Legislators' Retirement System Actuarial Valuation

As of June 30, 2018

CalPERS

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Actuarial Certification

February 2019

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 Legislators' Retirement System. This valuation is based on the member and financial data as of June 30, 2018 provided by the various CalPERS databases and the benefits under this plan 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 the standards of practice prescribed by the Actuarial Standards Board. The assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employee's 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

Highlights and Executive Summary (continued)

Introduction

This is the actuarial valuation report as of June 30, 2018 for the Legislators' Retirement System. This actuarial valuation is used to set the fiscal year 2019-20 required employer contribution rates. This report provides information regarding retirement and ancillary benefits for Senators and Members of the Assembly (first elected prior to November 7, 1990), Constitutional Officers (first elected prior to December 31, 2012), and Legislative Statutory Officers (first appointed prior to December 31, 2012).

Effective January 1, 2013, the system is closed to new members. The system was partially closed as a result of the Political Reform Act of 1990 (to Senators and Members of the Assembly first elected after November 7, 1990). As a result of Assembly Bill 340 which was signed by the Governor on September 12, 2012, the Legislators' Retirement System is also closed to Constitutional and Statutory Officers effective January 1, 2013.

Section 7522.52 requires that a public employer's contribution to a defined benefit plan, in combination with employee contributions to that defined benefit plan, shall not be less than the normal cost rate. This requirement impacts the results of this valuation.

Effective December 7, 2009, elected officials salaries were reduced 18 percent. For the purposes of determining the present value of benefits, salaries prior to the reduction were used. However, actual salaries were used to calculate employer contribution rates.

Purpose of Report

This actuarial valuation of the Legislators' Retirement System was performed by the CalPERS Actuarial Office using data as of June 30, 2018 in order to:

- Set forth the assets, accrued liabilities, and funded status of this plan as of June 30, 2018.
- Establish the Required Employer Contributions of the System for the fiscal year 2019-20.
- Provide actuarial information as of June 30, 2018 to the CalPERS Board of Administration 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 No. 68. A separate accounting valuation report for such purposes is available from CalPERS. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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 by the California Actuarial Advisory Panel (CAAP). Additionally, this report includes the following "Enhanced Risk Disclosures" also recommended by the CAAP in the Model Disclosure Elements document:

- A "Deterministic Stress Test," projecting future results under different investment income scenarios
- A "Sensitivity Analysis," showing the impact on current valuation results using a 1 percent plus or minus change in the discount rate and inflation rate.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions adopted in 2017. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

Highlights and Executive Summary (continued)

Required Employer Contribution

This actuarial valuation sets forth the employer contribution rate for the fiscal year 2019-20. The following table shows the Required Employer Contribution. The Required Employer Contribution is shown in dollars and as a percentage of projected payroll.

Required Employer Contribution

	FY 2018-19	FY 2019-20
1) Contribution in Projected Dollars		
a) Total Normal Cost	$580,743	$122,577
b) Employee Contribution	94,037	21,315
c) Employer Normal Cost [(1a) – (1b)]	$486,706	$101,262
d) Unfunded Accrued Liability Payment[1]	0	0
e) Required Employer Contribution [(1c) + (1d)]	$486,706	$101,262
Projected Annual Payroll for Contribution Year[2]	$1,275,936	$287,089
2) Contribution as a Percentage of Payroll		
a) Total Normal Cost	45.515%	42.697%
b) Employee Contribution	7.370%	7.425%
c) Employer Normal Cost [(2a) – (2b)]	38.145%	35.272%
d) Unfunded Accrued Liability Payment[1]	0.000%	0.000%
e) Required Employer Contribution [(2c) + (2d)]	38.145%	35.272%

(1) Under the Public Employee Pension Reform Act (PEPRA), the minimum required contribution cannot be less than the plan's normal cost. Therefore, any surplus cannot be used to lower the required contribution amount.

(2) Due to the closed nature of the Legislators' Retirement System and term limits met by a majority of the June 30, 2018 active members during fiscal year 2018-19, the projected payroll for fiscal year 2019-20 has been adjusted to reflect expected active members. The assumed payroll growth rate assumption of 2.75% was used to project fiscal year 2019-20 payroll for expected remaining actives.

Plan's Funded Status

The table below summarizes the funded status of the Legislators' Retirement System over the last two years.

	June 30, 2017	June 30, 2018
1) Present Value of Projected Benefits	$102,175,579	$99,556,131
2) Entry Age Normal Accrued Liability	100,844,514	98,926,634
3) Market Value of Assets (MVA)	116,883,856	115,484,165
4) Unfunded Accrued Liability [(2) - (3)]	($16,039,342)	($16,557,531)
5) Funded Ratio [(3) / (2)]	115.9%	116.7%

This measure of funded status is an assessment of the need for future employer contributions. The Unfunded Accrued Liability, if positive, is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. This measure of funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligations.

Changes Since Prior Year's Valuation

Actuarial Methods and Assumptions

CalPERS has implemented a new actuarial valuation software system for the June 30, 2018 valuation. With this new system we have refined and improved some of our calculation methodology. Any difference in liability between the old software and new software calculations is captured as a method change line item.

Due to the closed nature of the Legislators' Retirement System and term limits met by a majority of the June 30, 2018 active members during fiscal year 2018-19, the projected payroll for fiscal year 2019-20 has been adjusted to reflect expected active members. The assumed payroll growth rate assumption of 2.75% was used to project fiscal year 2019-20 payroll for expected remaining actives.

A complete description of the actuarial methods and assumptions used in the June 30, 2018 valuation may be found in Appendix A of this report.

Plan Provisions

No changes were made since the prior valuation. A complete description of the principal plan provisions used in the June 30, 2018 valuation may be found in Appendix B of this report.

Subsequent Events

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

Assets

Assets

Reconciliation of the Market Value of Assets

The following displays the change in the Market Value of Assets from the prior valuation date to June 30, 2018.

	Market Value
Beginning Balance as of June 30, 2017	$116,883,856
Member Contributions	81,915
Employer Contributions	467,272
Benefit Payments and Refunds	(6,917,804)
Administration Costs	(517,085)
Investment Earnings[1]	5,486,012
Ending Balance as of June 30, 2018	$115,484,165

(1) Net Fund return for the FY 2017-18 is 4.82%

Asset Allocation

Shown below is the Market Value of Assets, by asset type, as of the valuation date.

	June 30, 2018
Cash	$1,207,030
Investments at Market Value	
Global Equity Securities	$40,063,351
Global Debt Securities	73,934,249
Short Term Investments	227,443
Securities Lending Collateral	443,556
Accounts Receivable	166,500
Subtotal of Investments	$116,042,129
Liabilities	
Accounts Payable	($115,184)
Securities Lending Obligation	(442,780)
Subtotal of Accounts Receivable	(557,964)
Fund Balance at Market Value on 6/30/2018	$115,484,165

Liabilities and Employer Contributions

Liabilities and Required Employer Contributions

Comparison of Current and Prior Year Results

Shown below is the comparison of key valuation results for the current valuation date to the corresponding values from the prior valuation date.

	June 30, 2017	June 30, 2018
1) Members Included in the Valuation		
a) Active Members	8	7
b) Deferred Vested Terminated Members and QDRO's	7	8
c) Receiving Payments	232	212
d) Total	247	227
2) Payroll		
a) Covered Annual Payroll	$1,208,552	$1,097,953
b) Projected Covered Annual Payroll	1,275,936	287,089
c) Average Covered Annual Payroll [(2a) / (1a)]	$151,069	$156,850
3) Age and Service for Actives		
a) Average Attained Age for Actives	64.53	66.07
b) Average Service for Actives	10.57	11.98
4) Present Value of Benefits at Valuation Date		
a) Active Members	$6,987,264	$5,991,587
b) Inactive Members	2,649,409	3,292,497
c) Receiving Benefits	92,538,906	90,272,047
d) Total	$102,175,579	$99,556,131
5) Present Value of Future Employee Contributions	$215,436	$123,040
6) Present Value of Future Employer Normal Cost	$1,115,629	$506,457
7) Accrued Actuarial Liability		
a) Active Members	$5,656,199	$5,362,090
b) Inactive Members	2,649,409	3,292,497
c) Receiving Benefits	92,538,906	90,272,047
d) Total	$100,844,514	$98,926,634
8) Assets		
a) Market Value of Assets	$116,883,856	$115,484,165
b) Unfunded Accrued Actuarial Liability [(7d) – (8a)]	($16,039,342)	($16,557,531)
c) Funded Ratio [(8a) / (7d)]	115.9%	116.7%

Liabilities and Required Employer Contributions (continued)

(Gain)/Loss Analysis

Shown below is an analysis of the (Gain)/Loss for the fiscal year ending on the valuation date. The Gain or Loss is shown separately for assets, contributions, and liabilities.

1) Total (Gain)/Loss for the Year	
a) Unfunded Accrued Liability (UAL) as of 6/30/2017	($16,039,342)
b) Expected Payment on UAL During FY 2017-2018	44,096
c) Interest through 6/30/2018 [(0.05 x 1a) – (1.05^½ -1) x 1b]	(803,056)
d) Expected UAL Before All Other Changes [1a – 1b + 1c]	($16,886,494)
e) Change Due to Revised Actuarial Methods	574,706
f) Change Due to New Actuarial Assumptions	—
g) Expected UAL After All Changes [1d + 1e + 1f]	($16,311,788)
h) Actual Unfunded Accrued Liability as of 6/30/2018	(16,557,531)
i) Total (Gain)/Loss for FY 2017-2018 [1h – 1g]	($245,743)
2) Contribution (Gain)/Loss for the Year	
a) Expected Contribution (Employer and Employee)	$539,512
b) Interest on Expected Contributions [(1.05^½ -1) x 2a]	13,323
c) Actuarial Contribution	549,186
d) Interest on Actuarial Contributions [(1.05^½ -1) x 2c]	13,562
e) Contribution (Gain)/Loss [(2a + 2b) – (2c + 2d)]	($9,913)
3) Asset (Gain)/Loss for the Year	
a) Market Value of Assets as of 6/30/2017	$116,883,856
b) Contributions Received	549,186
c) Benefits, Refunds Paid and Administrative Costs	(7,434,889)
d) Expected Interest [0.05 x 3a + (1.05^½ -1) x (3b + 3c)]	5,674,150
e) Expected Assets as of 6/30/2018 [3a + 3b + 3c + 3d]	115,672,304
f) Market Value of Assets as of 6/30/2018	115,484,165
g) Asset (Gain)/Loss [3e – 3f]	$188,139
4) Liability (Gain)/Loss for the Year	
a) Total (Gain)/Loss (1i)	($245,743)
b) Contribution (Gain)/Loss (2e)	(9,913)
c) Asset (Gain)/Loss (3g)	188,139
d) Liability (Gain)/Loss [4a – 4b – 4c]	($423,969)

Liabilities and Required Employer Contributions (continued)

Schedule of Amortization Bases

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, 2018.
- The required employer contributions determined by the valuation are for the fiscal year beginning one year after the valuation date: Fiscal Year 2019-20.

This one-year lag is necessary due to the amount of time needed to extract and test the membership and financial data.

The schedule below shows the development of the payment on the Amortization Base(s).

Reason for Base	Date Established	Remaining Period	Balance on 6/30/18	Expected Payment on UAL 18-19	6/30/19	Scheduled Payment Fiscal Year 2019-2020
Actuarially Determined Surplus	6/30/2018	N/A[1]	($16,557,531)	$8,996	($17,394,626)	—
Total			($16,557,531)	$8,996	($17,394,626)	—

(1) Under the Public Employee Pension Reform Act (PEPRA), the minimum required contribution cannot be less than the plan's normal cost. Therefore, any surplus cannot be used to lower the required contribution amount.

Reconciliation of Required Employer Contributions

This table illustrates how the contribution rate is calculated and, more importantly, why the Employer Contribution Rate differs this year from the previous year.

	Percentage of Projected Payroll
Normal Cost (% of Payroll)	
1. For Period 7/1/18 – 6/30/19	
a) Employer Normal Cost	38.145%
b) Employee Contribution	7.370%
c) Total Normal Cost	45.515%
2. Changes Since the Prior Annual Valuation	
a) Effect of Changes in Demographics	(1.517%)
b) Effect of Plan Changes	0.000%
c) Effect of Method Changes	(1.301%)
d) Effect of Assumption Changes	0.000%
e) Effect of Fresh Start	0.000%
f) Net Effect of Changes [Sum of a – e]	(2.818%)
3. For Period 7/1/19 – 6/30/20	
a) Employer Normal Cost	35.272%
b) Employee Contribution	7.425%
c) Total Normal Cost	42.697%
Employer Normal Cost Change [(3a) – (1a)]	(2.873%)
Employee Contribution Change [(3b) – (1b)]	0.055%

Liabilities and Required Employer Contributions (continued)

Required Employer Contribution Rate History

This table provides the 10-year history of employer contribution rates for the Legislators' Retirement System.

Fiscal Year	Required Employer Contribution Rate
2019-20	35.272%
2018-19	38.145%
2017-18	41.696%
2016-17	40.659%
2015-16	42.265%
2014-15	42.257%
2013-14	38.381%
2012-13	N/A
2011-12	N/A
2010-11	N/A

Funding History

The Funding History below shows the recent history of the actuarial accrued liability, the market value of assets, funded ratios and the annual covered payroll.

Valuation Date	Entry Age Normal Accrued Liability[1]	Market Value of Assets (MVA)	Funded Ration (MVA)	Annual Covered Payroll
6/30/18	$98,926,634	$115,484,165	116.7%	$1,097,953
6/30/17	100,844,514	116,883,856	115.9%	1,208,552
6/30/16	106,974,655	119,049,997	111.3%	1,320,844
6/30/15	105,746,107	121,468,928	114.9%	1,275,083
6/30/14	111,274,434	130,353,307	117.1%	1,500,257
6/30/13	115,805,781	122,147,891	105.5%	1,427,241
6/30/12	108,585,275	123,029,188	113.3%	1,983,348
6/30/11	108,976,845	123,569,795	113.4%	2,269,390
6/30/10	112,355,875	114,104,852	101.6%	2,159,181
6/30/09	111,898,151	111,829,179	99.9%	2,057,335

(1) The aggregate funding method was used in the June 30, 2010 and prior valuations. The Entry Age Normal Accrued Liability (EANAL) was not used for funding purposes. However, the EANAL was disclosed for accounting purposes due to GASB Statement #50.

Risk Analysis

Risk Analysis

Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2018-19, 2019-20, 2020-21 and 2021-22). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

For fiscal years 2018-19, 2019-20, 2020-21, and 2021-22 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0 percent, 3.0 percent, 5.0 percent, 6.5 percent and 8.5 percent.

The alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2022. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5th, 25th, 50th, 75th, and 95th percentiles for these outcomes. For example, of all the 4-year outcomes generated in the stochastic analysis, approximately 25 percent of them had an average annual return of 3.0 percent or less.

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0 percent or greater than 8.5 percent over this four-year period, the possibility of a single investment return less than -1.0 percent or greater than 8.5 percent in any given year is much greater.

The table below shows the projected required employer contributions under the five different investment return scenarios.

	Required Contribution	Projected Required Employer Contribution			
Assumed Annual Return from 2018-19 through 2021-22	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24 No Expected Remaining Active Members[1]
1.00% (5th Percentile)					
Normal Cost	35.3%	29.3%	29.3%	29.3%	29.3%
UAL Contribution	$0	$0	$0	$0	$0
3.00% (25th Percentile)					
Normal Cost	35.3%	29.3%	29.3%	29.3%	29.3%
UAL Contribution	$0	$0	$0	$0	$0
5.00% (50th Percentile)					
Normal Cost	35.3%	29.3%	29.3%	29.3%	29.3%
UAL Contribution	$0	$0	$0	$0	$0
6.50% (75th Percentile)					
Normal Cost	35.3%	29.3%	29.3%	29.3%	29.3%
UAL Contribution	$0	$0	$0	$0	$0
8.50% (95th Percentile)					
Normal Cost	35.3%	29.3%	29.3%	29.3%	29.3%
UAL Contribution	$0	$0	$0	$0	$0

(1) It is expected that there will be no active members during fiscal year 2023-24. However, if active members are present, the expected normal cost for possible active members is shown above.

Risk Analysis (continued)

Discount Rate Sensitivity

The following analysis looks at the fiscal year 2019-20 employer contribution rates under two different discount rate scenarios. Shown below are the employer contribution rates assuming discount rates that are 1 percent lower and 1 percent higher than the current valuation discount rate.

This type of analysis gives the reader a sense of the long-term risk to the employer contribution rates.

Sensitivity Analysis				
As of June 30, 2018	Plan's Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
4.00% Discount Rate (-1%)	50.8%	$110,681,494	($4,802,671)	104.3%
5.00% Return (Assumed Rate)	42.7%	$98,926,634	($16,557,531)	116.7%
6.00% Discount Rate (+1%)	36.2%	$89,351,219	($26,132,946)	129.2%

Mortality Sensitivity

The following looks at the change in the June 30, 2018 plan costs and funded ratio under two different longevity scenarios, namely assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions adopted in 2017. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

As of June 30, 2018	10% Lower Mortality Rates	Current Mortality	10% Higher Mortality Rates
a) Accrued Liability	$102,283,251	$98,926,634	$95,921,337
b) Market Value of Assets	$115,484,165	$115,484,165	$115,484,165
c) Unfunded Liability (Surplus) [(a)-(b)]	($13,200,914)	($16,557,531)	($19,562,828)
d) Funded Ratio	112.9%	116.7%	120.4%

A 10 percent increase (decrease) in assumed mortality rates over the long-term would result in approximately a 3-percentage point increase (decrease) to the funded ratio.

Inflation Rate Sensitivity

The following analysis looks at the change in the June 30, 2018 plan costs and funded ratio under two different inflation rate scenarios, namely assuming the liability inflation rate is 1 percent lower or 1 percent higher than the current valuation inflation rate assumption of 2.50%. This type of analysis highlights the impact on the plan of increased or decreased inflation of active salaries and retiree COLAs over the long-term.

As of June 30, 2018	-1% Inflation Rate	Current Inflation Rate	+1% Inflation Rate
a) Accrued Liability	$89,214,343	$98,926,634	$110,665,932
b) Market Value of Assets	$115,484,165	$115,484,165	$115,484,165
c) Unfunded Liability (Surplus) [(a)-(b)]	($26,269,822)	($16,557,531)	($4,818,233)
d) Funded Ratio	129.4%	116.7%	104.4%

A decrease of 1 percent in the liability inflation rate (2.50 percent to 1.50 percent) reduces the Accrued Liability by 9.8 percent. However, a 1 percent increase in the liability inflation rate (2.50 percent to 3.50 percent) increases the Accrued Liability by 11.9 percent.

Risk Analysis (continued)

Plan Maturity Measures

As pension plans mature they become much more sensitive to risks than plans that are less mature. Understanding plan maturity and how it affects the ability of a pension plan to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its 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 starts increasing. A mature plan will often have a ratio above 60-65 percent. For both CalPERS and other retirement systems in the United States, these ratios have been steadily increasing in recent years. For plans that become closed to new entrants, this ratio will approach 100 percent over time.

Ratio of Retiree Accrued Liabilities to Total Accrued Liabilities	As of June 30, 2017	As of June 30,2018
1. Retiree Accrued Liability	$92,538,906	$90,272,047
2. Total Accrued Liability	$100,844,514	$98,926,634
3. Ratio of Retiree AL to Total AL [(1) / (2)]	91.8%	91.3%

Volatility Ratios

The actuarial calculations supplied in this communication are based on a number of assumptions about very long-term demographic and economic behavior. Unless these assumptions (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 the ups and downs of investment returns.

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. Below we have shown your asset volatility ratio, a measure of the plan's current rate volatility. It should be noted that this ratio is a measure of the current situation. 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 8 is expected to have twice the contribution volatility of a plan with a liability to payroll ratio of 4. 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 and the asset volatility ratio, described above, will tend to move closer to this ratio as the plan matures. However, if a plan becomes closed to new entrants, both of these ratios can grow quite large.

Rate Volatility	As of June 30, 2018
1) Market Value of Assets	$115,484,165
2) Payroll	$1,097,953
3) Asset Volatility Ratio [(1) / (2)]	105.2
4) Accrued Liability	$98,926,634
5) Liability Volatility Ratio [(4) / (2)]	90.1

Appendices

Appendix A
Actuarial Methods and Assumptions

Actuarial Data

As stated in the Actuarial Certification, the data, which serves as the basis of this valuation, has been obtained from the various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate.

Actuarial Cost Method

The actuarial funding method used for the Retirement Program is the Entry Age Normal 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 percent of pay in each year from the member's entry age to the assumed retirement age. 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.

The following table provides a brief history of the actuarial cost method

Valuation Year June 30	Funding Method
1996	Entry Age Normal
1997 to 2010	Aggregate
2011 to Current	Entry Age Normal

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 an amortization payment toward the unfunded liability. The unfunded liability is amortized as a “level percent of pay”. Commencing with the June 30, 2013 valuation, all new 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. A summary of the current policy is provided in the table below:

Driver	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 - Inactive Plans	2.75% 0%	2.75% 0%	2.75% 0%	2.75% 0%	2.75% 0%
Ramp Up	5	5	5	0	0
Ramp Down	5	5	5	0	0

Appendix A - Actuarial Methods and Assumptions (continued)

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.

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 positive payment would be required on a negative unfunded actuarial liability (or conversely a negative payment on a positive unfunded actuarial liability); or
- When there are excess assets, rather than an unfunded liability. In this situation, a minimum 30-year fresh start is used.

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 30 years.

Investment Return (Interest)

5.00 percent compounded per year, net of assumed expenses of 0.25 percent.

The following table provides a brief history of the Investment Return Assumption.

Time Frame	Investment Return
7/1/2016 - Current	5.00%
7/1/2011 - 6/30/2016	5.75%
7/1/2010 - 6/30/2011	6.00%
7/1/2004 - 6/30/2010	7.00%
7/1/1998 - 6/30/2004	7.50%

Individual Salary Increases

2.75 percent compounded per year.

Overall Payroll Growth

2.75 percent compounded annually for active population that will not decrement due to term limits or non-reelection.

Inflation

2.50 percent compounded per year. The current inflation assumption based on the most recent CalPERS Experience Study adopted by the CalPERS Board in December 2017. The following table provides a brief history of the Inflation Return Assumption.

Time Frame	Inflation
7/1/2017 - Current	2.50%
7/1/2011 - 6/30/2017	2.75%
7/1/2004 - 6/30/2011	3.00%
7/1/1998 - 6/30/2004	3.50%

Appendix A - Actuarial Methods and Assumptions (continued)

Demographic Assumptions

The demographic assumptions used in the valuation, with the exception of the mortality assumption, have been in place for many years and have not produced significant experience gains or losses for the plan. The actuary has concluded that the continued use of these assumptions is reasonable for valuation purposes. More information on the mortality assumption is available in the mortality assumption section of this appendix.

Percentage Married

90 percent

Retirement

Active members are assumed to retire immediately at the end of their term limit, if eligible.

Normal Form of Payment

The normal form of payment is assumed a 100 percent Joint and Survivor Annuity for all members of the Legislature. While the normal form is a 50 percent Joint and Survivor Annuity for this group, it is valued as a 100 percent Joint and Survivor Annuity to reflect employer subsidies used in the calculation of other optional benefit forms available to the member. The normal form of payment for all Constitutional and Legislative Statutory Officers is assumed a straight life annuity.

Mortality Rates

The mortality assumptions are based on mortality rates resulting from the most recent CalPERS Experience Study adopted by the CalPERS Board in December 2017. For purposes of the mortality rates, the rates include a 15-year mortality improvement projection using 90 percent of Scale MP 2016.

Sample mortality rates are shown in the following table:

	Healthy Recipients		Disabled Recipients	
Attained Age	Male	Female	Male	Female
35	0.00049	0.00027	0.00049	0.00027
40	0.00064	0.00037	0.00064	0.00037
45	0.00080	0.00054	0.00080	0.00054
50	0.00372	0.00346	0.01183	0.01083
55	0.00437	0.00410	0.01613	0.01178
60	0.00671	0.00476	0.02166	0.01404
65	0.00928	0.00637	0.02733	0.01757
70	0.01339	0.00926	0.03358	0.02183
75	0.02316	0.01635	0.04277	0.02969
80	0.03977	0.03007	0.06272	0.04641
85	0.07122	0.05418	0.09793	0.07847
90	0.13044	0.10089	0.14616	0.13220
95	0.21658	0.17698	0.21658	0.21015
100	0.32222	0.28151	0.32222	0.32226
105	0.46691	0.43491	0.46691	0.43491
110	1.00000	1.00000	1.00000	1.00000

Appendix A - Actuarial Methods and Assumptions (continued)

Probability of Decrement for Active Participants

Vested Withdrawal - Sample vested withdrawal rates are shown in the following table.

Disability - Sample disability rates are shown in the following table.

Non-vested Withdrawal - Sample rates for non-vested withdrawal are shown in the following

For each 1,000 active participants at the age shown, the following number will leave within a year on account of:

Age	Vested Withdrawal	Disability	Non-Vested Withdrawal
30	50.0	0.1	25.0
35	50.0	0.2	25.0
40	50.0	0.7	20.0
45	40.0	1.2	15.0
50	40.0	2.2	10.0
55	40.0	5.0	0.0
60	40.0	9.5	0.0

For those members subject to a term limit, the Vested Withdrawal assumption is 100 percent at the end of the term limit.

Retirement Age

The maximum retirement age was assumed age 60, except for participants who would not meet the service requirements at age 60 or are older than age 60. Retirement for these participants was assumed to occur at the age when the service requirements were met or when their term limits expires, whichever is later.

Purchase of Non-Contributory Service

Current active and non-retired inactive members are assumed to have purchased 100 percent of all non-contributory service as a member of the Legislature, as a Constitutional Officer other than a Judge, or as a Legislative Statutory Officer. Contributions made for the purchase of non-contributory service are based on their current or final compensation.

Asset Valuation Method

The value of assets is the market value of assets.

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 were taken into account in this valuation.

Internal Revenue Code Section 401 (a)(17)

The limitations on benefits imposed by Internal Revenue Code Section 401(a) (17) was taken into account in this valuation.

Appendix B
Summary of Principal Plan Provisions

Political Reform Act 1990

Proposition 140, the Political Reform Act of 1990, required that Senators and members of the Assembly, first elected after November 7, 1990, participate in the Federal Social Security Program and in no other retirement system.

Name

Legislators' Retirement System.

Effective Date

Effective 1947 by Chapter 879, Statutes of 1947.

Authorization

This System is authorized by the Legislators' Retirement Law. The System was first established by Chapter 879, Statutes of 1947. The Legislators' Retirement Law is contained in Sections 9350 through 9378 of the Government Code. Section 9354 of the Code established the Legislators' Retirement Fund.

Administration of Plan

Administration is by the Board of Administration of the California Public Employees' Retirement System.

Eligibility for Membership

Members of the Legislature first elected prior to November 7, 1990. Prior to January 1, 2013, all Constitutional Officers upon electing to join the System, the Insurance Commissioner, and the Legislative Statutory Officers. Currently, these include the Chief Clerk of the Assembly, the Secretary of the Senate, the Sergeant-at-Arms of the Assembly, and the Sergeant-at-Arms of the Senate. Effective January 1, 2013, the system is closed to new members. The system was partially closed as a result of the Political Reform Act of 1990 (to Senators and Members of the Assembly first elected after November 7, 1990). As a result of Assembly Bill 340 which was signed by the Governor on September 12, 2012, the Legislators' Retirement System is also closed to Constitutional and Statutory Officers effective January 1, 2013.

Plan Year

The twelve-month period ending June 30th.

Credited Service

The period of time computed in years and/or fractions thereof as a member of the Senate or Assembly, an elective officer of the state, or statutory officer from date of electing membership in the system to termination date. For the purpose of crediting service, each full term as a Member of the Senate shall constitute four calendar years; each full term as a Member of the Assembly shall constitute two calendar years.

Appendix B - Summary of Principal Plan Provisions (continued)

Member Contributions

Members of the Legislature and Constitutional Officers - 4 percent of compensation if elected before March 4, 1972 and 8 percent of compensation if elected after March 4, 1972. Contributions may be made at any time up to benefit commencement date, provided the individual elected to join the system while in service. No interest is charged on contributions made after the applicable service is performed.

Legislative Statutory Officers - 6 1/2 percent of compensation if elected before March 4, 1972 and 8 percent of compensation if elected after March 4, 1972.

State Contributions

Per Section 9358 of the Legislators' Retirement System Law, which was amended because of Assembly Bill 817, Chapter 897, Statutes of 1999, the State now contributes the actuarially required employer contribution rate determined by the Annual Actuarial Valuation as of June 30th. Under PEPRA, effective January 1, 2013, the state has been required to contribute the employer normal cost at a minimum, which is not necessarily the actuarially determined contribution rate.

Compensation

Compensation means remuneration paid in cash out of funds controlled by the state, excluding mileage, reimbursement for expenses incurred in the performance of official duties, and any per diem allowance paid in lieu of such expenses.

Effective December 7, 2009, elected officials' salaries were reduced 18 percent. For the purposes of determining the present value of benefits, salaries prior to the reduction were used. Actual salaries were used to calculate employer contribution rates.

Eligibility for Unreduced Service Retirement Allowance

A member is eligible for an unreduced service retirement allowance provided the member has satisfied all of the following requirements:

- The member has attained the age of 60 years and has completed 4 or more years of credited service or
- The member, regardless of attained age, has completed 20 or more years of credited service.
- Legislative Statutory Officers are eligible upon the attainment of age 55 years regardless of the number of years of credited service.

Amount of Unreduced Service Retirement Allowance

The monthly normal retirement benefit is equal to the following:

Members of the Legislature - 3 percent of the highest compensation multiplied by the years of credited service plus 2 percent of the first $500 of monthly compensation multiplied by the years of credited service up to 15 years with a maximum benefit of 66 2/3 percent of the highest monthly compensation

Constitutional Officers - 5 percent of the highest compensation multiplied by the years of credited service up to 8 years plus (if the member has 24 or more years of credited service) 1 2/3 percent of monthly compensation multiplied by the years of credited service in excess of 8 years, not to exceed 12 years of credited service. The maximum percentage of compensation is 60 percent of highest monthly compensation.

Legislative Statutory Officers - 3 percent of the final compensation multiplied by the years of credited service. The allowance may not exceed 66 2/3 percent of the greater of the member's compensation at the time the member vacates the office or the compensation of the incumbent of that office at the time the payments of the allowance fall due.

Appendix B - Summary of Principal Plan Provisions (continued)

Cost-of-Living Increases

All benefits are subject to the full cost-of-living adjustment from the benefit commencement date based on the United States city average of the Consumer Price Index for all Urban Consumers. Compensation rates are not adjusted for increases in the incumbent's compensation after the member leaves office.

Normal Form of Service Retirement Allowance

For Legislators a 50 percent Joint Survivor Annuity, for Constitutional Officers a Single Straight Life Annuity, and for Legislative Statutory Officers a Single Straight Life Annuity.

Eligibility for a Reduced Early Retirement Allowance

A member, other than a Legislative Statutory Officer is eligible for a reduced early retirement allowance benefit provided the member has completed 15 or more years of credited service regardless of age. Legislative Statutory Officers are not eligible for a reduced early retirement allowance.

Amount of Reduced Early Retirement Allowance

The monthly-reduced early retirement is the unreduced service retirement allowance reduced 2 percent for each year by which the member's age at the time of retirement is below age 60. Reduction Factors are shown for ages 50 to 59 in the table below.

Age at Retirement	% of Service Retirement Benefit Paid
59	98%
58	96%
57	94%
56	92%
55	90%

Age at Retirement	% of Service Retirement Benefit Paid
54	88%
53	86%
52	84%
51	82%
50	80%

Forms of Retirement Allowance Payments

Optional Settlement 1 - Single Life Annuity, with the payment of the balance of the member's contributions at the death of the member to the member's beneficiary.

Optional Settlement 2 - 100 percent Joint and Survivor Annuity.

Optional Settlement 3 - 50 percent Joint and Survivor Annuity.

Optional Settlement 4 - Subject to the approval of the Board of Administration, a member may select other benefits that are the actuarial equivalent of his/her retirement allowance.

Members of the Legislature - The member's retirement allowance is unreduced due to the selection of any of the above optional settlements.

Eligibility for Disability Allowance

All members are eligible and there is no minimum age or service requirements. A medical examination may be required if the applicant is below the minimum age for Service or Early Retirement.

Appendix B - Summary of Principal Plan Provisions (continued)

Amount of Disability Allowance

The disability allowance is the same as the service retirement allowance that would be payable to the member if the member had retired for reasons other than disability.

Eligibility for Pre-Retirement Death Allowance

All members are eligible for a Pre-Retirement Death Allowance.

Amount of Pre-Retirement Death Allowance

Prior to eligibility for Service or Early Retirement - Refund of the member's contributions with interest plus one-twelfth of the member's annual compensation during the last 12 months in office immediately preceding the member's death multiplied by the member's years of credited service.

Subsequent to eligibility for Service or Early Retirement - If the member had elected an optional settlement before death, the surviving spouse will receive the same benefit the surviving spouse would have received had the member's retirement preceded death. If the member had not elected an optional settlement, then the surviving spouse would receive the same benefits had the member elected Optional Settlement 2, a 100 percent Joint and Survivor Annuity, retired and then died.

Eligibility for Special Survivor Allowance

The surviving spouse who has the care of unmarried children under the age of 18 or unmarried incapacitated children if over the age of 18 or if there is not a spouse with these responsibilities, the guardian who has the care of unmarried children under the age of 18 or unmarried incapacitated children if over the age of 18. In the case where there are no incapacitated children, but a surviving spouse, a deferment age of 62 is required before receiving a benefit. In the case where there is not a surviving spouse or guardian, the dependent parents of the member are eligible and shall be paid the Survivor's Allowance once the age of 62 is attained. This allowance is payable only if the member is not covered by Social Security.

Amount of Special Survivor Allowance

Survivor	Monthly Allowance
Spouse or One Child	$180
Spouse and One Child or Two Children	$360
Spouse and Two Children or Three Children	$430

Benefit payments under this provision are reduced by any other survivor benefits under any other provision under this system.

In Service Death Allowance

In addition to any benefits paid, the beneficiary of a member who died while in office or employed as a Legislative or Statutory Officer will receive an allowance equal to the member's compensation during the 12 months immediately preceding the member's death.

Post Retirement Death Benefit

Upon the death of a retiree, a one-time lump sum payment of $600 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Appendix C
Participant Data

Summary of Valuation Data

The table below illustrates counts of records processed by the valuation.

	June 30, 2017	June 30, 2018
1) Active Members		
a) Counts	8	7
b) Average Attained Age	64.53	66.07
c) Average Entry Age to Rate Plan	53.96	50.28
d) Average Years of Credited Service	10.57	11.98
e) Average Annual Covered Pay	$151,069	$156,850
f) Annual Covered Payroll	1,208,552	1,097,953
g) Projected Annual Payroll for Contribution Year	1,275,936	287,089
h) Present Value of Future Payroll	2,923,360	1,587,693
2) Transferred and Vested Termination Members		
a) Counts	7	8
3) Retired Members and Beneficiaries		
a) Counts	232	212
b) Average Attained Age	74.90	75.79
c) Average Annual Benefits	$30,693	$33,951
4) Active to Retired Ratio [(1a) / (3a)]	0.03	0.03

Reconciliation of Participants

The table below illustrates the change in members from June 30, 2017 to June 30, 2018.

Reconciliation of Participants for the Fiscal Year Ending June 30, 2018

	Actives	Inactive	Retirees and Beneficiaries	Total
As of June 30, 2017	8	7	232	247
New Entrants	—	—	—	—
Rehires	—	—	—	—
Refunds	—	—	—	—
Retirements	—	—	—	—
Disabilities	—	—	—	—
Terminations	(1)	1	—	—
Community Property Merge[1]	—	—	(17)	(17)
Death with Beneficiary	—	—	(5)	(5)
Death without Beneficiary	—	—	(1)	(1)
New Beneficiary	—	—	6	6
Beneficiary Death	—	—	(3)	(3)
As of June 30, 2018	7	8	212	227

(1) CalPERS implemented a new actuarial valuation software system for the June 30, 2018 valuation. Part of the new methodology required the community property payees to be merged with the corresponding affected members.

Appendix C - Participant Data (continued)

Distribution of Active Members

The table below illustrates a distribution of active member counts based on age and service. 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 Active Participants Attained Age and Years of Credited Service as of June 30, 2018

Attained Age	Years of Service at Valuation Date							Total	Annual Valuation Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+		
15 - 19	0	0	0	0	0	0	0	0	$0
20 - 24	—	—	—	—	—	—	—	—	—
25 - 29	—	—	—	—	—	—	—	—	—
30 - 34	—	—	—	—	—	—	—	—	—
35 - 39	—	—	—	—	—	—	—	—	—
40 - 44	—	—	—	—	—	—	—	—	—
45 - 49	—	—	—	—	—	—	—	—	—
50 - 54	—	—	—	—	—	—	—	—	—
55 - 59	—	1	—	1	—	—	—	2	313,286
60 - 64	—	—	1	—	—	—	—	1	156,643
65+	—	3	—	—	1	—	—	4	628,024
Total	0	4	1	1	1	0	0	7	$1,097,953

Distribution of Average Annual Salaries

The table below illustrates a distribution of active member annual salaries based on age and service.

Distribution of Average Annual Salaries by Age and Credited Service as of June 30, 2018

Attained Age	Years of Service at Valuation Date							Average Annual Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	
15 - 19	$0	$0	$0	$0	$0	$0	$0	$0
20 - 24	—	—	—	—	—	—	—	—
25 - 29	—	—	—	—	—	—	—	—
30 - 34	—	—	—	—	—	—	—	—
35 - 39	—	—	—	—	—	—	—	—
40 - 44	—	—	—	—	—	—	—	—
45 - 49	—	—	—	—	—	—	—	—
50 - 54	—	—	—	—	—	—	—	—
55 - 59	—	156,643	—	156,643	—	—	—	156,643
60 - 64	—	—	156,643	—	—	—	—	156,643
65+	—	144,073	—	—	195,806	—	—	157,006
Average	$0	$147,215	$156,643	$156,643	$195,806	$0	$0	$156,850

Appendix C - Participant Data (continued)

Distribution of Vested Terminated Participants

The table below illustrates a distribution of inactive member counts based on age and service.

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 Vested Inactive Terminated by Age and Service as of June 30, 2018

Attained Age	Years of Service at Valuation Date							Total	Average Annual Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+		
15 - 19	0	0	0	0	0	0	0	0	$0
20 - 24	—	—	—	—	—	—	—	—	—
25 - 29	—	—	—	—	—	—	—	—	—
30 - 34	—	—	—	—	—	—	—	—	—
35 - 39	—	—	—	—	—	—	—	—	—
40 - 44	—	—	—	—	—	—	—	—	—
45 - 49	—	—	—	—	—	—	—	—	—
50 - 54	1	1	—	—	—	—	—	2	147,808
55 - 59	1	2	—	—	—	—	—	3	100,456
60 - 64	—	1	—	—	—	—	—	1	142,577
65+	1	—	1	—	—	—	—	2	105,817
Total	3	4	1	0	0	0	0	8	$118,899

Retirees & Beneficiaries

The table below illustrates a summary of Retiree and Beneficiary counts and annual benefits by year of retirement.

Retirees and Beneficiaries Number Counts and Annual Benefits by Year of Retirement as of June 30, 2018

Years Retired	Total Retirees	Total Annual Benefits	Average Annual Benefits
2018	0	$0	$0
2017	2	53,988	26,994
2016	3	117,251	39,084
2015	1	65,830	65,830
2014	2	44,051	22,026
2013	2	114,643	57,321
2012	1	84,327	84,327
2011	2	127,746	63,873
2010	6	161,787	26,964
2009	1	90,444	90,444
2008	2	134,445	67,223
2007	2	83,784	41,892
2006	4	336,088	84,022
2005	3	57,158	19,053
2004	7	342,463	48,923
2003	3	65,938	21,979
2002	7	475,881	67,983
2001	4	108,789	27,197
2000	5	298,438	59,688
1999	3	158,667	52,889

Years Retired	Total Retirees	Total Annual Benefits	Average Annual Benefits
1998	4	105,360	26,340
1997	5	142,174	28,435
1996	19	864,608	45,506
1995	8	276,612	34,576
1994	9	350,455	38,939
1993	4	111,366	27,842
1992	8	383,596	47,949
1991	7	378,773	54,110
1990	9	196,788	21,865
1989	6	105,609	17,602
1988	2	72,001	36,001
1987	2	94,611	47,306
1986	4	98,510	24,627
1985	2	28,424	14,212
1984	8	123,683	15,460
1983	1	23,574	23,574
1982	12	237,830	19,819
1981	3	65,166	21,722
1980	9	117,429	13,048
1979 & Earlier	30	499,396	16,647
Totals	212	$7,197,683	$33,951

Appendix C - Participant Data (continued)

Distribution of Retirees & Beneficiaries

The table below illustrates a distribution of Retiree and Beneficiary counts by age and retirement type.

Distribution of Retirees and Beneficiaries by Age and Retirement Type (counts only) as of June 30, 2018

Retiree Age	Service Retiree	Disability Retiree		Death in Service		Death After Service Retirement	Total
		Non-Industrial	Industrial	Non-Industrial	Industrial		
Under 30	3	6	0	0	0	0	9
30-34	—	—	—	—	—	—	—
35-39	—	—	—	—	—	—	—
40-44	—	—	—	—	—	—	—
45-49	—	—	—	—	—	—	—
50-54	1	—	—	—	—	—	1
55-59	6	—	—	—	—	—	6
60-64	16	—	—	—	—	—	16
65-69	25	—	—	1	—	—	26
70-74	24	1	—	—	—	—	25
75-79	38	—	—	—	—	—	38
80-84	28	—	—	—	—	—	28
85 and Over	62	1	—	—	—	—	63
Total	203	8	0	1	0	0	212

The table below illustrates a distribution of Retiree and Beneficiary total annual benefit amounts by age and retirement type.

Distribution of Total Annual Benefits for Retirees and Beneficiaries by Age and Retirement Type as of June 30, 2018

Retiree Age	Service Retiree	Disability Retiree		Death in Service		Death After Service Retirement	Total Annual Benefits
		Non-Industrial	Industrial	Non-Industrial	Industrial		
Under 30	$95,514	$10,755	$0	$0	$0	$0	$106,269
30-34	—	—	—	—	—	—	—
35-39	—	—	—	—	—	—	—
40-44	—	—	—	—	—	—	—
45-49	—	—	—	—	—	—	—
50-54	18,227	—	—	—	—	—	18,227
55-59	143,288	—	—	—	—	—	143,288
60-64	518,640	—	—	—	—	—	518,640
65-69	1,056,981	—	—	9,559	—	—	1,066,540
70-74	812,479	29,145	—	—	—	—	841,624
75-79	1,155,997	—	—	—	—	—	1,155,997
80-84	1,023,836	—	—	—	—	—	1,023,836
85 and Over	2,254,947	68,315	—	—	—	—	2,323,262
Total	$7,079,909	$108,215	$0	$9,559	$0	$0	$7,197,683

Appendix C - Participant Data (continued)

Distribution of Retirees & Beneficiaries (continued)

The table below illustrates a distribution of Retiree and Beneficiary counts by years retired and retirement type.

Distribution of Retirees and Beneficiaries by Years Retired and Retirement Type (counts only) as of June 30, 2018

Years Retired	Service Retiree	Disability Retiree		Death in Service		Death After Service Retirement	Total
		Non-Industrial	Industrial	Non-Industrial	Industrial		
Under 5	8	0	0	0	0	0	8
5-9	11	—	—	1	—	—	12
10-14	18	—	—	—	—	—	18
15-19	22	—	—	—	—	—	22
20-24	45	—	—	—	—	—	45
25-29	34	—	—	—	—	—	34
30 and Over	65	8	—	—	—	—	73
Total	203	8	0	1	0	0	212

The table below illustrates a distribution of Retiree and Beneficiary total annual benefit amounts by years retired and retirement type.

Distribution of Retiree and Beneficiary Annual Benefits by Years Retired and Retirement Type as of June 30, 2018

Years Retired	Service Retiree	Disability Retiree		Death in Service		Death After Service Retirement	Total Annual Benefits
		Non-Industrial	Industrial	Non-Industrial	Industrial		
Under 5	$281,120	$0	$0	$0	$0	$0	$281,120
5-9	569,387	—	—	9,559	—	—	578,946
10-14	953,938	—	—	—	—	—	953,938
15-19	1,107,713	—	—	—	—	—	1,107,713
20-24	1,739,209	—	—	—	—	—	1,739,209
25-29	1,176,132	—	—	—	—	—	1,176,132
30 and Over	1,252,410	108,215	—	—	—	—	1,360,625
Total	$7,079,909	$108,215	$0	$9,559	$0	$0	$7,197,683

Appendix D
Glossary of Actuarial Terms

Accrued Liability: (also called Actuarial Accrued Liability or Entry Age Normal 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 funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

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 Liability. The total Unfunded 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.

Entry Age: The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan. In most cases, this is the age of the member on their date of hire.

Entry Age Normal Cost Method: An actuarial cost method designed to fund a member's total plan benefit over the course of his or her career. This method is designed to yield a 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.)

Fresh Start: A Fresh Start is when multiple amortization bases are collapsed to one base and amortized together over a new funding 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.

Appendix D – Glossary of Actuarial Terms (continued)

Normal Cost: The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost should be viewed as the long term contribution rate.

Pension Actuary: A business professional that is authorized by the Society of Actuaries, and the American Academy of Actuaries to perform the calculations necessary to properly fund a pension plan.

Present Value of Benefits (PVB): The total dollars needed as of the valuation date to fund all benefits earned in the past or expected to be earned in the future for *current* members.

Unfunded Liability (UAL): When a plan or pool's Value of Assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Liability. If the Unfunded Liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

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