,675	10,279,309
d) Contributions Received During 2018-19	2,088,900,558	604,153,220
e) Benefits and Refunds Paid During 2018-19	(2,209,556,805)	(612,298,138)
f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments During 2018-19	18,914,934	3,517,443
g) Expected Interest for 2018-19 $[0.07 \times (3a + 3b) + ((1.07)^{1/2} - 1) \times ((3d) + (3e) + (3f))]$	2,324,506,031	596,939,577
h) Expected Assets as of June 30, 2019 $[(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]$	35,545,779,686	9,132,574,256
i) Actual Market Value of Assets as of June 30, 2019	35,358,588,464	9,082,325,286
j) Investment (Gain)/Loss for 2018-19 $[(3h) - (3i)]$	\$187,191,223	\$50,248,970
4) Liability (Gain)/Loss for the Year		
a) Total (Gain)/Loss for 2018-19 (1i)	\$258,350,977	\$142,171,068
b) Contribution (Gain)/Loss for 2018-19 (2c)	(96,450,249)	(29,102,292)
c) Asset (Gain)/Loss for 2018-19 (3j)	187,191,223	50,248,970
d) Liability (Gain)/Loss for 2018-19 $[(4a) - (4b) - (4c)]$	\$167,610,003	\$121,024,390

Group Term Life Insurance (GTLI) Contributions

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
1) GTLI Market Value of Assets as of June 30, 2018	\$5,371,393	\$1,170,178	\$2,158,319	\$3,492,612	\$306,891
2) Contributions Received for GTLI During Fiscal Year 2018-19	3,341,146	80	3,955	2,361	(6)
3) Benefits Paid for GTLI During Fiscal Year 2018-19	(3,445,176)	(223,666)	(993,086)	(696,826)	(213,891)
4) Investment Return During Fiscal Year 2018-19	439,822	64,996	136,527	204,743	8,687
5) GTLI Market Value of Assets as of June 30, 2019	\$5,707,184	\$1,011,588	\$1,305,715	\$3,002,891	\$101,681
6) Expected GTLI Benefit Payments for Fiscal Year 2019-20	3,250,098	201,471	737,078	991,469	244,809
7) Closed Group Projected Payroll for Fiscal Year 2019-20	12,467,241,005	712,029,287	2,333,715,527	3,558,095,984	900,534,781
8) Required GTLI Contribution Rate $[(1.5 \times (6) - (5)), \text{ but not less than zero}] \div (7)$	0.00%	0.00%	0.00%	0.00%	0.03%
9) Projected Payroll for Contributions	\$13,617,180,568	\$770,378,496	\$2,554,050,987	\$3,825,172,999	\$961,377,235
10) Required GTLI Contribution for Fiscal Year 2020-21 ¹ $[(8) \times (9)]$	\$0	\$0	\$0	\$0	\$288,413

(1) The Required GTLI Contribution for Miscellaneous Tier 1 and Tier 2 is divided equally between the two groups as a percentage of payroll.

Liabilities and Employer Contributions

Reconciliation of Employer Contribution Rates

Change in Normal Cost Rate from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Normal Cost Rate	9.908%	10.292%	12.701%	18.438%	19.325%
Effect of Changes in Demographic Results	(0.348%)	(0.232%)	(0.361%)	(0.388%)	(0.325%)
Effect of Change in Member Contribution Rates	0.06%	0.00%	0.00%	0.00%	0.00%
2020-2021 Normal Cost Rate	9.62%	10.06%	12.34%	18.05%	19.00%

Change in Unfunded Liability Amortization Rate from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Rate to Amortize the Unfunded Liability	21.069%	10.531%	8.825%	28.760%	38.480%
Effect of Progression of Amortization Bases and Change in Payroll	0.611%	0.799%	0.595%	1.860%	1.280%
Effect of Investment (Gain)/Loss	0.08%	0.07%	0.06%	0.11%	0.12%
Effect of Non-Investment (Gain)/Loss	0.38%	0.16%	(0.16%)	0.15%	0.85%
2020-2021 Rate to Amortize the Unfunded Liability	22.14%	11.56%	9.32%	30.88%	40.73%

Change in Group Term Life Insurance Rate from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Group Term Life Insurance Rate	0.000%	0.000%	0.000%	0.000%	0.006%
Effect of (Gain)/Loss and Other Changes	0.000%	0.000%	0.000%	0.000%	0.024%
2020-2021 Group Term Life Insurance Rate	0.00%	0.00%	0.00%	0.00%	0.03%

Change in Total Rate from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Employer Rate	30.977%	20.823%	21.526%	47.198%	57.811%
Effect of Progression of Amortization Bases and Change in Payroll	0.611%	0.799%	0.595%	1.860%	1.280%
Effect of (Gain)/Loss	0.112%	(0.002%)	(0.461%)	(0.128%)	0.669%
Effect of Change in Member Contribution Rates	0.06%	0.00%	0.00%	0.00%	0.00%
2020-2021 Employer Rate	31.76%	21.62%	21.66%	48.93%	59.76%

Liabilities and Employer Contributions

Reconciliation of Employer Contributions

Change in Normal Cost Contribution from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Normal Cost Contribution	\$1,281,506,494	\$75,979,724	\$310,572,898	\$685,719,705	\$177,888,311
Effect of Change in Payroll	67,621,581	3,307,630	13,817,117	19,565,692	7,897,840
Effect of Changes in Demographic Results	(47,325,613)	(1,787,278)	(9,220,122)	(14,841,672)	(3,124,477)
Effect of Change in Member Contribution Rates	8,170,308	0	0	0	0
2020-21 Normal Cost Contribution	\$1,309,972,770	\$77,500,076	\$315,169,893	\$690,443,725	\$182,661,674

Change in Unfunded Liability Amortization Contribution from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Amortization of the Unfunded Liability	\$2,725,165,218	\$77,744,321	\$215,802,566	\$1,069,586,142	\$354,215,017
Effect of Progression of Amortization Bases	227,204,864	9,542,839	24,825,225	101,760,877	27,987,936
Effect of Investment (Gain)/Loss	11,203,226	506,502	1,475,495	4,379,237	1,175,547
Effect of Non-Investment (Gain)/Loss	51,242,488	1,240,913	(3,975,086)	5,671,511	8,180,273
2020-2021 Amortization of the Unfunded Liability	\$3,014,815,796	\$89,034,575	\$238,128,200	\$1,181,397,767	\$391,558,773

Change in Group Term Life Insurance Contribution from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Group Term Life Insurance Contribution	\$0	\$0	\$0	\$0	\$55,231
Effect of (Gain)/Loss and Other Changes	0	0	0	0	233,182
2020-2021 Group Term Life Insurance Contribution	\$0	\$0	\$0	\$0	\$288,413

Change in Total Contribution from 2019-20 to 2020-21

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2019-2020 Employer Contribution	\$4,006,671,712	\$153,724,045	\$526,375,465	\$1,755,305,849	\$532,158,559
Effect of Change in Payroll and Progression of Amortization Bases	294,826,445	12,850,469	38,642,341	121,326,567	35,885,776
Effect of (Gain)/Loss	15,120,101	(39,863)	(11,719,713)	(4,790,924)	6,464,525
Effect of Change in Member Contribution Rates	8,170,308	0	0	0	0
2020-2021 Employer Contribution	\$4,324,788,566	\$166,534,651	\$553,298,093	\$1,871,841,492	\$574,508,860

Liabilities and Employer Contributions

History of Employer Contribution Rates

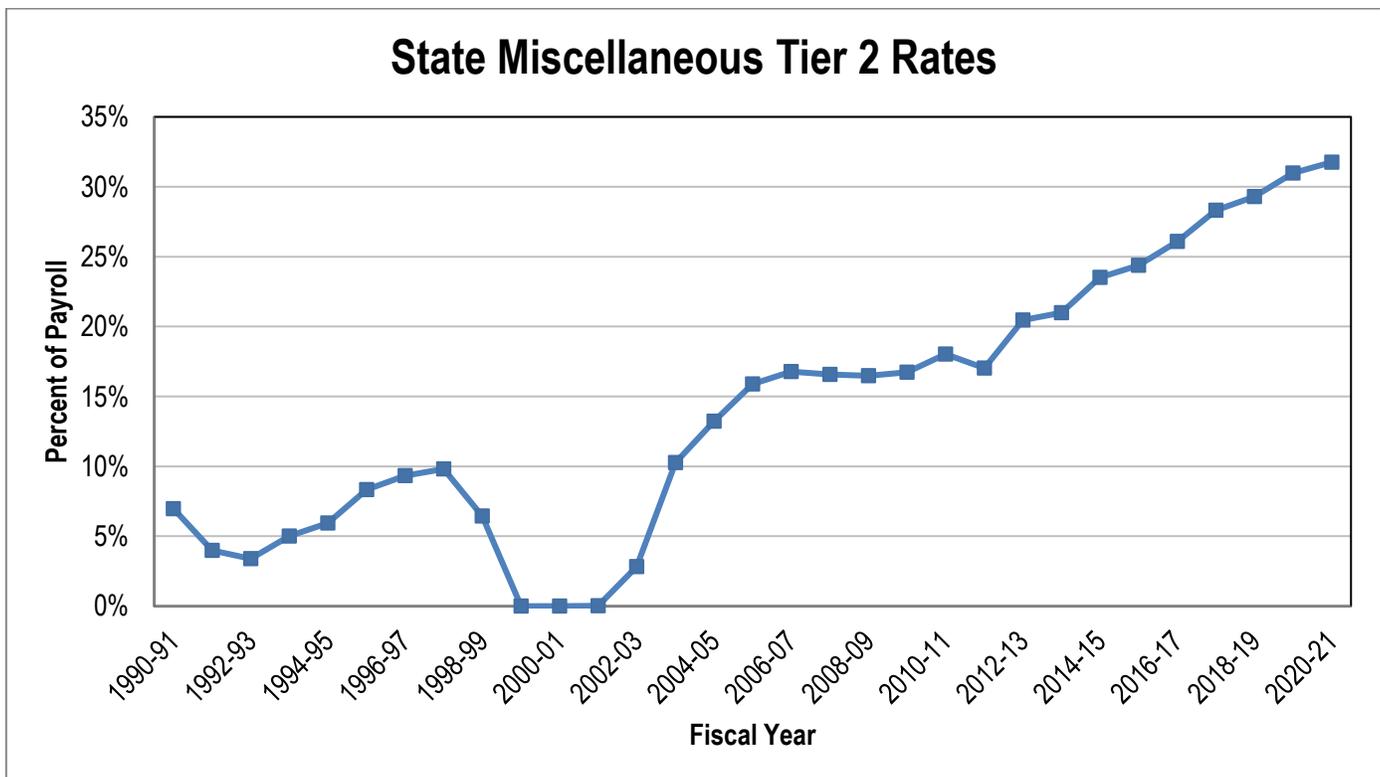
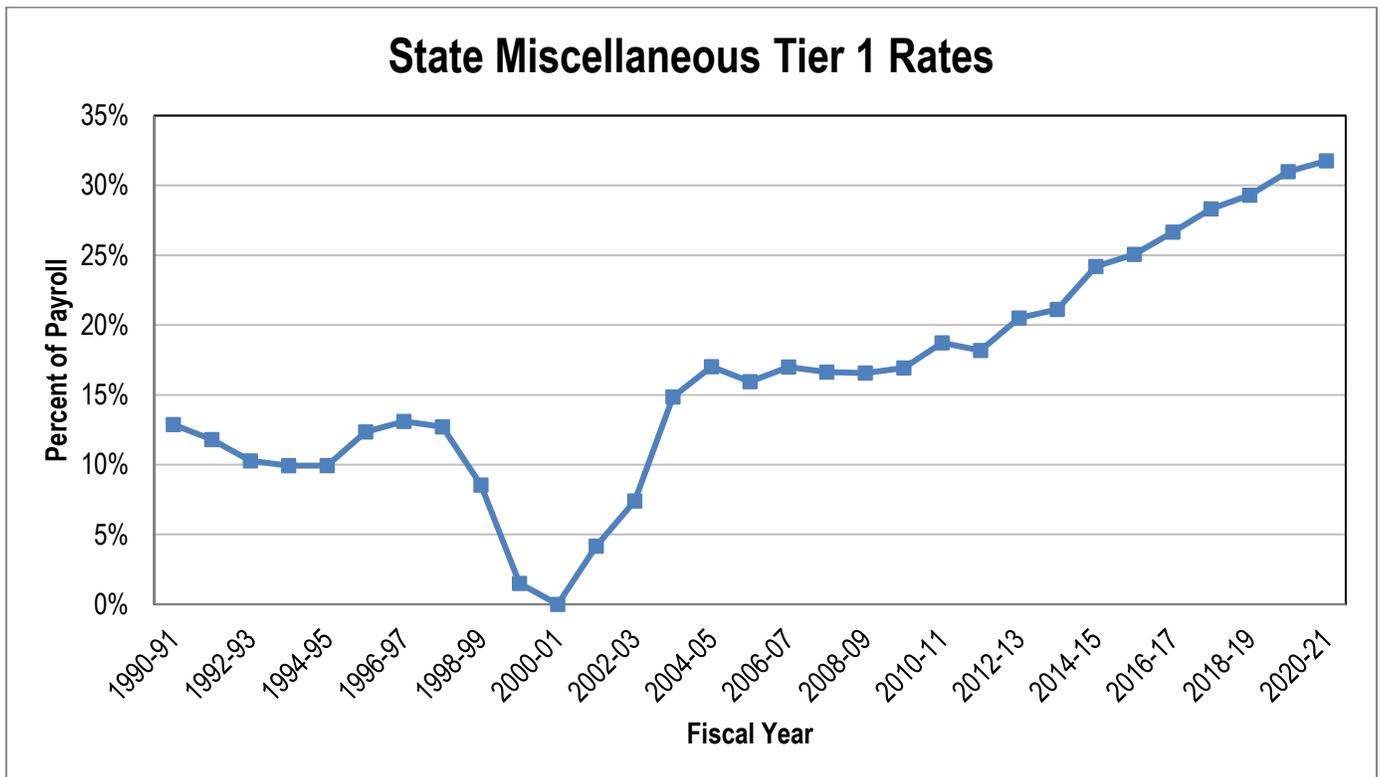
The table below provides a 30-year history of contribution rates. In cases where the contribution rate changed during the course of a fiscal year, the entry shown is the weighted average of the rates effective during the fiscal year.

Fiscal Year	State Miscellaneous		State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
	Tier 1	Tier 2				
2020-21 ¹	31.76%	31.76%	21.62%	21.66%	48.93%	59.76%
2019-20	30.977%	30.977%	20.823%	21.526%	47.198%	57.811%
2018-19	29.298%	29.298%	19.550%	20.352%	43.724%	53.805%
2017-18	28.325%	28.325%	19.527%	19.402%	42.598%	52.785%
2016-17	26.646%	26.095%	18.365%	18.753%	40.276%	48.719%
2015-16	25.068%	24.389%	17.775%	18.082%	37.338%	45.406%
2014-15	24.198%	23.510%	17.286%	18.156%	35.180%	42.175%
2013-14	21.121%	20.992%	15.682%	17.205%	30.495%	34.616%
2012-13	20.503%	20.457%	16.302%	17.503%	30.297%	33.728%
2011-12	18.175%	17.025%	14.934%	16.428%	27.415%	31.264%
2010-11	18.725%	18.032%	16.433%	18.187%	28.722%	31.291%
2009-10	16.917%	16.737%	17.251%	18.099%	25.848%	28.438%
2008-09	16.574%	16.470%	17.236%	18.411%	26.064%	32.149%
2007-08	16.633%	16.565%	17.345%	18.835%	25.552%	32.212%
2006-07	16.997%	16.778%	17.861%	19.294%	24.505%	31.463%
2005-06	15.942%	15.890%	17.147%	19.026%	23.563%	26.396%
2004-05	17.022%	13.216%	16.386%	20.773%	23.841%	33.434%
2003-04	14.843%	10.265%	11.099%	21.930%	20.325%	32.653%
2002-03	7.413%	2.813%	2.858%	17.055%	13.925%	23.076%
2001-02	4.166%	0.036%	0.350%	12.923%	9.638%	16.897%
2000-01	0.000%	0.000%	0.026%	6.808%	2.729%	13.711%
1999-00	1.491%	0.000%	0.026%	7.487%	0.000%	13.345%
1998-99	8.541%	6.437%	4.583%	9.440%	9.591%	13.541%
1997-98	12.721%	9.822%	9.048%	13.754%	15.270%	15.515%
1996-97	13.106%	9.345%	9.260%	14.656%	15.401%	15.851%
1995-96	12.350%	8.326%	8.981%	14.228%	14.350%	14.778%
1994-95	9.934%	5.947%	10.597%	13.927%	12.817%	15.552%
1993-94	9.939%	5.005%	11.765%	15.485%	15.202%	16.940%
1992-93	10.266%	3.391%	11.995%	15.698%	15.560%	17.074%
1991-92	11.804%	3.986%	13.399%	17.376%	17.386%	21.721%

¹ Rates for fiscal year 2020-21 are prior to reduction for the supplanting payment under Government Code section 20825.1.

Liabilities and Employer Contributions

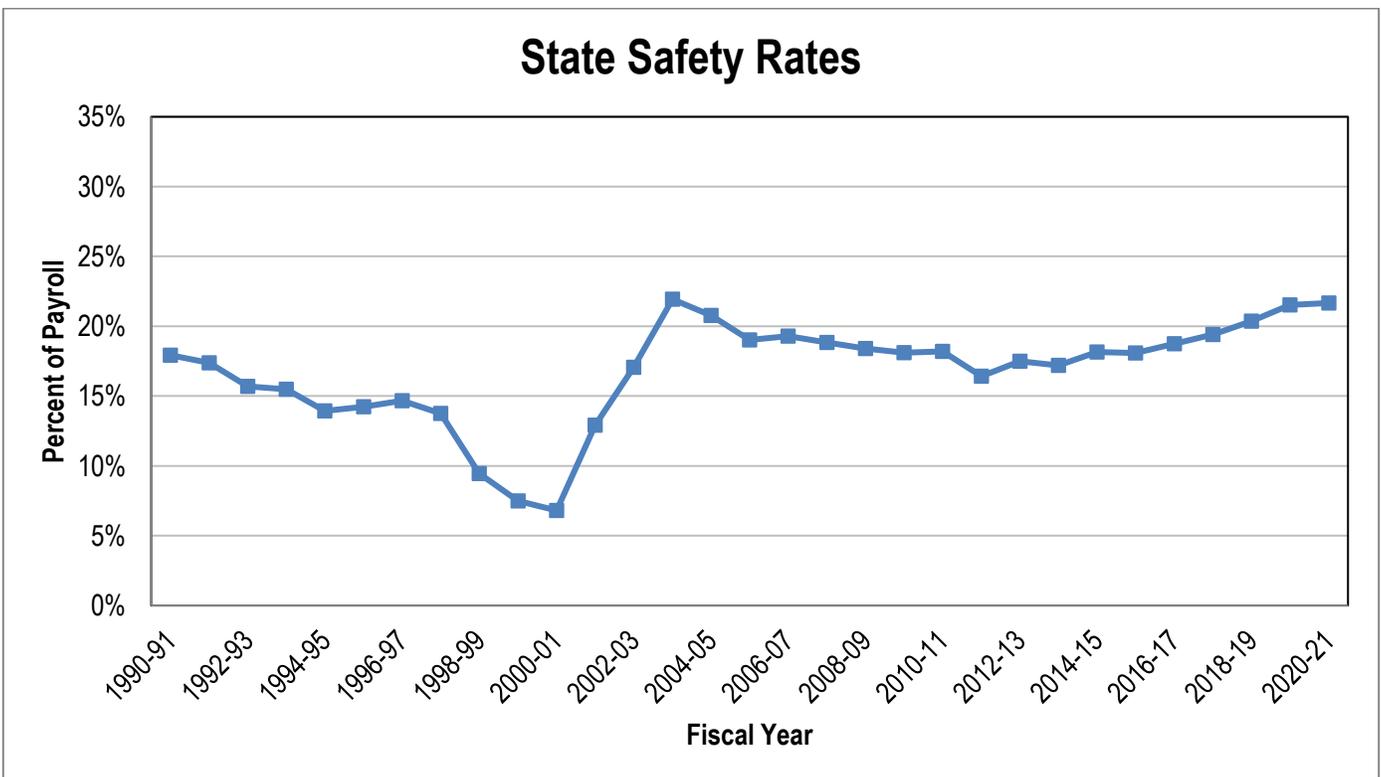
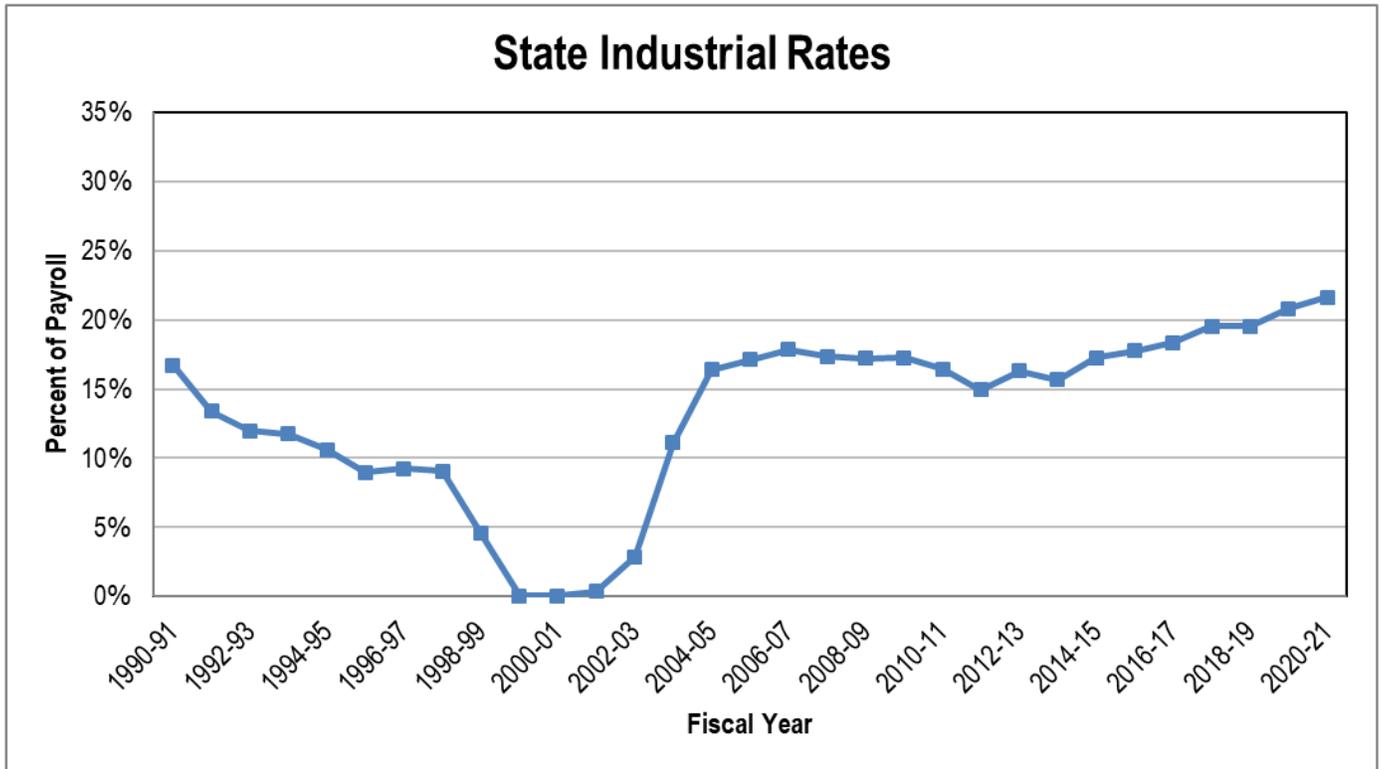
History of Employer Contribution Rates (continued)



Rates for fiscal year 2020-21 are prior to reduction for the supplanting payment under Government Code section 20825.1.

Liabilities and Employer Contributions

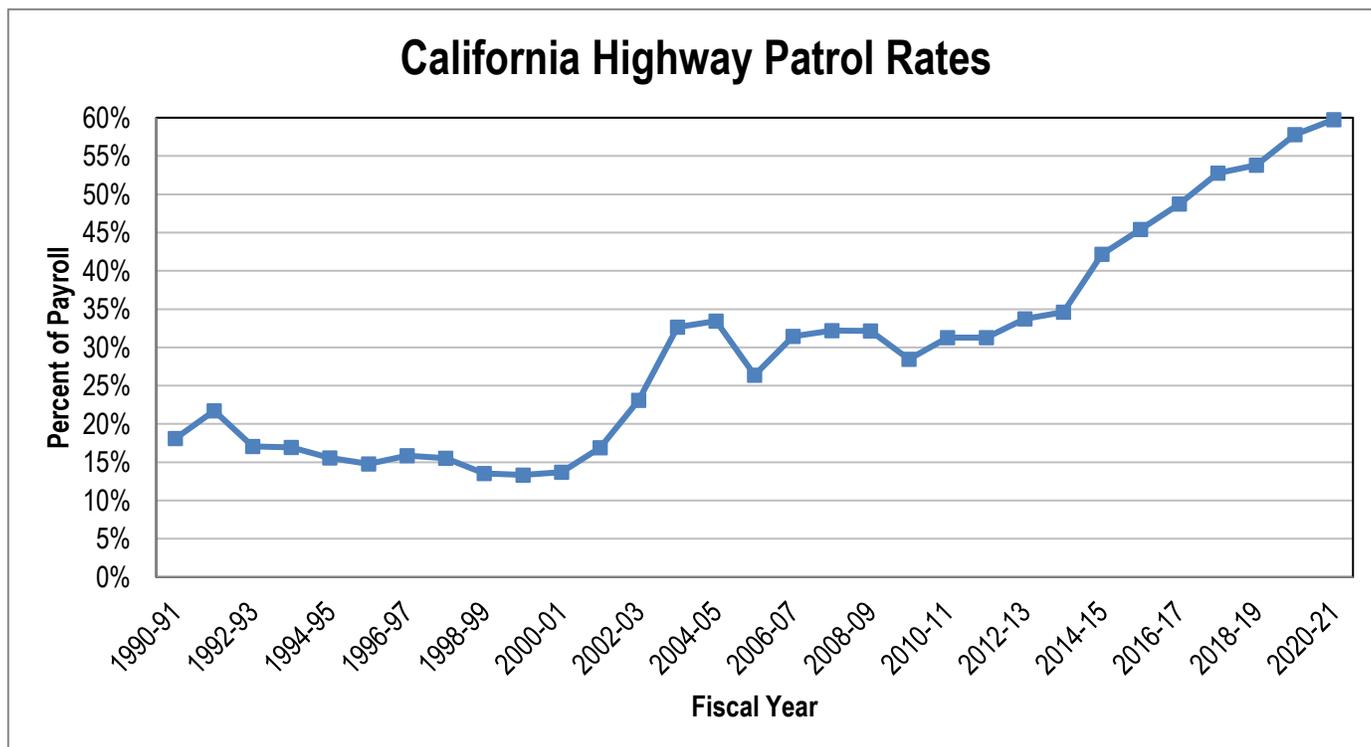
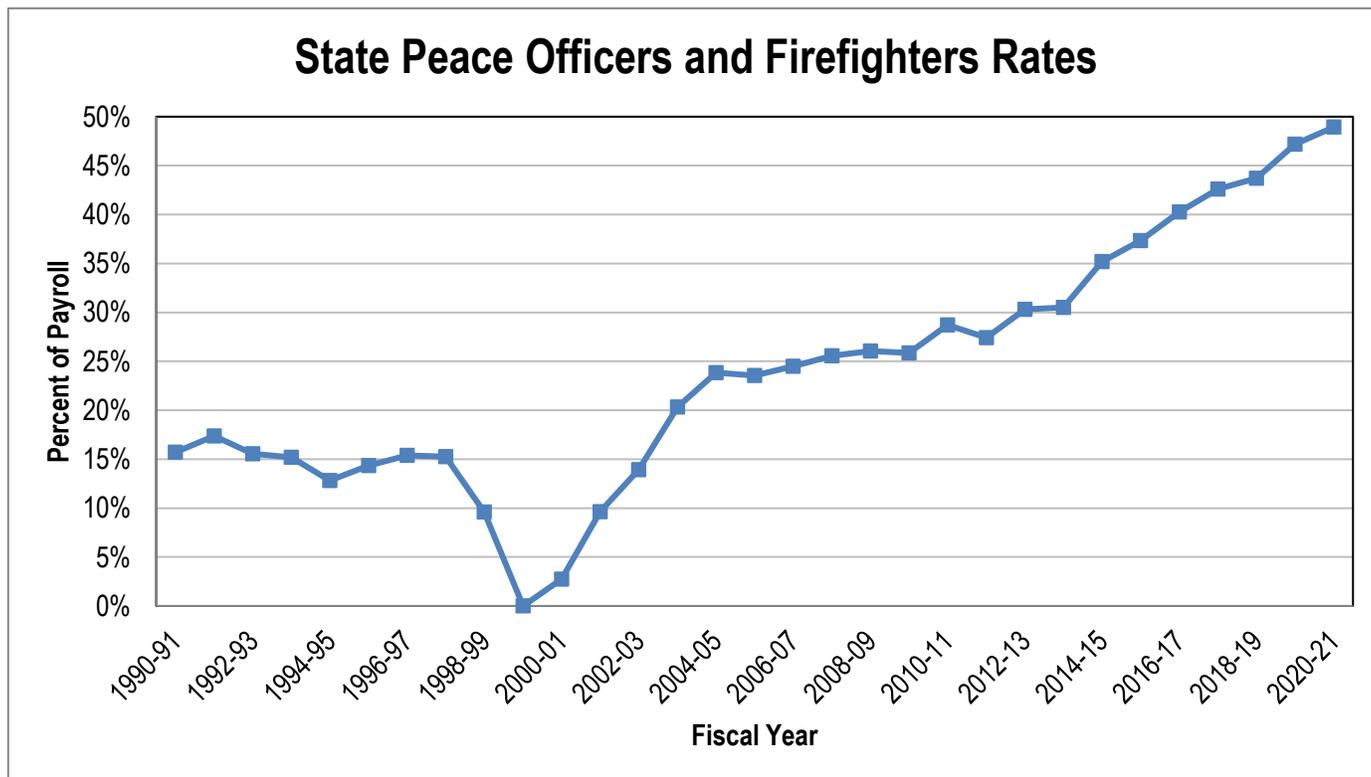
History of Employer Contribution Rates (continued)



Rates for fiscal year 2020-21 are prior to reduction for the supplanting payment under Government Code section 20825.1.

Liabilities and Employer Contributions

History of Employer Contribution Rates (continued)



Rates for fiscal year 2020-21 are prior to reduction for the supplanting payment under Government Code section 20825.1.

Liabilities and Employer Contributions

History of Funded Status and Funding Progress

Shown below is a 30-year history of funding progress for the plans on a market value of assets basis.

State Miscellaneous (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets	Funded Status	Unfunded Liabilities/(Surplus)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/19	\$120,101	\$83,817	69.8%	\$36,285	\$13,617	266.5%
6/30/18	115,469	80,223	69.5%	35,246	12,935	272.5%
6/30/17	106,956	72,204	67.5%	34,752	12,396	280.4%
6/30/16	102,444	66,608	65.0%	35,836	11,995	298.7%
6/30/15	97,831	68,080	69.6%	29,751	11,558	257.4%
6/30/14	94,442	68,359	72.4%	26,084	10,854	240.3%
6/30/13	90,277	60,029	66.5%	30,248	10,014	302.1%
6/30/12	83,524	55,371	66.3%	28,152	10,254	274.6%
6/30/11	81,271	57,452	70.7%	23,819	10,426	228.5%
6/30/10	76,980	48,646	63.2%	28,335	10,515	269.5%
6/30/09	74,763	44,094	59.0%	30,669	10,465	293.1%
6/30/08	69,648	59,979	86.1%	9,669	10,241	94.4%
6/30/07	65,342	64,442	98.6%	900	9,530	9.4%
6/30/06	61,299	55,051	89.8%	6,248	8,956	69.8%
6/30/05	58,267	50,231	86.2%	8,036	8,897	90.3%
6/30/04	54,701	45,460	83.1%	9,241	9,079	101.8%
6/30/03	51,559	39,324	76.3%	12,235	9,207	132.9%
6/30/02	48,118	39,530	82.2%	8,588	9,238	93.0%
6/30/01	45,261	43,933	97.1%	1,328	8,816	15.1%
6/30/00	42,386	49,208	116.1%	(6,822)	8,246	(82.7%)
6/30/99	35,771	46,176	129.1%	(10,405)	7,332	(141.9%)
6/30/98	34,169	42,011	122.9%	(7,842)	6,592	(119.0%)
6/30/97	32,557	35,959	110.4%	(3,401)	6,624	(51.4%)
6/30/96	31,742	30,452	95.9%	1,290	6,881	18.8%
6/30/95	29,960	27,088	90.4%	2,872	7,009	41.0%
6/30/94	27,821	24,278	87.3%	3,542	6,827	51.9%
6/30/93	26,162	24,715	94.5%	1,447	6,310	22.9%
6/30/92	24,887	22,979	92.3%	1,908	6,243	30.6%
6/30/91	23,153	22,441	96.9%	711	6,303	11.3%
6/30/90	22,442	16,027	71.4%	6,415	5,816	110.3%

Liabilities and Employer Contributions

History of Funded Status and Funding Progress (continued)

State Industrial (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets	Funded Status	Unfunded Liabilities/(Surplus)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/19	\$4,946	\$3,822	77.3%	\$1,123	\$770	145.8%
6/30/18	4,670	3,590	76.9%	1,080	738	146.3%
6/30/17	4,210	3,215	76.4%	995	690	144.2%
6/30/16	3,970	2,898	73.0%	1,072	672	159.6%
6/30/15	3,669	2,885	78.6%	785	636	123.3%
6/30/14	3,458	2,825	81.7%	633	581	108.9%
6/30/13	3,236	2,418	74.7%	818	532	153.7%
6/30/12	2,968	2,168	73.0%	800	578	138.4%
6/30/11	2,832	2,180	77.0%	652	616	105.7%
6/30/10	2,614	1,785	68.3%	830	616	134.7%
6/30/09	2,467	1,556	63.1%	912	574	158.9%
6/30/08	2,235	2,034	91.0%	201	522	38.5%
6/30/07	2,044	2,119	103.7%	(76)	440	(17.2%)
6/30/06	1,870	1,776	95.0%	94	381	24.6%
6/30/05	1,754	1,586	90.4%	168	380	44.2%
6/30/04	1,602	1,415	88.3%	187	378	49.5%
6/30/03	1,462	1,201	82.1%	261	381	68.5%
6/30/02	1,295	1,200	92.7%	95	390	24.4%
6/30/01	1,196	1,325	110.8%	(129)	390	(33.1%)
6/30/00	1,079	1,463	135.6%	(384)	379	(101.3%)
6/30/99	880	1,360	154.5%	(480)	344	(139.5%)
6/30/98	790	1,226	155.2%	(436)	297	(147.1%)
6/30/97	741	1,042	140.7%	(302)	285	(106.0%)
6/30/96	721	861	119.4%	(140)	294	(47.7%)
6/30/95	659	751	113.9%	(91)	271	(33.7%)
6/30/94	619	665	107.5%	(46)	235	(19.7%)
6/30/93	597	668	111.8%	(71)	278	(25.4%)
6/30/92	540	610	113.0%	(70)	268	(26.2%)
6/30/91	492	579	117.6%	(87)	256	(33.8%)
6/30/90	460	401	87.2%	59	224	26.2%

Liabilities and Employer Contributions

History of Funded Status and Funding Progress (continued)

State Safety (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets	Funded Status	Unfunded Liabilities/(Surplus)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/19	\$14,483	\$11,386	78.6%	\$3,097	\$2,554	121.2%
6/30/18	13,591	10,551	77.6%	3,039	2,445	124.3%
6/30/17	12,204	9,327	76.4%	2,877	2,293	125.5%
6/30/16	11,288	8,288	73.4%	3,000	2,245	133.6%
6/30/15	10,255	7,859	76.6%	2,396	2,135	112.2%
6/30/14	9,551	7,562	79.2%	1,990	2,038	97.6%
6/30/13	8,834	6,327	71.6%	2,507	1,881	133.3%
6/30/12	7,827	5,524	70.6%	2,303	1,899	121.3%
6/30/11	7,224	5,390	74.6%	1,835	1,984	92.5%
6/30/10	6,436	4,196	65.2%	2,239	2,004	111.7%
6/30/09	6,006	3,514	58.5%	2,492	2,048	121.7%
6/30/08	5,146	4,365	84.8%	781	1,914	40.8%
6/30/07	4,467	4,342	97.2%	126	1,530	8.2%
6/30/06	3,907	3,486	89.2%	421	1,226	34.3%
6/30/05	3,473	3,000	86.4%	473	1,107	42.7%
6/30/04	3,087	2,509	81.3%	579	889	65.1%
6/30/03	2,788	2,049	73.5%	739	891	82.9%
6/30/02	2,476	1,926	77.8%	551	876	62.9%
6/30/01	2,179	2,000	91.8%	180	850	21.1%
6/30/00	1,865	2,122	113.8%	(257)	759	(33.9%)
6/30/99	1,364	1,927	141.3%	(563)	682	(82.6%)
6/30/98	1,285	1,672	130.1%	(386)	511	(75.7%)
6/30/97	1,086	1,404	129.2%	(318)	414	(76.8%)
6/30/96	947	1,123	118.6%	(176)	474	(37.2%)
6/30/95	914	936	102.5%	(23)	408	(5.5%)
6/30/94	761	762	100.1%	(1)	385	(0.2%)
6/30/93	644	722	112.0%	(77)	265	(29.2%)
6/30/92	602	680	112.8%	(77)	263	(29.4%)
6/30/91	548	637	116.2%	(89)	262	(33.8%)
6/30/90	499	426	85.3%	73	232	31.5%

Liabilities and Employer Contributions

History of Funded Status and Funding Progress (continued)

State Peace Officers and Firefighters (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets	Funded Status	Unfunded Liabilities/(Surplus)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/19	\$51,219	\$35,359	69.0%	\$15,860	\$3,825	414.6%
6/30/18	48,792	33,327	68.3%	15,466	3,719	415.9%
6/30/17	44,619	29,424	65.9%	15,194	3,616	420.2%
6/30/16	41,485	26,622	64.2%	14,863	3,434	432.9%
6/30/15	39,394	26,973	68.5%	12,420	3,335	372.4%
6/30/14	37,466	26,591	71.0%	10,875	3,206	339.2%
6/30/13	35,271	22,919	65.0%	12,352	3,087	400.1%
6/30/12	31,336	20,526	65.5%	10,810	3,132	345.2%
6/30/11	30,127	20,801	69.0%	9,326	3,393	274.8%
6/30/10	27,712	17,199	62.1%	10,512	3,455	304.3%
6/30/09	26,291	15,083	57.4%	11,208	3,592	312.0%
6/30/08	24,004	19,734	82.2%	4,270	3,589	119.0%
6/30/07	22,250	20,539	92.3%	1,711	3,420	50.0%
6/30/06	19,737	16,973	86.0%	2,764	3,058	90.4%
6/30/05	17,753	14,985	84.4%	2,769	2,860	96.8%
6/30/04	15,668	12,999	83.0%	2,670	2,604	102.5%
6/30/03	14,220	11,038	77.6%	3,182	2,507	126.9%
6/30/02	12,827	10,731	83.7%	2,095	2,407	87.1%
6/30/01	11,949	11,574	96.9%	375	2,304	16.3%
6/30/00	10,720	12,668	118.2%	(1,947)	2,227	(87.4%)
6/30/99	8,091	11,685	144.4%	(3,594)	2,018	(178.1%)
6/30/98	7,016	10,322	147.1%	(3,306)	1,540	(214.6%)
6/30/97	6,495	8,436	129.9%	(1,941)	1,410	(137.7%)
6/30/96	6,129	6,860	111.9%	(731)	1,654	(44.2%)
6/30/95	5,552	5,892	106.1%	(340)	1,592	(21.4%)
6/30/94	4,884	5,032	103.0%	(148)	1,505	(9.8%)
6/30/93	4,476	4,867	108.7%	(392)	1,348	(29.1%)
6/30/92	4,193	4,232	100.9%	(39)	1,332	(2.9%)
6/30/91	3,773	3,854	102.1%	(81)	1,320	(6.1%)
6/30/90	3,440	2,585	75.2%	855	1,151	74.3%

Liabilities and Employer Contributions

History of Funded Status and Funding Progress (continued)

California Highway Patrol (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets	Funded Status	Unfunded Liabilities/(Surplus)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/19	\$14,087	\$9,082	64.5%	\$5,005	\$961	520.6%
6/30/18	13,384	8,541	63.8%	4,843	921	526.2%
6/30/17	12,322	7,417	60.2%	4,904	900	545.1%
6/30/16	11,471	6,706	58.5%	4,765	848	562.2%
6/30/15	10,942	6,735	61.6%	4,207	852	493.9%
6/30/14	10,329	6,645	64.3%	3,684	801	460.0%
6/30/13	9,775	5,760	58.9%	4,014	767	523.5%
6/30/12	8,659	5,220	60.3%	3,439	773	445.0%
6/30/11	8,193	5,336	65.1%	2,857	780	366.4%
6/30/10	7,704	4,440	57.6%	3,264	767	425.4%
6/30/09	7,300	3,932	53.9%	3,368	734	459.1%
6/30/08	6,609	5,238	79.3%	1,371	675	203.2%
6/30/07	6,249	5,546	88.8%	703	613	114.6%
6/30/06	5,744	4,682	81.5%	1,062	556	191.0%
6/30/05	5,349	4,249	79.4%	1,100	546	201.4%
6/30/04	4,742	3,734	78.7%	1,008	509	198.2%
6/30/03	4,421	3,230	73.1%	1,191	476	250.3%
6/30/02	4,138	3,159	76.3%	979	461	212.3%
6/30/01	3,981	3,466	87.1%	515	455	113.2%
6/30/00	3,635	3,443	94.7%	192	433	44.4%
6/30/99	2,983	3,249	108.9%	(266)	402	(66.1%)
6/30/98	2,756	2,901	105.3%	(145)	367	(39.5%)
6/30/97	2,621	2,912	111.1%	(291)	371	(78.6%)
6/30/96	2,328	2,496	107.2%	(168)	343	(49.0%)
6/30/95	2,134	2,207	103.4%	(73)	302	(24.2%)
6/30/94	1,971	1,968	99.9%	2	288	0.8%
6/30/93	1,773	1,941	109.5%	(168)	279	(60.2%)
6/30/92	1,733	1,956	112.9%	(224)	282	(79.2%)
6/30/91	1,629	1,916	117.6%	(287)	288	(99.7%)
6/30/90	1,613	1,395	86.5%	218	271	80.3%

Normal Cost Information

38 Normal Cost by Group

39 PEPRA Member Contribution Rates

40 State Bargaining Units 5, 9, 10, and 16 Member Contribution Rates

Normal Cost Information

Normal Cost by Group

The table below displays normal cost broken out by benefit group. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits. Generally, the normal cost for a benefit group subject to more generous benefit provisions will be greater than the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of Total Normal Cost for each group may differ significantly from the current values due to such factors as changes in demographics of the group, changes in economic and demographic assumptions, and changes in plan benefits or applicable law.

The employee contribution rate and breakpoint information shown here reflects membership data as stored in our system and is for informational purposes only. Please refer to the Public Employees' Retirement Law and/or applicable Memoranda of Understanding for the latest rate information. FAC means Final Average Compensation.

	State Plans	Total Normal Cost	Employee Contribution	Range of Breakpoints ²	Average Effective Member Rate ^{3,4}	Employer Normal Cost
P	State Miscellaneous (Including CSU) - 2% @ 62	15.1%	6% - 11%	\$0 - \$513	7.4%	7.7%
E	State Miscellaneous - 2nd Tier 2% @ 62 ⁴	10.9%	3.75%	\$0	3.8%	7.1%
P	State Industrial - 2% @ 62	15.6%	6% - 11%	\$317 - \$513	8.0%	7.6%
R	State Industrial - 2nd Tier 2% @ 62 ⁴	11.2%	3.75%	\$0	3.8%	7.4%
A	State Safety - 2% @ 57	19.6%	11% - 11.5%	\$317	10.5%	9.1%
	State POFF - 2.5% @ 57	24.3%	12% - 13%	\$0 - \$863	11.1%	13.2%
	State POFF - 2.7% @ 57	24.1%	13%	\$863	10.5%	13.6%
	CHP - 2.7% @ 57	23.3%	11.5%	\$863	10.3%	13.0%
C	State Miscellaneous - 2% @ 60 & 3 Year FAC	16.6%	5% - 11%	\$317 - \$513	6.8%	9.8%
L	State Miscellaneous - 2% @ 55 ¹	17.5%	5% - 11%	\$317 - \$513	7.0%	10.5%
A	State Miscellaneous - 2nd Tier 2% @ 55 ⁴	12.5%	3.75%	\$0	3.8%	8.7%
S	State Industrial - 2% @ 60 & 3 Year FAC	17.7%	5% - 11%	\$317 - \$513	8.3%	9.4%
S	State Industrial - 2% @ 55 ¹	19.6%	5% - 11%	\$317 - \$513	8.2%	11.4%
I	State Industrial - 2nd Tier 2% @ 55 ⁴	14.5%	3.75%	\$0	3.8%	10.7%
C	State Safety - 2% @ 55 ¹	21.0%	11% - 11.5%	\$317	10.5%	10.5%
	State Safety - 2.5% @ 60 & 3 Year FAC	22.7%	11% - 11.5%	\$317	10.8%	11.9%
	State Safety - 2.5% @ 55 ¹	25.2%	11% - 11.5%	\$317	10.6%	14.6%
	State POFF - 2.5% @ 55 & 3 Year FAC	28.4%	8% - 13%	\$238 - \$863	11.1%	17.3%
	State POFF - 3% @ 55 ¹	31.1%	8% - 13%	\$238 - \$863	11.3%	19.8%
	State POFF - 3% @ 50 ¹	31.4%	8% - 13%	\$238 - \$863	11.6%	19.8%
	CHP - 3% @ 55 & 3 Year FAC	29.3%	11.5%	\$863	10.5%	18.8%
	CHP - 3% @ 50 ¹	30.9%	11.5%	\$863	10.6%	20.3%
B	State Miscellaneous	16.62%	3.75% - 11%	\$0 - \$513	7.0%	9.6%
L	State Industrial	18.13%	3.75% - 11%	\$0 - \$513	8.1%	10.1%
N	State Safety	22.90%	11% - 11.5%	\$317	10.6%	12.3%
D	State POFF	29.56%	8% - 13%	\$0 - \$863	11.5%	18.1%
E	CHP	29.57%	11.5%	\$863	10.6%	19.0%

- (1) Most Classic employees have benefits based on a final one-year compensation period while new hires' benefits are based on a final three-year compensation period.
- (2) Employees make contributions to the pension plan based only on monthly compensation above the breakpoint.
- (3) The average effective member rate was calculated based on data as of June 30, 2019 and is reflective of the different breakpoints and contribution rates paid by members within the same plans. For example, a member earning \$6,000 a month with an 8% contribution rate and a breakpoint of \$513 will contribute \$438.96 and have an effective contribution rate of 7.316% of salary. This is calculated as $(\$6,000 - \$513) \times 8\%$ divided by \$6,000.
- (4) Reflects the Total Normal Cost assuming conversion to Tier 1 benefits for members with Tier 2 service.

Normal Cost Information

PEPRA Member Contribution Rates

PEPRA members are required to contribute at least 50% of the total normal cost of their pension benefit. According to Government Code section 7522.30, State employees are excluded from this requirement except for employees of the Legislature, California State University (CSU), and the judicial branch.

The total normal cost of PEPRA members' benefits is remeasured annually as part of the actuarial valuation based on the active PEPRA population in the plan. If the total normal cost changes by more than 1% from the base total normal cost basis established for the plan, the member rate is revised to equal 50% of the new total normal cost rounded to the nearest quarter percent.

The table below shows the determination of the member contribution rates effective July 1, 2020, based on 50% of the total normal cost for each respective plan as of the June 30, 2019 valuation.

	Basis for Current Rate			Rates Effective July 1, 2020			
	Total Normal Cost	Actuarial Valuation Date	Member Rate	Total Normal Cost	Change	Change Needed	Member Rate
State Miscellaneous – CSU, Legislature and Judicial	14.61%	6/30/2017	7.25%	15.07%	0.46%	No	7.25%
State POFF – CSU, Legislature and Judicial	24.09%	6/30/2018	12.00%	24.15%	0.06%	No	12.00%

Normal Cost Information

State Bargaining Units 5, 9, 10, and 16 Member Contribution Rates

Pursuant to Government Code section 20683, members of State Bargaining Units 5, 9, 10, and 16 are required to contribute at least 50% of the total annual normal cost of their pension benefit. The total normal cost is remeasured annually as part of the actuarial valuation. Initially, if the total normal cost of the category changes¹ by more than 1% from the total normal cost determined as of June 30, 2015, the new member rate shall be 50% of the new normal cost rounded to the nearest quarter percent. Subsequently, if the total normal cost of the category changes¹ by more than 1% from the basis at that time, the member rate will be revised to equal 50% of the new total normal cost rounded to the nearest quarter percent.

For State Bargaining Unit 5, these cost sharing provisions have been suspended and during the suspension member rates will remain at the levels shown below. For State Bargaining Units 9 and 10, these cost sharing provisions expired June 30, 2020 and member rates reverted on July 1, 2020 to previous levels. Rates effective July 1, 2020 are shown in the table below.

The table below shows the determination of the member contribution rates effective July 1, 2020 based on 50% of the total normal cost for each respective plan as of the June 30, 2019 valuation.

	Basis for Current Rate			Rates Effective July 1, 2020			
	Total Normal Cost	Actuarial Valuation Date	Member Rate	Total Normal Cost	Change	Change Needed	Member Rate
BU 5							
State Miscellaneous ²	15.48%	6/30/2015	8.00%	N/A	N/A	No	8.00%
California Highway Patrol	26.45%	6/30/2015	11.50%	N/A	N/A	No	11.50%
BU 9							
State Miscellaneous ²	16.88%	6/30/2018	8.50%	N/A	N/A	Yes	8.00%
State Industrial ²	18.02%	6/30/2015	9.00%	N/A	N/A	No	9.00%
State Safety	23.19%	6/30/2018	11.50%	N/A	N/A	Yes	11.00%
BU 10							
State Miscellaneous ²	16.88%	6/30/2018	8.50%	N/A	N/A	Yes	8.00%
State Industrial ²	18.02%	6/30/2015	9.00%	N/A	N/A	No	9.00%
State Safety	23.19%	6/30/2018	11.50%	N/A	N/A	Yes	11.00%
BU 16							
State Miscellaneous ²	15.48%	6/30/2015	10.00%	16.68%	1.20%	No	10.00%
State Industrial ²	18.02%	6/30/2015	10.00%	18.13%	0.11%	No	10.00%
State Safety	23.19%	6/30/2018	11.50%	22.90%	(0.29%)	No	11.50%

(1) Provisions by Bargaining Unit:

- BU 5: 50% of normal cost sharing provisions are currently suspended. Upon resumption, the member rate will initially be adjusted if the Total Normal Cost increases or decreases by 1% or more; subsequently, the member rate will be adjusted if the Total Normal Cost increases or decreases by more than 1%. The annual change in member rate is limited to 1%.
- BU 9 and 10: 50% of normal cost sharing expired June 30, 2020 and member rates reverted on July 1, 2020 to previous levels.
- BU 16: the member rate will initially be adjusted if the Total Normal Cost increases by 1% or more; subsequently, the member rate will be adjusted if the Total Normal Cost increases or decreases by more than 1%.

(2) The member rate shown here is for a member who participates in Social Security. The member rate for members of these groups who do not participate in Social Security is currently 1% higher than the rate shown here.

Risk Analysis

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Risk Analysis

Projected Rates

The table below shows the required and projected employer contribution rates for the next six fiscal years. Projected results reflect a 4.7% investment return reduced for estimated administrative expenses for fiscal year 2019-20 and the anticipated decrease in normal cost due to new hires entering lower benefit formulas under PEPPRA. Projected rates also reflect the contribution of \$2.5 billion in July 2019 to serve as supplanting payments over a period of three fiscal years as well as the contributions of \$25 million and \$243 million to the California Highway Patrol plan in August 2020. Rates do not reflect additional contributions to offset increased member contributions pursuant to Government Code section 20683.2. It is assumed that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period.

Plan	2020-21 Employer Rate		Projected Future Employer Contribution Rates				
	Before Supplanting Payment	After Supplanting Payment	2021-22	2022-23	2023-24	2024-25	2025-26
State Miscellaneous	31.76%	29.27%	29.4%	33.4%	34.1%	33.5%	33.6%
State Industrial	21.62%	17.31%	16.6%	22.8%	23.0%	21.5%	21.5%
State Safety	21.66%	18.77%	18.2%	22.4%	22.0%	22.0%	21.9%
State Peace Officers & Firefighters	48.93%	34.45%	30.9%	51.6%	52.7%	51.8%	52.0%
California Highway Patrol	59.76%	59.76%	61.3%	62.3%	61.5%	60.9%	61.3%

Under the amortization policy in effect for this valuation, changes in the Unfunded Accrued Liability (UAL) due to investment gains or losses (return relative to the prevailing assumption, currently 7%) are amortized using a five-year ramp up. For more information, please see “Amortization of the Unfunded Actuarial Accrued Liability” under “Actuarial Methods” in Appendix A. This method attempts to mitigate employer cost volatility from year to year by phasing in the impact of investment experience over a five-year period. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is poor investment return, the relatively small amortization payments during the ramp-up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the investment loss is phased in.

Future Investment Return Scenarios

Analysis was performed to estimate the effects of various future investment returns on required employer contributions. Starting with the baseline projections and underlying inputs/assumptions described in “Projected Rates” above, the projections below provide a range of results based on five hypothetical investment return scenarios over the three following fiscal years (2020-21, 2021-22, and 2022-23). Each scenario assumes an alternative fixed annual return during each of these fiscal years.

The alternative investment returns were chosen based on stochastic analysis of possible future investment returns over a four-year period. Using the expected return and volatility of each asset class in which the funds are invested, 10,000 stochastic outcomes were generated for this period. Annual returns were then selected that approximate the 5th, 25th, 50th, 75th, and 95th percentiles of these outcomes. The corresponding annual returns are 1%, 4%, 7%, 9% and 12%. For example, of all the four-year outcomes generated in the stochastic analysis, approximately 25% had an average annual return of 4% or less.

Risk Analysis

Future Investment Return Scenarios (continued)

Required contributions outside of this range are also possible. In particular, while it is unlikely that investment returns will average less than 1% or greater than 12% over this period, the possibility of a single investment return less than 1% or greater than 12% in any given year is much greater.

The tables below show the projected contribution rates for 2022-23 through 2024-25 for the various State plans under the five different scenarios. These projections also reflect the impact of the CalPERS risk mitigation policy (which reduces the discount rate when investment returns exceed specified trigger points).

Estimated: 2022-23 Rates as a Percentage of Payroll

	Annual Investment Return Scenario				
	1 st Scenario	2 nd Scenario	3 rd Scenario	4 th Scenario	5 th Scenario
Plan	1%	4%	7%	9%	12%
State Miscellaneous	34.2%	33.8%	33.4%	33.4%	33.0%
State Industrial	23.5%	23.1%	22.8%	22.9%	22.5%
State Safety	23.0%	22.7%	22.4%	22.5%	22.2%
State Peace Officers & Firefighters	52.8%	52.2%	51.6%	51.7%	51.0%
California Highway Patrol	63.7%	63.0%	62.3%	62.4%	61.8%

Estimated: 2023-24 Rates as a Percentage of Payroll

	Annual Investment Return Scenario				
	1 st Scenario	2 nd Scenario	3 rd Scenario	4 th Scenario	5 th Scenario
Plan	1%	4%	7%	9%	12%
State Miscellaneous	36.5%	35.3%	34.1%	33.9%	32.7%
State Industrial	25.0%	24.0%	23.0%	23.0%	22.0%
State Safety	23.8%	22.9%	22.0%	22.1%	21.2%
State Peace Officers & Firefighters	56.5%	54.6%	52.7%	52.7%	50.8%
California Highway Patrol	65.4%	63.5%	61.5%	61.5%	59.4%

Estimated: 2024-25 Rates as a Percentage of Payroll

	Annual Investment Return Scenario				
	1 st Scenario	2 nd Scenario	3 rd Scenario	4 th Scenario	5 th Scenario
Plan	1%	4%	7%	9%	12%
State Miscellaneous	38.2%	35.9%	33.5%	33.0%	30.5%
State Industrial	25.5%	23.5%	21.5%	21.4%	19.3%
State Safety	25.6%	23.8%	22.0%	22.0%	20.1%
State Peace Officers & Firefighters	59.1%	55.5%	51.8%	51.4%	47.5%
California Highway Patrol	68.6%	64.8%	60.9%	60.6%	56.4%

Risk Analysis

Discount Rate Sensitivity and Government Code Section 20229

This section illustrates the sensitivity of employer contribution rates to a change in the discount rate assumption. The discount rate reflects expectations of what the markets will deliver in the future. It is calculated based on two components: expected price inflation and real rate of return. A change in either component over the long term would necessitate further evaluation of the discount rate.

For purposes of this analysis, the discount rate is changed by varying the real rate of return assumption while keeping the price inflation assumption unchanged. For information on sensitivity to changes in the underlying price inflation assumption, see the Inflation Rate Sensitivity section.

Government Code section 20229 requires the Board to annually disclose contribution rates and liabilities calculated under specified scenarios, including:

- Investment return and discount rate assumptions that are 2% above and 2% below the current investment return and discount rate assumptions set by the Board
- An amortization period equal to the estimated average remaining service periods (EARSP) of the employees covered by the contributions

On the following pages, contribution rates and other key results are shown for the following discount rates:

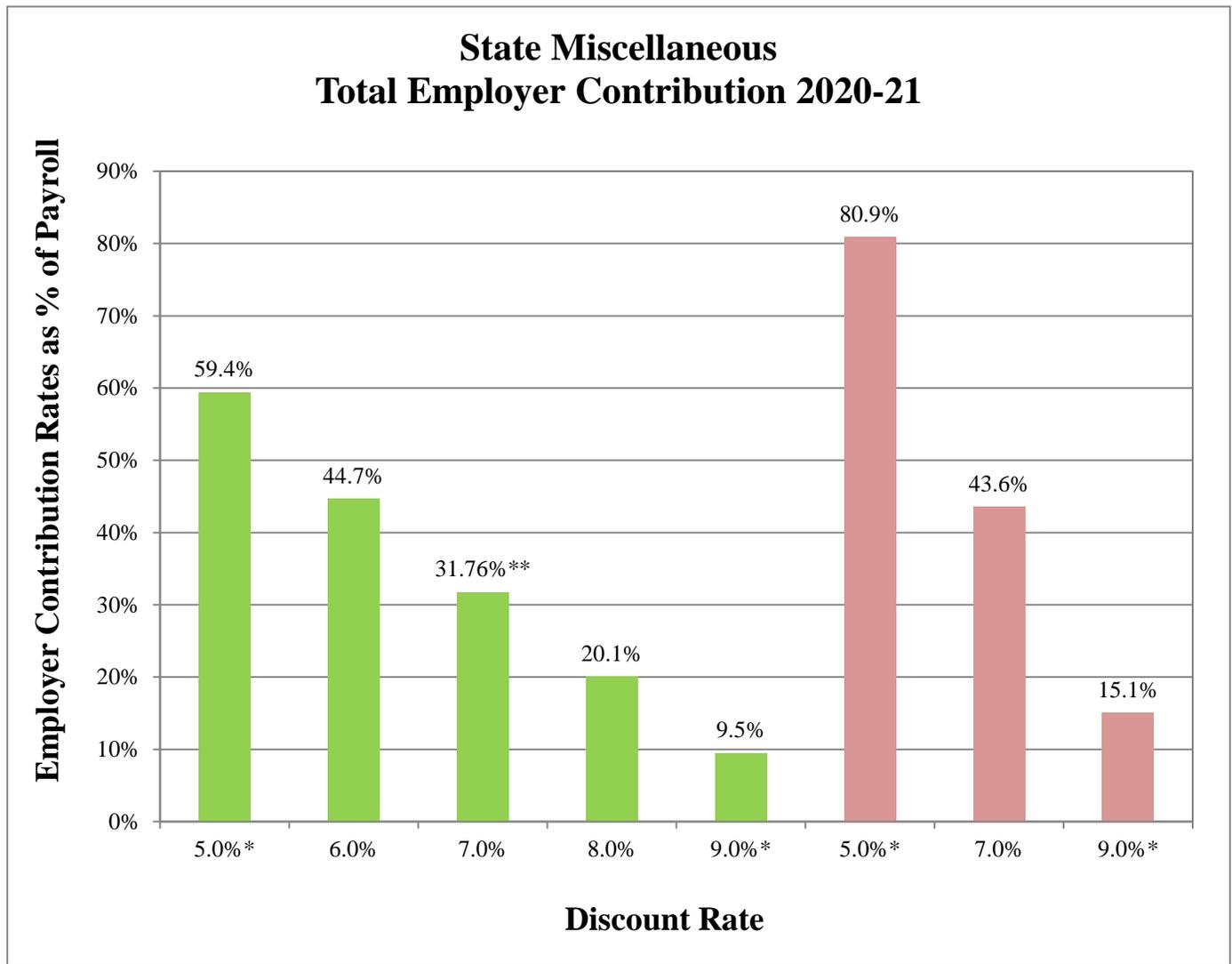
- 5% (current discount rate -2%)
- 6% (current discount rate -1%)
- 7% (current discount rate)
- 8% (current discount rate +1%)
- 9% (current discount rate +2%)

The discount rates of 6% and 8% were selected as they reflect a 1% decrease or increase to the current rate of 7%. This shows the potential plan impacts if the PERF were to realize investment returns of 6% or 8% over the long term. The discount rates of 5% and 9% are shown in order to meet the requirements G.C. 20229. To further satisfy G.C. 20229, in the 5% and 9% discount rate scenarios, contribution rates for the current fiscal year are shown using both the current amortization method and amortization over the EARSP of the employees covered by the contributions.

The results of the analysis are displayed in both graphical and tabular form. The reader may interpolate between the data points to estimate other data points of interest.

Risk Analysis

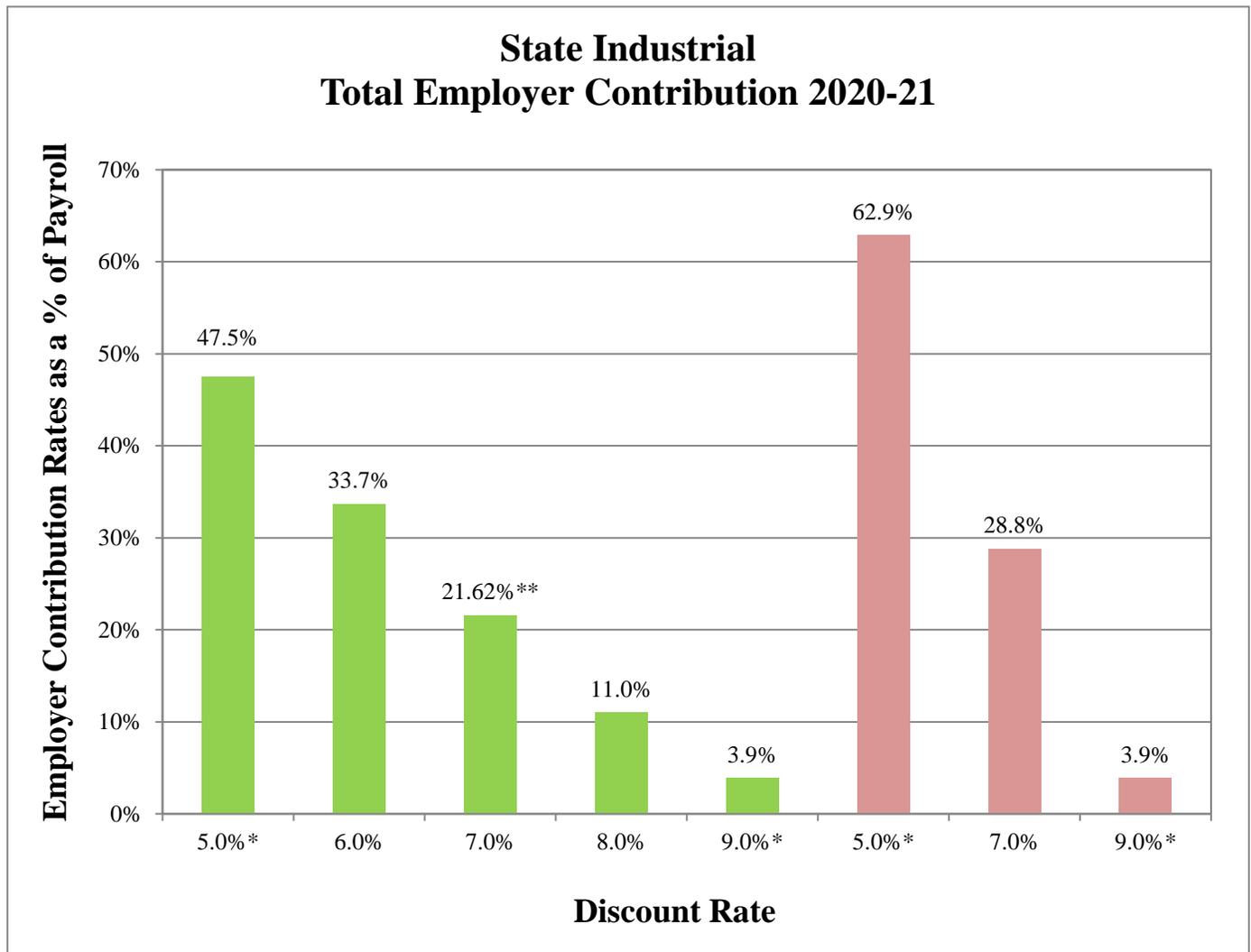
Discount Rate Sensitivity and Government Code Section 20229 (continued)



	Analysis of discount rate sensitivity based on current amortization method (varies from 4 to 29 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UAL over EARSP (11 years)
*	Required by Government Code section 20229
**	Actuarially required contribution rate for 2020-21 adopted by CalPERS Board

Risk Analysis

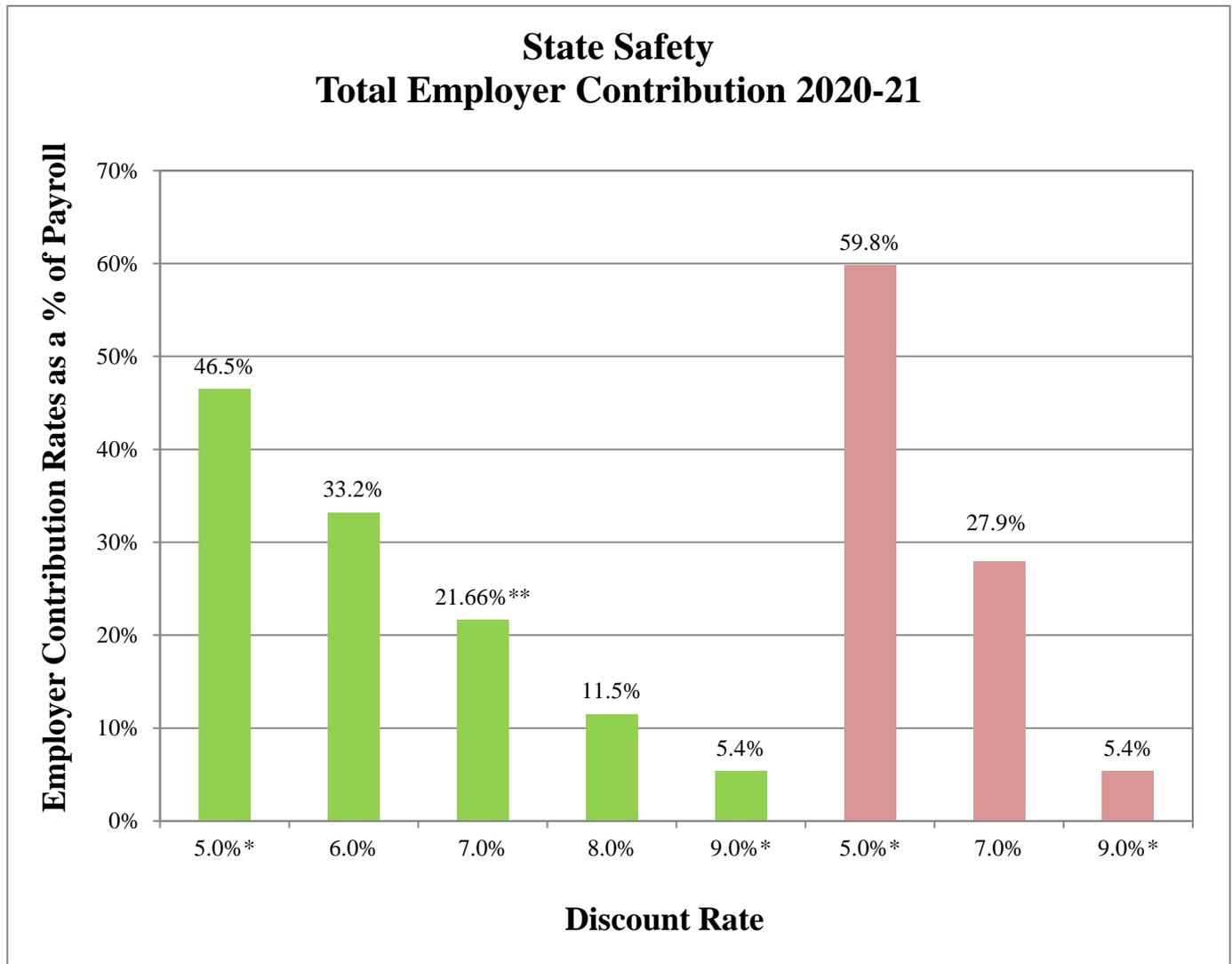
Discount Rate Sensitivity and Government Code Section 20229 (continued)



	Analysis of discount rate sensitivity based on current amortization method (varies from 4 to 29 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UAL over EARSP (11 years)
*	Required by Government Code section 20229
**	Actuarially required contribution rate for 2020-21 adopted by CalPERS Board

Risk Analysis

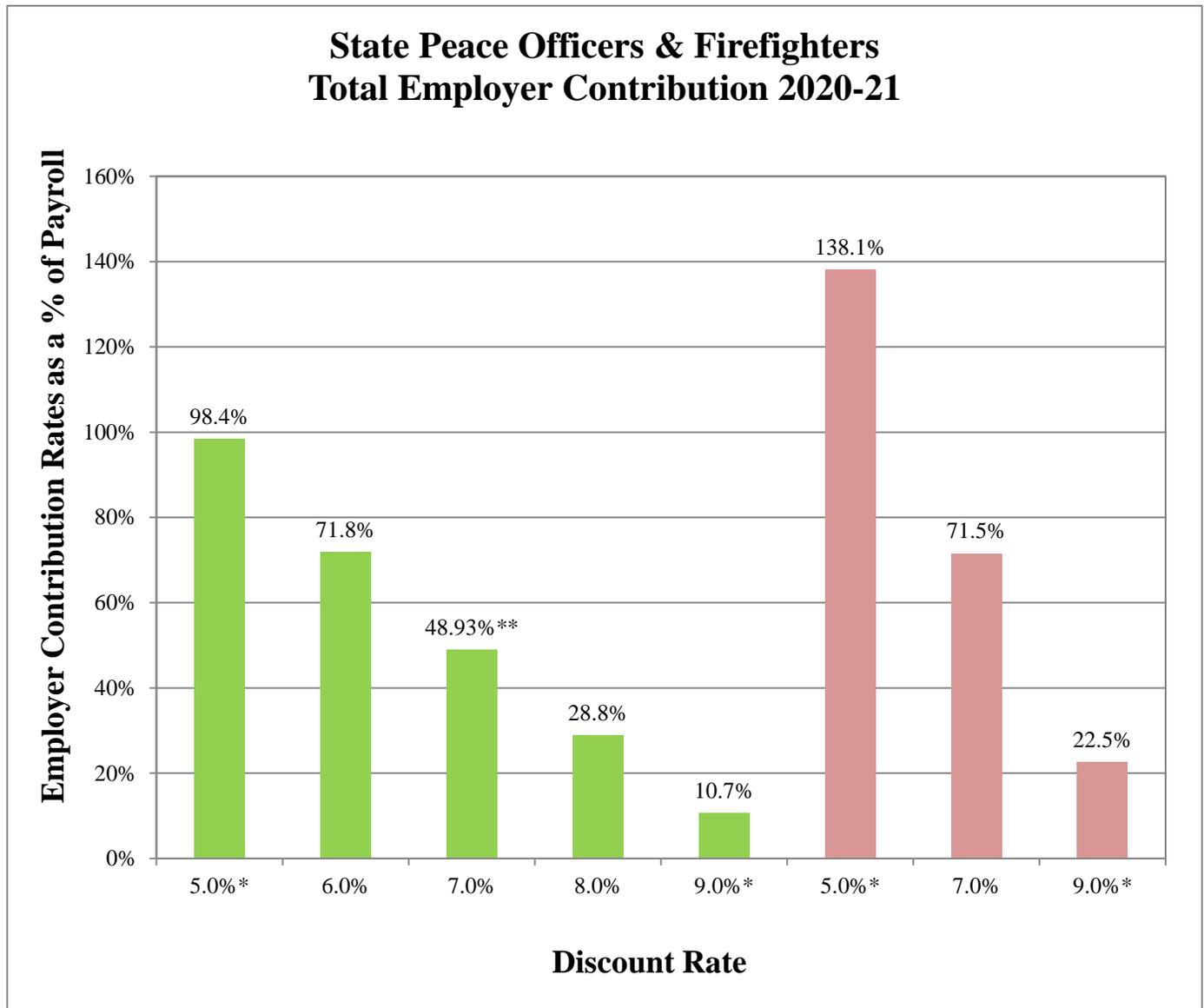
Discount Rate Sensitivity and Government Code Section 20229 (continued)



	Analysis of discount rate sensitivity based on current amortization method (varies from 3 to 29 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UAL over EARSP (11 years)
*	Required by Government Code section 20229
**	Actuarially required contribution rate for 2020-21 adopted by CalPERS Board

Risk Analysis

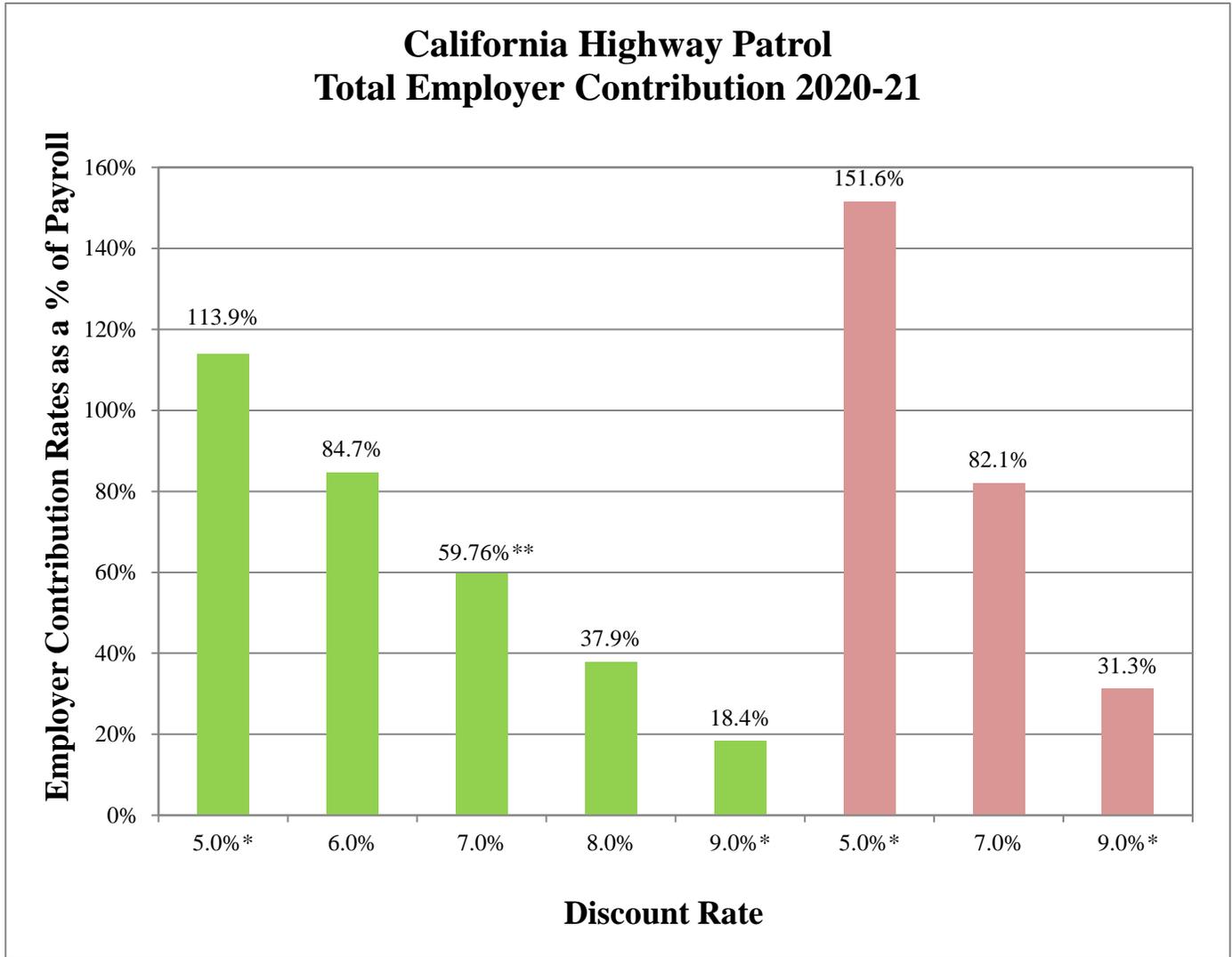
Discount Rate Sensitivity and Government Code Section 20229 (continued)



	Analysis of discount rate sensitivity based on current amortization method (varies from 4 to 29 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UAL over EARSP (11 years)
*	Required by Government Code section 20229
**	Actuarially required contribution rate for 2020-21 adopted by CalPERS Board

Risk Analysis

Discount Rate Sensitivity and Government Code Section 20229 (continued)



	Analysis of discount rate sensitivity based on current amortization method (varies from 2 to 29 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UAL over EARSP (12 years)
*	Required by Government Code section 20229
**	Actuarially required contribution rate for 2020-21 adopted by CalPERS Board

Risk Analysis

Discount Rate Sensitivity and Government Code Section 20229 (continued)

State Miscellaneous

Discount Rate Sensitivity (+/- 1% Change in Discount Rate)

Sensitivity Analysis							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
6.0%	14.1%	30.6%	0.0%	44.7%	134,800,103,103	50,983,251,365	62.2%
7.0% (current discount rate)	9.6%	22.1%	0.0%	31.8%	120,101,465,581	36,284,613,843	69.8%
8.0%	6.2%	13.9%	0.0%	20.1%	107,797,014,351	23,980,162,613	77.8%

Government Code Section 20229 (+/- 2% Change in Discount Rate)

Current Amortization Method							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	20.0%	39.4%	0.0%	59.4%	152,499,819,701	68,682,967,963	55.0%
7.0% (current discount rate)	9.6%	22.1%	0.0%	31.8%	120,101,465,581	36,284,613,843	69.8%
9.0%	3.7%	5.9%	0.0%	9.5%	97,417,882,350	13,601,030,612	86.0%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	20.0%	61.0%	0.0%	80.9%	152,499,819,701	68,682,967,963	55.0%
7.0% (current discount rate)	9.6%	34.0%	0.0%	43.6%	120,101,465,581	36,284,613,843	69.8%
9.0%	3.7%	11.4%	0.0%	15.1%	97,417,882,350	13,601,030,612	86.0%

- The change in accrued liability due to the change in discount rate of +/-1% or +/-2% was amortized over 20 years as a level dollar amount (except for the "Amortization of Unfunded Accrued Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Risk Analysis

Discount Rate Sensitivity and Government Code Section 20229 (continued)

State Industrial

Discount Rate Sensitivity (+/- 1% Change in Discount Rate)

Sensitivity Analysis							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
6.0%	14.6%	19.1%	0.0%	33.7%	5,628,007,601	1,805,745,844	67.9%
7.0% (current discount rate)	10.1%	11.6%	0.0%	21.6%	4,945,680,604	1,123,418,847	77.3%
8.0%	6.6%	4.4%	0.0%	11.0%	4,384,128,297	561,866,540	87.2%

Government Code Section 20229 (+/- 2% Change in Discount Rate)

Current Amortization Method							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	20.6%	26.9%	0.0%	47.5%	6,465,141,646	2,642,879,889	59.1%
7.0% (current discount rate)	10.1%	11.6%	0.0%	21.6%	4,945,680,604	1,123,418,847	77.3%
9.0%	3.9%	0.0%	0.0%	3.9%	3,917,716,754	95,454,997	97.6%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	20.6%	42.3%	0.0%	62.9%	6,465,141,646	2,642,879,889	59.1%
7.0% (current discount rate)	10.1%	18.7%	0.0%	28.8%	4,945,680,604	1,123,418,847	77.3%
9.0%	3.9%	0.0%	0.0%	3.9%	3,917,716,754	95,454,997	97.6%

- The change in accrued liability due to the change in discount rate of +/-1% or +/-2% was amortized over 20 years as a level dollar amount (except for the "Amortization of Unfunded Accrued Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Risk Analysis

Discount Rate Sensitivity and Government Code Section 20229 (continued)

State Safety

Discount Rate Sensitivity (+/- 1% Change in Discount Rate)

Sensitivity Analysis							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
6.0%	17.4%	15.8%	0.0%	33.2%	16,411,839,646	5,025,491,282	69.4%
7.0% (current discount rate)	12.3%	9.3%	0.0%	21.7%	14,482,873,130	3,096,524,766	78.6%
8.0%	8.5%	3.1%	0.0%	11.5%	12,887,841,722	1,501,493,358	88.3%

Government Code Section 20229 (+/- 2% Change in Discount Rate)

Current Amortization Method							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	23.9%	22.6%	0.0%	46.5%	18,766,670,387	7,380,322,023	60.7%
7.0% (current discount rate)	12.3%	9.3%	0.0%	21.7%	14,482,873,130	3,096,524,766	78.6%
9.0%	5.4%	0.0%	0.0%	5.4%	11,557,258,384	170,910,020	98.5%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	23.9%	35.9%	0.0%	59.8%	18,766,670,387	7,380,322,023	60.7%
7.0% (current discount rate)	12.3%	15.5%	0.0%	27.9%	14,482,873,130	3,096,524,766	78.6%
9.0%	5.4%	0.0%	0.0%	5.4%	11,557,258,384	170,910,020	98.5%

- The change in accrued liability due to the change in discount rate of +/-1% or +/-2% was amortized over 20 years as a level dollar amount (except for the "Amortization of Unfunded Accrued Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Risk Analysis

Discount Rate Sensitivity and Government Code Section 20229 (continued)

State Peace Officers and Firefighters

Discount Rate Sensitivity (+/- 1% Change in Discount Rate)

Sensitivity Analysis							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
6.0%	26.0%	45.8%	0.0%	71.8%	58,358,407,099	22,999,818,635	60.6%
7.0% (current discount rate)	18.1%	30.9%	0.0%	48.9%	51,218,664,150	15,860,075,686	69.0%
8.0%	12.0%	16.8%	0.0%	28.8%	45,368,371,967	10,009,783,503	77.9%

Government Code Section 20229 (+/- 2% Change in Discount Rate)

Current Amortization Method							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	36.7%	61.7%	0.0%	98.4%	67,167,560,092	31,808,971,628	52.6%
7.0% (current discount rate)	18.1%	30.9%	0.0%	48.9%	51,218,664,150	15,860,075,686	69.0%
9.0%	7.4%	3.2%	0.0%	10.7%	40,525,197,911	5,166,609,447	87.3%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	36.7%	101.4%	0.0%	138.1%	67,167,560,092	31,808,971,628	52.6%
7.0% (current discount rate)	18.1%	53.4%	0.0%	71.5%	51,218,664,150	15,860,075,686	69.0%
9.0%	7.4%	15.0%	0.0%	22.5%	40,525,197,911	5,166,609,447	87.3%

- The change in accrued liability due to the change in discount rate of +/-1% or +/-2% was amortized over 20 years as a level dollar amount (except for the "Amortization of Unfunded Accrued Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Risk Analysis

Discount Rate Sensitivity and Government Code Section 20229 (continued)

California Highway Patrol

Discount Rate Sensitivity (+/- 1% Change in Discount Rate)

Sensitivity Analysis							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
6.0%	27.8%	56.9%	0.0%	84.7%	16,087,831,912	7,005,506,626	56.5%
7.0% (current discount rate)	19.0%	40.7%	0.0%	59.8%	14,087,273,224	5,004,947,938	64.5%
8.0%	12.4%	25.4%	0.0%	37.9%	12,451,727,665	3,369,402,379	72.9%

Government Code Section 20229 (+/- 2% Change in Discount Rate)

Current Amortization Method							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	39.5%	74.4%	0.0%	113.9%	18,562,364,488	9,480,039,202	48.9%
7.0% (current discount rate)	19.0%	40.7%	0.0%	59.8%	14,087,273,224	5,004,947,938	64.5%
9.0%	7.5%	10.9%	0.0%	18.4%	11,100,481,187	2,018,155,901	81.8%

Amortization of Unfunded Accrued Liability over EARSP (12 Years)							
As of June 30, 2019	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
5.0%	39.5%	112.0%	0.0%	151.6%	18,562,364,488	9,480,039,202	48.9%
7.0% (current discount rate)	19.0%	63.1%	0.0%	82.1%	14,087,273,224	5,004,947,938	64.5%
9.0%	7.5%	23.8%	0.0%	31.3%	11,100,481,187	2,018,155,901	81.8%

- The change in accrued liability due to the change in discount rate of +/-1% or +/-2% was amortized over 20 years as a level dollar amount (except for the "Amortization of Unfunded Accrued Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Risk Analysis

Mortality Rate Sensitivity

The following tables show key valuation results under two alternate longevity scenarios, namely assuming rates of mortality are 10% lower or 10% higher than the current mortality assumption. This type of analysis highlights the impact on the plans of improving or worsening mortality over the long term.

State Miscellaneous

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
10% lower mortality rates	\$122,839,978,585	\$83,816,851,738	\$39,023,126,847	68.2%	16.90%
Current mortality rates	120,101,465,581	83,816,851,738	36,284,613,843	69.8%	16.62%
10% higher mortality rates	117,589,644,936	83,816,851,738	33,772,793,198	71.3%	16.35%

State Industrial

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
10% lower mortality rates	\$5,045,622,677	\$3,822,261,757	\$1,223,360,920	75.8%	18.43%
Current mortality rates	4,945,680,604	3,822,261,757	1,123,418,847	77.3%	18.13%
10% higher mortality rates	4,853,590,992	3,822,261,757	1,031,329,235	78.8%	17.85%

State Safety

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
10% lower mortality rates	\$14,768,167,672	\$11,386,348,364	\$3,381,819,308	77.1%	23.25%
Current mortality rates	14,482,873,130	11,386,348,364	3,096,524,766	78.6%	22.90%
10% higher mortality rates	14,219,937,133	11,386,348,364	2,833,588,769	80.1%	22.58%

State Peace Officers & Firefighters

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
10% lower mortality rates	\$52,028,945,235	\$35,358,588,464	\$16,670,356,771	68.0%	29.90%
Current mortality rates	51,218,664,150	35,358,588,464	15,860,075,686	69.0%	29.56%
10% higher mortality rates	50,466,838,131	35,358,588,464	15,108,249,667	70.1%	29.21%

California Highway Patrol

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
10% lower mortality rates	\$14,312,330,067	\$9,082,325,286	\$5,230,004,781	63.5%	29.93%
Current mortality rates	14,087,273,224	9,082,325,286	5,004,947,938	64.5%	29.57%
10% higher mortality rates	13,878,774,450	9,082,325,286	4,796,449,164	65.4%	29.24%

Risk Analysis

Inflation Rate Sensitivity

The following tables show key valuation results under two alternate inflation rate scenarios, namely assuming the price inflation rate is 1% lower or 1% higher than the current assumption of 2.5%. For this analysis, the real rate of return is held constant at the current assumption of 4.5%. This type of analysis highlights the impact on the plans of higher or lower inflation over the long term.

State Miscellaneous

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
-1% inflation rate	\$126,044,679,857	\$83,816,851,738	\$42,227,828,119	66.5%	17.75%
Current inflation rate	120,101,465,581	83,816,851,738	36,284,613,843	69.8%	16.62%
+1% inflation rate	110,882,462,829	83,816,851,738	27,065,611,091	75.6%	15.10%

State Industrial

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
-1% inflation rate	\$5,210,165,245	\$3,822,261,757	\$1,387,903,488	73.4%	19.44%
Current inflation rate	4,945,680,604	3,822,261,757	1,123,418,847	77.3%	18.13%
+1% inflation rate	4,548,367,513	3,822,261,757	726,105,756	84.0%	16.45%

State Safety

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
-1% inflation rate	\$15,264,655,793	\$11,386,348,364	\$3,878,307,429	74.6%	24.50%
Current inflation rate	14,482,873,130	11,386,348,364	3,096,524,766	78.6%	22.90%
+1% inflation rate	13,315,371,215	11,386,348,364	1,929,022,851	85.5%	20.79%

State Peace Officers & Firefighters

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
-1% inflation rate	\$54,194,140,986	\$35,358,588,464	\$18,835,552,522	65.2%	31.78%
Current inflation rate	51,218,664,150	35,358,588,464	15,860,075,686	69.0%	29.56%
+1% inflation rate	46,928,351,264	35,358,588,464	11,569,762,800	75.3%	26.76%

California Highway Patrol

As of June 30, 2019	Accrued Liability	Market Value of Assets	Unfunded Accrued Liability/(Surplus)	Funded Status	Total Normal Cost
-1% inflation rate	\$14,902,501,272	\$9,082,325,286	\$5,820,175,986	60.9%	31.73%
Current inflation rate	14,087,273,224	9,082,325,286	5,004,947,938	64.5%	29.57%
+1% inflation rate	12,925,822,308	9,082,325,286	3,843,497,022	70.3%	26.80%

Risk Analysis

Maturity Measures

As pension plans mature they become more sensitive to risks. To understand plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk, it is important to understand how a plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions.

One measure of a plan's maturity is the ratio of retiree liability to total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio increases. A mature plan will often have a ratio above 60-65 percent. For both CalPERS and many other retirement systems in the United States, these ratios have been steadily increasing in recent years.

Ratio of Retiree Accrued Liability to Total Accrued Liability

Plan	June 30, 2018			June 30, 2019		
	Retiree Accrued Liability	Total Accrued Liability	Ratio	Retiree Accrued Liability	Total Accrued Liability	Ratio
State Miscellaneous	\$68,450,027,359	\$115,469,058,970	59.3%	\$71,929,750,290	\$120,101,465,581	59.9%
State Industrial	2,374,543,882	4,670,036,601	50.8%	2,548,612,377	4,945,680,604	51.5%
State Safety	7,440,109,308	13,590,778,296	54.7%	8,015,373,155	14,482,873,130	55.3%
State Peace Officers & Firefighters	30,135,515,826	48,792,433,542	61.8%	32,045,744,847	51,218,664,150	62.6%
California Highway Patrol	8,255,474,114	13,383,782,393	61.7%	8,633,928,267	14,087,273,224	61.3%

Another measure of maturity is the ratio of actives to retirees, also called the Support Ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures, and members retire, the ratio declines. A mature plan will often have a ratio near or below one.

Support Ratio

Plan	June 30, 2018			June 30, 2019		
	Number of Actives	Number of Retirees	Support Ratio	Number of Actives	Number of Retirees	Support Ratio
State Miscellaneous	174,402	195,158	89.4%	176,842	197,691	89.5%
State Industrial	11,811	14,642	80.7%	11,795	15,345	76.9%
State Safety	28,335	25,749	110.0%	28,953	26,866	107.8%
State Peace Officers & Firefighters	41,289	39,947	103.4%	41,144	41,657	98.8%
California Highway Patrol	7,311	9,158	79.8%	7,267	9,301	78.1%

Volatility ratios, presented in the following section, are another measure for assessing plan maturity.

Risk Analysis

Volatility Ratios

The actuarial calculations supplied in this communication are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise the employer's rates from one year to the next. Therefore, the rates will inevitably fluctuate, especially due to fluctuations in investment return.

Asset Volatility Ratio

Plans that have higher asset-to-payroll ratios produce more volatile employer rates due to investment return. For example, a plan with an asset-to-payroll ratio of 8 may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 4. Shown below is the asset volatility ratio, a measure of the plan's current rate volatility. It should be noted that this ratio is a current measure. It increases over time but generally tends to stabilize as the plan matures.

Liability Volatility Ratio

Plans that have higher liability-to-payroll ratios produce more volatile employer rates due to investment return and changes in liability. For example, a plan with a liability-to-payroll ratio of 12 is expected to have twice the contribution volatility of a plan with a liability-to-payroll ratio of 6. The liability volatility ratio is also included in the table below. It should be noted that this ratio indicates a longer-term potential for contribution volatility. The asset volatility ratio, described above, will tend to move closer to the liability volatility ratio as the plan matures.

Rate Volatility

	Market Value of Assets without Receivables	Annual Covered Payroll	Asset Volatility Ratio	Accrued Liability	Liability Volatility Ratio
Plan	(1)	(2)	(1)÷(2)	(3)	(3)÷(2)
State Miscellaneous	\$83,601,112,571	\$12,898,034,530	6.5	\$120,101,465,581	9.3
State Industrial	3,809,852,044	729,693,522	5.2	4,945,680,604	6.8
State Safety	11,372,076,201	2,419,167,291	4.7	14,482,873,130	6.0
State Peace Officers & Firefighters	35,292,812,789	3,623,159,227	9.7	51,218,664,150	14.1
California Highway Patrol	9,072,045,977	910,605,298	10.0	14,087,273,224	15.5

Appendices

A-1 Appendix A – Statement of Actuarial Methods and Assumptions

B-1 Appendix B – Principal Plan Provisions

C-1 Appendix C – Participant Data

D-1 Appendix D – Employer Rate for Fiscal Year 2020-21 Adjusted for Supplanting Payment

E-1 Appendix E – Glossary of Actuarial Terms

Appendix A – Statement of Actuarial Methods and Assumptions

Actuarial Data

As stated in the Actuarial Certification, the data, which serves as the basis for this valuation, has been obtained from various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate. We are unaware of any potential data issues that would have a material effect on the results of this valuation, except that data does not always contain the latest salary information for former members now in reciprocal systems and does not recognize the potential for unusually large salary deviation in certain cases such as elected officials. Therefore, salary information in these cases may not be accurate. These situations are relatively infrequent, however, and when they do occur, they generally do not have a material impact on the employer contribution rates.

Actuarial Methods

Actuarial Cost Method

The actuarial cost method used for this report is the Entry Age Actuarial Cost Method. Under this method, projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

The actuarial accrued liability for active members is then calculated as the portion of the total cost of the plan allocated to prior years. The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits is equal to the present value of the benefits expected to be paid. No normal costs are applicable for these participants.

Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and a payment toward the UAL. The UAL payment is equal to the sum of individual amortization payments, each representing a different source of UAL for a given measurement period.

Amortization payments are determined according to the CalPERS amortization policy. The CalPERS Board adopted a new policy effective for the June 30, 2019 actuarial valuation. The new policy applies prospectively only; amortization bases (sources of UAL) established prior to the June 30, 2019 valuation will continue to be amortized according to the prior policy.

Appendix A - Statement of Actuarial Methods and Assumptions

Actuarial Methods (continued)

Prior Policy (Bases Established prior to June 30, 2019)

Amortization payments are determined as a level percentage of payroll whereby the payment increases each year at an escalation rate. Gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. Bases established prior to June 30, 2013 may be amortized differently. A summary is provided in the following table:

	Source				
	(Gain)/Loss		Assumption/ Method Change	Benefit Change	Golden Handshake
	Investment	Non- investment			
Amortization Period	30 Years	30 Years	20 Years	20 Years	5 Years
Escalation Rate					
- Active Plans	2.75%	2.75%	2.75%	2.75%	2.75%
- Inactive Plans	0%	0%	0%	0%	0%
Ramp Up	5	5	5	0	0
Ramp Down	5	5	5	0	0

The 5-year ramp up means that the payments in the first four years of the amortization period are 20 percent, 40 percent, 60 percent and 80 percent of the "full" payment which begins in year five. The 5-year ramp down means that the reverse is true in the final four years of the amortization period.

Current Policy (Bases Established on or after June 30, 2019)

Amortization payments are determined as a level dollar amount. Investment gains or losses are amortized over a fixed 20-year period with a 5-year ramp up at the beginning of the amortization period. Non-investment gains or losses are amortized over a fixed 20-year period with no ramps. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramps. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with no ramps. Changes in unfunded accrued liability due to a Golden Handshake are amortized over a period of five years. A summary is provided in the table below:

	Source				
	(Gain)/Loss		Assumption/ Method Change	Benefit Change	Golden Handshake
	Investment	Non- investment			
Amortization Period	20 Years	20 Years	20 Years	20 Years	5 Years
Escalation Rate	0%	0%	0%	0%	0%
Ramp Up	5	0	0	0	0
Ramp Down	0	0	0	0	0

Appendix A - Statement of Actuarial Methods and Assumptions

Actuarial Methods (continued)

Exceptions for Inconsistencies

An exception to the amortization rules above is used whenever their application results in inconsistencies. In these cases, a “fresh start” approach is used. This means that the current unfunded actuarial liability is projected and amortized over a set number of years. For example, a fresh start is needed in the following situations:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

It should be noted that the actuary may determine that a fresh start is necessary under other circumstances. In all cases of a fresh start, the period is set by the actuary at what is deemed appropriate; however, the period will not be greater than 20 years.

By State statute for California Highway Patrol only, a portion of the assets in excess of the Entry Age Normal accrued liability can be applied as a direct offset to required employer and employee contributions.

The 1959 Survivor Program valuation is not provided in this report. A separate report for that program is available.

The Term Insurance Method is used for the State Group Term Life Insurance Program. The required contribution for the coming fiscal year is the difference between the reserves for that benefit and one and one-half times the expected benefit payments, but not less than zero.

Purchasing Power Protection Act (PPPA) Method

PPPA benefits are cost-of-living adjustments intended to maintain the individual's current retirement benefit at 75 percent of the original benefit at retirement adjusted for inflation since retirement. The PPPA benefit is paid, if necessary, in addition to any other cost-of-living adjustment provided under the terms of the plan. Prior to January 1, 2001, there was a single PPPA pool covering all CalPERS employers. However, commencing January 1, 2001, separate PPPA pools were established. A pool was set up for all State plans and a separate pool for School employers. The public agencies were removed entirely from PPPA pooling resulting in each public agency plan paying for its own PPPA benefits. The creation of separate pools effectively eliminates the cross subsidization between the State, Schools and public agencies. Because there is a single PPPA pool for all State plans, cross subsidization between State plans still occurs.

For the State plans, the total annual outlay for PPPA benefits is limited by State statute to earnings of up to 1.1 percent of accumulated member contributions. If this annual outlay is insufficient to provide the PPPA benefits in a given fiscal year, the 75 percent maintenance target would be proportionately reduced. Since the inception of the PPPA benefit program, 1.1 percent has proved more than sufficient to provide the 75 percent maintenance. Under the inflation assumption of 2.5 percent compounded annually, the 1.1 percent appears to remain more than sufficient in the foreseeable future.

Internal Revenue Code Section 415

The valuation reflects the limitations on benefits imposed by Internal Revenue Code section 415. The current valuation is based on the IRC 415(b) dollar limit for 2019 of \$225,000, up from the 2018 limit of \$220,000 used in the prior valuation.

Internal Revenue Code Section 401(a)(17)

The valuation reflects the limitations on pensionable compensation imposed by Internal Revenue Code section 401(a)(17). The current valuation is based on the IRC 401(a)(17) limit for 2019 of \$280,000, up from the 2018 limit of \$275,000 used in the prior valuation.

Appendix A - Statement of Actuarial Methods and Assumptions

Actuarial Methods (continued)

PEPRA Assumptions

The Public Employees' Pension Reform Act of 2013 (PEPRA) mandated new benefit formulas and member contributions for members hired on or after January 1, 2013, as defined by PEPRA. Different assumptions for PEPRA members are disclosed below.

Asset Valuation Method

Market value of assets plus accounts receivable.

It is the policy of the CalPERS Board of Administration to use professionally accepted amortization methods to eliminate a surplus or an unfunded accrued liability in a manner that maintains benefit security for the members of the System while minimizing substantial variations in required employer contribution rates. As stated in the "Amortization of Unfunded Actuarial Accrued Liability" section above, CalPERS' policy in effect for this valuation amortizes all actuarial investment gains and losses over a fixed 20-year period. The increase or decrease in the rate is then spread directly over a 5-year period. This method is referred to as "direct rate smoothing." The direct rate smoothing method is equivalent to a method using a 5-year asset smoothing period with no actuarial value of asset corridor and a 15-year amortization period for gains and losses.

Accounts Receivable

In preparing valuations and setting employer contribution rates, asset values include accounts receivable. The CalPERS Actuarial Office assumes that all assets are accruing interest at the actuarially assumed rate. Therefore, the rates depicted assume that all payments have been made and are accruing interest.

Actuarial Assumptions

In 2017, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In December 2017, the CalPERS Board of Administration adopted relatively modest changes to the asset allocation that reduced the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 7.0%. The Board also approved several changes to the demographic assumptions that more closely aligned with actual experience. These new actuarial assumptions were first used in the June 30, 2017 valuation to set the fiscal year 2018-19 contribution for the State plans.

On December 21, 2016, the CalPERS Board of Administration lowered the discount rate from 7.5% to 7.0% using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The required employer contributions for fiscal year 2019-20 determined in this valuation were calculated using a discount rate of 7.0%. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate schedule provides a more realistic assumption for the long-term investment return of the fund.

Notwithstanding the Board's decision to phase into a 7.0% discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a further change to the discount rate.

For more details and additional rationale for the selection of the actuarial assumptions, please refer to the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017 that can be found on the CalPERS website under "Forms and Publications." Click on "View All" and search for "Experience Study."

All actuarial assumptions used in this valuation represent estimates of future experience rather than observations of estimates inherent in market data.

Appendix A - Statement of Actuarial Methods and Assumptions

Actuarial Assumptions (continued)

Economic Assumptions

Discount Rate

The discount rate assumption adopted by the Board is 7.0% compounded annually (net of investment and administrative expenses).

Salary Growth

Annual increases vary by entry age and duration of service. A sample of assumed increases is shown below. Wage inflation assumption in the valuation year (2.75% for 2019) is added to these factors for total salary growth.

State Miscellaneous Tier 1 & Tier 2

Duration of Service	Entry Age		
	20	30	40
0	6.4%	5.6%	4.4%
3	5.3%	4.4%	3.1%
5	4.3%	3.6%	2.4%
10	2.3%	1.8%	1.2%
15	1.5%	1.2%	0.8%
20	1.0%	0.9%	0.6%
25	0.7%	0.6%	0.4%
30	0.5%	0.4%	0.3%

State Industrial

Duration of Service	Entry Age		
	20	30	40
0	7.3%	7.0%	6.4%
3	5.1%	4.7%	3.9%
5	4.0%	3.6%	2.8%
10	2.7%	2.2%	1.4%
15	1.8%	1.5%	1.1%
20	1.2%	1.0%	0.8%
25	0.8%	0.7%	0.6%
30	0.5%	0.5%	0.4%

State Safety, POFF and CHP

Duration of Service	State Safety	POFF	CHP
0	5.0%	14.7%	6.8%
3	3.1%	6.7%	4.0%
5	2.1%	4.0%	2.4%
10	0.8%	1.2%	1.0%
15	0.7%	0.5%	1.0%
20	0.6%	1.4%	1.8%
25	0.5%	1.5%	2.0%
30	0.5%	1.0%	1.0%

Appendix A - Statement of Actuarial Methods and Assumptions

Economic Assumptions (continued)

Overall Payroll Growth

2.75% compounded annually (used in projecting the payroll over which unfunded accrued liability is amortized for amortization bases established prior to June 30, 2019). For the State Miscellaneous plan, the payroll of Tier 2 members is assumed to decrease in accordance with actuarial assumptions based on the assumption that all new State Miscellaneous entrants will elect Tier 1. The payroll of Tier 1 members is assumed to grow at the rate necessary for the overall payroll of the State Miscellaneous plan to grow annually at a rate of 2.75%.

Inflation

2.50% compounded annually.

Appendix A - Statement of Actuarial Methods and Assumptions

Demographic Assumptions

Post-Retirement Mortality

Rates vary by age, type of retirement, and gender. See sample rates in table below. These rates are used for all plans.

Age	Healthy Recipients		Non-Industrial Disabled (Not Job-Related)		Industrial Disabled (Job-Related)	
	Male	Female	Male	Female	Male	Female
50	0.00372	0.00346	0.01183	0.01083	0.00372	0.00346
55	0.00437	0.00410	0.01613	0.01178	0.00437	0.00410
60	0.00671	0.00476	0.02166	0.01404	0.00671	0.00476
65	0.00928	0.00637	0.02733	0.01757	0.01113	0.00765
70	0.01339	0.00926	0.03358	0.02183	0.01607	0.01111
75	0.02316	0.01635	0.04277	0.02969	0.02779	0.01962
80	0.03977	0.03007	0.06272	0.04641	0.04773	0.03609
85	0.07122	0.05418	0.09793	0.07847	0.08547	0.06501
90	0.13044	0.10089	0.14616	0.13220	0.14348	0.11098
95	0.21658	0.17698	0.21658	0.21015	0.21658	0.17698
100	0.32222	0.28151	0.32222	0.32226	0.32222	0.28151
105	0.46691	0.43491	0.46691	0.43491	0.46691	0.43491
110	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

The post-retirement mortality rates above include 15 years of projected ongoing mortality improvement using 90% of Scale MP-2016 published by the Society of Actuaries.

Marital Status

For active members, it is assumed the following are married upon retirement.

Plan	Percent Married
State Miscellaneous	70%
State Industrial	70%
State Safety	70%
State Peace Officers & Firefighters	80%
California Highway Patrol	90%

Age of Spouse

It is assumed that female spouses are 3 years younger than male spouses.

Terminated Members

Terminated members who are not vested are assumed to refund immediately. Terminated members who are vested are assumed to retire at age 59 (State Miscellaneous and Industrial) or age 54 (State Safety, State Peace Officers and Firefighters, and California Highway Patrol).

Appendix A - Statement of Actuarial Methods and Assumptions

Miscellaneous Loading Factors

Credit for Unused Sick Leave

Total years of service is increased by 1% for employees in plans with the Credit for Unused Sick Leave provision.

Norris Decision (Best Factors)

Projected benefit amounts for employees hired prior to July 1, 1982 are increased to reflect the use of “Best Factors” in the calculation of optional benefit forms. This is due to a 1983 Supreme Court decision, known as the Norris Decision, which required males and females to be treated equally in the determination of benefit amounts. Consequently, anyone already employed at that time is given the best possible conversion factor when optional benefits are determined. No loading is necessary for employees hired after July 1, 1982.

Miscellaneous Assumptions

Tier 2 Members electing Tier 1 benefits

In general, Tier 2 members of both the State Miscellaneous and State Industrial plans have the right to convert their Tier 2 service to Tier 1 service provided they make up the shortfall in their accumulated contributions with interest. In this valuation, we have assumed that all Tier 2 members eligible to convert their Tier 2 service to Tier 1 service will elect to do so.

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS

State Miscellaneous Tier 1

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.007	0.010	0.014	0.019	0.019	0.022	0.029
52	0.013	0.012	0.013	0.018	0.020	0.023	0.031
54	0.011	0.017	0.020	0.030	0.035	0.039	0.049
56	0.023	0.035	0.043	0.062	0.083	0.106	0.165
58	0.027	0.043	0.047	0.074	0.089	0.121	0.170
60	0.037	0.062	0.075	0.119	0.141	0.175	0.246
62	0.087	0.127	0.152	0.221	0.263	0.310	0.356
65	0.090	0.158	0.175	0.245	0.249	0.301	0.344
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	0.009	0.008	0.009	0.013	0.014	0.016	0.022
54	0.008	0.012	0.014	0.021	0.025	0.027	0.034
56	0.016	0.025	0.030	0.043	0.058	0.074	0.116
58	0.020	0.032	0.035	0.056	0.067	0.091	0.128
60	0.030	0.050	0.060	0.095	0.113	0.140	0.197
62	0.070	0.102	0.122	0.177	0.210	0.248	0.285
65	0.081	0.142	0.158	0.221	0.224	0.271	0.310
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
0	0.16570	0.16570	0.15120	0.13660	0.12920
1	0.13660	0.13660	0.12160	0.10660	0.09650
2	0.11060	0.11060	0.09650	0.08250	0.07190
3	0.08770	0.08770	0.07600	0.06430	0.05540
4	0.06790	0.06790	0.06000	0.05200	0.04680
5	0.02720	0.02720	0.02230	0.01740	0.01600
10	0.00480	0.00480	0.00430	0.00370	0.00270
15	0.00160	0.00160	0.00120	0.00080	0.00070
20	0.00110	0.00110	0.00080	0.00050	0.00050
25	0.00080	0.00080	0.00060	0.00040	0.00030
30	0.00060	0.00060	0.00040	0.00020	0.00020

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Miscellaneous Tier 1 (continued)

Termination with Vested Benefits

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
5	0.04410	0.04410	0.03940	0.03460	0.02890
6	0.03970	0.03970	0.03570	0.03180	0.02610
7	0.03550	0.03550	0.03220	0.02890	0.02330
8	0.03170	0.03170	0.02880	0.02600	0.02060
9	0.02820	0.02820	0.02570	0.02320	0.01800
10	0.02510	0.02510	0.02270	0.02040	0.01560
14	0.01610	0.01610	0.01370	0.01130	0.00850
15	0.01460	0.01460	0.01220	0.00970	0.00740
19	0.01040	0.01040	0.00790	0.00540	0.00430
20	0.00950	0.00950	0.00710	0.00470	0.00380
24	0.00580	0.00580	0.00370	0.00170	0.00130
25	0.00500	0.00500	0.00290	0.00080	0.00070
29	0.00290	0.00290	0.00150	0.00000	0.00000
30	0.00260	0.00260	0.00130	0.00000	0.00000

- When a member is eligible to retire, the termination with vested benefits probability is set to zero.
- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.

Non-Industrial (Not Job-Related) Death and Disability

Rates vary by age and gender. See sample rates in the table below.

Attained Age	Non-Industrial Death (Not Job-Related)		Non-Industrial Disability (Not Job-Related)	
	Male	Female	Male	Female
20	0.000216	0.000069	0.000190	0.000390
25	0.000289	0.000109	0.000190	0.000390
30	0.000379	0.000155	0.000190	0.000460
35	0.000491	0.000270	0.000360	0.000960
40	0.000637	0.000366	0.001030	0.001860
45	0.000795	0.000543	0.002040	0.003260
50	0.001161	0.000794	0.002740	0.004050
55	0.001717	0.001204	0.002380	0.003100
60	0.002550	0.001657	0.002000	0.002560

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Miscellaneous Tier 2

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.007	0.010	0.014	0.019	0.019	0.022	0.029
52	0.013	0.012	0.013	0.018	0.020	0.023	0.031
54	0.011	0.017	0.020	0.030	0.035	0.039	0.049
56	0.023	0.035	0.043	0.062	0.083	0.106	0.165
58	0.027	0.043	0.047	0.074	0.089	0.121	0.170
60	0.037	0.062	0.075	0.119	0.141	0.175	0.246
62	0.087	0.127	0.152	0.221	0.263	0.310	0.356
65	0.090	0.158	0.175	0.245	0.249	0.301	0.344
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	0.009	0.008	0.009	0.013	0.014	0.016	0.022
54	0.008	0.012	0.014	0.021	0.025	0.027	0.034
56	0.016	0.025	0.030	0.043	0.058	0.074	0.116
58	0.020	0.032	0.035	0.056	0.067	0.091	0.128
60	0.030	0.050	0.060	0.095	0.113	0.140	0.197
62	0.070	0.102	0.122	0.177	0.210	0.248	0.285
65	0.081	0.142	0.158	0.221	0.224	0.271	0.310
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
0	0.1496	0.1433	0.1370	0.1307	0.1244
1	0.1365	0.1302	0.1239	0.1176	0.1113
2	0.1234	0.1172	0.1109	0.1046	0.0983
3	0.1104	0.1041	0.0978	0.0915	0.0852
4	0.0973	0.0910	0.0848	0.0785	0.0722
5	0.0843	0.0780	0.0717	0.0654	0.0591
6	0.0792	0.0729	0.0666	0.0603	0.0540
7	0.0741	0.0678	0.0615	0.0553	0.0490
8	0.0691	0.0628	0.0565	0.0502	0.0439
9	0.0640	0.0577	0.0514	0.0451	0.0388

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Miscellaneous Tier 2 (continued)

Termination with Vested Deferred Benefits

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
10	0.0589	0.0526	0.0463	0.0400	0.0000
14	0.0480	0.0417	0.0354	0.0291	—
15	0.0453	0.0390	0.0327	—	—
19	0.0344	0.0281	0.0218	—	—
20	0.0317	0.0254	—	—	—
24	0.0208	0.0145	—	—	—
25	0.0180	—	—	—	—
29	0.0071	—	—	—	—
30	—	—	—	—	—

- When a member is eligible to retire, the termination with vested benefits probability is set to zero.
- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.

Non-Industrial (Not Job-Related) Death and Disability

Rates vary by age and gender. See sample rates in the table below.

Attained Age	Non-Industrial Death (Not Job-Related)		Non-Industrial Disability (Not Job-Related)	
	Male	Female	Male	Female
20	0.000216	0.000069	0.000190	0.000390
25	0.000289	0.000109	0.000190	0.000390
30	0.000379	0.000155	0.000190	0.000460
35	0.000491	0.000270	0.000360	0.000960
40	0.000637	0.000366	0.001030	0.001860
45	0.000795	0.000543	0.002040	0.003260
50	0.001161	0.000794	0.002740	0.004050
55	0.001717	0.001204	0.002380	0.003100
60	0.002550	0.001657	0.002000	0.002560

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Industrial

Service Retirement - Classic Members

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.006	0.008	0.013	0.019	0.026	0.029	0.036
52	0.007	0.009	0.015	0.023	0.031	0.034	0.043
54	0.014	0.020	0.030	0.046	0.062	0.069	0.086
56	0.028	0.040	0.062	0.094	0.126	0.140	0.174
58	0.029	0.041	0.064	0.098	0.131	0.145	0.181
60	0.042	0.060	0.093	0.142	0.191	0.211	0.262
62	0.079	0.113	0.176	0.266	0.357	0.398	0.493
65	0.081	0.117	0.182	0.276	0.371	0.413	0.511
70	0.097	0.139	0.217	0.329	0.443	0.493	0.611
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	0.005	0.006	0.011	0.016	0.022	0.024	0.030
54	0.010	0.014	0.021	0.032	0.043	0.048	0.060
56	0.020	0.028	0.043	0.066	0.088	0.098	0.122
58	0.022	0.031	0.048	0.074	0.098	0.109	0.136
60	0.034	0.048	0.074	0.114	0.153	0.169	0.210
62	0.063	0.090	0.141	0.213	0.286	0.318	0.394
65	0.073	0.105	0.164	0.248	0.334	0.372	0.460
70	0.097	0.139	0.217	0.329	0.443	0.493	0.611
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by years of service. See sample rates in the table below.

Duration of Service									
0	5	10	15	20	25	30	35	40	45
0.0912	0.0190	0.0029	0.0016	0.0010	0.0006	0.0004	0.0002	0.0001	0.0001

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Industrial (continued)

Termination with Vested Deferred Benefits

Rates vary by entry age and years of service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
5	0.0496	0.0449	0.0405	0.0356	0.0311
6	0.0470	0.0421	0.0377	0.0328	0.0281
7	0.0442	0.0393	0.0346	0.0297	0.0250
8	0.0414	0.0365	0.0316	0.0267	0.0220
9	0.0384	0.0335	0.0285	0.0234	0.0187
10	0.0353	0.0302	0.0253	0.0201	—
14	0.0311	0.0257	0.0206	0.0152	—
15	0.0302	0.0246	0.0194	—	—
19	0.0248	0.0190	0.0136	—	—
20	0.0232	0.0176	—	—	—
24	0.0173	0.0115	—	—	—
25	0.0159	—	—	—	—
29	0.0091	—	—	—	—
30	—	—	—	—	—

- When a member is eligible to retire, the termination with vested benefits probability is set to zero.
- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

Attained Age	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000430	0.000040	0.000150
25	0.000289	0.000109	0.000430	0.000060	0.000150
30	0.000379	0.000155	0.001060	0.000070	0.000150
35	0.000491	0.000270	0.001840	0.000090	0.000290
40	0.000637	0.000366	0.002950	0.000100	0.000290
45	0.000795	0.000543	0.004480	0.000120	0.000440
50	0.001161	0.000794	0.006010	0.000130	0.000440
55	0.001717	0.001204	0.007710	0.000150	0.000580
60	0.002550	0.001657	0.007710	0.000160	0.000580

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Safety

Service Retirement - Classic Members

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.008	0.013	0.020	0.030	0.032	0.039	0.045
52	0.008	0.017	0.017	0.030	0.030	0.035	0.044
54	0.016	0.023	0.023	0.034	0.041	0.054	0.099
56	0.032	0.039	0.058	0.109	0.138	0.171	0.231
58	0.035	0.047	0.069	0.109	0.132	0.179	0.256
60	0.048	0.056	0.090	0.154	0.158	0.201	0.257
62	0.084	0.095	0.140	0.239	0.253	0.308	0.356
65	0.111	0.138	0.172	0.249	0.257	0.311	0.359
70	0.137	0.167	0.214	0.281	0.309	0.373	0.401
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.007	0.011	0.017	0.026	0.027	0.033	0.038
52	0.007	0.014	0.014	0.026	0.026	0.030	0.037
54	0.012	0.017	0.017	0.026	0.031	0.041	0.074
56	0.024	0.029	0.044	0.082	0.104	0.128	0.173
58	0.028	0.038	0.055	0.087	0.106	0.143	0.205
60	0.043	0.050	0.081	0.139	0.142	0.181	0.231
62	0.067	0.076	0.112	0.191	0.202	0.246	0.285
65	0.100	0.124	0.155	0.224	0.231	0.280	0.323
70	0.137	0.167	0.214	0.281	0.309	0.373	0.401
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by service. See sample rates in the table below.

Duration of Service										
0	1	2	3	4	5	10	15	20	25	30
0.1408	0.1014	0.0723	0.0533	0.0444	0.0155	0.0033	0.0019	0.0011	0.0006	0.0004

Termination with Vested Deferred Benefits

Rates vary by service. See sample rates in the table below.

Duration of Service										
5	6	7	8	9	10	15	20	25	30	35
0.0246	0.0218	0.0194	0.0173	0.0155	0.0141	0.0097	0.0073	0.0050	0.0034	0.0000

- When a member is eligible to retire, the termination with vested benefits probability is set to zero.
- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Safety (continued)

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

Attained Age	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000360	0.000040	0.000020
25	0.000289	0.000109	0.000540	0.000060	0.000760
30	0.000379	0.000155	0.000630	0.000070	0.001700
35	0.000491	0.000270	0.000720	0.000090	0.002640
40	0.000637	0.000366	0.000720	0.000100	0.003600
45	0.000795	0.000543	0.001080	0.000120	0.004570
50	0.001161	0.000794	0.002010	0.000130	0.005570
55	0.001717	0.001204	0.002400	0.000150	0.006580
60	0.002550	0.001657	0.003200	0.000160	0.007620

State Peace Officers and Firefighters

Service Retirement - Classic Members

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.012	0.030	0.044	0.109	0.224	0.449	0.467
52	0.012	0.026	0.041	0.096	0.145	0.255	0.257
54	0.021	0.042	0.053	0.118	0.162	0.292	0.306
56	0.031	0.044	0.057	0.135	0.213	0.335	0.345
58	0.020	0.065	0.070	0.158	0.224	0.354	0.354
60	0.035	0.066	0.094	0.179	0.276	0.360	0.367
62	0.067	0.104	0.130	0.221	0.324	0.415	0.440
65	0.065	0.081	0.127	0.231	0.342	0.427	0.453
70	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members – 2.5% @ 57

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.008	0.021	0.031	0.076	0.157	0.314	0.327
52	0.008	0.018	0.029	0.067	0.102	0.179	0.180
54	0.016	0.032	0.040	0.089	0.122	0.219	0.230
56	0.025	0.035	0.046	0.108	0.170	0.268	0.276
58	0.018	0.059	0.063	0.142	0.202	0.319	0.319
60	0.033	0.063	0.089	0.170	0.262	0.342	0.349
62	0.067	0.104	0.130	0.221	0.324	0.415	0.440
65	0.065	0.081	0.127	0.231	0.342	0.427	0.453
70	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Peace Officers and Firefighters (continued)

Service Retirement - PEPRA Members – 2.7% @ 57

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.008	0.021	0.031	0.076	0.157	0.314	0.327
52	0.009	0.020	0.031	0.072	0.109	0.191	0.193
54	0.017	0.034	0.042	0.094	0.130	0.234	0.245
56	0.026	0.037	0.048	0.115	0.181	0.285	0.293
58	0.020	0.065	0.070	0.158	0.224	0.354	0.354
60	0.035	0.066	0.094	0.179	0.276	0.360	0.367
62	0.067	0.104	0.130	0.221	0.324	0.415	0.440
65	0.065	0.081	0.127	0.231	0.342	0.427	0.453
70	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by years of service. See sample rates in the table below.

Duration of Service										
0	1	2	3	4	5	10	15	20	25	30
0.1217	0.0779	0.0431	0.0353	0.0275	0.0056	0.0039	0.0025	0.0015	0.0006	0.0003

Termination with Vested Deferred Benefits

Rates vary by years of service. See sample rates in the table below.

Duration of Service										
5	6	7	8	9	10	15	20	25	30	35
0.0117	0.0115	0.0112	0.0108	0.0103	0.0098	0.0069	0.0049	0.0031	0.0020	0.0000

- When a member is eligible to retire, the termination with vested benefits probability is set to zero.
- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

Attained Age	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000300	0.000040	0.000390
25	0.000289	0.000109	0.000300	0.000060	0.000870
30	0.000379	0.000155	0.000300	0.000070	0.001670
35	0.000491	0.000270	0.000300	0.000090	0.002890
40	0.000637	0.000366	0.000400	0.000100	0.004640
45	0.000795	0.000543	0.000600	0.000120	0.007060
50	0.001161	0.000794	0.000980	0.000130	0.010270
55	0.001717	0.001204	0.001430	0.000150	0.014420
60	0.002550	0.001657	0.001880	0.000160	0.019660

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

California Highway Patrol

Service Retirement - Classic Members

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.038	0.038	0.038	0.049	0.107	0.418	0.453
52	0.027	0.027	0.027	0.027	0.093	0.315	0.383
54	0.038	0.038	0.038	0.038	0.124	0.309	0.404
56	0.051	0.051	0.051	0.084	0.139	0.350	0.380
58	0.049	0.049	0.049	0.049	0.171	0.338	0.350
60	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and years of service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.027	0.027	0.027	0.034	0.075	0.293	0.317
52	0.020	0.020	0.020	0.020	0.070	0.236	0.287
54	0.030	0.030	0.030	0.030	0.099	0.247	0.323
56	0.043	0.043	0.043	0.071	0.118	0.298	0.323
58	0.044	0.044	0.044	0.044	0.154	0.304	0.315
60	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by service. See sample rates in the table below.

Duration of Service										
0	1	2	3	4	5	10	15	20	25	30
0.1050	0.0243	0.0152	0.0091	0.0054	0.0029	0.0005	0.0003	0.0002	0.0002	0.0002

Termination with Vested Deferred Benefits

Rates vary by service. See sample rates in the table below.

Duration of Service										
5	6	7	8	9	10	15	20	25	30	35
0.0090	0.0084	0.0079	0.0075	0.0071	0.0067	0.0049	0.0034	0.0023	0.0010	0.0000

- When a member is eligible to retire, the termination with vested benefits probability is set to zero.
- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.

Appendix A - Statement of Actuarial Methods and Assumptions

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

California Highway Patrol (continued)

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

Attained Age	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000100	0.000040	0.000156
25	0.000289	0.000109	0.000100	0.000060	0.000348
30	0.000379	0.000155	0.000100	0.000070	0.000684
35	0.000491	0.000270	0.000100	0.000090	0.001224
40	0.000637	0.000366	0.000100	0.000100	0.002022
45	0.000795	0.000543	0.000200	0.000120	0.003162
50	0.001161	0.000794	0.000200	0.000130	0.012138
55	0.001717	0.001204	0.000200	0.000150	0.054066
60	0.002550	0.001657	0.000200	0.000160	0.204306

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 1

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of this plan. Many of the statements in this summary are general in nature and intended to provide a summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Service Retirement

Eligibility

Classic members become eligible for Service Retirement upon attainment of age 50 with at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). PEPRA members become eligible for Service Retirement upon attainment of age 52 with at least five years of service.

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from the **2% at 55** benefit factor table. New Classic members hired on or after January 15, 2011 are subject to the **2% at 60** benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **2% at 62** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	2% @ 55 Factor	2% @ 60 Factor	2% @ 62 Factor
50	1.100%	1.092%	N/A
51	1.280%	1.156%	N/A
52	1.460%	1.224%	1.000%
53	1.640%	1.296%	1.100%
54	1.820%	1.376%	1.200%
55	2.000%	1.460%	1.300%
56	2.064%	1.552%	1.400%
57	2.126%	1.650%	1.500%
58	2.188%	1.758%	1.600%
59	2.250%	1.874%	1.700%
60	2.314%	2.000%	1.800%
61	2.376%	2.134%	1.900%
62	2.438%	2.272%	2.000%
63	2.500%	2.418%	2.100%
64	2.500%	2.418%	2.200%
65	2.500%	2.418%	2.300%
66	2.500%	2.418%	2.400%
67 & Up	2.500%	2.418%	2.500%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 1 (continued)

- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary used to calculate final compensation based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is \$124,180 for 2019 and for those employees who do not participate in Social Security the cap for 2019 is \$149,016. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- Employees may or may not be covered by Social Security. For employees covered by Social Security, the final compensation is offset by \$133.33 (or by one third if the final compensation is less than \$400). For some PEPRA members, the final compensation is not offset.
- The Service Retirement benefit is not capped.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

Classic members become eligible to receive a deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50. PEPRA members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 52.

Benefit

The vested deferred retirement benefit is the same as the Service Retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes disabled and has at least five years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS has reciprocity agreements). There is no special age requirement. Disabled means the member is unable to perform his or her job because of an illness or injury which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job related. A CalPERS member must be actively working with any CalPERS employer at the time of disability in order to be eligible for this benefit.

Benefit

The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8 percent of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or
- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33-1/3% of Final Compensation.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 1 (continued)

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members eligible to retire, and who have attained the normal retirement age determined by their service retirement benefit formula, will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of \$2,000 will be made to the retiree's designated survivor(s) or the retiree's estate.

Form of Payment for Retirement Allowance

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

For retirement allowances with respect to service earned by employment in this group, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, *without* a reduction in the retiree's allowance. This additional benefit is often referred to as *post retirement survivor allowance* (PRSA) or simply as *survivor continuance*.

In other words, 25% of the allowance, the *continuance portion*, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried children until they attain age 18; or, if no eligible children, to a qualifying dependent parent) for the rest of his or her lifetime.

The remaining 75% of the retirement allowance, which may be referred to as the *option portion* of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. The retiree may choose to provide for some of this *option portion* to be paid to **any** designated beneficiary after the retiree's death. Benefit options applicable to the *option portion* are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the *option portion*.

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of \$5,000 plus an additional amount equal to 50% of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount will not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 1 (continued)

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility

An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit

The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is credited at the greater of 6% or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Optional Settlement 2W Death benefit.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 1 (continued)

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified Service Retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor benefit.

Benefit

The Optional Settlement 2W Death benefit is a monthly allowance equal to the Service Retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any particular year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 75% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan. The total annual outlay for PPPA is limited to 1.1% of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75% target would be proportionately reduced.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 1 (continued)

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to “pick up” these contributions for the employees. For employees covered by Social Security, the monthly compensation breakpoint is \$513, and the contribution schedule is as follows:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint ranges from 5% to 10%.

There are a small number of employees not covered by Social Security in this plan. For those employees, the monthly compensation breakpoint is \$317, and contributions are as follows:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint is 1% greater than the contribution paid by those covered by Social Security.

For some new PEPRA members, the monthly compensation breakpoint is \$0, and contributions are as follows:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint is half of the total normal cost. See the “PEPRA Member Contribution Rates” section of this report for more information.

Refund of Employee Contributions

If the member’s service with the employer ends and the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited annually with 6% interest.

1959 Survivor Benefits Program

For these benefits, please refer to the 1959 Survivor Benefit Program Actuarial Valuation Report available on our website.

State Miscellaneous Tier 2

The following is a summary of the major plan provisions applicable to State Miscellaneous Tier 2 members. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees’ Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Tier 2 Members electing Tier 1 benefits

In general, State Miscellaneous Tier 2 members have the right to convert their Tier 2 service to Tier 1 service provided they make up the shortfall in their accumulated contributions with interest. In this valuation, we have assumed that all State Miscellaneous Tier 2 members eligible to convert their Tier 2 service to Tier 1 service will elect to do so.

Service Retirement

Eligibility

A member becomes eligible for Service Retirement upon attainment of age 55 with at least 10 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 2 (continued)

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for Classic employees comes from the **1.25% at 65** Tier 2 benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **1.25% at 67** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	1.25% @ 65 Tier 2 Factor	1.25% @ 67 Tier 2 Factor
50	0.500%	N/A
51	0.550%	N/A
52	0.600%	0.650%
53	0.650%	0.690%
54	0.700%	0.730%
55	0.750%	0.770%
56	0.800%	0.810%
57	0.850%	0.850%
58	0.900%	0.890%
59	0.950%	0.930%
60	1.000%	0.970%
61	1.050%	1.010%
62	1.100%	1.050%
63	1.150%	1.090%
64	1.200%	1.130%
65	1.250%	1.170%
66	1.250%	1.210%
67 & Up	1.250%	1.250%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.
- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary used to calculate final compensation based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is \$124,180 for 2019 and for those employees who do not participate in Social Security the cap for 2019 is \$149,016. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers
 - Employees may or may not be covered by Social Security. The final compensation is not offset by a dollar amount.
 - The Service Retirement benefit is not capped.

Vested Deferred Retirement

Eligibility for Deferred Status

A member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, and has earned at least 10 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 2 (continued)

Eligibility to Start Receiving Benefits

The member becomes eligible to receive a deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 55. Members with five years of service before January 1, 1985 are eligible at age 50.

Benefit

The vested deferred retirement benefit is the same as the Service Retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes disabled and has at least 10 years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). There is no special age requirement. Disabled means the member is unable to perform his or her job because of an illness or injury which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job related. A CalPERS member must be actively working with any CalPERS employer at the time of disability in order to be eligible for this benefit. Members with five years of service before January 1, 1985 are also eligible.

Benefit

The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.125% of final compensation, multiplied by service, which is determined as follows:

- Service is CalPERS credited service, for members with less than 10 years of service or greater than 29.628 years of service; or
- Service is CalPERS credited service plus the additional number of years that the member would have worked until age 65, for members with at least 10 years but not more than 29.628 years of service. The maximum benefit in this case is 33-1/3% of Final Compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members who are eligible to retire and have attained the normal retirement age determined by their service retirement benefit formula will receive the same dollar amount for disability retirement that is payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of \$2,000 will be made to the retiree's designated survivor(s) or the retiree's estate.

Form of Payment for Retirement Allowance

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 2 (continued)

For retirement allowances with respect to service earned by employment in this group, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, *without* a reduction in the retiree's allowance. This additional benefit is often referred to as post-retirement survivor allowance (PRSA) or simply as *survivor continuance*.

In other words, 25% of the allowance, the *continuance portion*, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried children until they attain age 18; or, if no eligible children, to a qualifying dependent parent) for the rest of his or her lifetime.

The remaining 75% of the retirement allowance, which may be referred to as the *option portion* of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. The retiree may choose to provide for some of this *option portion* to be paid to **any** designated beneficiary after the retiree's death. Benefit options applicable to the *option portion* are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the *option portion*.

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of \$5,000 plus an additional amount equal to 50% of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount will not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility

An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit

The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is the greater of 6% or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 2 (continued)

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed and has attained retirement eligibility. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Optional Settlement 2W Death benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified Service Retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed and has attained retirement eligibility. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor benefit.

Benefit

The Optional Settlement 2W Death benefit is a monthly allowance equal to the Service Retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 2 (continued)

Cost-of-Living Adjustments

Beginning the second calendar year after the year of retirement, retirement and survivor allowances will be annually adjusted on a compound basis by 3%.

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 75% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan. The total annual outlay for PPPA is limited to 1.1% of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75% target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to “pick-up” these contributions for the employees.

- The percent contributed above the monthly compensation breakpoint is 3.75%.
- The monthly compensation breakpoint is \$0.
- The percent contributed below the monthly compensation breakpoint is 0%.

Refund of Employee Contributions

If the member's service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited annually with 6% interest.

1959 Survivor Benefits Program

For these benefits, please refer to the 1959 Survivor Benefit Program Actuarial Valuation Report available on our website.

State Industrial Tier 1

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of the plan. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Service Retirement

Eligibility

Classic members become eligible for Service Retirement upon attainment of age 50 with at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). PEPRA members become eligible for Service Retirement upon attainment of age 52 with at least five years of service.

Appendix B – Principal Plan Provisions

State Industrial Tier 1 (continued)

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from the **2% at 55** benefit factor table. New Classic members hired on or after January 15, 2011 are subject to the **2% at 60** benefit factor table. New PEPRAs members hired on or after January 1, 2013 are subject to the **2% at 62** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	2% @ 55 Factor	2% @ 60 Factor	2% @ 62 Factor
50	1.100%	1.092%	N/A
51	1.280%	1.156%	N/A
52	1.460%	1.224%	1.000%
53	1.640%	1.296%	1.100%
54	1.820%	1.376%	1.200%
55	2.000%	1.460%	1.300%
56	2.064%	1.552%	1.400%
57	2.126%	1.650%	1.500%
58	2.188%	1.758%	1.600%
59	2.250%	1.874%	1.700%
60	2.314%	2.000%	1.800%
61	2.376%	2.134%	1.900%
62	2.438%	2.272%	2.000%
63	2.500%	2.418%	2.100%
64	2.500%	2.418%	2.200%
65	2.500%	2.418%	2.300%
66	2.500%	2.418%	2.400%
67 & Up	2.500%	2.418%	2.500%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.
- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRAs members have a cap on the annual salary used to calculate final compensation based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is \$124,180 for 2019 and for those employees who do not participate in Social Security the cap for 2019 is \$149,016. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- Employees may or may not be covered by Social Security. For employees covered by Social Security, the final compensation is offset by \$133.33 (or by one third if the final compensation is less than \$400). For some PEPRAs members, the final compensation is not offset.
- The Service Retirement benefit is not capped.

Appendix B – Principal Plan Provisions

State Industrial Tier 1 (continued)

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, and has earned at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

Classic members become eligible to receive the deferred benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50. PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 52.

Benefit

The vested deferred retirement benefit is the same as the Service Retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes disabled and has at least five years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). There is no special age requirement. Disabled means the member is unable to perform his or her job because of an illness or injury which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job-related. A CalPERS member must be actively working with any CalPERS employer at the time of disability in order to be eligible for this benefit.

Benefit

The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or
- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33-1/3% of Final Compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members eligible to retire, and who have attained the normal retirement age determined by their service retirement benefit formula, will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Appendix B – Principal Plan Provisions

State Industrial Tier 1 (continued)

Industrial (Job-Related) Disability Retirement

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes disabled while working, where disabled means the member is unable to perform the duties of the job because of a work-related illness or injury which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit except to the extent described in the next paragraph.

Benefit

The Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation. However, if a member is eligible for Service Retirement and if the Service Retirement benefit is more than the Industrial Disability Retirement benefit, the member may choose to receive the larger benefit. For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of \$2,000 will be made to the retiree's designated survivor(s) or the retiree's estate.

Form of Payment for Retirement Allowance

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

For retirement allowances with respect to service earned by employment in this group, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree *without* a reduction in the retiree's allowance. This additional benefit is often referred to as post-retirement survivor allowance (PRSA) or simply as *survivor continuance*.

In other words, 25% of the allowance, the *continuance portion*, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried children until they attain age 18; or, if no eligible children, to a qualifying dependent parent) for the rest of his or her lifetime.

The remaining 75% of the retirement allowance, which may be referred to as the *option portion* of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. Or, the retiree may choose to provide for some of this *option portion* to be paid to any designated beneficiary after the retiree's death. Benefit options applicable to the *option portion* are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the *option portion*.

Appendix B – Principal Plan Provisions

State Industrial Tier 1 (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of \$5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount will not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility

An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit

The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is the greater of 6% or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

Special Death Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the Special Death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried children under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The Special Death benefit is a monthly allowance equal to 50% of final compensation. The allowance will be increased whenever the compensation paid to active employees is increased but ceases to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death, at which time the allowance is continued to any unmarried children under age 22. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Appendix B – Principal Plan Provisions

State Industrial Tier 1 (continued)

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving children (*eligible* means unmarried children under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- If 1 eligible child: 12.5% of final compensation
- If 2 eligible children: 20.0% of final compensation
- If 3 or more eligible children: 25.0% of final compensation

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100% continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for Classic members and age 52 for PEPRAs members, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified Service Retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Appendix B – Principal Plan Provisions

State Industrial Tier 1 (continued)

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor benefit.

Benefit

The Optional Settlement 2W Death benefit is a monthly allowance equal to the Service Retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any particular year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 75% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan. The total annual outlay for PPPA is limited to 1.1% of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75% target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick-up" these contributions for the employees. For employees covered by Social Security, the monthly compensation breakpoint is \$513 and the contribution schedule is as follows:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint ranges from 5% to 10%.

There are a small number of employees not covered by Social Security in this plan. For those employees, the monthly compensation breakpoint is \$317 and contributions are as follows:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint is 1% greater than those covered by Social Security.

Appendix B – Principal Plan Provisions

State Industrial Tier 1 (continued)

Refund of Employee Contributions

If the member's service with the employer ends and the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited annually with 6% interest.

1959 Survivor Benefits Program

For these benefits, please refer to the 1959 Survivor Benefit Program Actuarial Valuation Report available on our website.

State Industrial Tier 2

The following is a summary of the major plan provisions applicable to State Industrial Tier 2 Members. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Tier 2 Members Electing Tier 1 Benefits

State Industrial Tier 2 members have the right to convert their Tier 2 service to Tier 1 service provided they make up the shortfall in their accumulated contributions with interest. In this valuation, we have assumed that all State Industrial Tier 2 members eligible to convert their Tier 2 service to Tier 1 service will elect to do so.

Service Retirement

Eligibility

A CalPERS member becomes eligible for Service Retirement upon attainment of age 55 with at least 10 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). Members with 5 years of service before January 1, 1985 are also eligible.

Appendix B – Principal Plan Provisions

State Industrial Tier 2 (continued)

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The benefit factor for Classic employees comes from the **1.25% at 65** Tier 2 benefit factor table. PEPRA members are subject to the **1.25% at 67** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	1.25% @ 65 Tier 2 Factor	1.25% @ 67 Tier 2 Factor
50	0.500%	N/A
51	0.550%	N/A
52	0.600%	0.650%
53	0.650%	0.690%
54	0.700%	0.730%
55	0.750%	0.770%
56	0.800%	0.810%
57	0.850%	0.850%
58	0.900%	0.890%
59	0.950%	0.930%
60	1.000%	0.970%
61	1.050%	1.010%
62	1.100%	1.050%
63	1.150%	1.090%
64	1.200%	1.130%
65	1.250%	1.170%
66	1.250%	1.210%
67 & Up	1.250%	1.250%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.
- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary used to calculate final compensation based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is \$124,180 for 2019 and for those employees who do not participate in Social Security the cap for 2019 is \$149,016. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group may or may not be covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit is not capped.

Appendix B – Principal Plan Provisions

State Industrial Tier 2 (continued)

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 10 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). Members with five years of service before January 1, 1985 are also eligible.

Eligibility to Start Receiving Benefits

The CalPERS member becomes eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 55. Members with five years of service before January 1, 1985 are eligible at age 50.

Benefit

The vested deferred retirement benefit is the same as the Service Retirement benefit where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least 10 years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job-related. A CalPERS member must be actively working with any CalPERS employer at the time of disability in order to be eligible for this benefit. Members with five years of service before January 1, 1985 are also eligible.

Benefit

The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.125% of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 29.628 years of service; or
- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 65, for members with at least 10 years but not more than 29.628 years of service. The maximum benefit in this case is 33-1/3% of Final Compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members who are eligible to retire and have attained the normal retirement age determined by their service retirement benefit formula will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Appendix B – Principal Plan Provisions

State Industrial Tier 2 (continued)

Industrial (Job-Related) Disability Retirement

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes disabled while working, where disabled means the member is unable to perform the duties of the job because of a work-related illness or injury which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described in the next paragraph.

Benefit

The Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation. However, if a member is eligible for Service Retirement and if the Service Retirement benefit is more than the Industrial Disability Retirement benefit, the member may choose to receive the larger benefit. For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of \$2,000 will be made to the retiree's designated survivor(s) or the retiree's estate.

Form of Payment for Retirement Allowance

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

For retirement allowances with respect to service earned by employment in this group, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. This additional benefit is often referred to as post-retirement survivor allowance (PRSA) or simply as *survivor continuance*.

In other words, 25% of the allowance, the *continuance portion*, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried children until they attain age 18; or, if no eligible children, to a qualifying dependent parent) for the rest of his or her lifetime.

The remaining 75% of the retirement allowance, which may be referred to as the *option portion* of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. Or, the retiree may choose to provide for some of this *option portion* to be paid to **any** designated beneficiary after the retiree's death. Benefit options applicable to the *option portion* are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the *option portion*.

Appendix B – Principal Plan Provisions

State Industrial Tier 2 (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of \$5,000 plus an additional amount equal to 50% of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount will not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility

An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit

The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is the greater of 6% or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

Special Death Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the Special Death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried children under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The Special Death benefit is a monthly allowance equal to 50% of final compensation. The allowance will be increased whenever the compensation paid to active employees is increased but ceases to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death, at which time the allowance is continued to any unmarried children under age 22. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Appendix B – Principal Plan Provisions

State Industrial Tier 2 (continued)

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving children (*eligible* means unmarried children under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- If 1 eligible child: 12.5% of final compensation
- If 2 eligible children: 20.0% of final compensation
- If 3 or more eligible children: 25.0% of final compensation

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100% continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed and has attained retirement eligibility. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified Service Retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Appendix B – Principal Plan Provisions

State Industrial Tier 2 (continued)

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed and has attained retirement eligibility. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor benefit.

Benefit

The Optional Settlement 2W Death benefit is a monthly allowance equal to the Service Retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Beginning the second calendar year after the year of retirement, retirement and survivor allowances will be annually adjusted on a compound basis by 3%.

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 75% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan. The total annual outlay for PPPA is limited to 1.1% of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75% target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick up" these contributions for the employees.

- The percent contributed above the monthly compensation breakpoint is 3.75%.
- The monthly compensation breakpoint is \$0.
- The percent contributed below the monthly compensation breakpoint is 0%.

Refund of Employee Contributions

If the member's service with the employer ends and the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited annually with 6% interest.

1959 Survivor Benefits Program

For these benefits, please refer to the 1959 Survivor Benefit Program Actuarial Valuation Report available on our website.

Appendix B – Principal Plan Provisions

State Safety

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of the plan. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Service Retirement

Eligibility

Members become eligible for Service Retirement upon attainment of age 50 with at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from the **2.5% at 55** Safety benefit factor table. Classic members hired on or after January 15, 2011 are subject to either the **2.5% at 60** Safety or the **2% at 55** Safety benefit factor table. PEPRAs members are subject to the **2% at 57** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	2.5% @ 55 Factor	2.5% @ 60 Factor	2% @ 55 Factor	2% @ 57 Factor
50	1.700%	1.426%	1.426%	1.426%
51	1.800%	1.522%	1.522%	1.508%
52	1.900%	1.628%	1.628%	1.590%
53	2.000%	1.742%	1.742%	1.672%
54	2.250%	1.866%	1.866%	1.754%
55	2.500%	2.000%	2.000%	1.836%
56	2.500%	2.100%	2.000%	1.918%
57	2.500%	2.200%	2.000%	2.000%
58	2.500%	2.300%	2.000%	2.000%
59	2.500%	2.400%	2.000%	2.000%
60 & Up	2.500%	2.500%	2.000%	2.000%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.
- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRAs members have a cap on the annual salary used to calculate final compensation based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is \$124,180 for 2019 and for those employees who do not participate in Social Security the cap for 2019 is \$149,016. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group are not covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit for Classic members is capped at 80% of final compensation.

Appendix B – Principal Plan Provisions

State Safety (continued)

Vested Deferred Retirement

Eligibility for Deferred Status

A member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

A member becomes eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50.

Benefit

The vested deferred retirement benefit is the same as the Service Retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes disabled and has at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). There is no special age requirement. Disabled means the member is unable to perform his or her job because of an illness or injury which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job-related. A CalPERS member must be actively working with any CalPERS employer at the time of disability in order to be eligible for this benefit.

Benefit

The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or
- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33-1/3% of Final Compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members who are eligible to retire and have attained the normal retirement age determined by their service retirement benefit formula will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Appendix B – Principal Plan Provisions

State Safety (continued)

Industrial (Job-Related) Disability Retirement

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes *disabled* while working, where *disabled* means the member is unable to perform the duties of the job because of a work-related illness or injury which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described in the next paragraph.

Benefit

The Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation. However, if a member is eligible for Service Retirement and the Service Retirement benefit is greater than the Industrial Disability Retirement benefit, the member may choose to receive the larger benefit. For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of \$2,000 will be made to the retiree's designated survivor(s) or the retiree's estate.

Form of Payment for Retirement Allowance

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

For retirement allowances with respect to service earned by employment in this group, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, *without* a reduction in the retiree's allowance. This additional benefit is often referred to as *post-retirement survivor allowance* (PRSA) or simply as *survivor continuance*.

In other words, 50% of the allowance, the *continuance portion*, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried children until they attain age 18; or, if no eligible children, to a qualifying dependent parent) for the rest of his or her lifetime.

The remaining 50% of the retirement allowance, which may be referred to as the *option portion* of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. The retiree may choose to provide for some of this *option portion* to be paid to **any** designated beneficiary after the retiree's death. Benefit options applicable to the *option portion* are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the *option portion*.

Appendix B – Principal Plan Provisions

State Safety (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of \$5,000 plus an additional amount equal to 50% of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount will not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility

An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit

The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is the greater of 6% or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

Special Death Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the Special Death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried children under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The Special Death benefit is a monthly allowance equal to 50% of final compensation. The allowance will be increased whenever the compensation paid to active employees is increased but ceases to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death, at which time the allowance is continued to any unmarried children under age 22. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Appendix B – Principal Plan Provisions

State Safety (continued)

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving children (*eligible* means unmarried children under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- If 1 eligible child: 12.5% of final compensation
- If 2 eligible children: 20.0% of final compensation
- If 3 or more eligible children: 25.0% of final compensation

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100% continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified Service Retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Appendix B – Principal Plan Provisions

State Safety (continued)

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed, has attained at least age 50, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor benefit.

Benefit

The Optional Settlement 2W Death benefit is a monthly allowance equal to the Service Retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any particular year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 75% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan. The total annual outlay for PPPA is limited to 1.1% of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75% target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon the following schedule. The employer may choose to "pick up" these contributions for the employees.

The active population is subject to the following schedule:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The monthly compensation breakpoint is \$317.
- The percent contributed above the monthly compensation breakpoint is 11%, or half of the normal cost, depending on bargaining unit.

Appendix B – Principal Plan Provisions

State Safety (continued)

Refund of Employee Contributions

If the member's service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited annually with 6% interest.

1959 Survivor Benefits Program

For these benefits, please refer to the 1959 Survivor Benefit Program Actuarial Valuation Report available on our website.

State Peace Officers and Firefighters

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of this plan. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Service Retirement

Eligibility

Members become eligible for Service Retirement upon attainment of age 50 with at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from either the **3% at 55** or the **3% at 50** benefit factor table. New Classic members, except firefighters, hired on or after January 15, 2011 are subject to the **2.5% at 55** Safety benefit factor table. New Classic firefighters hired on or after October 31, 2010 are subject to the **3% at 55** benefit factor table. The factor depends on the member's age at retirement. PEPRA members are subject to the **2.5% at 57** or **2.7% at 57** benefit factor table. Listed below are the factors for retirement at whole year ages:

Retirement Age	3% @ 50 Factor	3% @ 55 Factor	2.5% @ 55 Factor	2.5% @ 57 Factor	2.7% @ 57 Factor
50	3.000%	2.400%	2.000%	2.000%	2.000%
51	3.000%	2.520%	2.100%	2.071%	2.100%
52	3.000%	2.640%	2.200%	2.143%	2.200%
53	3.000%	2.760%	2.300%	2.214%	2.300%
54	3.000%	2.880%	2.400%	2.286%	2.400%
55	3.000%	3.000%	2.500%	2.357%	2.500%
56	3.000%	3.000%	2.500%	2.429%	2.600%
57 & Up	3.000%	3.000%	2.500%	2.500%	2.700%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.

Appendix B – Principal Plan Provisions

State Peace Officers and Firefighters (continued)

- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after January 1, 2007 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRAs members have a cap on the annual salary used to calculate final compensation based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is \$124,180 for 2019 and for those employees who do not participate in Social Security the cap for 2019 is \$149,016. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group are not covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit for Classic members is capped at 90% of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

Members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50.

Benefit

The vested deferred retirement benefit is the same as the Service Retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job-related. A CalPERS member must be actively working with any CalPERS employer at the time of disability in order to be eligible for this benefit.

Benefit

The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or
- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33-1/3% of Final Compensation.

Appendix B – Principal Plan Provisions

State Peace Officers and Firefighters (continued)

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members who are eligible to retire and have attained the normal retirement age determined by their service retirement benefit formula will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Industrial (Job-Related) Disability Retirement

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes *disabled* while working, where *disabled* means the member is unable to perform the duties of the job because of a work-related illness or injury which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described in the next paragraph.

Benefit

The Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation. However, if a member is eligible for Service Retirement and if the Service Retirement benefit is more than the Industrial Disability Retirement benefit, the member may choose to receive the larger benefit. For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of \$2,000 will be made to the retiree's designated survivor(s) or the retiree's estate.

Form of Payment for Retirement Allowance

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

For retirement allowances with respect to service earned by employment in this group, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. This additional benefit is often referred to as *post retirement survivor allowance* (PRSA) or simply as *survivor continuance*. In other words, 50% of the allowance, the *continuance portion*, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried children until they attain age 18; or, if no eligible children, to a qualifying dependent parent) for the rest of his or her lifetime.

The remaining 50% of the retirement allowance, which may be referred to as the *option portion* of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. The retiree may choose to provide for some of this *option portion* to be paid to **any** designated beneficiary after the retiree's death. Benefit options applicable to the *option portion* are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the *option portion*.

Appendix B – Principal Plan Provisions

State Peace Officers and Firefighters (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of \$5,000 plus an additional amount equal to 50% of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount will not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility

An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit

The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is the greater of 6% or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

Special Death Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the Special Death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried children under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The Special Death benefit is a monthly allowance equal to 50% of final compensation. The allowance will be increased whenever the compensation paid to active employees is increased but ceases to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death, at which time the allowance is continued to any unmarried children under age 22. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Appendix B – Principal Plan Provisions

State Peace Officers and Firefighters (continued)

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving children (*eligible* means unmarried children under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- If 1 eligible child: 12.5% of final compensation
- If 2 eligible children: 20.0% of final compensation
- If 3 or more eligible children: 25.0% of final compensation

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100% continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified Service Retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Appendix B – Principal Plan Provisions

State Peace Officers and Firefighters (continued)

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed, has attained at least age 50, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor benefit.

Benefit

The Optional Settlement 2W Death benefit is a monthly allowance equal to the Service Retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any particular year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 75% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan. The total annual outlay for PPPA is limited to 1.1% of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75% target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick up" these contributions for the employees.

Most of the active population has a monthly compensation breakpoint of \$238, \$513, or \$863 and is subject to the following schedule:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint is 13%.

A small portion of the Classic members have a monthly compensation breakpoint of \$238 and are subject to the following schedule:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint is 8%.

Appendix B – Principal Plan Provisions

State Peace Officers and Firefighters (continued)

A small portion of the PEPRA members have a monthly compensation breakpoint of \$0 and are subject to the following schedule:

- The percent contributed below the monthly compensation breakpoint is 0%.
- The percent contributed above the monthly compensation breakpoint is half of the total normal cost. See the “PEPRA Member Contribution Rates” section of this report for more information.

Refund of Employee Contributions

If the member’s service with the employer ends and the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited annually with 6% interest.

1959 Survivor Benefits Program

For these benefits, please refer to the 1959 Survivor Benefit Program Actuarial Valuation Report available on our website.

California Highway Patrol

The following is a summary of the major plan provisions used in calculating the liabilities of the plan. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees’ Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Service Retirement

Eligibility

Members become eligible for Service Retirement upon attainment of age 50 with at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees is **3% at 50**. Classic members hired on or after October 31, 2010 are subject to the **3% at 55** benefit factor table. PEPRA members are subject to the **2.7% at 57** benefit factor table.

Retirement Age	3% @ 50 Factor	3% @ 55 Factor	2.7% @ 57 Factor
50	3.000%	2.400%	2.000%
51	3.000%	2.520%	2.100%
52	3.000%	2.640%	2.200%
53	3.000%	2.760%	2.300%
54	3.000%	2.880%	2.400%
55	3.000%	3.000%	2.500%
56	3.000%	3.000%	2.600%
57 & Up	3.000%	3.000%	2.700%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer’s contract with CalPERS including service at the CHP Academy for graduating members). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer’s contract, and then added together for the total allowance. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.

Appendix B – Principal Plan Provisions

California Highway Patrol (continued)

- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The *final compensation* for an employee hired on or after October 31, 2010 is the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRAs members have a cap on the annual salary used to calculate final compensation based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is \$124,180 for 2019 and for those employees who do not participate in Social Security the cap for 2019 is \$149,016. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group are not covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit for Classic members is capped at 90% of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

Members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50.

Benefit

The vested deferred retirement benefit is the same as the Service Retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least five years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job-related. A CalPERS member must be actively working with any CalPERS employer at the time of disability in order to be eligible for this benefit.

Benefit

The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or
- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33-1/3% of Final Compensation.

Appendix B – Principal Plan Provisions

California Highway Patrol (continued)

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members who are eligible to retire and have attained the normal retirement age determined by their service retirement benefit formula will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Industrial (Job-Related) Disability Retirement

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes *disabled* while working, where *disabled* means the member is unable to perform the duties of the job because of a work-related illness or injury which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described in the next paragraph.

Benefit

The Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation. For members who, as a result of a single event, incur serious bodily injury, the benefit provided is equal to the greater of 50% of final compensation, or, 3% of final compensation multiplied by the number of years of service credited to the member, plus an annuity purchased with the accumulated additional contributions, if any. However, if a member is eligible for Service Retirement and if the Service Retirement benefit is more than the Industrial Disability Retirement benefit, the member may choose to receive the larger benefit, plus an annuity purchased with the accumulated additional contributions, if any. For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of \$2,000 will be made to the retiree's designated survivor(s) or the retiree's estate.

Form of Payment for Retirement Allowance

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

For retirement allowances with respect to service earned by employment in this group, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, *without* a reduction in the retiree's allowance. This additional benefit is often referred to as *post retirement survivor allowance* (PRSA) or simply as *survivor continuance*.

In other words, 50% of the allowance, the *continuance portion*, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried children until they attain age 18; or, if no eligible children, to a qualifying dependent parent) for the rest of his or her lifetime.

The remaining 50% of the retirement allowance, which may be referred to as the *option portion* of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. The retiree may choose to provide for some of this option portion to be paid to **any** designated beneficiary after the retiree's death. Benefit options applicable to the option portion are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the option portion.

Appendix B – Principal Plan Provisions

California Highway Patrol (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of \$5,000 plus an additional amount equal to 50% of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount will not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility

An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit

The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is the greater of 6% or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

Special Death Benefit

Eligibility

An employee's eligible survivor(s) may receive the Special Death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An eligible survivor means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried children under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The Special Death benefit is a monthly allowance equal to 50% of final compensation. It will be increased whenever the compensation paid to active employees is increased but ceases to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death, at which time the allowance is continued to any unmarried children under age 22. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Appendix B – Principal Plan Provisions

California Highway Patrol (continued)

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving children (*eligible* means unmarried children under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- If 1 eligible child: 12.5% of final compensation
- If 2 eligible children: 20.0% of final compensation
- If 3 or more eligible children: 25.0% of final compensation

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100% continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified Service Retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to a dependent child, the benefit will be discontinued upon death or attainment of age 18, unless the child is disabled. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Appendix B – Principal Plan Provisions

California Highway Patrol (continued)

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed, has attained at least age 50, and has at least five years of credited service (total service across all CalPERS employers and with certain other Retirement Systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor Benefit.

Benefit

The Optional Settlement 2W Death benefit is a monthly allowance equal to the Service Retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2W. (A retiree who elects Optional Settlement 2W receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) The allowance is payable as long as the surviving spouse lives. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any particular year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 75% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan. The total annual outlay for PPPA is limited to 1.1% of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75% target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon the following schedule. The employer may choose to "pick up" these contributions for the employees.

- The percent contributed below the monthly compensation breakpoint is 0%.
- The monthly compensation breakpoint is \$863.
- The percent contributed above the monthly compensation breakpoint is 11.5%. This rate was originally scheduled to increase 1%/year until it reached 50% of normal cost, but this gradual increase has been temporarily suspended.

Refund of Employee Contributions

If the member's service with the employer ends and the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited annually with 6% interest.

1959 Survivor Benefits Program

For these benefits, please refer to the 1959 Survivor Benefit Program Actuarial Valuation Report available on our website.

Appendix C – Participant Data

Source of Participant Information

The data was extracted from various databases within CalPERS and placed in a data warehouse by a series of extract programs. Included in this data is:

- Individual member and beneficiary information,
- Employment and payroll information,
- Accumulated contributions with interest,
- Service information,
- Benefit payment information,
- Information about the various organizations which contract with CalPERS, and
- Detailed information about the plan provisions applicable to each group of members.

Data Validation

Once the information is extracted from the various computer systems into the data warehouse, update queries are then run against this data to correct for flaws found in the data. This part of the process is intended to validate the participant data for all CalPERS plans. It is not specific to the State plans.

Checks on the data included:

- A reconciliation of the membership of the plans,
- Comparisons of various member statistics (average attained age, average entry age, average salary, etc.) for each plan with those from the prior valuation,
- Comparison of pension amounts for each retiree and beneficiary receiving payments with those from the prior valuation,
- Checks for invalid ages and dates, and
- Reasonableness checks on various key data elements such as service and salary.

As a result of the tests on the data, a number of adjustments were determined to be necessary, such as dates of hire and dates of entry being adjusted to be consistent with the service fields, the date of birth and each other.

Appendix C - Participant Data

Data Statement

The data does not contain information about reciprocal systems and hence salary information for terminated participants covered by reciprocal systems may not be up to date. This situation is not expected to have a material impact on the employer contribution rates since the total present value for all terminated participants represents less than 2% of the present value of benefits for all members. We are unaware of any other data issues that would have a material effect on the results of this valuation.

It is our opinion that, after the adjustments noted above, the participant data was sufficient and reliable for the purposes of the valuation.

Reconciliation of Participants

State Miscellaneous¹

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2018	174,402	37,586	61,005	195,158	468,151
Retirements	(6,537)	(1,388)	(675)	8,600	-
Industrial Disabilities	-	(59)	(4)	63	-
Non-Industrial Disabilities	(224)	(41)	(41)	306	-
Deaths ²	(250)	(63)	(181)	(6,358)	(6,852)
New Survivors	n/a	n/a	n/a	1,767	1,767
Non-Vested Terminations ³	(3,918)	(647)	4,567	(2)	-
Vested Terminations	(1,530)	(588)	2,126	(8)	-
Refunds of Contributions	(694)	(124)	(1,257)	(1)	(2,076)
Transfers	(2,932)	3,919	(947)	(40)	-
Redeposits/Rehires	2,429	(1,141)	(1,186)	(102)	-
First Year in Status	16,539	543	988	57	18,127
Data Corrections ⁴	(443)	(175)	(1,392)	(1,749)	(3,759)
As of June 30, 2019	176,842	37,822	63,003	197,691	475,358

(1) Includes State Miscellaneous Tier 1 and Tier 2.

(2) Includes both deaths without survivors and deaths with survivors receiving a benefit.

(3) Includes non-vested terminated participants with employee contributions left in the plan.

(4) May include the combining of data records into a single record.

Appendix C - Participant Data

Reconciliation of Participants (continued)

State Industrial

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2018	11,811	8,909	3,566	14,642	38,928
Retirements	(374)	(384)	(64)	796	(26)
Industrial Disabilities	(3)	(19)	(1)	23	-
Non-Industrial Disabilities	(32)	(18)	(6)	60	4
Deaths ¹	(16)	(8)	(14)	(283)	(321)
New Survivors	n/a	n/a	n/a	89	89
Non-Vested Terminations ²	(182)	(56)	238	-	-
Vested Terminations	(101)	(78)	180	(1)	-
Refunds of Contributions	(72)	(28)	(87)	-	(187)
Transfers	(670)	776	(90)	(16)	-
Redeposits/Rehires	201	(145)	(47)	(9)	-
First Year in Status	1,310	54	47	31	1,442
Data Corrections ³	(77)	(29)	8	13	(85)
As of June 30, 2019	11,795	8,974	3,730	15,345	39,844

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit.

(2) Includes non-vested terminated participants with employee contributions left in the plan.

(3) May include the combining of data records into a single record.

State Safety

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2018	28,335	5,956	7,103	25,749	67,143
Retirements	(901)	(262)	(97)	1,223	(37)
Industrial Disabilities	(168)	(18)	(19)	215	10
Non-Industrial Disabilities	(48)	(7)	(5)	64	4
Deaths ¹	(43)	(6)	(20)	(655)	(724)
New Survivors	n/a	n/a	n/a	210	210
Non-Vested Terminations ²	(521)	(83)	604	-	-
Vested Terminations	(286)	(70)	360	(4)	-
Refunds of Contributions	(245)	(23)	(263)	-	(531)
Transfers	(678)	810	(125)	(7)	-
Redeposits/Rehires	421	(254)	(145)	(22)	-
First Year in Status	3,085	173	324	109	3,691
Data Corrections ³	2	-	(11)	(16)	(25)
As of June 30, 2019	28,953	6,216	7,706	26,866	69,741

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit.

(2) Includes non-vested terminated participants with employee contributions left in the plan.

(3) May include the combining of data records into a single record.

Appendix C - Participant Data

Reconciliation of Participants (continued)

State Peace Officers and Firefighters

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2018	41,289	6,173	7,078	39,947	94,487
Retirements	(1,311)	(216)	(114)	1,566	(75)
Industrial Disabilities	(302)	(22)	(21)	396	51
Non-Industrial Disabilities	(28)	(2)	(3)	26	(7)
Deaths ¹	(42)	(3)	(6)	(607)	(658)
New Survivors	n/a	n/a	n/a	297	297
Non-Vested Terminations ²	(577)	(72)	649	-	-
Vested Terminations	(201)	(76)	280	(3)	-
Refunds of Contributions	(78)	(14)	(118)	-	(210)
Transfers	(338)	563	(215)	(10)	-
Redeposits/Rehires	331	(98)	(208)	(25)	-
First Year in Status	2,395	103	270	117	2,885
Data Corrections ³	6	(47)	(47)	(47)	(135)
As of June 30, 2019	41,144	6,289	7,545	41,657	96,635

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit.

(2) Includes non-vested terminated participants with employee contributions left in the plan.

(3) May include the combining of data records into a single record.

California Highway Patrol

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2018	7,311	265	451	9,158	17,185
Retirements	(168)	(10)	(16)	190	(4)
Industrial Disabilities	(49)	(5)	-	61	7
Non-Industrial Disabilities	(1)	-	-	(2)	(3)
Deaths ¹	(7)	-	-	(219)	(226)
New Survivors	n/a	n/a	n/a	82	82
Non-Vested Terminations ²	(12)	-	12	-	-
Vested Terminations	(35)	(3)	39	(1)	-
Refunds of Contributions	(10)	(1)	(5)	-	(16)
Transfers	(4)	15	(10)	(1)	-
Redeposits/Rehires	9	-	(6)	(3)	-
First Year in Status	236	3	22	41	302
Data Corrections ³	(3)	-	(5)	(5)	(13)
As of June 30, 2019	7,267	264	482	9,301	17,314

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit.

(2) Includes non-vested terminated participants with employee contributions left in the plan.

(3) May include the combining of data records into a single record.

Appendix C - Participant Data

Active Members

Distribution of Active Members by Age and Years of Service

State Miscellaneous – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	2,971	7	0	0	0	0	2,978	\$119,459,465
25 - 29	11,549	1,135	3	0	0	0	12,687	624,656,294
30 - 34	12,852	5,202	933	35	0	0	19,022	1,145,754,153
35 - 39	10,628	5,911	3,909	946	62	2	21,458	1,482,457,278
40 - 44	7,640	4,695	4,400	3,394	878	78	21,085	1,570,497,717
45 - 49	6,192	4,120	4,502	4,882	2,654	1,017	23,367	1,822,919,857
50 - 54	5,144	3,503	3,946	4,991	3,220	4,506	25,310	2,032,583,356
55 - 59	4,391	3,233	3,426	4,463	3,069	6,467	25,049	2,024,018,981
60 - 64	2,628	2,409	2,531	3,129	2,004	4,168	16,869	1,350,212,271
65 and over	1,410	1,442	1,580	1,618	957	2,010	9,017	725,475,158
Total	65,405	31,657	25,230	23,458	12,844	18,248	176,842	\$12,898,034,530

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Average Annual Salaries by Age and Years of Service

State Miscellaneous – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	
15 - 24	\$40,122	\$36,727	\$0	\$0	\$0	\$0	\$40,114
25 - 29	48,276	59,003	49,621	0	0	0	49,236
30 - 34	56,592	66,906	72,472	79,156	0	0	60,233
35 - 39	62,352	73,148	78,148	80,537	89,301	100,764	69,086
40 - 44	63,478	75,684	81,497	83,086	93,001	101,993	74,484
45 - 49	62,333	74,526	81,707	86,043	92,821	94,049	78,013
50 - 54	61,079	72,399	79,260	84,483	91,983	96,356	80,308
55 - 59	60,394	70,245	76,118	83,856	91,233	95,362	80,802
60 - 64	59,765	69,491	75,746	81,357	88,868	96,299	80,041
65 and over	55,065	69,404	76,799	83,460	91,538	101,378	80,456
Average	\$57,362	\$71,335	\$78,727	\$83,832	\$91,514	\$96,440	\$72,935

Appendix C - Participant Data

Active Members (continued)

Distribution of Active Members by Age and Years of Service

State Industrial – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	247	0	0	0	0	0	247	\$8,913,026
25 - 29	978	64	0	0	0	0	1,042	44,746,822
30 - 34	1,037	351	93	1	0	0	1,482	80,306,887
35 - 39	740	406	352	52	1	0	1,551	92,623,278
40 - 44	568	356	360	167	31	1	1,483	95,853,592
45 - 49	581	325	363	241	117	43	1,670	112,037,997
50 - 54	423	355	391	250	135	119	1,673	115,422,717
55 - 59	348	249	360	228	139	134	1,458	98,385,307
60 - 64	175	155	221	116	86	60	813	54,971,886
65 and over	72	87	91	61	41	24	376	26,432,010
Total	5,169	2,348	2,231	1,116	550	381	11,795	\$729,693,522

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Average Annual Salaries by Age and Years of Service

State Industrial – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	
15 - 24	\$36,085	\$0	\$0	\$0	\$0	\$0	\$36,085
25 - 29	42,341	52,141	0	0	0	0	42,943
30 - 34	51,368	60,746	60,661	74,736	0	0	54,188
35 - 39	55,548	64,037	62,364	67,699	46,574	0	59,718
40 - 44	58,880	69,291	66,775	67,930	73,571	77,808	64,635
45 - 49	62,578	71,736	65,921	69,063	74,809	70,685	67,089
50 - 54	65,267	71,531	67,767	68,807	70,931	76,865	68,991
55 - 59	62,437	69,948	67,266	66,849	67,494	77,620	67,480
60 - 64	64,164	70,554	65,153	66,453	70,427	77,386	67,616
65 and over	68,446	78,021	67,400	59,985	69,818	85,874	70,298
Average	\$54,167	\$67,791	\$65,803	\$67,558	\$70,830	\$77,085	\$61,865

Appendix C - Participant Data

Active Members (continued)

Distribution of Active Members by Age and Years of Service

State Safety – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	379	0	0	0	0	0	379	\$17,234,152
25 - 29	1,611	172	3	0	0	0	1,786	103,012,842
30 - 34	2,218	861	195	3	0	0	3,277	233,619,494
35 - 39	1,990	1,051	612	76	1	0	3,730	285,574,344
40 - 44	1,644	961	939	254	22	0	3,820	318,350,872
45 - 49	1,558	949	1,114	446	131	14	4,212	375,533,549
50 - 54	1,291	868	1,074	570	280	74	4,157	364,038,055
55 - 59	1,022	765	953	500	268	126	3,634	323,035,618
60 - 64	509	561	738	458	198	87	2,551	241,368,195
65 and over	208	263	464	245	165	62	1,407	157,400,170
Total	12,430	6,451	6,092	2,552	1,065	363	28,953	\$2,419,167,291

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Average Annual Salaries by Age and Years of Service

State Safety – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	
15 - 24	\$45,473	\$0	\$0	\$0	\$0	\$0	\$45,473
25 - 29	57,042	63,356	73,659	0	0	0	57,678
30 - 34	68,869	77,349	71,812	89,339	0	0	71,291
35 - 39	73,798	81,057	78,225	72,963	107,124	0	76,561
40 - 44	75,481	89,208	89,733	88,721	78,903	0	83,338
45 - 49	79,538	90,795	97,374	96,449	97,213	87,392	89,158
50 - 54	78,126	90,559	94,786	87,058	94,760	89,404	87,572
55 - 59	76,740	89,617	94,521	93,603	100,720	96,651	88,893
60 - 64	81,450	95,113	100,989	94,551	101,183	99,810	94,617
65 and over	97,295	110,024	121,121	106,160	114,398	115,184	111,869
Average	\$72,223	\$87,434	\$94,787	\$92,908	\$100,482	\$98,739	\$83,555

Appendix C - Participant Data

Active Members (continued)

Distribution of Active Members by Age and Years of Service

State Peace Officers and Firefighters – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	1,026	2	0	0	0	0	1,028	\$50,673,813
25 - 29	4,490	398	0	0	0	0	4,888	321,083,928
30 - 34	3,377	1,395	739	1	0	0	5,512	415,961,160
35 - 39	1,737	1,263	3,001	681	0	0	6,682	579,746,493
40 - 44	865	742	2,212	2,442	540	4	6,805	637,578,043
45 - 49	562	536	1,645	2,095	2,241	570	7,649	762,215,700
50 - 54	306	320	986	1,183	1,311	739	4,845	487,700,328
55 - 59	144	173	551	613	618	439	2,538	251,081,214
60 - 64	45	84	202	234	240	145	950	93,219,084
65 and over	10	24	48	67	43	55	247	23,899,464
Total	12,562	4,937	9,384	7,316	4,993	1,952	41,144	\$3,623,159,227

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Average Annual Salaries by Age and Years of Service

State Peace Officers and Firefighters – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	
15 - 24	\$49,216	\$89,094	\$0	\$0	\$0	\$0	\$49,294
25 - 29	64,364	80,622	0	0	0	0	65,688
30 - 34	67,734	84,117	94,417	106,683	0	0	75,465
35 - 39	69,723	85,713	94,418	98,434	0	0	86,762
40 - 44	73,467	88,079	94,466	98,935	106,686	126,646	93,693
45 - 49	81,195	92,631	95,348	98,832	106,547	112,739	99,649
50 - 54	91,814	94,312	95,439	98,356	105,461	109,212	100,661
55 - 59	86,925	94,783	95,481	97,131	102,768	105,932	98,929
60 - 64	79,055	97,734	94,339	96,558	102,527	104,789	98,125
65 and over	58,572	92,503	93,825	94,585	102,817	106,031	96,759
Average	\$67,129	\$87,072	\$94,757	\$98,499	\$105,584	\$109,122	\$88,060

Appendix C - Participant Data

Active Members (continued)

Distribution of Active Members by Age and Years of Service

California Highway Patrol – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	122	0	0	0	0	0	122	\$10,702,011
25 - 29	625	46	0	0	0	0	671	68,561,613
30 - 34	414	282	310	0	0	0	1,006	115,389,897
35 - 39	223	295	768	134	1	0	1,421	172,195,123
40 - 44	21	145	515	625	175	1	1,482	189,422,829
45 - 49	0	44	226	522	688	174	1,654	224,090,910
50 - 54	1	1	28	133	382	232	777	110,484,202
55 - 59	0	0	1	3	49	81	134	19,758,713
60 - 64	0	0	0	0	0	0	0	0
65 and over	0	0	0	0	0	0	0	0
Total	1,406	813	1,848	1,417	1,295	488	7,267	\$910,605,298

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Average Annual Salaries by Age and Years of Service

California Highway Patrol – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	
15 - 24	\$87,721	\$0	\$0	\$0	\$0	\$0	\$87,721
25 - 29	100,918	119,295	0	0	0	0	102,178
30 - 34	103,468	121,636	123,396	0	0	0	114,702
35 - 39	103,801	121,651	124,452	130,091	149,132	0	121,179
40 - 44	107,929	120,288	123,473	130,237	140,548	132,158	127,816
45 - 49	0	120,553	124,301	128,150	141,577	151,698	135,484
50 - 54	167,820	83,328	127,747	129,480	140,300	154,485	142,193
55 - 59	0	0	129,664	149,648	134,595	155,370	147,453
60 - 64	0	0	0	0	0	0	0
65 and over	0	0	0	0	0	0	0
Average	\$101,133	\$121,163	\$124,036	\$129,424	\$140,803	\$153,592	\$125,307

Appendix C - Participant Data

Transferred and Terminated Participants

Distribution by Age and Years of Service – Transfers to Other CalPERS Plans

State Miscellaneous – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	240	0	0	0	0	0	240	\$66,947
25 - 29	1,795	34	0	0	0	0	1,829	71,460
30 - 34	3,116	595	39	0	0	0	3,750	73,700
35 - 39	3,284	1,045	231	27	1	0	4,588	77,903
40 - 44	3,546	1,093	363	152	15	1	5,170	81,164
45 - 49	3,873	1,442	496	282	91	27	6,211	84,135
50 - 54	3,323	1,512	710	408	218	87	6,258	83,145
55 - 59	2,815	1,099	627	360	202	141	5,244	81,713
60 - 64	1,786	624	310	188	120	85	3,113	80,468
65 and over	885	289	104	65	38	38	1,419	79,690
Total	24,663	7,733	2,880	1,482	685	379	37,822	\$80,248

Distribution by Age and Years of Service – Terminated Participants with Funds on Deposit

State Miscellaneous – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	793	0	0	0	0	0	793	\$31,936
25 - 29	4,096	49	0	0	0	0	4,145	36,781
30 - 34	6,475	562	32	0	0	0	7,069	42,320
35 - 39	7,950	1,232	247	23	1	0	9,453	45,050
40 - 44	7,157	1,423	457	138	14	0	9,189	48,569
45 - 49	5,937	1,592	661	248	66	10	8,514	52,154
50 - 54	4,822	1,601	844	274	114	34	7,689	52,625
55 - 59	4,609	1,261	655	258	72	30	6,885	48,359
60 - 64	3,670	801	461	139	38	20	5,129	45,485
65 and over	3,354	446	228	71	22	16	4,137	42,749
Total	48,863	8,967	3,585	1,151	327	110	63,003	\$46,678

Appendix C - Participant Data

Transferred and Terminated Participants (continued)

Distribution by Age and Years of Service – Transfers to Other CalPERS Plans

State Industrial – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	40	0	0	0	0	0	40	\$41,826
25 - 29	294	10	0	0	0	0	304	51,349
30 - 34	731	126	10	0	0	0	867	64,831
35 - 39	838	203	25	2	0	0	1,068	72,027
40 - 44	843	238	60	20	2	0	1,163	77,279
45 - 49	1,040	327	114	50	13	4	1,548	79,675
50 - 54	1,166	357	157	58	31	16	1,785	79,228
55 - 59	829	254	99	42	31	9	1,264	80,458
60 - 64	473	130	44	13	16	4	680	76,872
65 and over	184	43	18	7	1	2	255	84,247
Total	6,438	1,688	527	192	94	35	8,974	\$75,831

Distribution by Age and Years of Service – Terminated Participants with Funds on Deposit

State Industrial – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	36	0	0	0	0	0	36	\$32,676
25 - 29	189	3	0	0	0	0	192	36,929
30 - 34	293	35	3	0	0	0	331	39,503
35 - 39	375	59	16	1	0	0	451	41,963
40 - 44	332	71	12	8	2	0	425	42,332
45 - 49	440	106	26	15	2	2	591	43,631
50 - 54	411	99	42	13	5	1	571	43,571
55 - 59	344	86	18	5	2	0	455	38,419
60 - 64	257	33	6	0	0	0	296	37,061
65 and over	331	46	2	2	0	1	382	37,916
Total	3,008	538	125	44	11	4	3,730	\$40,713

Appendix C - Participant Data

Transferred and Terminated Participants (continued)

Distribution by Age and Years of Service – Transfers to Other CalPERS Plans

State Safety – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	30	0	0	0	0	0	30	\$44,642
25 - 29	247	6	0	0	0	0	253	57,573
30 - 34	462	79	4	1	0	0	546	70,127
35 - 39	631	196	34	1	0	0	862	79,406
40 - 44	690	215	59	3	1	0	968	86,051
45 - 49	691	237	77	17	2	0	1,024	92,858
50 - 54	635	217	88	23	10	0	973	94,087
55 - 59	543	184	66	21	11	3	828	92,745
60 - 64	355	117	52	13	3	3	543	98,338
65 and over	126	53	7	2	1	0	189	103,670
Total	4,410	1,304	387	81	28	6	6,216	\$87,252

Distribution by Age and Years of Service – Terminated Participants with Funds on Deposit

State Safety – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	105	0	0	0	0	0	105	\$34,660
25 - 29	395	5	0	0	0	0	400	45,525
30 - 34	687	63	6	0	0	0	756	55,870
35 - 39	876	155	19	1	0	0	1,051	60,078
40 - 44	857	155	43	11	0	0	1,066	69,208
45 - 49	925	196	51	23	6	0	1,201	69,757
50 - 54	811	177	53	14	1	0	1,056	70,134
55 - 59	717	92	15	6	1	0	831	61,522
60 - 64	626	50	16	5	0	1	698	63,575
65 and over	499	32	6	3	1	1	542	64,108
Total	6,498	925	209	63	9	2	7,706	\$63,469

Appendix C - Participant Data

Transferred and Terminated Participants (continued)

Distribution by Age and Years of Service – Transfers to Other CalPERS Plans

State Peace Officers and Firefighters – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	59	0	0	0	0	0	59	\$54,210
25 - 29	438	6	0	0	0	0	444	70,539
30 - 34	788	77	6	0	0	0	871	73,557
35 - 39	940	158	43	0	0	0	1,141	86,802
40 - 44	898	123	51	31	1	0	1,104	98,350
45 - 49	910	174	72	46	37	3	1,242	103,644
50 - 54	586	128	50	30	20	9	823	103,740
55 - 59	305	66	29	7	4	6	417	94,385
60 - 64	91	30	5	5	3	4	138	85,010
65 and over	38	8	2	2	0	0	50	87,856
Total	5,053	770	258	121	65	22	6,289	\$91,555

Distribution by Age and Years of Service – Terminated Participants with Funds on Deposit

State Peace Officers and Firefighters – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	272	0	0	0	0	0	272	\$39,860
25 - 29	738	3	0	0	0	0	741	41,934
30 - 34	878	88	2	0	0	0	968	42,125
35 - 39	1,116	144	45	2	0	0	1,307	42,686
40 - 44	938	181	71	36	9	0	1,235	45,944
45 - 49	851	212	101	61	34	6	1,265	50,791
50 - 54	679	109	32	8	4	2	834	42,448
55 - 59	444	68	25	6	0	1	544	38,835
60 - 64	198	29	7	2	2	0	238	37,612
65 and over	123	9	6	2	1	0	141	38,222
Total	6,237	843	289	117	50	9	7,545	\$43,783

Appendix C - Participant Data

Transferred and Terminated Participants (continued)

Distribution by Age and Years of Service – Transfers to Other CalPERS Plans

California Highway Patrol – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	0	0	0	0	0	0	0	\$0
25 - 29	6	0	0	0	0	0	6	81,624
30 - 34	23	3	0	0	0	0	26	77,831
35 - 39	19	4	1	0	0	0	24	81,073
40 - 44	35	12	3	1	0	0	51	93,017
45 - 49	55	12	11	2	1	0	81	97,523
50 - 54	35	5	2	1	0	0	43	103,764
55 - 59	18	5	1	1	0	0	25	76,787
60 - 64	4	1	1	1	0	0	7	87,983
65 and over	1	0	0	0	0	0	1	74,478
Total	196	42	19	6	1	0	264	\$91,569

Distribution by Age and Years of Service – Terminated Participants with Funds on Deposit

California Highway Patrol – As of June 30, 2019

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-24	25+		
15 - 24	3	0	0	0	0	0	3	\$66,423
25 - 29	18	1	0	0	0	0	19	70,423
30 - 34	28	14	4	0	0	0	46	82,247
35 - 39	35	16	9	0	0	0	60	89,122
40 - 44	45	47	18	5	1	0	116	88,720
45 - 49	53	47	27	13	4	0	144	86,722
50 - 54	37	18	4	1	0	0	60	70,743
55 - 59	10	11	2	0	0	0	23	78,019
60 - 64	5	3	1	0	0	0	9	57,427
65 and over	2	0	0	0	0	0	2	37,896
Total	236	157	65	19	5	0	482	\$83,152

Appendix C - Participant Data

Retired Members and Beneficiaries

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Miscellaneous – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	1	13	2	244	260
30-34	0	2	4	0	0	152	158
35-39	0	32	15	3	1	222	273
40-44	1	97	26	11	4	265	404
45-49	0	296	57	36	2	353	744
50-54	1,381	723	164	68	11	523	2,870
55-59	9,833	1,488	377	183	17	979	12,877
60-64	23,923	2,184	532	292	13	1,573	28,517
65-69	35,375	2,400	471	357	10	2,468	41,081
70-74	33,515	1,954	403	351	6	3,343	39,572
75-79	21,729	1,244	225	271	7	3,824	27,300
80-84	14,149	742	130	221	6	4,027	19,275
85 and Over	15,352	569	75	276	5	8,083	24,360
Total	155,258	11,731	2,480	2,082	84	26,056	197,691

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Miscellaneous – Annual Amounts Including PPPA Payments – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	\$0	\$0	\$181	\$82,098	\$789	\$2,063,422	\$2,146,491
30-34	0	11,707	871	0	0	1,380,646	1,393,224
35-39	0	247,600	31,078	86,918	162	2,157,746	2,523,505
40-44	20,712	1,142,672	12,651	254,389	34,115	3,276,317	4,740,856
45-49	0	4,099,685	236,155	751,058	30,019	4,721,658	9,838,575
50-54	17,184,629	11,259,462	689,863	1,452,149	64,600	7,624,265	38,274,968
55-59	283,890,152	24,405,328	1,695,479	4,157,242	177,776	15,981,550	330,307,526
60-64	835,345,841	37,589,470	2,731,044	7,962,234	124,615	30,236,417	913,989,621
65-69	1,251,205,060	41,679,040	2,148,299	9,755,038	178,898	56,114,125	1,361,080,460
70-74	1,195,595,857	33,623,187	2,020,260	10,233,148	2,150	83,966,599	1,325,441,201
75-79	791,046,997	23,014,301	1,219,764	7,946,936	28,025	105,325,079	928,581,102
80-84	504,380,324	13,118,466	668,169	6,436,300	9,533	119,969,567	644,582,360
85 and Over	497,150,852	8,504,671	299,094	7,436,881	5,036	219,786,873	733,183,407
Total	\$5,375,820,425	\$198,695,589	\$11,752,909	\$56,554,392	\$655,716	\$652,604,265	\$6,296,083,295

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Miscellaneous – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	40,853	1,588	305	341	6	8,700	51,793
5 - 9	37,198	1,844	337	389	10	6,217	45,995
10 - 14	29,263	1,468	333	344	14	4,343	35,765
15 - 19	21,934	2,147	460	297	11	2,922	27,771
20 - 24	12,225	2,210	376	236	12	1,851	16,910
25 - 29	8,035	1,270	372	189	8	1,085	10,959
30 and over	5,750	1,204	297	286	23	938	8,498
Total	155,258	11,731	2,480	2,082	84	26,056	197,691

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Miscellaneous – Annual Amounts Including PPPA Payments – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	\$1,471,951,507	\$25,742,935	\$1,625,403	\$8,892,199	\$106,148	\$240,426,563	\$1,748,744,755
5 - 9	1,321,713,754	30,444,394	2,127,470	10,745,611	133,335	163,317,243	1,528,481,807
10 - 14	1,056,111,034	26,080,639	2,122,208	9,514,076	177,510	107,247,569	1,201,253,036
15 - 19	820,229,925	39,025,029	2,852,842	8,524,572	127,967	68,833,316	939,593,652
20 - 24	361,690,244	40,291,302	1,665,768	7,004,543	43,594	38,882,911	449,578,362
25 - 29	236,470,780	22,103,068	995,765	5,264,520	51,817	20,800,124	285,686,073
30 and over	107,653,181	15,008,223	363,453	6,608,869	15,344	13,096,539	142,745,609
Total	\$5,375,820,425	\$198,695,589	\$11,752,909	\$56,554,392	\$655,716	\$652,604,265	\$6,296,083,295

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Industrial – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	1	0	0	19	20
30-34	0	1	0	0	0	18	19
35-39	0	9	3	0	0	17	29
40-44	0	25	8	0	0	22	55
45-49	0	67	24	2	0	22	115
50-54	238	155	42	5	1	38	479
55-59	1,357	226	95	13	2	74	1,767
60-64	2,539	288	100	22	1	115	3,065
65-69	2,961	289	120	17	1	156	3,544
70-74	2,390	196	69	16	1	179	2,851
75-79	1,269	124	36	16	2	180	1,627
80-84	724	57	20	13	2	146	962
85 and Over	517	27	18	4	3	243	812
Total	11,995	1,464	536	108	13	1,229	15,345

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Industrial – Annual Amounts Including PPPA Payments – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	\$0	\$0	\$37	\$0	\$0	\$72,760	\$72,796
30-34	0	1,635	0	0	0	71,787	73,422
35-39	0	40,638	1,924	0	0	100,291	142,853
40-44	0	214,433	78,378	0	0	127,095	419,907
45-49	0	534,943	104,766	21,764	0	286,754	948,228
50-54	1,624,126	1,605,403	300,422	47,002	6,049	258,034	3,841,037
55-59	18,595,643	2,279,683	438,902	148,537	1,188	410,378	21,874,330
60-64	36,845,289	2,943,344	800,538	265,446	464	1,019,205	41,874,287
65-69	42,081,940	2,794,159	745,633	80,915	69	1,263,426	46,966,142
70-74	35,574,641	1,952,089	529,339	149,628	19,756	1,726,359	39,951,812
75-79	20,073,706	1,370,378	319,114	270,555	1,675	1,987,137	24,022,566
80-84	11,705,139	676,440	158,059	444,004	55,192	2,092,663	15,131,497
85 and Over	9,320,223	422,300	143,672	119,581	72,206	3,916,915	13,994,896
Total	\$175,820,708	\$14,835,445	\$3,620,784	\$1,547,432	\$156,598	\$13,332,805	\$209,313,772

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Industrial – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	3,828	300	97	26	3	448	4,702
5 - 9	3,473	324	107	20	1	301	4,226
10 - 14	2,250	193	82	21	1	219	2,766
15 - 19	1,398	307	121	15	0	114	1,955
20 - 24	606	193	54	13	1	83	950
25 - 29	276	102	41	9	0	39	467
30 and over	164	45	34	4	7	25	279
Total	11,995	1,464	536	108	13	1,229	15,345

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Industrial – Annual Amounts Including PPPA Payments – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	\$57,638,896	\$3,097,746	\$561,087	\$346,254	\$6,518	\$5,010,137	\$66,660,639
5 - 9	51,659,677	3,251,235	910,459	192,805	69	3,214,701	59,228,946
10 - 14	33,062,931	2,075,397	699,192	451,219	1,182	2,444,801	38,734,722
15 - 19	20,769,388	3,255,727	792,157	160,870	0	1,314,035	26,292,176
20 - 24	6,874,808	1,792,243	179,274	198,183	83	785,533	9,830,124
25 - 29	3,541,284	950,893	261,317	157,139	0	315,354	5,225,986
30 and over	2,273,724	412,204	217,299	40,961	148,746	248,244	3,341,179
Total	\$175,820,708	\$14,835,445	\$3,620,784	\$1,547,432	\$156,598	\$13,332,805	\$209,313,772

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Safety – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	2	2	2	45	51
30-34	0	0	24	0	0	18	42
35-39	0	0	54	0	0	26	80
40-44	0	21	100	3	0	31	155
45-49	0	34	191	1	1	43	270
50-54	281	71	292	18	3	64	729
55-59	1,827	100	547	31	7	144	2,656
60-64	3,596	164	804	57	12	278	4,911
65-69	4,594	190	929	78	17	398	6,206
70-74	3,949	147	805	51	13	479	5,444
75-79	2,092	70	430	30	10	496	3,128
80-84	1,055	32	212	20	12	384	1,715
85 and Over	623	22	157	16	11	650	1,479
Total	18,017	851	4,547	307	88	3,056	26,866

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Safety – Annual Amounts Including PPPA Payments – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	\$0	\$0	\$44,716	\$26,372	\$55,445	\$316,489	\$443,022
30-34	0	0	765,368	0	0	165,676	931,043
35-39	0	0	1,599,061	0	0	329,538	1,928,599
40-44	0	269,221	3,088,967	85,004	0	315,692	3,758,884
45-49	0	313,435	6,110,920	25,798	30,495	544,116	7,024,763
50-54	3,836,310	887,049	9,108,302	474,119	109,098	846,984	15,261,862
55-59	41,846,822	1,264,780	16,209,036	456,605	348,729	2,444,657	62,570,629
60-64	86,488,784	2,298,569	23,211,741	1,099,464	286,877	4,958,402	118,343,836
65-69	114,286,339	2,808,412	27,532,371	1,335,168	545,326	6,902,317	153,409,934
70-74	96,003,356	2,128,713	22,267,091	1,054,056	364,325	8,734,104	130,551,646
75-79	48,066,379	1,031,340	12,747,979	504,691	301,398	8,744,075	71,395,861
80-84	23,095,016	688,269	6,352,260	431,678	375,660	6,142,470	37,085,352
85 and Over	12,838,886	371,861	4,655,814	295,863	322,179	11,221,503	29,706,105
Total	\$426,461,892	\$12,061,649	\$133,693,625	\$5,788,816	\$2,739,532	\$51,666,022	\$632,411,535

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Safety – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	5,775	261	961	71	6	1,128	8,202
5 - 9	5,535	215	916	63	6	801	7,536
10 - 14	3,533	107	640	71	7	468	4,826
15 - 19	1,982	118	694	49	16	285	3,144
20 - 24	710	88	384	27	8	189	1,406
25 - 29	262	33	284	6	4	93	682
30 and over	220	29	668	20	41	92	1,070
Total	18,017	851	4,547	307	88	3,056	26,866

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Safety – Annual Amounts Including PPPA Payments – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	\$157,429,404	\$4,799,454	\$34,070,325	\$1,575,339	\$216,091	\$21,078,418	\$219,169,031
5 - 9	146,182,563	3,635,048	31,864,828	1,447,237	416,877	13,490,136	197,036,690
10 - 14	73,000,811	1,323,321	18,559,860	1,185,316	237,302	7,673,567	101,980,176
15 - 19	33,785,457	1,150,177	18,367,847	717,738	433,710	4,166,122	58,621,051
20 - 24	8,581,956	687,934	9,459,435	415,906	283,367	2,477,653	21,906,250
25 - 29	3,377,829	231,158	6,142,185	87,925	126,884	1,410,623	11,376,603
30 and over	4,103,874	234,557	15,229,146	359,355	1,025,301	1,369,503	22,321,735
Total	\$426,461,892	\$12,061,649	\$133,693,625	\$5,788,816	\$2,739,532	\$51,666,022	\$632,411,535

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Peace Officers and Firefighters – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	6	1	4	62	73
30-34	0	1	25	2	1	24	53
35-39	0	13	154	2	3	30	202
40-44	0	13	403	1	9	45	471
45-49	0	36	769	11	13	59	888
50-54	2,903	64	1,318	32	23	113	4,453
55-59	5,937	111	2,034	39	26	233	8,380
60-64	5,728	113	1,792	48	27	410	8,118
65-69	5,206	85	1,566	52	24	559	7,492
70-74	4,047	71	1,173	40	19	568	5,918
75-79	1,973	25	569	20	13	542	3,142
80-84	912	19	208	8	8	407	1,562
85 and Over	509	7	81	7	1	300	905
Total	27,215	558	10,098	263	171	3,352	41,657

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Peace Officers and Firefighters – Annual Amounts Including PPPA Payments – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	\$0	\$0	\$142,366	\$26,722	\$58,912	\$752,479	\$980,479
30-34	0	6,392	912,846	72,301	58,835	341,528	1,391,902
35-39	0	205,715	5,491,003	81,757	83,106	646,250	6,507,831
40-44	0	245,263	14,827,809	70,246	386,483	1,016,947	16,546,748
45-49	0	706,979	29,314,958	515,960	704,843	1,521,650	32,764,390
50-54	189,872,577	1,697,367	58,113,605	1,767,513	1,065,948	3,762,814	256,279,824
55-59	386,890,469	2,717,646	89,706,145	1,849,802	1,112,768	8,859,952	491,136,782
60-64	368,168,071	3,276,485	78,640,697	2,141,512	1,104,055	17,157,930	470,488,750
65-69	319,063,212	2,576,498	71,881,408	2,320,046	975,028	22,913,224	419,729,417
70-74	236,078,874	2,028,950	54,015,443	1,680,899	684,806	24,568,005	319,056,977
75-79	102,578,677	890,920	25,207,945	906,183	475,560	21,790,197	151,849,484
80-84	44,334,358	575,674	8,773,590	290,006	360,943	16,271,429	70,605,999
85 and Over	21,999,489	138,102	3,156,492	206,456	32,098	10,810,689	36,343,325
Total	\$1,668,985,727	\$15,065,990	\$440,184,307	\$11,929,400	\$7,103,386	\$130,413,096	\$2,273,681,907

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Peace Officers and Firefighters – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	7,857	123	1,841	57	19	1,384	11,281
5 - 9	8,462	124	1,916	47	22	874	11,445
10 - 14	5,611	78	1,399	51	52	526	7,717
15 - 19	3,156	102	2,072	52	32	295	5,709
20 - 24	1,182	86	1,292	31	18	163	2,772
25 - 29	625	33	1,034	20	7	72	1,791
30 and over	322	12	544	5	21	38	942
Total	27,215	558	10,098	263	171	3,352	41,657

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Peace Officers and Firefighters – Annual Amounts Including PPPA Payments – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	\$478,365,213	\$4,439,180	\$91,907,411	\$2,870,732	\$774,001	\$58,360,146	\$636,716,683
5 - 9	533,560,341	3,477,935	91,464,899	2,266,987	1,138,391	34,824,370	666,732,922
10 - 14	376,873,746	2,304,514	70,874,636	2,503,989	2,362,874	19,073,328	473,993,087
15 - 19	183,475,647	2,247,588	85,388,984	2,062,822	1,254,687	9,926,432	284,356,160
20 - 24	51,907,533	1,796,329	47,794,092	1,290,759	627,903	5,094,344	108,510,960
25 - 29	31,211,639	551,689	37,041,051	736,580	279,562	2,109,696	71,930,218
30 and over	13,591,608	248,756	15,713,233	197,531	665,968	1,024,781	31,441,877
Total	\$1,668,985,727	\$15,065,990	\$440,184,307	\$11,929,400	\$7,103,386	\$130,413,096	\$2,273,681,907

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

California Highway Patrol – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	0	5	16	21
30-34	0	0	7	0	2	2	11
35-39	0	1	12	0	7	6	26
40-44	0	2	36	0	7	7	52
45-49	0	2	87	1	15	6	111
50-54	527	3	202	4	20	17	773
55-59	929	2	370	4	23	46	1,374
60-64	878	8	451	6	8	67	1,418
65-69	540	4	403	7	8	135	1,097
70-74	505	4	634	6	16	236	1,401
75-79	487	4	666	7	13	305	1,482
80-84	232	5	366	2	10	248	863
85 and Over	141	3	203	3	9	313	672
Total	4,239	38	3,437	40	143	1,404	9,301

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

California Highway Patrol – Annual Amounts Including PPPA Payments – As of June 30, 2019

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	\$0	\$0	\$0	\$0	\$251,271	\$280,991	\$532,262
30-34	0	0	387,052	0	120,728	33,483	541,264
35-39	0	1,132	645,116	0	528,106	55,003	1,229,357
40-44	0	48,727	1,898,743	0	564,681	74,533	2,586,684
45-49	0	43,488	4,349,455	91,000	1,094,274	108,844	5,687,061
50-54	51,787,783	52,174	14,802,262	248,313	1,386,536	850,175	69,127,243
55-59	95,350,168	26,265	25,403,123	357,295	1,386,303	2,621,050	125,144,204
60-64	86,393,731	146,841	32,546,148	451,642	450,622	3,643,096	123,632,079
65-69	45,942,926	192,341	27,705,265	596,915	298,859	5,551,299	80,287,604
70-74	33,728,127	199,091	42,276,915	334,518	438,791	9,257,594	86,235,037
75-79	27,673,787	180,907	34,356,387	328,061	375,038	11,311,097	74,225,278
80-84	10,802,248	102,524	16,174,387	76,719	302,514	7,903,198	35,361,590
85 and Over	5,909,706	83,997	8,554,060	71,355	249,941	8,675,471	23,544,529
Total	\$357,588,475	\$1,077,488	\$209,098,913	\$2,555,818	\$7,447,666	\$50,365,833	\$628,134,193

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

California Highway Patrol – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	1,097	4	276	4	42	460	1,883
5 - 9	991	3	307	3	16	329	1,649
10 - 14	913	4	459	5	20	210	1,611
15 - 19	505	4	586	13	6	156	1,270
20 - 24	397	11	467	3	5	103	986
25 - 29	175	2	495	5	4	56	737
30 and over	161	10	847	7	50	90	1,165
Total	4,239	38	3,437	40	143	1,404	9,301

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

California Highway Patrol – Annual Amounts Including PPPA Payments – As of June 30, 2019

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	\$111,502,187	\$126,571	\$24,894,993	\$422,947	\$3,127,950	\$18,866,576	\$158,941,224
5 - 9	95,942,196	3,375	27,298,652	199,297	1,039,920	13,703,931	138,187,370
10 - 14	81,797,777	358,117	40,623,355	317,690	1,259,752	6,974,613	131,331,303
15 - 19	32,923,107	162,154	43,678,293	1,020,692	259,402	5,072,847	83,116,495
20 - 24	20,996,337	240,298	25,620,758	157,513	203,347	2,575,520	49,793,773
25 - 29	7,787,284	668	21,848,020	242,857	164,076	1,204,359	31,247,265
30 and over	6,639,588	186,306	25,134,841	194,821	1,393,221	1,967,988	35,516,764
Total	\$357,588,475	\$1,077,488	\$209,098,913	\$2,555,818	\$7,447,666	\$50,365,833	\$628,134,193

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number Counts and Benefits - by Year of Retirement – As of June 30, 2019

State Miscellaneous

Year Retired	Total Retirement	Total Benefits	Average Benefits
2019 ¹	3,846	\$116,150,380	\$30,200
2018	10,958	378,453,093	34,534
2017	10,379	361,202,338	34,801
2016	9,988	330,857,708	33,126
2015	9,966	327,846,736	32,897
2014	9,906	321,630,525	32,468
2013	8,604	263,473,744	30,622
2012	9,317	302,427,564	32,460
2011	9,208	296,508,430	32,201
2010	9,818	349,120,410	35,559
2009	8,481	314,395,748	37,071
2008	7,241	254,532,500	35,152
2007	6,873	227,994,626	33,173
2006	6,505	199,324,654	30,642
2005	7,227	240,020,091	33,212
2004	8,145	287,182,016	35,259
2003	5,720	182,363,038	31,882
2002	5,510	181,728,138	32,982
2001	5,475	199,692,389	36,473
2000	6,841	252,428,040	36,899
1999	2,831	65,317,625	23,072
1998	3,785	98,668,145	26,068
1997	3,637	94,874,548	26,086
1996	3,330	90,447,720	27,161
1995	2,839	78,837,847	27,770
1994	2,728	72,918,747	26,730
1993	2,035	42,936,936	21,099
1992	2,883	81,397,525	28,234
1991	2,771	87,626,997	31,623
1990 and Earlier	10,844	195,725,035	18,049
Total	197,691	\$6,296,083,293	\$31,848

State Industrial

Year Retired	Total Retirement	Total Benefits	Average Benefits
2019 ¹	378	\$5,063,849	\$13,396
2018	965	14,384,054	14,906
2017	914	13,203,459	14,446
2016	936	13,425,283	14,343
2015	924	12,731,076	13,778
2014	874	11,299,619	12,929
2013	771	9,995,680	12,965
2012	890	12,945,240	14,545
2011	809	11,039,249	13,646
2010	923	13,716,541	14,861
2009	769	10,936,033	14,221
2008	604	8,475,852	14,033
2007	498	6,902,888	13,861
2006	528	6,763,699	12,810
2005	516	7,679,208	14,882
2004	610	8,801,745	14,429
2003	419	5,162,610	12,321
2002	406	5,321,474	13,107
2001	373	5,383,642	14,433
2000	467	6,873,711	14,719
1999	169	1,783,733	10,555
1998	246	2,435,830	9,902
1997	209	2,228,041	10,660
1996	164	1,678,603	10,235
1995	158	1,689,469	10,693
1994	128	1,252,013	9,781
1993	102	920,320	9,023
1992	121	1,692,940	13,991
1991	91	1,304,830	14,339
1990 and Earlier	383	4,223,081	11,026
Total	15,345	\$209,313,772	\$13,641

(1) The numbers for 2019 represent the first 6 months of the calendar year only.

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix C - Participant Data

Retired Members and Beneficiaries (continued)

Number Counts and Benefits - by Year of Retirement – As of June 30, 2019 (continued)

State Safety

Year Retired	Total Retirement	Total Benefits	Average Benefits
2019 ¹	684	\$17,162,519	\$25,091
2018	1,740	48,733,181	28,008
2017	1,589	43,127,899	27,142
2016	1,621	43,872,041	27,065
2015	1,553	40,473,754	26,062
2014	1,579	38,764,472	24,550
2013	1,463	37,102,031	25,360
2012	1,580	39,136,618	24,770
2011	1,468	37,752,348	25,717
2010	1,581	45,401,504	28,717
2009	1,317	35,048,040	26,612
2008	1,027	24,620,762	23,973
2007	952	20,479,267	21,512
2006	883	16,360,449	18,528
2005	929	18,232,496	19,626
2004	938	18,581,690	19,810
2003	690	13,085,101	18,964
2002	648	11,834,530	18,263
2001	617	11,529,549	18,686
2000	686	13,069,882	19,052
1999	335	5,271,706	15,736
1998	351	5,077,458	14,466
1997	304	5,082,574	16,719
1996	240	3,815,171	15,897
1995	205	2,972,689	14,501
1994	207	3,135,892	15,149
1993	119	2,095,546	17,610
1992	183	3,457,901	18,896
1991	151	2,130,031	14,106
1990 and Earlier	1,226	25,004,431	20,395
Total	26,866	\$632,411,532	\$23,539

State Peace Officers and Firefighters

Year Retired	Total Retirement	Total Benefits	Average Benefits
2019 ¹	826	\$43,542,464	\$52,715
2018	2,327	133,458,613	57,352
2017	2,187	123,263,006	56,362
2016	2,113	115,986,395	54,892
2015	2,329	134,786,542	57,873
2014	2,276	124,989,104	54,916
2013	2,164	116,543,163	53,855
2012	2,474	143,762,008	58,109
2011	2,186	123,191,040	56,355
2010	2,364	144,020,018	60,922
2009	2,110	138,379,664	65,583
2008	1,521	97,535,077	64,126
2007	1,694	110,716,728	65,358
2006	1,912	120,838,507	63,200
2005	1,194	65,218,999	54,622
2004	1,355	69,329,997	51,166
2003	1,114	54,782,134	49,176
2002	1,231	62,459,012	50,738
2001	1,106	54,526,074	49,300
2000	1,402	75,498,085	53,850
1999	544	18,739,190	34,447
1998	621	22,201,185	35,751
1997	614	23,965,923	39,032
1996	554	23,562,828	42,532
1995	468	19,657,453	42,003
1994	428	16,229,604	37,920
1993	403	16,056,386	39,842
1992	452	19,023,429	42,087
1991	392	17,863,266	45,570
1990 and Earlier	1,296	43,556,014	33,608
Total	41,657	\$2,273,681,908	\$54,581

(1) The numbers for 2019 represent the first 6 months of the calendar year only.

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix D – Normal Cost Information

Retired Members and Beneficiaries (continued)

Number Counts and Benefits - by Year of Retirement – As of June 30, 2019 (continued)

California Highway Patrol

Year Retired	Total Retirement	Total Benefits	Average Benefits
2019 ¹	117	\$7,752,368	\$66,260
2018	374	29,455,888	78,759
2017	431	39,242,809	91,051
2016	359	29,013,267	80,817
2015	395	34,373,467	87,021
2014	301	24,908,967	82,754
2013	308	24,163,665	78,453
2012	371	31,308,058	84,388
2011	364	31,891,223	87,613
2010	371	33,299,380	89,756
2009	349	32,076,914	91,911
2008	273	23,055,358	84,452
2007	272	21,147,756	77,749
2006	306	22,998,808	75,160
2005	345	27,618,256	80,053
2004	261	18,652,717	71,466
2003	193	11,820,722	61,247
2002	271	18,218,794	67,228
2001	286	20,637,945	72,161
2000	403	26,768,169	66,422
1999	145	7,095,735	48,936
1998	179	8,806,538	49,199
1997	214	10,724,102	50,113
1996	230	12,728,155	55,340
1995	192	9,614,052	50,073
1994	170	7,395,180	43,501
1993	194	8,774,729	45,231
1992	148	5,818,381	39,313
1991	153	6,909,952	45,163
1990 and Earlier	1,326	41,862,838	31,571
Total	9,301	\$628,134,193	\$67,534

(1) The numbers for 2019 represent the first 6 months of the calendar year only.

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix D – Employer Rate for Fiscal Year 2020-21 Adjusted for Supplanting Payment

Senate Bill 90 (SB 90), approved by the Governor in June 2019, established Government Code section 20825.1 and directed the State to contribute an additional \$2.5 billion to the State plans. The contribution was made July 29, 2019.

According to the original statute and direction from the Department of Finance, this payment was to be split between an advance payment for fiscal year 2019-20 and an additional paydown of Unfunded Accrued Liability (UAL). The advance payment portion was an acceleration of part of the UAL payment required for fiscal year 2019-20 with a corresponding reduction in the required employer rate for that fiscal year. The additional UAL paydown portion was intended to supplement the required payment, thereby reducing UAL more quickly and generating long-term savings.

Due to budget challenges caused by the COVID-19 pandemic, in order to capture all contribution savings over the next two fiscal years, in June 2020 the Department of Finance revised the application of the portion originally intended to be an additional UAL payment to instead be supplanting payments for fiscal years 2020-21 and 2021-22. The revised allocation of the July 2019 supplemental payment of \$2.5 billion among plans and fiscal years is as follows:

Plan	Fiscal Year 2019-20	Fiscal Year 2020-21	Fiscal Year 2021-22	Total Supplanting Payment
State Miscellaneous	\$32,384,208	\$339,222,800	\$476,449,992	\$848,057,000
State Industrial	3,166,795	33,172,000	46,591,205	82,930,000
State Safety	7,042,595	73,770,800	103,613,605	184,427,000
State Peace Officers & Firefighters	52,872,296	553,834,400	777,879,304	1,384,586,000
California Highway Patrol	0	0	0	0
Total	\$95,465,894	\$1,000,000,000	\$1,404,534,106	\$2,500,000,000

The table below shows the total employer contribution rate for fiscal year 2020-21 reflecting both the supplanting payment and the additional statutory contribution under Government Code section 20683.2. For more information on the latter, see “Additional Contributions per Government Code Section 20683.2” in the Highlights and Executive Summary section.

Plan	Preliminary Actuarially Required Employer Contribution for 2020-21	Reduction due to Supplanting Payment per GC 20825.1	Revised Actuarially Required Employer Contribution for 2020-21	Additional Statutory Contribution per GC 20683.2	Total Employer Contribution for 2020-21
State Miscellaneous	31.76%	(2.49%)	29.27%	0.10%	29.37%
State Industrial	21.62%	(4.31%)	17.31%	0.88%	18.19%
State Safety	21.66%	(2.89%)	18.77%	1.18%	19.95%
State Peace Officers & Firefighters	48.93%	(14.48%)	34.45%	1.65%	36.10%
California Highway Patrol	59.76%	-	59.76%	1.32%	61.08%

Appendix E – Glossary of Actuarial Terms

Accrued Liability (also called *Actuarial Accrued Liability* or *Entry Age Actuarial Accrued Liability*): The total dollars needed as of the valuation date to fund all benefits earned in the past for current members.

Actuarial Assumptions: Assumptions made about certain events that will affect pension costs. Assumptions generally can be broken down into two categories: demographic and economic. Demographic assumptions include such things as mortality, disability and retirement rates. Economic assumptions include discount rate, salary growth and inflation.

Actuarial Methods: Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include cost method, amortization policy and determination of asset value on which funding requirements are based.

Actuarial Valuation: The determination as of a valuation date of the Normal Cost, Accrued Liability, and related actuarial present values for a pension plan. These valuations are performed annually or when an employer is contemplating a change to their plan provisions.

Amortization Bases: Separate payment schedules for different portions of the Unfunded Accrued Liability. The total Unfunded Accrued Liability of a plan can be segregated by "cause," creating "bases," and each such base will be separately amortized and paid for over a specific period of time. However, all bases are amortized using investment and payroll assumptions from the current valuation. This can be likened to a home having a first mortgage of 24 years remaining payments and a second mortgage that has 10 years remaining payments. Each base or each mortgage note has its own terms (payment period, principal, etc.).

Generally, in an actuarial valuation, the separate bases consist of changes in unfunded liability due to contract amendments, actuarial assumption changes, actuarial methodology changes, and/or gains and losses. Amortization methodology is determined by Board policy.

Amortization Period: The number of years required to pay off an Amortization Base.

Classic Member (under PEPPRA): A classic member is a member who joined CalPERS prior to January 1, 2013 and who is not defined as a new member under PEPPRA. (See definition of new member below.)

Discount Rate: The assumed long-term rate of return on plan assets. This is the rate at which projected future cash flows are discounted to the valuation date to determine Accrued Liability. This assumption is called "investment return" in earlier CalPERS reports or "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law (PERL).

Entry Age: The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan or risk pool. In most cases, this is the same as the date of hire.

Entry Age Actuarial Cost Method: An actuarial cost method designed to fund a member's total plan benefit in a level manner over the course of his or her career. The method as employed in this valuation yields a funding rate expressed as a level percentage of payroll.

The assumed retirement age less the entry age is the amount of time required to fund a member's total benefit. Generally, the older a member on the date of hire, the greater the entry age normal cost. This is mainly because there is less time to earn investment income to fund the future benefits.

Appendix E – Glossary of Actuarial Terms

Appendix E – Glossary of Actuarial Terms

Glossary of Actuarial Terms (continued)

Fresh Start: A Fresh Start is when multiple Amortization Bases are collapsed to one base and amortized together over a new Amortization Period.

Funded Status: A measure of how well funded, or how "on track" a plan or risk pool is with respect to assets versus accrued liabilities. A ratio greater than 100% means the plan or risk pool has more assets than liabilities and a ratio less than 100% means liabilities are greater than assets.

GASB 68: Statement No. 68 of the Governmental Accounting Standards Board, the accounting standard governing a state or local governmental employer's accounting and financial reporting for pensions. GASB 68 replaced GASB 27 effective the first fiscal year beginning after June 15, 2014.

New Member (under PEPPRA): A new member is an individual who becomes a member of a public retirement system for the first time on or after January 1, 2013, was not a member of another public retirement system prior to that date, and is not subject to reciprocity with another public retirement system.

Normal Cost: The annual cost of service accrual for a given fiscal year for active employees. The normal cost as a percentage of payroll can be viewed as the long-term contribution rate.

Pension Actuary: A business professional who is authorized by the Society of Actuaries and the American Academy of Actuaries to perform the calculations necessary to properly fund a pension plan.

PEPPRA: The California Public Employees' Pension Reform Act of 2013.

Present Value of Benefits (PVB): The total dollars needed as of the valuation date to fund all benefits earned in the past and expected to be earned in the future for current members.

Unfunded Accrued Liability (UAL): When a plan or pool's Market Value of Assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Accrued Liability. If the Unfunded Accrued Liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

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