



## **Alameda County Employees' Retirement Association**

**Actuarial Valuation and Review as of  
December 31, 2018**

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May 20, 2019

Board of Retirement  
Alameda County Employees' Retirement Association  
475 14<sup>th</sup> Street, Suite 1000  
Oakland, CA 94612

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of December 31, 2018. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal 2019-2020.

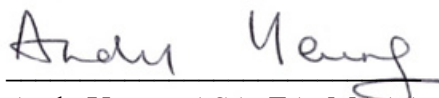
This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement Association. The census information and financial information on which our calculations were based was prepared by the staff of the Association. That assistance is gratefully acknowledged.

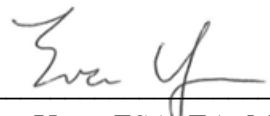
The actuarial calculations were directed under the supervision of Eva Yum, FSA, MAAA, Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Association.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By:   
Andy Yeung, ASA, EA, MAAA, FCA  
Vice President and Actuary

  
Eva Yum, FSA, EA, MAAA  
Senior Actuary

*JB/jl*

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# Section 1: Actuarial Valuation Summary

## Purpose and Basis

This report was prepared by Segal Consulting (“Segal”) to present a valuation of the Alameda County Employees’ Retirement Association (“the Plan”) as of December 31, 2018. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan’s benefit obligations.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

The contribution requirements presented in this report are based on:

- The benefit provisions of the pension plan, as administered by the Board of Retirement;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of November 30, 2018, provided by the Retirement Association;
- The assets of the Plan as of December 31, 2018, provided by the Retirement Association;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. and
- The funding policy adopted by the Board of Retirement.

One of the general goals of an actuarial valuation is to establish contributions which fully fund the Association’s liabilities, and which, as a percentage of payroll, remain as level as possible for each generation of active members. Annual actuarial valuations measure the progress toward this goal, as well as test the adequacy of the contribution rates.

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Association’s liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the

Association's staff. This information has not been audited by us, but it has been reviewed and found to be consistent, both internally and with prior year's information.

The contribution requirements are determined as a percentage of payroll.<sup>1</sup> The Association's employer rates provide for both Normal Cost and a contribution to amortize any unfunded or overfunded actuarial accrued liabilities. In this valuation, we have applied the funding policy adopted by the Board on September 18, 2014 (and reconfirmed by the Board on October 18, 2018). Details of the funding policy are provided in *Section 4, Exhibit I on page 90*.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit H on page 71*. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit I on page 76*.

The rates calculated in this report may be adopted by the Board for the fiscal year that extends from July 1, 2019 through June 30, 2020.

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<sup>1</sup> The contribution requirement for an employer with active member payroll is expressed as a level percentage of payroll for that employer. The contribution requirement for the Alameda County Office of Education with no active member payroll is expressed as a level dollar amount.

## Significant Issues

- Ref: Pg. 42
1. In the December 31, 2017 valuation, the ratio of the Valuation Value of Assets to Actuarial Accrued Liabilities (AAL) was 76.0%. In this December 31, 2018 valuation, the funded ratio has increased to 77.2%. The funded ratio if measured on a Market Value of Assets basis decreased from 77.7% as of December 31, 2017 to 71.8% as of December 31, 2018. The changes in the above ratios were primarily the result of an expected increase due to contributions made to pay down the unfunded liability, slight gain on the Valuation Value of Assets from the recognition of past gains after smoothing (for the valuation value funded ratio) and the loss on the Market Value of Assets during 2018 (for the market value funded ratio).
- Ref: Pg. 23 and Pg. 29
2. The Association's UAAL as of December 31, 2017 was \$2,156.7 million. In this year's valuation, the UAAL has decreased to \$2,137.1 million. The decrease in the UAAL was primarily due to (a) higher than expected return on investments (after smoothing), (b) other actuarial gains and the expected decrease due to contributions made to pay down the UAAL, offset somewhat by (c) the loss due to actual contributions lower than expected<sup>2</sup> and (d) higher than expected salary increases for active members. A reconciliation of the Association's UAAL is provided in *Section 2, Subsection E*. A schedule of the current UAAL amortization amounts may be found in *Section 3, Exhibit H*. Note that a graphical projection of the UAAL amortization bases and payments has been included in *Section 3, Exhibit I*.
- Ref: Pg. 31 and Pg. 121
3. The aggregate employer rate<sup>3</sup> calculated in this valuation has increased from 27.82% of payroll to 27.96% of payroll. This change was primarily due to (a) actual contributions lower than expected<sup>2</sup>, (b) higher than expected salary increases for active members and (c) the net effect of amortizing the prior year's UAAL over a different than expected projected payroll<sup>4</sup>, offset somewhat by (d) higher than expected return on investments (after smoothing) and (e) other actuarial gains<sup>5</sup>. A reconciliation of the Association's aggregate employer rate is provided in *Section 2, Subsection F*.

A schedule of the projected contributions by each participating employer is provided in *Section 4, Exhibit IV*. Under the Board of Retirement's current actuarial funding policy, the UAAL is paid off by the employers in the General Tiers 1, 2, and 4 membership group in proportion to their payroll (with the exception of the Alameda County Office of Education and the Livermore Area Recreation and Parks District, as discussed in item 8 below).

Employer rates for AHS/Court/First 5 are higher than the County's rates to reflect that only the County has received a reimbursement of \$6.9 million for the implicit retiree health benefit subsidy paid by the County for 2018 (note that this is an

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<sup>2</sup> Including scheduled delay in implementing contribution rates after the date of the valuation.

<sup>3</sup> For employers with active member payroll.

<sup>4</sup> The prior year's UAAL is amortized over a smaller than expected projected total payroll for Safety members and a slightly larger than expected projected total payroll for General members.

<sup>5</sup> Including changes in membership demographics.

estimated amount provided by ACERA). The \$6.9 million and the unused credit from prior years' transfers (the balance of prior transfers was about \$66.1 million<sup>6</sup> as of December 31, 2018) have been recognized over separate 20-year periods.

Ref: Pg. 32 and  
Pg. 102

4. The aggregate member rate calculated in this valuation remained at 9.34% of payroll. A reconciliation of the Association's aggregate member rate is provided in *Section 2, Subsection F*.

The individual member rates have been updated to reflect the valuation as of December 31, 2018. The detailed member rates are provided in *Section 4, Exhibit III* of this report.

Ref: Pg. 21

5. As indicated in *Section 2, Subsection B* of this report, the total unrecognized net investment loss as of December 31, 2018 is \$569.1 million (in the previous valuation, this amount was a \$309.1 million net gain). This net investment loss will be recognized in the determination of the Actuarial Value of Assets for funding purposes in the next few years, and will offset any investment gains that may occur after December 31, 2018. This implies that if the Association earns the assumed net rate of investment return of 7.25% per year on a **market value basis**, it will result in investment losses on the Actuarial Value of Assets in the next few years. So, if the actual market return is equal to the assumed 7.25% rate and all other actuarial assumptions are met, the contribution requirements would generally increase in the next few years.

The net deferred loss of \$569.1 million represents 7.5% of the Market Value of Assets as of December 31, 2018. Unless offset by future investment gains or other favorable experience, the recognition of the \$569.1 million deferred market loss is expected to have an impact on the Association's future funded percentage and contribution rate requirements. Under a simplified approach, which takes into account the size of the valuation and the SRBR reserves, this potential impact may be illustrated as follows:

- a. If a proportion of the net deferred loss that is commensurate with the size of the valuation reserves were recognized immediately in the valuation value of assets, the funded percentage would decrease from 77.2% to 71.8%.
  - b. If a proportion of the net deferred loss that is commensurate with the size of the valuation reserves were recognized immediately in the valuation value of assets, the aggregate employer rate<sup>7</sup> would increase from 27.96% to about 31.2% of payroll.
6. Similar to what we disclosed in our December 31, 2017 valuation report, the 7.25% investment return assumption that the Board approved on December 21, 2017 for determining the liabilities for funding purposes and used for establishing the employer and member contribution rates in this report has continued to be developed without considering the impact of any future 50/50 excess earnings allocation. This is based on our understanding that Article 5.5 of the Statute, which authorizes the allocation of 50% of excess earnings to the SRBR, does not allow for the use of a different investment return for funding than

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<sup>6</sup> See *Section 4, Exhibit V* for a schedule of the outstanding balances of the unused credit.

<sup>7</sup> For employers with active member payroll.

is used for interest crediting. This would appear in effect to preclude the prefunding of the SRBR through the use of an assumption lower than the market earnings assumption of 7.25%.

As required by the Actuarial Standard of Practice (ASOP) No. 4 (“Measuring Pension Obligations and Determining Pension Plan Costs or Contributions”), we performed a stochastic model, as detailed in our 2013-2016 experience study report, to estimate the impact of the 50% allocation of future excess earnings to the SRBR. The results of our model indicated that the 50/50 allocation of future excess earnings would have about the same impact as an “outflow” (i.e., assets not available to fund the benefits included in this valuation) that would average approximately 0.60% of assets over time. **For informational purposes only**, when we applied the results of our stochastic model to this valuation, we have estimated that such an annual outflow would increase the AAL measured in this valuation using a 7.25% investment return assumption from \$9.38 billion to \$10.07 billion (for a difference of \$0.69 billion) and would increase the employer’s UAAL contribution rate by about 4% - 5% of payroll.

Ref: Pg. 69

7. During the first half of 2018, investment experience (after smoothing) was favorable and there were \$21.1 million in “excess earnings” that were credited to the valuation reserves and the SRBR after building up a 1% Contingency Reserve. However, during the second half of 2018, investment experience (after smoothing) was unfavorable and the Contingency Reserve was reduced to 0.00% of total assets as of December 31, 2018. A complete presentation of the Association’s reserves is in *Section 3, Exhibit F*.
8. The Board adopted the Declining Employer Payroll Policy on October 18, 2018 and determined that the policy applies to the Alameda County Office of Education (ACOE) and the Livermore Area Recreation and Parks District (LARPD) Tier 1 members who were included as part of the General cost group in prior valuations. As a result, an unfunded actuarial accrued liability (UAAL) was allocated to each of these two employers as of December 31, 2017.

The UAAL allocated to ACOE for its Tier 1 members was \$1.4 million as of December 31, 2017 and was amortized over 20 years as a level dollar amount. The ACOE started payments in the 2018/2019 fiscal year by making a non-level contribution of \$750,000 on April 1, 2019. The UAAL contribution, expressed as a level dollar amount, that is required to be paid on April 1, 2020<sup>8</sup> (for the 2019/2020 fiscal year) is \$78 thousand.

The UAAL allocated to LARPD for its Tier 1 members was \$6.2 million as of December 31, 2017 and was amortized over 20 years as a level percentage of payroll. This UAAL (and the associated assets) was combined with the UAAL for LARPD Tier 3 and Tier 4. (For information purposes, the increase in the UAAL rate if they were to start payment in the 2018/2019 fiscal year would have been about 7.5% as a percentage of the total LARPD payroll.) As approved by the Board, and to reflect that the contribution towards the UAAL would not be paid until the 2019/2020 fiscal year, we have adjusted the UAAL amount

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<sup>8</sup> April 1 is the payment date for an annual payment, based on a request previously made by the ACOE.



with interest and expected contributions prior to the application of the policy,<sup>9</sup> and the recalculated increase in the UAAL rate is about 7.4% as a percentage of the total LARPD payroll.<sup>10</sup> The UAAL contribution, expressed as a level percentage of payroll, together with the Normal Cost rates for the 2019/2020 fiscal year are provided in *Section 2, Subsection F*.

9. The actuarial valuation report as of December 31, 2018 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected. Declines in asset values will increase the actuarial cost of the plan, while increases will decrease the actuarial cost of the plan.
10. The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 will be effective with ACERA's December 31, 2018 actuarial valuation. ASOP 51 requires actuaries to identify risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Investment risk, asset/liability mismatch risk, interest rate risk, longevity and other demographic risks and contribution risk are also cited as examples in ASOP 51. The standard does not require the actuary to evaluate the likelihood of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

The actuary's assessment can be qualitative or quantitative (e.g., based on numerical demonstrations). The actuary may use non-numerical methods for assessing risks that might take the form of commentary about potential adverse experience and the likely effect on future results. While the standard does not require that every valuation include a quantitative risk assessment, the actuary may recommend that a more detailed risk assessment be performed. When making that decision, the actuary will take into account such factors as the Plan's design, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions.

A copy of the risk report prepared to include the analyses recommended by Segal and subsequently approved by the Board will be available in May 2019.

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<sup>9</sup> We have also true-up the UAAL (by \$94 K) to reflect the liability for a new retiree who was valued in our last valuation as an inactive vested member based on the member's contribution account balance.

<sup>10</sup> The slight decrease in the incremental UAAL rate from the original 7.5% to the recalculated 7.4% reflected the larger than expected increase in the LARPD projected payroll as of December 31, 2018, over which the UAAL is amortized.

## Summary of Key Valuation Results

		December 31, 2018		December 31, 2017		
		Total Rate	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Total Rate	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	
<b>Employer Contribution Rates<sup>(2)</sup>:</b>	<u>County Only</u>					
	• General Tier 1	22.31%	\$1,925	22.30%	\$1,922	
	• General Tier 2	21.40	84,601	21.57	85,273	
	• General Tier 4	20.83	38,155	20.90	38,283	
	• Safety Tier 1	80.60	784	76.41	744	
	• Safety Tier 2	62.34	74,541	61.19	73,166	
	• Safety Tier 2C	63.63	2,131	62.54	2,095	
	• Safety Tier 2D	61.60	8,865	59.64	8,585	
	• Safety Tier 4	59.20	20,475	57.92	20,032	
	County Combined	30.46	231,477	30.28	230,100	
		<u>AHS, Court &amp; First 5 Only</u>				
		• General Tier 1	23.13	496	23.06	495
		• General Tier 2	22.22	45,557	22.33	45,783
		• General Tier 4	21.65	25,357	21.66	25,368
		<u>Housing Only</u>				
		• General Tier 1	28.34	926	28.32	926
		• General Tier 2	27.43	97	27.59	99
		• General Tier 4	26.86	303	26.92	304
		<u>LARPD Only<sup>(3)</sup></u>				
		• General Tier 1	33.62	225	28.32	190
		• General Tier 2	38.41	788	29.77	611
		• General Tier 3	32.14	632	23.12	454
		All Categories Combined	27.96	305,858	27.82	304,330

<sup>(1)</sup> Based on December 31, 2018 projected annual compensation.

<sup>(2)</sup> For employers with active member payroll. The UAAL contribution for ACOE, expressed as a level dollar amount, is \$78 K when made on April 1, 2020.

<sup>(3)</sup> For LARPD, the combined rate is 35.10% as of December 31, 2018 and 26.78% as of December 31, 2017.

## Summary of Key Valuation Results (continued)

		December 31, 2018		December 31, 2017		
		Total Rate	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Total Rate <sup>(2)</sup>	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	
<b>Average Member</b>	• General Tier 1	9.54%	\$1,403	9.59%	\$1,411	
<b>Contribution Rates:</b>	• General Tier 2	7.75	46,555	7.76	46,615	
	• General Tier 3	13.99	287	13.93	286	
	• General Tier 4	8.80	26,698	8.76	26,577	
	• Safety Tier 1	8.55	83	8.61	84	
	• Safety Tier 2	15.85	18,952	15.83	18,928	
	• Safety Tier 2C	13.38	448	13.35	447	
	• Safety Tier 2D	16.15	2,324	16.12	2,320	
	• Safety Tier 4	15.58	5,389	15.75	5,447	
		All Categories Combined	9.34	102,139	9.34	102,115

<sup>(1)</sup> Based on December 31, 2018 projected annual compensation.

<sup>(2)</sup> Average rates have been recalculated by applying the individual entry age based member rates determined in the December 31, 2017 valuation to the Association membership as of December 31, 2018.

## Summary of Key Valuation Results (continued)

		December 31, 2018	December 31, 2017
		(\$ in '000s)	(\$ in '000s)
<b>Actuarial Accrued Liability as of December 31:</b>	• Retired members and beneficiaries	\$5,696,148	\$5,428,099
	• Inactive vested members	243,463	234,639
	• Active members	3,436,786	3,324,323
	• Total Actuarial Accrued Liability <sup>(1)</sup>	9,376,397	8,987,061
	• Normal Cost for plan year beginning December 31	218,336	212,517
<b>Assets as of December 31:</b>	• Valuation Value of Assets (VVA) <sup>(2)</sup>	7,239,327	6,830,379
	• Market Value of Assets (MVA) <sup>(3)</sup>	6,734,526	6,980,597
	• VVA as a percentage of MVA	107.4%	97.8%
<b>Funded status as of December 31:</b>	• Unfunded Actuarial Accrued Liability on VVA basis	\$2,137,070	\$2,156,682
	• Funded percentage on VVA basis	77.2%	76.0%
	• Unfunded Actuarial Accrued Liability on MVA basis	\$2,641,871	\$2,006,464
	• Funded percentage on MVA basis	71.8%	77.7%
<b>Key assumptions:</b>	• Net investment return	7.25%	7.25%
	• Price Inflation	3.00%	3.00%
	• Payroll growth increase	3.50%	3.50%

<sup>(1)</sup> Excludes liabilities held for SRBR and other non-valuation reserves.

<sup>(2)</sup> Excludes Reserve for Interest Fluctuations (Contingency Reserve) if positive, Supplemental Retirees Benefit Reserve, and 401(h) Reserve.

<sup>(3)</sup> The Market Value of Assets as of December 31, 2018 equals the Valuation Value of Assets plus a proportion of the deferred market losses after netting out the balance in the Contingency Reserve that is commensurate with the size of the valuation reserves. The Market Value of Assets as of December 31, 2017 equals the Valuation Value of Assets plus one-half of the deferred market gains after adjustment to include the balance in the Contingency Reserve.

## Summary of Key Valuation Results (continued)

		December 31, 2018	December 31, 2017	Change From Prior Year
<b>Demographic data as of December 31:</b>	<b>Active Members:</b>			
	• Number of members	11,349	11,323	0.2%
	• Average age	47.0	47.1	-0.1
	• Average service	11.4	11.4	0.0
	• Total projected compensation	\$1,093,735,000	\$1,055,661,000	3.6%
	• Average projected compensation	\$96,373	\$93,232	3.4%
	<b>Retired Members and Beneficiaries:</b>			
	• Number of members:			
	– Service retired	7,628	7,379	3.4%
	– Disability retired	924	888	4.1%
	– Beneficiaries	1,231	1,212	1.6%
	– Total	9,783	9,479	3.2%
	• Average age	71.7	71.6	0.1
	• Average monthly benefit <sup>(1)</sup>	\$3,983	\$3,880	2.7%
	<b>Inactive Vested Members:</b>			
	• Number of members <sup>(2)</sup>	2,568	2,447	4.9%
	• Average Age	47.9	48.0	-0.1
<b>Total Members:</b>	<b>23,700</b>	<b>23,249</b>	<b>1.9%</b>	

<sup>(1)</sup> Excludes monthly benefits payable from the SRBR.

<sup>(2)</sup> Includes inactive members due a refund of member contributions.

## Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

<b>Plan of benefits</b>	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
<b>Participant data</b>	An actuarial valuation for a plan is based on data provided to the actuary by the Association. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
<b>Assets</b>	The valuation is based on the Market Value of Assets as of the valuation date, as provided by the Association. The Association uses a “Valuation Value of Assets” that differs from market value to gradually reflect six-month changes in the Market Value of Assets in determining the contribution requirements.
<b>Actuarial assumptions</b>	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan. Future contribution requirements may differ from those determined in the valuation because of:
  - Differences between actual experience and anticipated experience;
  - Changes in actuarial assumptions or methods;
  - Changes in statutory provisions; and
  - Differences between the contribution rates determined by the valuation and those adopted by the Board.
- If the Association is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of the Retirement Association, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Retirement Association.

## Section 2: Actuarial Valuation Results

### A. Member Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive vested members, retired members and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A, B, and C.*

#### MEMBER POPULATION: 2009 – 2018

Year Ended December 31	Active Members	Inactive Vested Members <sup>(1)</sup>	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives	Ratio of Retired Members and Beneficiaries to Actives
2009	10,927	1,816	7,333	9,149	0.84	0.67
2010	10,879	1,785	7,558	9,343	0.86	0.69
2011	10,724	1,796	7,906	9,702	0.90	0.74
2012	10,800	1,835	8,175	10,010	0.93	0.76
2013	10,877	1,902	8,566	10,468	0.96	0.79
2014	11,025	1,995	8,813	10,808	0.98	0.80
2015	11,071	2,027	8,990	11,017	1.00	0.81
2016	11,111	2,263	9,242	11,505	1.04	0.83
2017	11,323	2,447	9,479	11,926	1.05	0.84
2018	11,349	2,568	9,783	12,351	1.09	0.86

<sup>(1)</sup> Includes inactive members due a refund of member contributions.



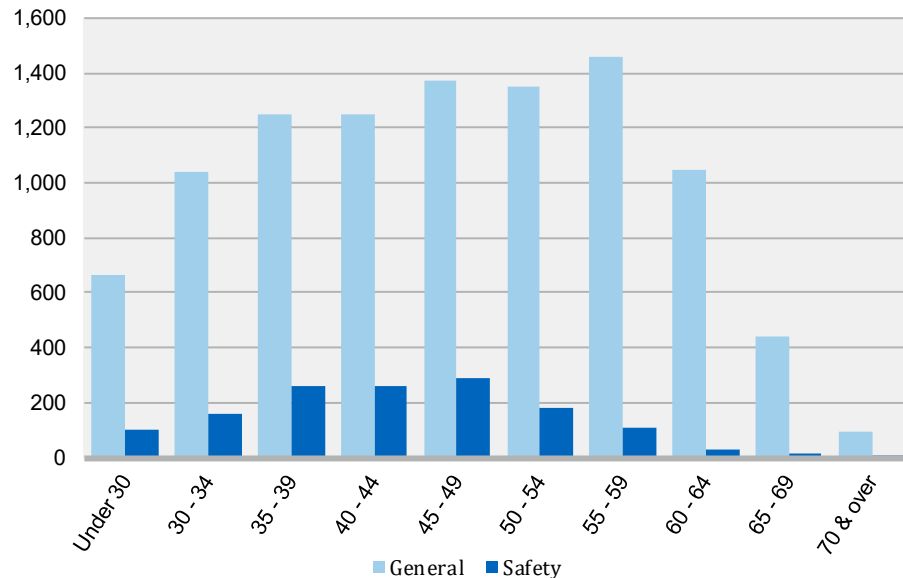
## Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 11,349 active members with an average age of 47.0, average years of service of 11.4 years and average compensation of \$96,373. The 11,323 active members in the prior valuation had an average age of 47.1, average service of 11.4 years and average compensation of \$93,232.

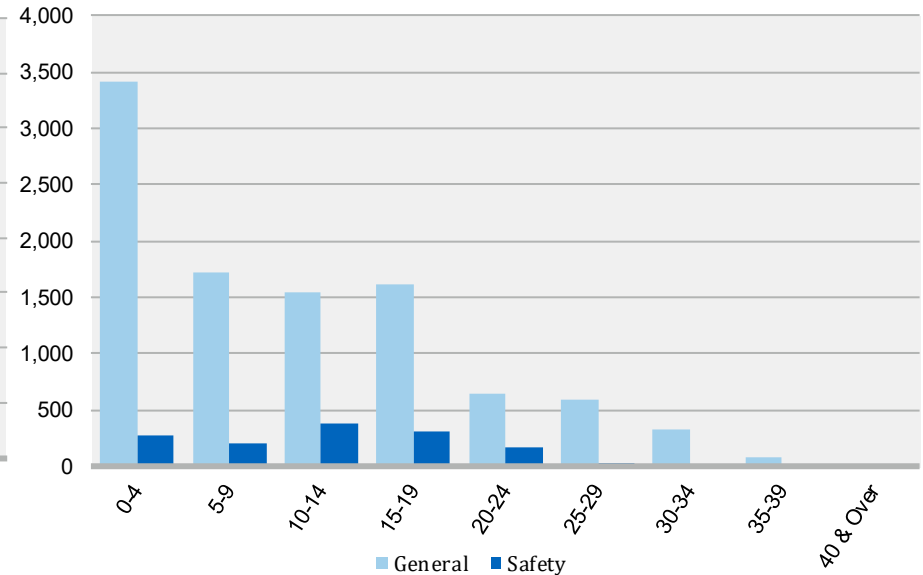
Among the active members, there were none with unknown age information.

### Distribution of Active Participants as of December 31, 2018

#### ACTIVES BY AGE



#### ACTIVES BY YEARS OF SERVICE



## Inactive Members

In this year's valuation, there were 2,568 members with a vested right to a deferred or immediate vested benefit versus 2,447 in the prior valuation.

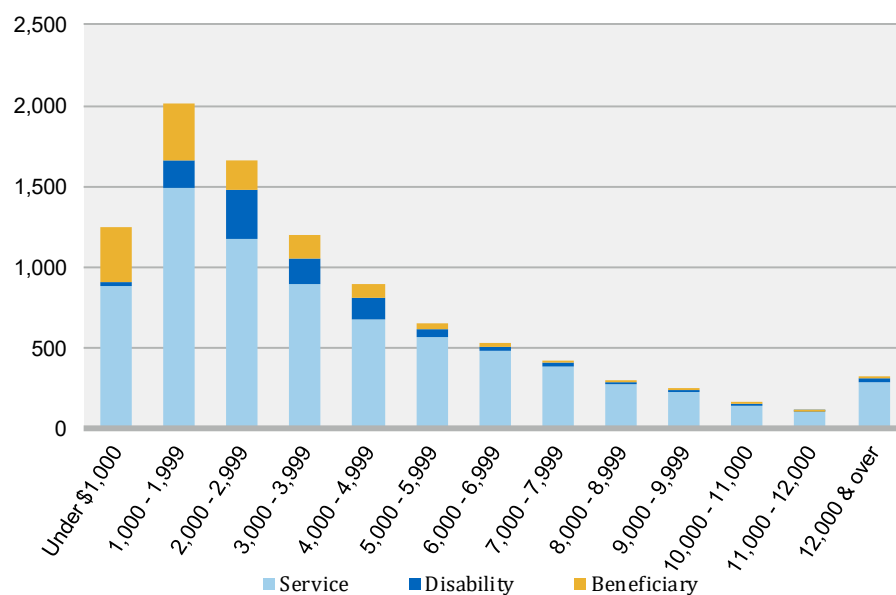
## Retired Members and Beneficiaries

As of December 31, 2018, 8,552 retired members and 1,231 beneficiaries were receiving total monthly benefits of \$38,968,811. For comparison, in the previous valuation, there were 8,267 retired members and 1,212 beneficiaries receiving monthly benefits of \$36,775,403. These monthly benefits exclude supplemental COLA benefits payable from the Supplemental Retirees Benefit Reserve (SRBR).

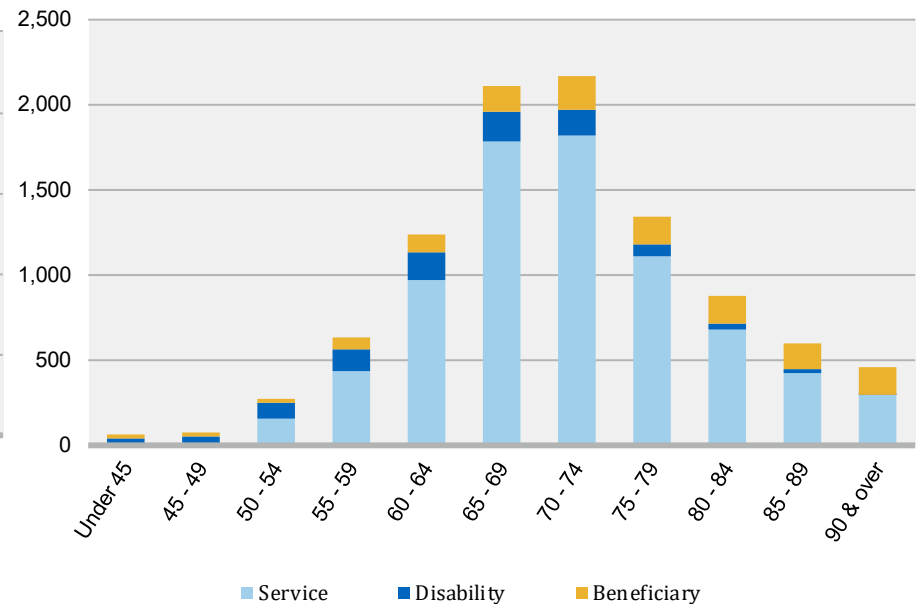
As of December 31, 2018, the average monthly benefit for retired members is \$4,221, compared to \$4,128 in the previous valuation. The average age for retired members is 71.2 in the current valuation, compared with 71.0 in the prior valuation. For beneficiaries as of December 31, 2018, the average monthly benefit is \$2,329, compared to \$2,187 in the previous valuation. The average age for beneficiaries is 75.2 in the current valuation, compared with 75.1 in the prior valuation.

### Distribution of Retired Members and Beneficiaries as of December 31, 2018

RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND AGE



## Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

### MEMBER DATA STATISTICS: 2009 – 2018

Year Ended December 31	Active Participants			Retired Members and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2009	10,927	47.2	11.5	7,333	70.5	\$2,914
2010	10,879	47.4	11.6	7,558	70.4	3,067
2011	10,724	47.7	11.8	7,906	70.5	3,190
2012	10,800	47.6	11.8	8,175	70.6	3,332
2013	10,877	47.3	11.5	8,566	70.7	3,442
2014	11,025	47.3	11.5	8,813	70.9	3,549
2015	11,071	47.3	11.6	8,990	71.1	3,648
2016	11,111	47.3	11.6	9,242	71.3	3,757
2017	11,323	47.1	11.4	9,479	71.6	3,880
2018	11,349	47.0	11.4	9,783	71.7	3,983

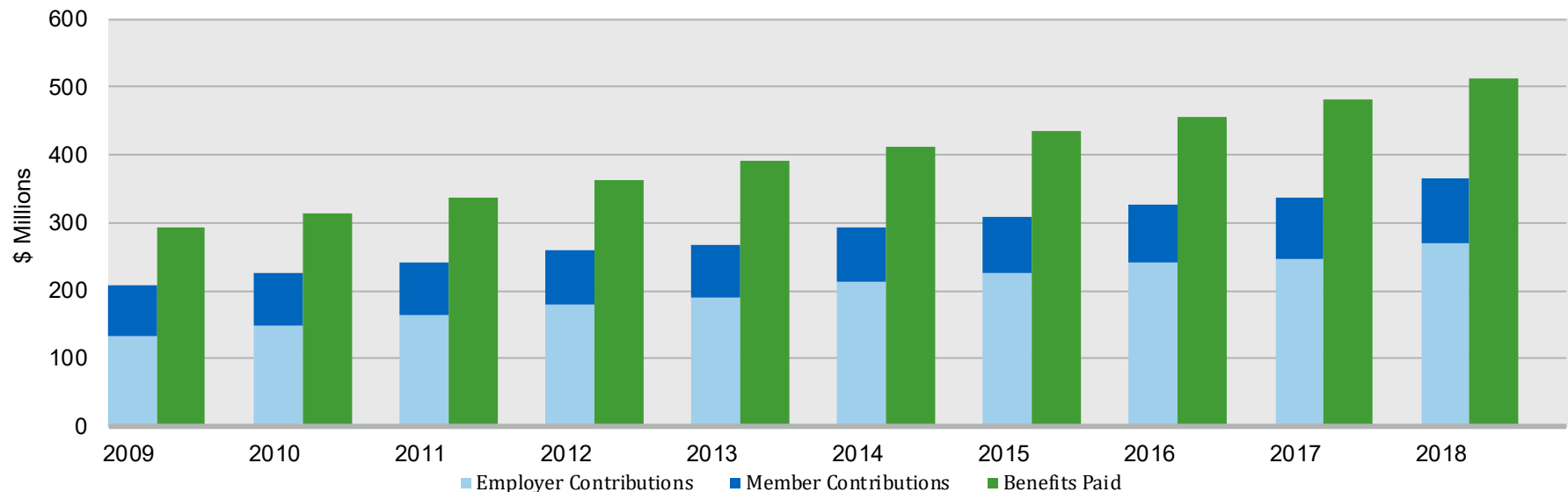
## B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions and investment earnings (less investment fees and administrative expenses) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of transactions for the valuation year, is presented in *Section 3, Exhibits D, E, F, and G.*

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

### COMPARISON OF CONTRIBUTIONS WITH BENEFITS FOR YEARS ENDED DECEMBER 31, 2009 – 2018



## DETERMINATION OF ACTUARIAL VALUE OF ASSETS

<b>1</b>	Market Value of Assets						\$7,592,586,569
<b>2</b>	Calculation of unrecognized return						
	<b>Six Month Period</b>		<b>Actual</b>	<b>Expected</b>	<b>Investment</b>	<b>Percent</b>	<b>Deferred</b>
	<b>From</b>	<b>To</b>	<b>Return</b>	<b>Return</b>	<b>Gain (Loss)</b>	<b>Deferred</b>	<b>Return</b>
a)	01/01/2014	06/30/2014	\$337,783,821	\$257,878,773	\$79,905,048	0%	\$0
b)	07/01/2014	12/31/2014	(71,755,579)	268,735,880	(340,491,459)	10	(34,049,146)
c)	01/01/2015	06/30/2015	210,088,252	263,436,620	(53,348,368)	20	(10,669,674)
d)	07/01/2015	12/31/2015	(230,048,258)	262,185,431	(492,233,689)	30	(147,670,107)
e)	01/01/2016	06/30/2016	75,639,795	251,178,961	(175,539,165)	40	(70,215,666)
f)	07/01/2016	12/31/2016	379,000,419	251,534,721	127,465,699	50	63,732,849
g)	01/01/2017	06/30/2017	658,890,554	263,335,665	395,554,890	60	237,332,934
h)	07/01/2017	12/31/2017	634,431,651	285,557,601	348,874,050	70	244,211,835
i)	01/01/2018	06/30/2018	86,346,238	306,788,550	(220,442,312)	80	(176,353,850)
j)	07/01/2018	12/31/2018	(457,457,856)	293,029,561	(750,487,417)	90	(675,438,676)
k)	Total unrecognized return <sup>(1)</sup>						\$(569,119,500)
<b>3</b>	Calculation of Preliminary Actuarial Value of Assets						
a)	Preliminary Actuarial Value of Assets <b>1 – 2k</b>						\$8,161,706,068
b)	Preliminary Actuarial Value as a Percentage of Market Value <b>3a ÷ 1</b>						107.5%
<b>4</b>	Adjustment to be within 40% corridor						0
<b>5</b>	Final Actuarial Value of Assets <b>3a + 4</b>						<u>\$8,161,706,068</u>
<b>6</b>	Non-valuation reserves and designations:						
a)	Reserve for Interest Fluctuations (Contingency Reserve), but no less than \$0						\$0
b)	Supplemental Retirees Benefit Reserve (SRBR)						919,488,617
c)	Other Non-Valuation Reserve (401(h) Reserve)						9,830,102
d)	SRBR Transfer to Employer Advance Reserve <sup>(2)</sup>						-6,939,808
e)	Subtotal						\$922,378,911
<b>7</b>	Final Valuation Value of Assets <b>5 – 6e</b>						<u>\$7,239,327,157</u>

Note: Results may be slightly off due to rounding.

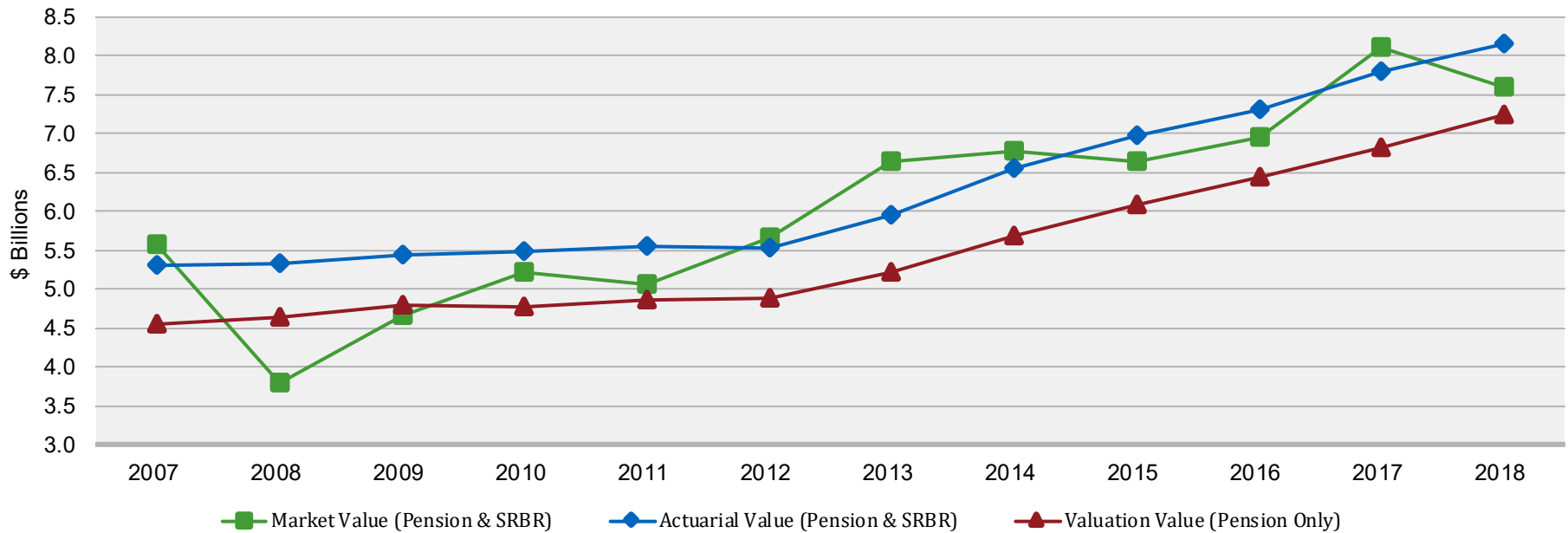
<sup>(1)</sup> Deferred return as of December 31, 2018 to be recognized in each of the next five years:

(a) Amount to be recognized on December 31, 2019	\$(198,080,409)
(b) Amount to be recognized on December 31, 2020	(104,138,220)
(c) Amount to be recognized on December 31, 2021	(32,553,588)
(d) Amount to be recognized on December 31, 2022	(159,298,541)
(e) Amount to be recognized on December 31, 2023	(75,048,742)
(f) Total deferred return as of December 31, 2018	\$(569,119,500)

<sup>(2)</sup> Estimate provided by ACERA.

The Market Value, Actuarial Value and Valuation Value of Assets are representations of the Plan’s financial status. As investment gains and losses are gradually taken into account, the Actuarial Value of Assets tracks the Market Value of Assets. The Valuation Value of Assets is the actuarial value, excluding any non-valuation reserves. The Valuation Value of Assets is significant because the Plan’s liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the Unfunded Actuarial Accrued Liability is an important element in determining the contribution requirement.

### MARKET VALUE , ACTUARIAL VALUE, AND VALUATION VALUE OF ASSETS AS OF DECEMBER 31, 2007 – 2018



### C. Actuarial Experience

To calculate any actuarially determined contribution, 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 measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the actuarially determined contribution will decrease from the previous year. On the other hand, the actuarially determined contribution will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year’s experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years. There are no assumption changes reflected in this report.

The total loss is \$12.4 million, which includes \$16.8 million from investment gains, a loss of \$31.5 million from contribution experience and \$2.3 in gains from all other sources. The net experience variation from individual sources other than investments and contributions was 0.02% of the Actuarial Accrued Liability. A discussion of the major components of the actuarial experience is on the following pages.

#### ACTUARIAL EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2018

<b>1</b>	Net gain from investments <sup>(1)</sup>	\$16,846,000
<b>2</b>	Net loss from contribution experience	(31,554,000)
<b>3</b>	Net gain from other experience <sup>(2)</sup>	<u>2,302,000</u>
<b>4</b>	Net experience loss: <b>1 + 2 + 3</b>	\$(12,406,000)

<sup>(1)</sup> Details on next page.

<sup>(2)</sup> See *Subsection E* for further details. Does not include the effect of plan or assumption changes, if any.

## Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. The rate of return on the Market Value of Assets was -4.62% for the year ended December 31, 2018.

For valuation purposes, the assumed rate of return on the Valuation Value of Assets is 7.25%. The actual rate of return on a valuation basis for the 2018 plan year was 7.50%. Since the actual return for the year was more than the assumed return, the Plan experienced an actuarial gain during the year ended December 31, 2018 with regard to its investments.

### INVESTMENT EXPERIENCE

	Year Ended December 31, 2018		
	Market Value	Actuarial Value	Valuation Value
<b>1</b> Net investment income	\$(371,111,618)	\$507,081,208	\$508,199,399
<b>2</b> Average value of assets	8,037,898,872	7,728,825,545	6,777,283,705
<b>3</b> Rate of return: <b>1 ÷ 2</b>	(4.62)%	6.56%	7.50%
<b>4</b> Assumed rate of return	7.25%	7.25%	7.25%
<b>5</b> Expected investment income: <b>2 x 4</b>	<u>\$582,747,668</u>	<u>\$560,339,852</u>	<u>\$491,353,069</u>
<b>6</b> Actuarial gain/(loss): <b>1 – 5</b>	<u>\$(953,859,286)</u>	<u>\$(53,258,644)</u>	<u>\$16,846,330</u>



Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial and valuation basis compared to the actual market value investment return for the last ten years, including averages over select time periods.

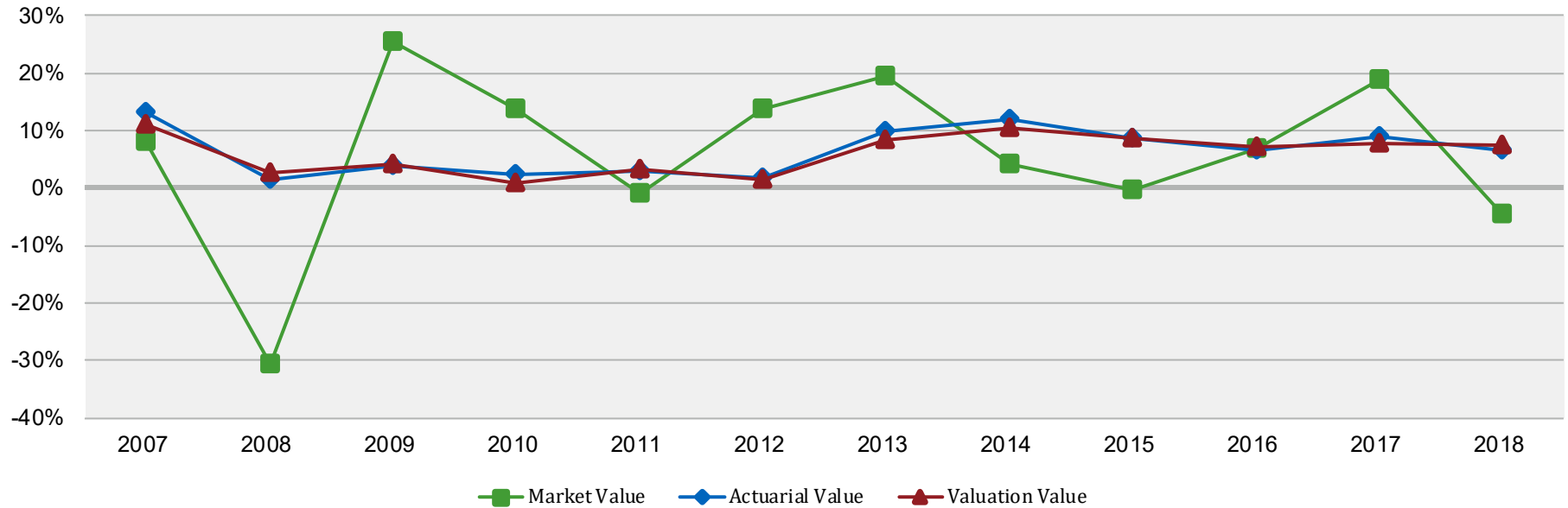
### INVESTMENT RETURN – MARKET VALUE, ACTUARIAL VALUE AND VALUATION VALUE: 2009 - 2018

Year Ended December 31	Market Value Investment Return		Actuarial Value Investment Return		Valuation Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent
2009	\$953,666,087	25.33%	\$208,175,576	3.94%	\$190,184,291	4.12%
2010	635,617,239	13.72%	122,091,092	2.26%	36,890,575	0.77%
2011	(53,810,165)	(1.04)%	164,671,046	3.03%	149,447,325	3.15%
2012	698,682,557	13.91%	91,936,980	1.67%	76,720,113	1.59%
2013	1,095,188,215	19.53%	533,248,385	9.73%	410,409,663	8.48%
2014	266,028,241	4.04%	710,015,277	12.05%	548,585,891	10.61%
2015	(19,960,005)	(0.30)%	569,295,018	8.78%	489,086,474	8.68%
2016	454,641,033	6.91%	452,144,779	6.53%	436,958,056	7.24%
2017	1,293,322,206	18.77%	640,343,891	8.85%	495,891,253	7.77%
2018	(371,111,618)	(4.62)%	507,081,208	6.56%	508,199,399	7.50%
Most recent five-year average return		4.67%		8.54%		8.35%
Most recent ten-year average return		9.21%		6.29%		5.94%

Note: Each year's yield is weighted by the average asset value in that year.

Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

### MARKET, ACTUARIAL AND VALUATION VALUE RATES OF RETURN FOR YEARS ENDED DECEMBER 31, 2007 – 2018



## Contributions

Contributions for the year ended December 31, 2018 totaled \$364.4 million, compared to the projected amount of \$394.9 million. This resulted in a loss of \$31.5 million for the year,<sup>11</sup> when adjusted for timing.

## Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected),
- salary increases (greater or smaller than projected), and
- cost-of-living adjustments (COLAs) higher or lower than anticipated.

The net gain from this other experience for the year ended December 31, 2018 amounted to \$2.3 million, which is 0.02% of the Actuarial Accrued Liability. See *Subsection E* for a detailed development of the Unfunded Actuarial Accrued Liability.

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<sup>11</sup> Including scheduled delay in implementing contribution rates after the date of the valuation.

## **D. Other Changes in the Actuarial Accrued Liability**

The Actuarial Accrued Liability as of December 31, 2018 is \$9.4 billion, an increase of \$0.4 billion, or 4.3%, from the Actuarial Accrued Liability as of the prior valuation date. The liability is expected to grow each year with Normal Cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

### **Actuarial Assumptions**

- There are no assumption changes reflected in this report.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

### **Plan Provisions**

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 4, Exhibit II*.

## E. Development of Unfunded/(Overfunded) Actuarial Accrued Liability

DEVELOPMENT FOR YEAR ENDED DECEMBER 31, 2018

(\$ IN 000'S)

<b>1</b>	Unfunded Actuarial Accrued Liability at beginning of year	\$2,156,682
<b>2</b>	Total Normal Cost at middle of year	212,517
<b>3</b>	Expected employer and member contributions	(394,869)
<b>4</b>	Interest	<u>150,334</u>
<b>5</b>	Expected Unfunded Actuarial Accrued Liability at end of year	\$2,124,664
<b>6</b>	Changes due to:	
	a) Investment return greater than expected	\$(16,846)
	b) Actual contributions less than expected <sup>(1)</sup>	31,554
	c) Individual salary increases higher than expected	16,403
	d) Other experience gain	<u>(18,705)</u>
	Total changes	<u>\$12,406</u>
<b>7</b>	Unfunded Actuarial Accrued Liability at end of year	<u>\$2,137,070</u>

Note: The sum of items 6c through 6d equals the "Net gain from other experience" shown in *Subsection C*.

<sup>(1)</sup> Including scheduled delay in implementing contribution rates after the date of the valuation.

## F. Recommended Contribution

The recommended contribution is equal to the employer Normal Cost payment and a payment on the Unfunded Actuarial Accrued Liability. As of December 31, 2018, the average recommended employer contribution is 27.96% of compensation.

The Board sets the funding policy used to calculate the recommended contribution based on layered amortization periods. See *Section 4, Exhibit I* for further details on the funding policy.

The contribution requirement as of December 31, 2018 is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

### AVERAGE RECOMMENDED EMPLOYER CONTRIBUTION<sup>12</sup> FOR YEAR ENDING DECEMBER 31

All Tiers Combined	2018		2017	
	Amount (\$ in '000s)	% of Projected Compensation	Amount (\$ in '000s)	% of Projected Compensation
<b>1</b> Total Normal Cost	\$218,336	19.96%	\$212,517	20.13%
<b>2</b> Expected member contributions	<u>-102,139</u>	<u>-9.34%</u>	<u>-98,938</u>	<u>-9.37%</u>
<b>3</b> Employer Normal Cost: <b>1 + 2</b>	\$116,197	10.62%	\$113,579	10.76%
<b>4</b> Actuarial Accrued Liability	9,376,397		8,987,061	
<b>5</b> Valuation Value of Assets	<u>7,239,327</u>		<u>6,830,379</u>	
<b>6</b> Unfunded Actuarial Accrued Liability: <b>4 - 5</b>	\$2,137,070		\$2,156,682	
<b>7</b> Payment on Unfunded Actuarial Accrued Liability	\$189,661	17.34%	\$182,352	17.27%
<b>8</b> Total average recommended employer contribution: <b>3 + 7</b>	\$305,858	<u>27.96%</u>	\$295,931	<u>28.03%</u>
<b>9</b> Projected compensation	\$1,093,735		\$1,055,661	

Note: Contributions are assumed to be paid at the middle of the year.

<sup>12</sup> For employers with active member payroll. The UAAL contribution for ACOE, expressed as a level dollar amount, is \$78 K when made on April 1, 2020.

## Reconciliation of Average Recommended Employer Contribution Rate

The chart below details the changes in the average recommended employer contribution rate from the prior valuation to the current year's valuation.

### RECONCILIATION OF AVERAGE RECOMMENDED EMPLOYER CONTRIBUTION RATE FROM DECEMBER 31, 2017 TO DECEMBER 31, 2018

	Contribution Rate	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
Average Recommended Employer Contribution Rate as of December 31, 2017 <sup>(2)</sup>	27.82%	\$304,330
Effect of Actuarial Experience during 2018		
• Effect of investment return (greater) than expected	(0.11)%	\$(1,203)
• Effect of actual contributions less than expected	0.21%	2,297
• Effect of individual salary increases higher than expected	0.09%	984
• Net effect of amortizing prior year's UAAL over smaller/(larger) expected projected payroll within each cost group <sup>(3)</sup>	0.12%	1,312
• Effect of changes in member demographics on Normal Cost	(0.03)%	(328)
• Net effect of other experience	<u>(0.14)%</u>	<u>(1,534)</u>
Total Change	0.14%	\$1,528
Average Recommended Employer Contribution Rate as of December 31, 2018	27.96%	\$305,858

<sup>(1)</sup> Based on December 31, 2018 projected compensation.

<sup>(2)</sup> Determined by applying the recommended employer contribution rates as of December 31, 2017 to the projected compensation as of December 31, 2018 by cost group, membership class and tier.

<sup>(3)</sup> The prior year's UAAL is amortized over a smaller than expected projected payroll for Safety members and a slightly larger than expected projected payroll for General members.

## Reconciliation of Average Recommended Member Contribution Rate

The chart below details the changes in the average recommended member contribution rate from the prior valuation to the current year's valuation.

### RECONCILIATION OF AVERAGE RECOMMENDED MEMBER CONTRIBUTION RATE FROM DECEMBER 31, 2017 TO DECEMBER 31, 2018

	Contribution Rate	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
Average Recommended Member Contribution Rate as of December 31, 2017	9.34%	\$102,115
• Effect of changes in member demographics	<u>0.00%</u>	<u>24</u>
Total Change	0.00%	\$24
Average Recommended Member Contribution Rate as of December 31, 2018	9.34%	\$102,139

<sup>(1)</sup> Based on December 31, 2018 projected compensation.



## Recommended Employer Contribution Rates<sup>13</sup>

County Only	December 31, 2018 Actuarial Valuation				December 31, 2017 Actuarial Valuation			
	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
<b>General Tier 1 Members</b>								
Normal Cost	7.55%	2.73%	10.28%	\$887	7.52%	2.64%	10.16%	\$876
UAAL (Before POB Credit)	13.53%	4.53%	18.06%	1,558	13.61%	4.55%	18.16%	1,566
Pension Obligation Bond Credit	-3.64%	-1.57%	-5.21%	-449	-3.66%	-1.60%	-5.26%	-454
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-71</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-66</u>
Total Contributions	16.62%	5.69%	22.31%	\$1,925	16.71%	5.59%	22.30%	\$1,922
<b>General Tier 2 Members</b>								
Normal Cost	7.77%	1.60%	9.37%	\$37,043	7.82%	1.61%	9.43%	\$37,280
UAAL (Before POB Credit)	13.53%	4.53%	18.06%	71,397	13.61%	4.55%	18.16%	71,793
Pension Obligation Bond Credit	-3.64%	-1.57%	-5.21%	-20,597	-3.66%	-1.60%	-5.26%	-20,795
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-3,242</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-3,005</u>
Total Contributions	16.84%	4.56%	21.40%	\$84,601	17.01%	4.56%	21.57%	\$85,273
<b>General Tier 4 Members</b>								
Normal Cost	7.18%	1.62%	8.80%	\$16,119	7.13%	1.63%	8.76%	\$16,046
UAAL (Before POB Credit)	13.53%	4.53%	18.06%	33,081	13.61%	4.55%	18.16%	33,264
Pension Obligation Bond Credit	-3.64%	-1.57%	-5.21%	-9,543	-3.66%	-1.60%	-5.26%	-9,635
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-1,502</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-1,392</u>
Total Contributions	16.25%	4.58%	20.83%	\$38,155	16.32%	4.58%	20.90%	\$38,283

<sup>(1)</sup> Amounts are based on the December 31, 2018 projected compensation shown on page 39.

<sup>13</sup> For employers with active member payroll. The UAAL contribution for ACOE, expressed as a level dollar amount, is \$78 K when made on April 1, 2020.

## Recommended Employer Contribution Rates (continued)

County Only	December 31, 2018 Actuarial Valuation				December 31, 2017 Actuarial Valuation			
	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
<b>Safety Tier 1 Members</b>								
Normal Cost	28.37%	11.61%	39.98%	\$389	26.38%	10.86%	37.24%	\$362
Member Cost Sharing Contributions (Adjusted for Refunds)	-3.00%	0.00%	-3.00%	-29	-3.00%	0.00%	-3.00%	-29
UAAL (Before POB Credit)	37.80%	11.78%	49.58%	482	36.65%	11.30%	47.95%	467
Pension Obligation Bond Credit	-3.17%	-1.97%	-5.14%	-50	-3.08%	-1.94%	-5.02%	-49
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-8</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-7</u>
Total Contributions	59.18%	21.42%	80.60%	\$784	56.19%	20.22%	76.41%	\$744
<b>Safety Tier 2 Members</b>								
Normal Cost	17.96%	3.69%	21.65%	\$25,887	18.18%	3.76%	21.94%	\$26,234
Member Cost Sharing Contributions (Adjusted for Refunds)	-2.93%	0.00%	-2.93%	-3,503	-2.92%	0.00%	-2.92%	-3,491
UAAL (Before POB Credit)	37.80%	11.78%	49.58%	59,283	36.65%	11.30%	47.95%	57,334
Pension Obligation Bond Credit	-3.17%	-1.97%	-5.14%	-6,146	-3.08%	-1.94%	-5.02%	-6,002
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-980</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-909</u>
Total Contributions	48.84%	13.50%	62.34%	\$74,541	48.07%	13.12%	61.19%	\$73,166
<b>Safety Tier 2C Members</b>								
Normal Cost	16.51%	3.50%	20.01%	\$670	16.71%	3.66%	20.37%	\$682
Member Cost Sharing Contributions (Adjusted for Refunds)	0.00%	0.00%	0.00%	0	0.00%	0.00%	0.00%	0
UAAL (Before POB Credit)	37.80%	11.78%	49.58%	1,660	36.65%	11.30%	47.95%	1,606
Pension Obligation Bond Credit	-3.17%	-1.97%	-5.14%	-172	-3.08%	-1.94%	-5.02%	-168
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-27</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-25</u>
Total Contributions	50.32%	13.31%	63.63%	\$2,131	49.52%	13.02%	62.54%	\$2,095

<sup>(1)</sup> Amounts are based on the December 31, 2018 projected compensation shown on page 39.

## Recommended Employer Contribution Rates (continued)

County Only	December 31, 2018 Actuarial Valuation				December 31, 2017 Actuarial Valuation			
	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
<b>Safety Tier 2D Members</b>								
Normal Cost	17.22%	3.69%	20.91%	\$3,009	16.93%	3.67%	20.60%	\$2,965
Member Cost Sharing Contributions (Adjusted for Refunds)	-2.93%	0.00%	-2.93%	-422	-3.13%	0.00%	-3.13%	-450
UAAL (Before POB Credit)	37.80%	11.78%	49.58%	7,136	36.65%	11.30%	47.95%	6,901
Pension Obligation Bond Credit	-3.17%	-1.97%	-5.14%	-740	-3.08%	-1.94%	-5.02%	-722
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-118</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-109</u>
Total Contributions	48.10%	13.50%	61.60%	\$8,865	46.61%	13.03%	59.64%	\$8,585
<b>Safety Tier 4 Members</b>								
Normal Cost	12.29%	3.29%	15.58%	\$5,389	12.39%	3.36%	15.75%	\$5,447
Member Cost Sharing Contributions (Adjusted for Refunds)	0.00%	0.00%	0.00%	0	0.00%	0.00%	0.00%	0
UAAL (Before POB Credit)	37.80%	11.78%	49.58%	17,148	36.65%	11.30%	47.95%	16,584
Pension Obligation Bond Credit	-3.17%	-1.97%	-5.14%	-1,778	-3.08%	-1.94%	-5.02%	-1,736
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-284</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-263</u>
Total Contributions	46.10%	13.10%	59.20%	\$20,475	45.20%	12.72%	57.92%	\$20,032
<b>All County Categories Combined</b>								
Normal Cost	9.68%	2.08%	11.76%	\$89,393	9.72%	2.11%	11.83%	\$89,892
Member Cost Sharing Contributions (Adjusted for Refunds)	-0.52%	0.00%	-0.52%	-3,954	-0.52%	0.00%	-0.52%	-3,970
UAAL (Before POB Credit)	19.05%	6.18%	25.23%	191,745	18.85%	6.09%	24.94%	189,515
Pension Obligation Bond Credit	-3.53%	-1.66%	-5.19%	-39,475	-3.53%	-1.68%	-5.21%	-39,561
Implicit Retiree Health Benefit Subsidy	<u>-0.82%</u>	<u>0.00%</u>	<u>-0.82%</u>	<u>-6,232</u>	<u>-0.76%</u>	<u>0.00%</u>	<u>-0.76%</u>	<u>-5,776</u>
Total Contributions	23.86%	6.60%	30.46%	\$231,477	23.76%	6.52%	30.28%	\$230,100

<sup>(1)</sup> Amounts are based on the December 31, 2018 projected compensation shown on page 39.

## Recommended Employer Contribution Rates (continued)

AHS, Court & First 5 Only	December 31, 2018 Actuarial Valuation				December 31, 2017 Actuarial Valuation			
	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
<b>General Tier 1 Members</b>								
Normal Cost	7.55%	2.73%	10.28%	\$221	7.52%	2.64%	10.16%	\$218
UAAL (Before POB Credit)	13.53%	4.53%	18.06%	387	13.61%	4.55%	18.16%	390
Pension Obligation Bond Credit	<u>-3.64%</u>	<u>-1.57%</u>	<u>-5.21%</u>	<u>-112</u>	<u>-3.66%</u>	<u>-1.60%</u>	<u>-5.26%</u>	<u>-113</u>
Total Contributions	17.44%	5.69%	23.13%	\$496	17.47%	5.59%	23.06%	\$495
<b>General Tier 2 Members</b>								
Normal Cost	7.77%	1.60%	9.37%	\$19,211	7.82%	1.61%	9.43%	\$19,334
UAAL (Before POB Credit)	13.53%	4.53%	18.06%	37,028	13.61%	4.55%	18.16%	37,233
Pension Obligation Bond Credit	<u>-3.64%</u>	<u>-1.57%</u>	<u>-5.21%</u>	<u>-10,682</u>	<u>-3.66%</u>	<u>-1.60%</u>	<u>-5.26%</u>	<u>-10,784</u>
Total Contributions	17.66%	4.56%	22.22%	\$45,557	17.77%	4.56%	22.33%	\$45,783
<b>General Tier 4 Members</b>								
Normal Cost	7.18%	1.62%	8.80%	\$10,307	7.13%	1.63%	8.76%	\$10,260
UAAL (Before POB Credit)	13.53%	4.53%	18.06%	21,152	13.61%	4.55%	18.16%	21,269
Pension Obligation Bond Credit	<u>-3.64%</u>	<u>-1.57%</u>	<u>-5.21%</u>	<u>-6,102</u>	<u>-3.66%</u>	<u>-1.60%</u>	<u>-5.26%</u>	<u>-6,161</u>
Total Contributions	17.07%	4.58%	21.65%	\$25,357	17.08%	4.58%	21.66%	\$25,368

<sup>(1)</sup> Amounts are based on the December 31, 2018 projected compensation shown on page 39.

## Recommended Employer Contribution Rates (continued)

Housing Authority	December 31, 2018 Actuarial Valuation				December 31, 2017 Actuarial Valuation			
	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
<b>General Tier 1 Members</b>								
Normal Cost	7.55%	2.73%	10.28%	\$336	7.52%	2.64%	10.16%	\$332
UAAL	<u>13.53%</u>	<u>4.53%</u>	<u>18.06%</u>	<u>590</u>	<u>13.61%</u>	<u>4.55%</u>	<u>18.16%</u>	<u>594</u>
Total Contributions	21.08%	7.26%	28.34%	\$926	21.13%	7.19%	28.32%	\$926
<b>General Tier 2 Members</b>								
Normal Cost	7.77%	1.60%	9.37%	\$33	7.82%	1.61%	9.43%	\$34
UAAL	<u>13.53%</u>	<u>4.53%</u>	<u>18.06%</u>	<u>64</u>	<u>13.61%</u>	<u>4.55%</u>	<u>18.16%</u>	<u>65</u>
Total Contributions	21.30%	6.13%	27.43%	\$97	21.43%	6.16%	27.59%	\$99
<b>General Tier 4 Members</b>								
Normal Cost	7.18%	1.62%	8.80%	\$99	7.13%	1.63%	8.76%	\$99
UAAL	<u>13.53%</u>	<u>4.53%</u>	<u>18.06%</u>	<u>204</u>	<u>13.61%</u>	<u>4.55%</u>	<u>18.16%</u>	<u>205</u>
Total Contributions	20.71%	6.15%	26.86%	\$303	20.74%	6.18%	26.92%	\$304

<sup>(1)</sup> Amounts are based on the December 31, 2018 projected compensation shown on page 39.

## Recommended Employer Contribution Rates (continued)

LARPD	December 31, 2018 Actuarial Valuation				December 31, 2017 Actuarial Valuation			
	Basic	COLA	Total <sup>(1)</sup>	Estimated Annual Dollar Amount <sup>(2)</sup> (\$ in '000s)	Basic	COLA	Total <sup>(1)</sup>	Estimated Annual Dollar Amount <sup>(2)</sup> (\$ in '000s)
<b>General Tier 1 Members</b>								
Normal Cost	7.55%	2.73%	10.28%	\$69	7.52%	2.64%	10.16%	\$68
UAAL	<u>15.70%</u>	<u>7.64%</u>	<u>23.34%</u>	<u>156</u>	<u>13.61%</u>	<u>4.55%</u>	<u>18.16%</u>	<u>122</u>
Total Contributions	23.25%	10.37%	33.62%	\$225	21.13%	7.19%	28.32%	\$190
<b>General Tier 3 Members</b>								
Normal Cost	10.92%	4.15%	15.07%	\$309	11.22%	4.19%	15.41%	\$316
UAAL	<u>15.70%</u>	<u>7.64%</u>	<u>23.34%</u>	<u>479</u>	<u>10.38%</u>	<u>3.98%</u>	<u>14.36%</u>	<u>295</u>
Total Contributions	26.62%	11.79%	38.41%	\$788	21.60%	8.17%	29.77%	\$611
<b>General Tier 4 Members</b>								
Normal Cost	7.18%	1.62%	8.80%	\$173	7.13%	1.63%	8.76%	\$172
UAAL	<u>15.70%</u>	<u>7.64%</u>	<u>23.34%</u>	<u>459</u>	<u>10.38%</u>	<u>3.98%</u>	<u>14.36%</u>	<u>282</u>
Total Contributions	22.88%	9.26%	32.14%	\$632	17.51%	5.61%	23.12%	\$454

<sup>(1)</sup> For LARPD, the combined rate is 35.10% as of December 31, 2018 and 26.78% as of December 31, 2017.

<sup>(2)</sup> Amounts are based on the December 31, 2018 projected compensation shown on page 39.

## Recommended Employer Contribution Rates (continued)

All Categories Combined	December 31, 2018 Actuarial Valuation				December 31, 2017 Actuarial Valuation			
	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)	Basic	COLA	Total	Estimated Annual Dollar Amount <sup>(1)</sup> (\$ in '000s)
<b>All Categories Combined</b>								
Normal Cost (Net)	8.67%	1.95%	10.62%	\$116,197	8.71%	1.96%	10.67%	\$116,755
UAAL (Net)	<u>13.27%</u>	<u>4.07%</u>	<u>17.34%</u>	<u>189,661</u>	<u>13.17%</u>	<u>3.98%</u>	<u>17.15%</u>	<u>187,575</u>
Total Contributions	21.94%	6.02%	27.96%	\$305,858	21.88%	5.94%	27.82%	\$304,330

<sup>(1)</sup> Amounts are based on the December 31, 2018 projected compensation shown below

Payroll Breakdown					
	County Only	AHS, Court, & First 5	Housing Authority	LARPD	Total
General Tier 1	\$8,626	\$2,145	\$3,269	\$670	\$14,710
General Tier 2	395,334	205,025	356		600,715
General Tier 3				2,051	2,051
General Tier 4	183,173	117,121	1,127	1,966	303,387
Safety Tier 1	973				973
Safety Tier 2	119,571				119,571
Safety Tier 2C	3,349				3,349
Safety Tier 2D	14,392				14,392
Safety Tier 4	34,587				34,587
Total	\$760,005	\$324,291	\$4,752	\$4,687	\$1,093,735

## Recommended Employer Contribution Rates (continued)

A breakdown of the approximate portion of the employer contribution rate by the various types of benefit is as follows:

	General	Safety
Service and non-service connected disability benefits	8%	24%
Service retirement and other benefits	92%	76%
<b>Total</b>	<b>100%</b>	<b>100%</b>

Note: In developing these percentages, we made the simplifying assumption that the liability for active and inactive members (including members who have already retired) can be approximated by the proportion of the normal cost required to fund disability and non-disability benefits.

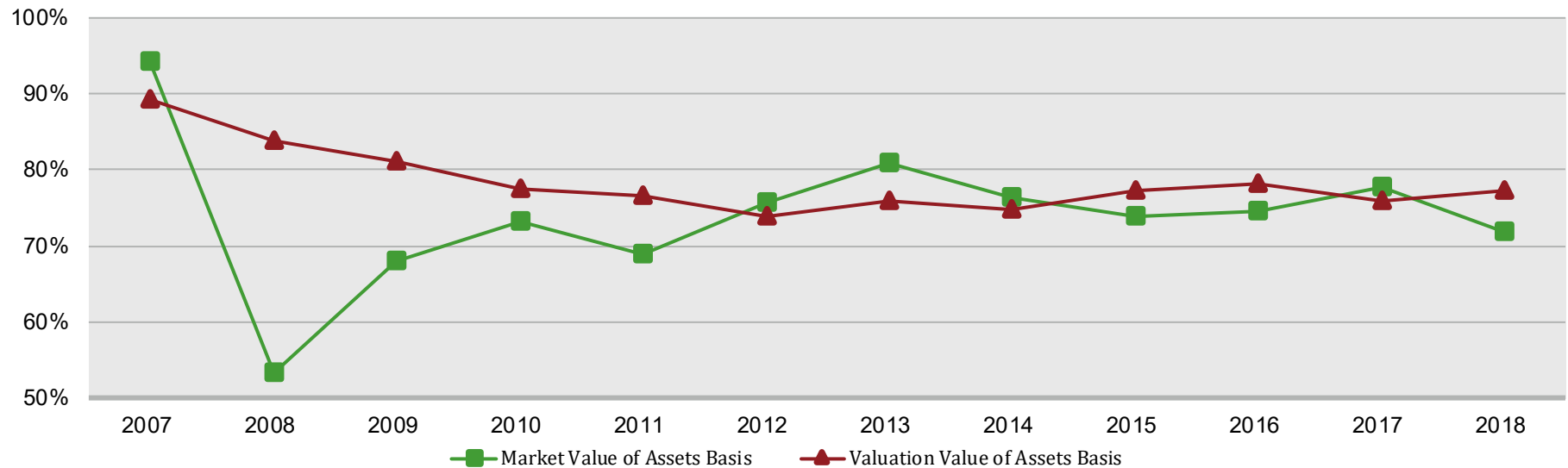


## G. Funded Status

A commonly reported piece of information regarding the Plan's financial status is the funded ratio. These ratios compare the Market and Valuation Value of Assets to the Actuarial Accrued Liability of the Plan. High ratios indicate a well-funded plan with assets sufficient to cover the Plan's Actuarial Accrued Liability. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other changes. The chart below depicts a history of the funded ratio for the Plan. The chart on the next page shows the Plan's schedule of funding progress for the last ten years.

The funded status measures shown in this valuation are appropriate for assessing the need for or amount of future contributions. However, they are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. As the chart below shows, the measures are different depending on whether the Market or Valuation Value of Assets is used.

**FUNDED RATIO  
FOR PLAN YEARS ENDING DECEMBER 31, 2007 – 2018<sup>(1)</sup>**



<sup>(1)</sup> Prior to the December 31, 2013 valuation, the Funded Ratio on a Market Value basis was calculated using the end-of-year Valuation Value of Assets plus any deferred market gains. Beginning with the December 31, 2013 valuation, the Market Value of Assets for this purpose includes either one-half of any deferred market gains (after adjustment to include the balance in the Contingency Reserve) or a proportion of any deferred investment losses after netting out the Contingency Reserve that is commensurate with the size of the valuation reserves.

**SCHEDULE OF FUNDING PROGRESS  
FOR PLAN YEARS ENDING JUNE 30, 2009 – 2018**

(\$ in '000s)

Actuarial Valuation Date as of December 31	Valuation Value of Assets <sup>(1)</sup> (a)	Actuarial Accrued Liability (AAL) <sup>(2)</sup> (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll (%) [(b) - (a)] / (c)
2009	\$4,789,000	\$5,899,331	\$1,110,331	81.2%	\$882,606	125.8%
2010	4,776,128	6,162,740	1,386,612	77.5	898,342	154.4
2011	4,868,689	6,359,483	1,490,794	76.6	892,489	167.0
2012	4,883,872	6,612,929	1,729,057	73.9	906,500	190.7
2013	5,210,944	6,861,687	1,650,743	75.9	916,803	180.1
2014	5,681,097	7,592,072	1,910,975	74.8	948,848	201.4
2015	6,083,536	7,875,020	1,791,484	77.3	969,534	184.8
2016	6,436,138	8,237,715	1,801,577	78.1	1,003,651	179.5
2017	6,830,379	8,987,061	2,156,682	76.0	1,055,661	204.3
2018	7,239,327	9,376,397	2,137,070	77.2	1,093,735	195.4

<sup>(1)</sup> Excludes assets for SRBR and other non-valuation reserves, and includes the following (whole dollar) reimbursement amounts of implicit retiree health benefit subsidy paid by the County (amounts beginning with the December 31, 2010 valuation date are estimates provided by ACERA):

Actuarial Valuation Date	Reimbursement Amount	For Year	Actuarial Valuation Date	Reimbursement Amount	For Year
12/31/2009	\$5,287,767	2009	12/31/2014	\$5,215,355	2014
12/31/2010	4,500,000	2010	12/31/2015	5,324,502	2015
12/31/2011	4,411,206	2011	12/31/2016	8,865,275	2016
12/31/2012	7,370,466	2012	12/31/2017	5,830,283	2017
12/31/2013	6,993,032	2013	12/31/2018	6,939,808	2018

<sup>(2)</sup> Excludes liabilities for SRBR and other non-valuation reserves.

## H. Actuarial Balance Sheet

An overview of the Plan’s funding is given by an Actuarial Balance Sheet. In this approach, the amount and timing of all future payments that will be made by the Plan for current participants is determined first. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the Actuarial Present Value of Future Benefits of the Plan.

Second, this Actuarial Present Value of Future Benefits is compared to the assets. The “assets” for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer Normal Cost contributions, and the present value of future employer amortization payments for the Unfunded Actuarial Accrued Liability.

### ACTUARIAL BALANCE SHEET FOR YEAR ENDED DECEMBER 31, 2018

	Basic (\$ in '000s)	COLA (\$ in '000s)	Total (\$ in '000s)
Actuarial Present Value of Future Benefits			
• Present value of benefits for retired members and beneficiaries	\$3,542,298	\$2,153,850	\$5,696,148
• Present value of benefits for inactive vested members	205,875	37,588	243,463
• Present value of benefits for active members	4,140,067	975,292	5,115,359
<b>Total Actuarial Present Value of Future Benefits</b>	<b><u>\$7,888,240</u></b>	<b><u>\$3,166,730</u></b>	<b><u>\$11,054,970</u></b>
Current and future assets			
• Total Valuation Value of Assets	\$4,912,371	\$2,326,956	\$7,239,327
• Present value of future contributions by members	679,720	170,526	850,246
• Present value of future employer contributions for:			
» Entry age Normal Cost	684,113	144,214	828,327
» Unfunded Actuarial Accrued Liability	1,612,036	525,034	2,137,070
<b>Total of current and future assets</b>	<b><u>\$7,888,240</u></b>	<b><u>\$3,166,730</u></b>	<b><u>\$11,054,970</u></b>

## I. Volatility Ratios

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the Market Value of Assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measurement since it is based on the current level of assets.

The current AVR is about 6.2. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 6.2% of one-year's payroll. Since actuarial gains and losses are amortized over 20 years, there would be a 0.4% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities. For example, if a plan is 50% funded on a market value basis, the liability volatility ratio would be double the asset volatility ratio and the plan sponsor should expect contribution volatility to increase over time as the plan becomes better funded.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current LVR is about 8.6. This is about 39% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long term.

The chart on the next page shows how the asset and liability volatility ratios have varied over time.

## VOLATILITY RATIOS FOR YEARS ENDED DECEMBER 31, 2009 – 2018

Year Ended December 31	Asset Volatility Ratio <sup>(1)(2)</sup>				Liability Volatility Ratio <sup>(2)</sup>			
	General (non-LARPD)	General (LARPD)	Safety	Total	General (non-LARPD)	General (LARPD)	Safety	Total
2009	4.2	3.0	6.1	4.5	5.9	5.0	10.6	6.7
2010	4.6	3.9	7.0	5.0	6.0	5.6	11.2	6.9
2011	4.5	4.2	7.0	4.9	6.2	6.8	11.9	7.1
2012	5.0	4.9	8.2	5.5	6.3	7.0	12.7	7.3
2013	5.5	5.7	9.1	6.1	6.4	7.4	13.1	7.5
2014	5.5	5.9	9.3	6.1	6.9	7.7	13.9	8.0
2015	5.5	5.7	8.8	6.0	7.0	7.3	13.7	8.1
2016	5.6	6.1	8.9	6.1	7.1	7.7	13.8	8.2
2017	6.0	7.6	9.8	6.6	7.3	9.1	14.6	8.5
2018	5.5	9.0	9.5	6.2	7.3	12.5	15.1	8.6

- <sup>(1)</sup> Prior to the December 31, 2013 valuation, the Asset Volatility Ratio was calculated using the end-of-year Valuation Value of Assets plus any deferred market gains. Beginning with the December 31, 2013 valuation, the adjusted Valuation Value of Assets for this purpose includes either one-half of any deferred market gains (after restoring the Contingency Reserve to 1% of total assets, if applicable) or a proportion of any deferred investment losses after netting out the Contingency Reserve that is commensurate with the size of the valuation reserves.
- <sup>(2)</sup> Prior to the December 31, 2018 valuation, volatility ratios for the General (non-LARPD) group were calculated including assets, liabilities, and payroll attributable to Tier 1 members from the Livermore Area Recreation and Park District (LARPD) and the Alameda County Office of Education (payroll was \$0 as of December 31, 2017). Beginning with the December 31, 2018 valuation, the assets, liabilities, and payroll attributable to LARPD Tier 1 members are included in calculating the volatility ratios for the General (LARPD) group, and the assets and liabilities attributable to Office of Education Tier 1 members are excluded from this table.

## Section 3: Supplemental Information

### EXHIBIT A – TABLE OF PLAN COVERAGE TOTAL PLAN

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	11,349	11,323	0.2%
• Average age	47.0	47.1	-0.1
• Average years of service	11.4	11.4	0.0
• Total projected compensation	\$1,093,735,678	\$1,055,661,653	3.6%
• Average projected compensation	\$96,373	\$93,232	3.4%
• Account balances	\$1,223,982,697	\$1,173,799,067	4.3%
• Total active vested members	7,665	7,701	-0.5%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	2,568	2,447	4.9%
• Average age	47.9	48.0	-0.1
<b>Retired members:</b>			
• Number in pay status	7,628	7,379	3.4%
• Average age	72.0	71.8	0.2
• Average monthly benefit <sup>(2)</sup>	\$4,301	\$4,215	2.0%
<b>Disabled members:</b>			
• Number in pay status	924	888	4.1%
• Average age	64.7	64.6	0.1
• Average monthly benefit <sup>(2)</sup>	\$3,565	\$3,401	4.8%
<b>Beneficiaries:</b>			
• Number in pay status	1,231	1,212	1.6%
• Average age	75.2	75.1	0.1
• Average monthly benefit <sup>(2)</sup>	\$2,329	\$2,187	6.5%

Notes: For all the General and Safety Tiers combined, the average age at retirement for the service retirees and disabled retirees was 60.0 and 49.9, respectively.

Results may be slightly off due to rounding.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)**  
**GENERAL TIER 1**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	158	192	-17.7%
• Average age	60.0	59.5	0.5
• Average years of service	29.9	29.6	0.3
• Total projected compensation	\$14,710,117	\$17,312,328	-15.0%
• Average projected compensation	\$93,102	\$90,168	3.3%
• Account balances	\$63,233,064	\$72,130,815	-12.3%
• Total active vested members	158	192	-17.7%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	52	61	-14.8%
• Average age	62.3	61.9	0.4
<b>Retired members:</b>			
• Number in pay status	3,189	3,272	-2.5%
• Average age	76.3	75.9	0.4
• Average monthly benefit <sup>(2)</sup>	\$4,902	\$4,707	4.1%
<b>Disabled members:</b>			
• Number in pay status	151	156	-3.2%
• Average age	73.8	72.8	1.0
• Average monthly benefit <sup>(2)</sup>	\$3,209	\$3,114	3.1%
<b>Beneficiaries:</b>			
• Number in pay status	706	726	-2.8%
• Average age	79.9	79.7	0.2
• Average monthly benefit <sup>(2)</sup>	\$2,332	\$2,162	7.9%

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the General Tier 1 service and disabled retirees was 59.2 and 51.9, respectively.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.

## EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED) GENERAL TIER 2

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	6,075	6,512	-6.7%
• Average age	51.6	51.2	0.4
• Average years of service	15.9	15.2	0.7
• Total projected compensation	\$600,715,279	\$615,364,242	-2.4%
• Average projected compensation	\$98,883	\$94,497	4.6%
• Account balances	\$772,973,971	\$750,750,981	3.0%
• Total active vested members	5,926	6,284	-5.7%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	1,792	1,794	-0.1%
• Average age	50.0	49.5	0.5
<b>Retired members:</b>			
• Number in pay status	3,250	2,948	10.2%
• Average age	69.4	69.1	0.3
• Average monthly benefit <sup>(2)</sup>	\$2,693	\$2,584	4.2%
<b>Disabled members:</b>			
• Number in pay status	458	449	2.0%
• Average age	64.5	63.8	0.7
• Average monthly benefit <sup>(2)</sup>	\$2,616	\$2,538	3.1%
<b>Beneficiaries:</b>			
• Number in pay status	255	232	9.9%
• Average age	66.8	66.2	0.6
• Average monthly benefit <sup>(2)</sup>	\$1,360	\$1,288	5.6%

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the General Tier 2 service and disabled retirees was 62.4 and 50.6, respectively.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.



## EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED) GENERAL TIER 3

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	24	27	-11.1%
• Average age	54.0	53.9	0.1
• Average years of service	15.8	16.1	-0.3
• Total projected compensation	\$2,050,537	\$2,218,590	-7.6%
• Average projected compensation	\$85,439	\$82,170	4.0%
• Account balances	\$4,558,015	\$5,008,189	-9.0%
• Total active vested members	22	25	-12.0%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	12	13	-7.7%
• Average age	49.2	49.7	-0.5
<b>Retired members:</b>			
• Number in pay status	26	22	18.2%
• Average age	63.0	62.9	0.1
• Average monthly benefit <sup>(2)</sup>	\$4,169	\$4,085	2.1%
<b>Disabled members:</b>			
• Number in pay status	1	1	0.0%
• Average age	65.1	64.1	1.0
• Average monthly benefit <sup>(2)</sup>	\$2,127	\$2,065	3.0%
<b>Beneficiaries:</b>			
• Number in pay status	3	3	0.0%
• Average age	62.0	61.0	1.0
• Average monthly benefit <sup>(2)</sup>	\$3,391	\$3,292	3.0%

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the General Tier 3 service and disabled retirees was 58.6 and 62.6, respectively.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.

## EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED) GENERAL TIER 4

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	3,703	3,156	17.3%
• Average age	40.2	39.8	0.4
• Average years of service	2.7	2.3	0.4
• Total projected compensation	\$303,387,662 <sup>(1)</sup>	\$249,534,713	21.6%
• Average projected compensation	\$81,930	\$79,067	3.6%
• Account balances	\$62,652,374	\$42,674,606	46.8%
• Total active vested members	450	84	435.7%
<b>Inactive vested members:</b>			
• Number <sup>(2)</sup>	552	419	31.7%
• Average age	40.0	40.0	0.0
<b>Retired members:</b>			
• Number in pay status	8	2	300.0%
• Average age	69.6	63.5	6.1
• Average monthly benefit <sup>(3)</sup>	\$1,447	\$3,421	-57.7%
<b>Disabled members:</b>			
• Number in pay status	1	1	0.0%
• Average age	66.9	65.9	1.0
• Average monthly benefit <sup>(3)</sup>	\$1,727	\$1,693	2.0%
<b>Beneficiaries:</b>			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit <sup>(3)</sup>	N/A	N/A	N/A

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the General Tier 4 service and disabled retirees was 68.4 and 63.5, respectively.

For all the General Tiers combined, the average age at retirement for the service retirees and disabled retirees was 60.8 and 51.0, respectively.

<sup>(1)</sup> Projected compensation for 2019 has been limited. It is our understanding that in the determination of pension benefits under the CalPEPRA formulas, the compensation that can be taken into account for 2019 is equal to \$124,180. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$124,180, or \$149,016). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (reference: Section 7522.10(d)).

<sup>(2)</sup> Includes inactive members due a refund of member contributions.

<sup>(3)</sup> Excludes supplemental benefits paid from SRBR.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)**  
**SAFETY TIER 1**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	4	5	-20.0%
• Average age	61.9	60.3	1.6
• Average years of service	29.2	27.7	1.5
• Total projected compensation	\$972,954	\$1,050,029	-7.3%
• Average projected compensation	\$243,239	\$210,006	15.8%
• Account balances	\$3,992,044	\$4,342,104	-8.1%
• Total active vested members	4	5	-20.0%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	8	8	0.0%
• Average age	59.4	58.4	1.0
<b>Retired members:</b>			
• Number in pay status	612	624	-1.9%
• Average age	72.2	71.4	0.8
• Average monthly benefit <sup>(2)</sup>	\$8,303	\$8,056	3.1%
<b>Disabled members:</b>			
• Number in pay status	99	100	-1.0%
• Average age	69.7	68.8	0.9
• Average monthly benefit <sup>(2)</sup>	\$5,750	\$5,602	2.6%
<b>Beneficiaries:</b>			
• Number in pay status	195	187	4.3%
• Average age	74.8	74.2	0.6
• Average monthly benefit <sup>(2)</sup>	\$3,481	\$3,249	7.1%

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the Safety Tier 1 service and disabled retirees was 54.9 and 48.9, respectively.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)**  
**SAFETY TIER 2**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	917	991	-7.5%
• Average age	46.5	45.9	0.6
• Average years of service	16.3	15.5	0.8
• Total projected compensation	\$119,570,783	\$124,173,300	-3.7%
• Average projected compensation	\$130,393	\$125,301	4.1%
• Account balances	\$285,854,627	\$275,766,662	3.7%
• Total active vested members	916	990	-7.5%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	125	125	0.0%
• Average age	47.1	46.2	0.9
<b>Retired members:</b>			
• Number in pay status	537	510	5.3%
• Average age	62.8	62.2	0.6
• Average monthly benefit <sup>(2)</sup>	\$5,982	\$5,807	3.0%
<b>Disabled members:</b>			
• Number in pay status	212	181	17.1%
• Average age	56.5	57.0	-0.5
• Average monthly benefit <sup>(2)</sup>	\$4,855	\$4,591	5.8%
<b>Beneficiaries:</b>			
• Number in pay status	72	64	12.5%
• Average age	60.1	59.7	0.4
• Average monthly benefit <sup>(2)</sup>	\$2,573	\$2,567	0.2%

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the Safety Tier 2 service and disabled retirees was 55.7 and 47.1, respectively.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)**  
**SAFETY TIER 2C**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	28	26	7.7%
• Average age	43.2	41.8	1.4
• Average years of service	8.0	6.1	1.9
• Total projected compensation	\$3,348,788	\$3,009,549	11.3%
• Average projected compensation	\$119,600	\$115,752	3.3%
• Account balances	\$2,724,956	\$1,868,043	45.9%
• Total active vested members	24	21	14.3%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	7	8	-12.5%
• Average age	44.6	43.2	1.4
<b>Retired members:</b>			
• Number in pay status	1	1	0.0%
• Average age	51.5	50.5	1.0
• Average monthly benefit <sup>(2)</sup>	\$841	\$825	1.9%
<b>Disabled members:</b>			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit <sup>(2)</sup>	N/A	N/A	N/A
<b>Beneficiaries:</b>			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit <sup>(2)</sup>	N/A	N/A	N/A

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the Safety Tier 2C service retirees was 50.0.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)**  
**SAFETY TIER 2D**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	121	119	1.7%
• Average age	39.9	39.0	0.9
• Average years of service	8.0	7.4	0.6
• Total projected compensation	\$14,392,198	\$13,223,362	8.8%
• Average projected compensation	\$118,944	\$111,121	7.0%
• Account balances	\$13,249,563	\$10,994,083	20.5%
• Total active vested members	102	100	2.0%
<b>Inactive vested members:</b>			
• Number <sup>(1)</sup>	10	12	-16.7%
• Average age	40.7	40.1	0.6
<b>Retired members:</b>			
• Number in pay status	2	0	N/A
• Average age	56.0	N/A	N/A
• Average monthly benefit <sup>(2)</sup>	\$1,182	N/A	N/A
<b>Disabled members:</b>			
• Number in pay status	2	0	N/A
• Average age	45.4	N/A	N/A
• Average monthly benefit <sup>(2)</sup>	\$4,586	N/A	N/A
<b>Beneficiaries:</b>			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit <sup>(2)</sup>	N/A	N/A	N/A

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the Safety Tier 2D service and disabled retirees was 55.4 and 44.4, respectively.

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Excludes supplemental benefits paid from SRBR.

## EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED) SAFETY TIER 4

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
<b>Active members in valuation:</b>			
• Number	319	295	8.1%
• Average age	35.9	35.2	0.7
• Average years of service	3.5	2.8	0.7
• Total projected compensation	\$34,587,361 <sup>(1)</sup>	\$29,775,540	16.2%
• Average projected compensation	\$108,424	\$100,934	7.4%
• Account balances	\$14,744,082	\$10,263,584	43.7%
• Total active vested members	63	0	N/A
<b>Inactive vested members:</b>			
• Number <sup>(2)</sup>	10	7	42.9%
• Average age	36.4	32.9	3.5
<b>Retired members:</b>			
• Number in pay status	3	0	N/A
• Average age	57.4	N/A	N/A
• Average monthly benefit <sup>(3)</sup>	\$1,478	N/A	N/A
<b>Disabled members:</b>			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit <sup>(3)</sup>	N/A	N/A	N/A
<b>Beneficiaries:</b>			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit <sup>(3)</sup>	N/A	N/A	N/A

Note: Based on the data provided for the December 31, 2018 actuarial valuation, the average age at retirement for the Safety Tier 4 service retirees was 57.1.

For all the Safety Tiers combined, the average age at retirement for the service retirees and disabled retirees was 55.3 and 47.7, respectively.

<sup>(1)</sup> Projected compensation for 2019 has been limited. It is our understanding that in the determination of pension benefits under the CalPEPRA formulas, the compensation that can be taken into account for 2019 is equal to \$124,180. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$124,180, or \$149,016). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (reference: Section 7522.10(d)).

<sup>(2)</sup> Includes inactive members due a refund of member contributions.

<sup>(3)</sup> Excludes supplemental benefits paid from SRBR.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
TOTAL PLAN**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	102	102	--	--	--	--	--	--	--	--
	\$66,680	\$66,680	--	--	--	--	--	--	--	--
25 - 29	662	604	58	--	--	--	--	--	--	--
	76,950	75,462	\$92,450	--	--	--	--	--	--	--
30 - 34	1,202	834	301	67	--	--	--	--	--	--
	86,164	82,922	92,892	\$96,301	--	--	--	--	--	--
35 - 39	1,505	656	379	411	58	1	--	--	--	--
	94,247	85,607	96,987	104,798	\$99,698	\$70,755	--	--	--	--
40 - 44	1,507	458	306	394	303	46	--	--	--	--
	99,870	87,331	101,931	107,457	103,835	119,909	--	--	--	--
45 - 49	1,659	356	244	349	475	190	44	1	--	--
	102,311	92,182	100,233	105,855	103,286	117,415	\$92,531	\$76,100	--	--
50 - 54	1,528	257	209	245	393	218	160	44	2	--
	101,274	93,173	101,672	99,585	103,402	109,276	100,184	102,558	\$76,452	--
55 - 59	1,565	234	201	219	359	171	209	148	24	--
	98,577	92,524	99,199	101,321	92,521	102,002	107,379	103,336	87,552	--
60 - 64	1,076	125	154	157	224	125	147	98	40	6
	100,943	90,082	108,656	94,014	98,016	100,114	106,194	110,421	109,290	\$97,971
65 - 69	451	58	58	77	103	49	48	46	8	4
	98,246	92,356	94,838	98,486	94,586	95,780	97,484	110,238	117,509	185,674
70 & over	92	11	16	15	18	7	12	6	--	7
	91,293	98,043	108,000	83,670	72,221	138,760	69,861	75,575	--	110,623
<b>Total</b>	<b>11,349</b>	<b>3,695</b>	<b>1,926</b>	<b>1,934</b>	<b>1,933</b>	<b>807</b>	<b>620</b>	<b>343</b>	<b>74</b>	<b>17</b>
	<b>\$96,373</b>	<b>\$84,926</b>	<b>\$99,106</b>	<b>\$102,891</b>	<b>\$99,925</b>	<b>\$108,226</b>	<b>\$102,695</b>	<b>\$105,621</b>	<b>\$102,241</b>	<b>\$123,817</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.



**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
GENERAL TIER 1**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
30 - 34	2	--	2	--	--	--	--	--	--	--
	\$70,619	--	\$70,619	--	--	--	--	--	--	--
35 - 39	3	--	2	1	--	--	--	--	--	--
	73,070	--	70,611	\$77,986	--	--	--	--	--	--
40 - 44	5	--	4	--	1	--	--	--	--	--
	84,941	--	75,205	--	\$123,886	--	--	--	--	--
45 - 49	6	--	1	2	3	--	--	--	--	--
	89,905	--	58,889	80,618	106,435	--	--	--	--	--
50 - 54	12	--	1	2	6	1	--	--	2	--
	72,815	--	76,807	63,712	74,898	\$67,262	--	--	\$76,452	--
55 - 59	37	--	1	1	2	3	4	3	23	--
	87,235	--	111,808	68,118	74,251	99,254	\$91,693	\$97,186	84,486	--
60 - 64	62	--	4	2	2	--	9	8	31	6
	93,310	--	84,352	93,712	72,894	--	70,124	123,617	93,765	\$97,971
65 - 69	24	--	--	2	2	2	2	5	7	4
	113,520	--	--	128,029	83,127	65,264	166,477	76,482	101,940	185,674
70 & over	7	--	--	--	--	--	--	--	--	7
	110,623	--	--	--	--	--	--	--	--	110,623
<b>Total</b>	<b>158</b>	<b>--</b>	<b>15</b>	<b>10</b>	<b>16</b>	<b>6</b>	<b>15</b>	<b>16</b>	<b>63</b>	<b>17</b>
	<b>\$93,102</b>	<b>--</b>	<b>\$77,879</b>	<b>\$87,824</b>	<b>\$84,570</b>	<b>\$82,592</b>	<b>\$88,723</b>	<b>\$103,931</b>	<b>\$90,736</b>	<b>\$123,817</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
GENERAL TIER 2**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	17	3	14	--	--	--	--	--	--	--
	\$81,906	\$64,146	\$85,711	--	--	--	--	--	--	--
30 - 34	224	18	164	42	--	--	--	--	--	--
	87,204	95,975	88,442	\$78,610	--	--	--	--	--	--
35 - 39	571	22	253	256	39	1	--	--	--	--
	95,184	111,256	97,936	93,646	\$78,985	\$70,755	--	--	--	--
40 - 44	779	25	219	297	214	24	--	--	--	--
	99,039	109,675	103,111	101,995	91,285	83,358	--	--	--	--
45 - 49	994	24	175	280	363	113	38	1	--	--
	100,502	138,150	103,753	102,142	96,548	101,780	\$84,290	\$76,100	--	--
50 - 54	1,068	19	152	216	318	178	145	40	--	--
	100,810	122,305	105,874	98,143	99,971	102,535	97,139	98,049	--	--
55 - 59	1,167	20	135	196	328	149	202	136	1	--
	98,632	122,316	98,125	100,112	90,159	97,751	107,312	101,588	\$158,081	--
60 - 64	834	11	114	145	217	121	132	88	6	--
	102,724	114,968	114,039	91,596	98,058	100,013	107,427	109,277	158,100	--
65 - 69	351	7	46	71	98	42	46	40	1	--
	96,550	79,576	95,524	94,675	91,309	97,645	94,484	114,846	226,499	--
70 & over	70	2	11	15	18	6	12	6	--	--
	86,562	125,000	112,614	83,670	72,221	120,623	69,861	75,575	--	--
<b>Total</b>	<b>6,075</b>	<b>151</b>	<b>1,283</b>	<b>1,518</b>	<b>1,595</b>	<b>634</b>	<b>575</b>	<b>311</b>	<b>8</b>	<b>--</b>
	<b>\$98,883</b>	<b>\$114,350</b>	<b>\$100,696</b>	<b>\$97,659</b>	<b>\$94,390</b>	<b>\$99,866</b>	<b>\$101,444</b>	<b>\$104,430</b>	<b>\$166,648</b>	<b>--</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
GENERAL TIER 3**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	1	1	--	--	--	--	--	--	--	--
	\$104,359	\$104,359	--	--	--	--	--	--	--	--
35 - 39	1	--	--	1	--	--	--	--	--	--
	93,510	--	--	\$93,510	--	--	--	--	--	--
40 - 44	1	--	--	--	--	1	--	--	--	--
	71,866	--	--	--	--	\$71,866	--	--	--	--
45 - 49	2	--	1	--	--	1	--	--	--	--
	74,358	--	\$71,135	--	--	77,581	--	--	--	--
50 - 54	8	1	2	2	2	1	--	--	--	--
	77,170	96,044	85,588	71,756	\$68,029	70,574	--	--	--	--
55 - 59	5	--	--	2	2	--	--	1	--	--
	86,796	--	--	101,500	67,974	--	--	\$95,033	--	--
60 - 64	5	--	2	--	--	1	1	--	1	--
	97,213	--	101,971	--	--	99,388	\$99,388	--	\$83,348	--
65 - 69	1	--	--	--	--	--	--	1	--	--
	94,677	--	--	--	--	--	--	94,677	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>24</b>	<b>2</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>--</b>
	<b>\$85,439</b>	<b>\$100,202</b>	<b>\$89,250</b>	<b>\$88,004</b>	<b>\$68,002</b>	<b>\$79,852</b>	<b>\$99,388</b>	<b>\$94,855</b>	<b>\$83,348</b>	<b>--</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
GENERAL TIER 4**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	94	94	--	--	--	--	--	--	--	--
	\$64,177	\$64,177	--	--	--	--	--	--	--	--
25 - 29	552	528	24	--	--	--	--	--	--	--
	72,716	72,602	\$75,223	--	--	--	--	--	--	--
30 - 34	816	737	79	--	--	--	--	--	--	--
	80,816	80,432	84,404	--	--	--	--	--	--	--
35 - 39	672	591	79	2	--	--	--	--	--	--
	83,200	83,215	83,457	\$68,483	--	--	--	--	--	--
40 - 44	465	407	52	5	1	--	--	--	--	--
	84,139	84,070	86,367	67,868	\$77,581	--	--	--	--	--
45 - 49	371	316	54	--	1	--	--	--	--	--
	87,451	87,841	85,385	--	76,032	--	--	--	--	--
50 - 54	262	216	44	1	1	--	--	--	--	--
	85,512	86,282	82,853	47,413	74,196	--	--	--	--	--
55 - 59	249	199	43	7	--	--	--	--	--	--
	86,033	86,373	81,970	101,331	--	--	--	--	--	--
60 - 64	147	114	30	2	1	--	--	--	--	--
	87,868	87,680	86,975	93,838	124,180	--	--	--	--	--
65 - 69	61	51	10	--	--	--	--	--	--	--
	93,927	94,110	92,992	--	--	--	--	--	--	--
70 & over	14	9	5	--	--	--	--	--	--	--
	94,122	92,052	97,848	--	--	--	--	--	--	--
<b>Total</b>	<b>3,703</b>	<b>3,262</b>	<b>420</b>	<b>17</b>	<b>4</b>	--	--	--	--	--
	<b>\$81,930</b>	<b>\$81,621</b>	<b>\$84,207</b>	<b>\$83,571</b>	<b>\$87,997</b>	--	--	--	--	--

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
SAFETY TIER 1**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	--	--	--	--	--	--	--	--	--	--
50 - 54	--	--	--	--	--	--	--	--	--	--
55 - 59	1	--	--	--	--	--	--	1	--	--
	\$248,283	--	--	--	--	--	--	\$248,283	--	--
60 - 64	2	--	--	--	--	--	1	--	1	--
	228,514	--	--	--	--	--	\$118,657	--	\$338,372	--
65 - 69	1	--	--	--	1	--	--	--	--	--
	267,643	--	--	--	\$267,643	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>4</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>1</b>	<b>--</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>--</b>
	<b>\$243,239</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>\$267,643</b>	<b>--</b>	<b>\$118,657</b>	<b>\$248,283</b>	<b>\$338,372</b>	<b>--</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
SAFETY TIER 2**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
30 - 34	26	--	3	23	--	--	--	--	--	--
	\$126,744	--	\$125,317	\$126,930	--	--	--	--	--	--
35 - 39	165	--	8	140	17	--	--	--	--	--
	127,938	--	122,919	126,099	\$145,446	--	--	--	--	--
40 - 44	205	--	11	90	83	21	--	--	--	--
	134,223	--	118,570	127,289	136,289	\$163,970	--	--	--	--
45 - 49	256	--	7	63	105	76	5	--	--	--
	130,838	--	123,465	123,479	127,141	141,185	\$154,242	--	--	--
50 - 54	152	1	6	23	66	38	14	4	--	--
	128,925	\$82,883	113,616	121,705	124,038	142,979	130,182	\$147,647	--	--
55 - 59	75	--	7	13	26	19	3	7	--	--
	128,543	--	139,795	122,062	125,165	135,773	132,815	120,420	--	--
60 - 64	25	--	3	8	4	3	4	2	1	--
	125,946	--	144,351	137,968	101,758	104,431	145,268	107,968	\$94,536	--
65 - 69	12	--	1	4	2	5	--	--	--	--
	126,822	--	94,627	151,361	180,109	92,315	--	--	--	--
70 & over	1	--	--	--	--	1	--	--	--	--
	247,578	--	--	--	--	247,578	--	--	--	--
<b>Total</b>	<b>917</b>	<b>1</b>	<b>46</b>	<b>364</b>	<b>303</b>	<b>163</b>	<b>26</b>	<b>13</b>	<b>1</b>	<b>--</b>
	<b>\$130,393</b>	<b>\$82,883</b>	<b>\$124,256</b>	<b>\$126,109</b>	<b>\$129,843</b>	<b>\$142,385</b>	<b>\$137,434</b>	<b>\$126,882</b>	<b>\$94,536</b>	<b>--</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
SAFETY TIER 2C**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	1	--	1	--	--	--	--	--	--	--
	\$125,364	--	\$125,364	--	--	--	--	--	--	--
30 - 34	5	--	4	1	--	--	--	--	--	--
	119,410	--	122,749	\$106,056	--	--	--	--	--	--
35 - 39	4	--	3	1	--	--	--	--	--	--
	98,219	--	104,028	80,792	--	--	--	--	--	--
40 - 44	8	2	6	--	--	--	--	--	--	--
	126,628	\$138,823	122,563	--	--	--	--	--	--	--
45 - 49	5	1	1	2	--	--	1	--	--	--
	103,098	101,940	121,841	97,276	--	--	\$97,155	--	--	--
50 - 54	1	--	1	--	--	--	--	--	--	--
	151,319	--	151,319	--	--	--	--	--	--	--
55 - 59	4	1	3	--	--	--	--	--	--	--
	138,417	90,499	154,389	--	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>28</b>	<b>4</b>	<b>19</b>	<b>4</b>	<b>--</b>	<b>--</b>	<b>1</b>	<b>--</b>	<b>--</b>	<b>--</b>
	<b>\$119,600</b>	<b>\$117,521</b>	<b>\$126,323</b>	<b>\$95,350</b>	<b>--</b>	<b>--</b>	<b>\$97,155</b>	<b>--</b>	<b>--</b>	<b>--</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
SAFETY TIER 2D**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	8	1	7	--	--	--	--	--	--	--
	\$121,189	\$103,547	\$123,709	--	--	--	--	--	--	--
30 - 34	30	--	29	1	--	--	--	--	--	--
	120,463	--	120,301	\$125,160	--	--	--	--	--	--
35 - 39	32	4	16	10	2	--	--	--	--	--
	114,033	118,180	118,211	105,546	\$114,745	--	--	--	--	--
40 - 44	24	6	12	2	4	--	--	--	--	--
	124,085	130,491	127,621	125,078	103,374	--	--	--	--	--
45 - 49	15	6	4	2	3	--	--	--	--	--
	109,529	117,833	114,732	104,236	89,515	--	--	--	--	--
50 - 54	4	1	1	1	--	--	1	--	--	--
	120,484	146,233	132,109	81,956	--	--	\$121,637	--	--	--
55 - 59	8	1	6	--	1	--	--	--	--	--
	132,102	148,626	134,000	--	104,187	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>121</b>	<b>19</b>	<b>75</b>	<b>16</b>	<b>10</b>	<b>--</b>	<b>1</b>	<b>--</b>	<b>--</b>	<b>--</b>
	<b>\$118,944</b>	<b>\$124,267</b>	<b>\$122,301</b>	<b>\$107,575</b>	<b>\$101,572</b>	<b>--</b>	<b>\$121,637</b>	<b>--</b>	<b>--</b>	<b>--</b>

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.



**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)  
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION  
SAFETY TIER 4**

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	8	8	--	--	--	--	--	--	--	--
	\$96,091	\$96,091	--	--	--	--	--	--	--	--
25 - 29	84	72	12	--	--	--	--	--	--	--
	98,983	96,515	\$113,789	--	--	--	--	--	--	--
30 - 34	98	78	20	--	--	--	--	--	--	--
	105,490	103,166	114,553	--	--	--	--	--	--	--
35 - 39	57	39	18	--	--	--	--	--	--	--
	107,315	104,049	114,392	--	--	--	--	--	--	--
40 - 44	20	18	2	--	--	--	--	--	--	--
	111,244	109,918	123,181	--	--	--	--	--	--	--
45 - 49	10	9	1	--	--	--	--	--	--	--
	104,892	103,858	114,200	--	--	--	--	--	--	--
50 - 54	21	19	2	--	--	--	--	--	--	--
	140,841	139,981	149,016	--	--	--	--	--	--	--
55 - 59	19	13	6	--	--	--	--	--	--	--
	136,136	136,677	134,966	--	--	--	--	--	--	--
60 - 64	1	--	1	--	--	--	--	--	--	--
	149,016	--	149,016	--	--	--	--	--	--	--
65 - 69	1	--	1	--	--	--	--	--	--	--
	81,965	--	81,965	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>319</b>	<b>256</b>	<b>63</b>	--	--	--	--	--	--	--
	<b>\$108,424</b>	<b>\$106,142</b>	<b>\$117,698</b>	--	--	--	--	--	--	--

Note: Age and years of service were projected from November 30, 2018 to December 31, 2018.

## EXHIBIT C – RECONCILIATION OF MEMBER DATA

	Active Members	Inactive Vested Members <sup>(1)</sup>	Retired Members	Disableds	Beneficiaries	Total
<b>Number as of December 31, 2017</b>	<b>11,323</b>	<b>2,447</b>	<b>7,379</b>	<b>888</b>	<b>1,212</b>	<b>23,249</b>
• New members	896	0	0	0	83	979
• Terminations – with vested rights	(293)	293	0	0	0	0
• Contribution refunds	(161)	(101)	0	0	0	(262)
• Retirements	(386)	(74)	460	0	0	0
• New disabilities	(34)	(2)	(20)	56	0	0
• Return to work	31	(31)	0	0	0	0
• Died with or without beneficiary	(23)	(3)	(192)	(17)	(63)	(298)
• Data adjustments <sup>(2)</sup>	(4)	39	1	(3)	(1)	32
<b>Number as of December 31, 2018</b>	<b>11,349</b>	<b>2,568</b>	<b>7,628</b>	<b>924</b>	<b>1,231</b>	<b>23,700</b>

<sup>(1)</sup> Includes inactive members due a refund of member contributions.

<sup>(2)</sup> Out of the net 39 data adjustments for inactive vested members: 3 non-members from last year went to payment status this year; 37 members were hired and terminated employment after November 30, 2017 (i.e. the census data collection date for last year's valuation); 1 member was classified as contribution refunds in the December 31, 2017 valuation data, and terminated vested in the December 31, 2018 data; and 4 non-member records were added to the terminated vested file.

## EXHIBIT D – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

	Year Ended December 31, 2018	Year Ended December 31, 2017
Net assets at market value at the beginning of the year	\$8,112,099,556	\$6,965,580,182
<b>Contribution income:</b>		
• Employer contributions	\$269,684,809	\$247,063,550
• Member contributions	<u>94,735,673</u>	<u>89,325,824</u>
Net contribution income	\$364,420,482	\$336,389,374
<b>Investment income:</b>		
• Interest, dividends and other income	\$120,629,800	\$135,579,452
• Asset appreciation	(417,757,336)	1,231,437,848
• Less investment and administrative fees	<u>(73,984,083)</u>	<u>(73,695,094)</u>
Net investment income	<u>\$(371,111,619)</u>	<u>\$1,293,322,206</u>
<b>Total income available for benefits</b>	<b>\$(6,691,137)</b>	<b>\$1,629,711,580</b>
<b>Less benefit payments:</b>		
• Service retirement	\$(459,141,978)	\$(433,464,465)
• Death payments	(2,957,440)	(2,699,945)
• Supplemental cost of living	(1,134,613)	(1,231,500)
• Member refunds	(8,709,150)	(7,892,706)
• Health insurance subsidies	<u>(40,878,670)</u>	<u>(37,903,590)</u>
Net benefit payments	<u>\$(512,821,851)</u>	<u>\$(483,192,206)</u>
<b>Change in net assets at market value</b>	<b>\$(519,512,988)</b>	<b>\$1,146,519,374</b>
<b>Net assets at market value at the end of the year</b>	<b>\$7,592,586,569</b>	<b>\$8,112,099,556</b>

Note: Results may be slightly off due to rounding.

## EXHIBIT E – SUMMARY STATEMENT OF PLAN ASSETS

	Year Ended December 31, 2018	Year Ended December 31, 2017
Cash	\$1,573,133	\$17,130,210
Securities lending collateral	183,002,987	406,876,406
<b>Accounts receivable:</b>		
• Contributions	\$17,422,507	\$14,212,011
• Investment receivables	15,986,252	17,974,522
• Investments sold	1,202,614	9,858,317
• Foreign exchange contracts	100,999	666,144
• Others	<u>107,881</u>	<u>198,762</u>
Total accounts receivable	\$34,820,254	\$42,909,756
Prepaid expenses	1,292,997	847,774
<b>Investments:</b>		
• Short-term investments	\$159,672,681	\$210,167,993
• Equities	4,147,368,158	5,105,580,651
• Fixed income investments	1,203,445,404	1,231,352,419
• Real estate	561,242,142	512,139,741
• Capital assets	1,485,300	1,604,962
• Private equity and alternative investments	<u>1,512,465,825</u>	<u>1,047,693,755</u>
Total investments at market value	\$7,585,679,510	\$8,108,539,521
<b>Total assets</b>	<b>\$7,806,368,882</b>	<b>\$8,576,303,667</b>
<b>Accounts payable:</b>		
• Securities lending & investments purchased	\$(189,585,727)	\$(444,428,669)
• Investment-related payables	(12,363,273)	(12,594,238)
• Futures contracts & equity swaps	(1,392,567)	(230,781)
• Foreign exchange contracts	(3,651,400)	(467,537)
• Accrued administration expense	(2,275,696)	(2,495,061)
• Members benefits & refunds, and retirement payroll deductions payable	<u>(4,513,650)</u>	<u>(3,987,825)</u>
<b>Total accounts payable</b>	<b>\$(213,782,313)</b>	<b>\$(464,204,111)</b>
<b>Net assets at market value</b>	<b>\$7,592,586,569</b>	<b>\$8,112,099,556</b>
<b>Net assets at actuarial value</b>	<b>\$8,161,706,068</b>	<b>\$7,803,026,229</b>
<b>Net assets at valuation value</b>	<b>\$7,239,327,157</b>	<b>\$6,830,379,459</b>

Note: Results may be slightly off due to rounding.

## EXHIBIT F – SUMMARY OF REPORTED RESERVE INFORMATION AS OF DECEMBER 31, 2018

	Reserves
<b>Used in Development of Valuation Value of Assets:</b>	
• Members deposit-basic	\$1,253,468,831
• Members cost-of-living	278,683,009
• Employer advance (before transfer from SRBR to employer advance)	1,045,827,592
• Pension reserve-current	1,634,911,232
• Pension reserve-prior	5,135,578
• Annuity reserve	964,599,901
• Cost-of-living reserve	2,048,273,150
• Survivor death benefit	1,488,057
• SRBR transfer to employer advance <sup>(1)</sup>	6,939,808
• Reserve for interest fluctuations (contingency reserve), if negative	<u>0</u>
Subtotal	\$7,239,327,157 <sup>(2)</sup>
<b>Not Used in Development of Valuation Value of Assets:</b>	
• 401(h) account	\$9,830,102
• Supplemental retirees benefit reserve (before transfer from SRBR to employer advance)	919,488,617
• Reserve for interest fluctuations (contingency reserve), if positive	0
• Market stabilization reserve	(569,119,500)
• SRBR transfer to employer advance <sup>(1)</sup>	<u>(6,939,808)</u>
Subtotal	\$353,259,411
<b>Total</b>	<b>\$7,592,586,569</b>

Note: Results may be slightly off due to rounding.

<sup>(1)</sup> Estimate provided by ACERA.

<sup>(2)</sup> A breakdown of this amount between the different cost groups is provided in Section 4, Exhibit VI.

## EXHIBIT G – DEVELOPMENT OF THE FUND THROUGH DECEMBER 31, 2018

Year Ended December 31	Employer Contributions	Member Contributions	Net Investment Return <sup>(1)</sup>	Benefit Payments	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2009	\$132,198,602	\$77,270,662	\$953,666,086	\$292,205,845	\$4,676,879,594	\$5,453,769,119	116.6%
2010	147,543,301	77,604,809	635,617,238	313,150,062	5,224,494,880	5,487,858,259	105.0%
2011	162,879,221	77,990,907	(53,810,166)	337,156,660	5,074,398,182	5,556,242,772	109.5%
2012	179,648,812	78,608,004	698,682,556	363,133,358	5,668,204,196	5,543,303,209	97.8%
2013	191,180,146	76,230,024	1,095,188,216	390,507,104	6,640,295,478	5,953,454,661	89.7%
2014	213,254,775	79,714,187	266,028,241	411,279,675	6,788,013,006	6,545,159,225	96.4%
2015	224,607,104	82,948,934	(19,960,005)	434,984,266	6,640,624,773	6,987,026,015	105.2%
2016	241,728,451	85,736,229	454,641,033	457,150,304	6,965,580,182	7,309,485,170	104.9%
2017	247,063,550	89,325,824	1,293,322,206	483,192,206	8,112,099,556	7,803,026,229	96.2%
2018	269,684,809	94,735,673	(371,111,618)	512,821,851	7,592,586,569	8,161,706,068	107.5%

<sup>(1)</sup> On a market basis, net of investment and administrative fees.

## EXHIBIT H – TABLE OF AMORTIZATION BASES

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment <sup>(1)</sup> (\$ in '000s)
<b>General (Excluding LARPD &amp; Office of Education)</b>						
Combined Bases	December 31, 2011	\$885,036	21	\$858,986	14	\$79,493
Experience Loss	December 31, 2012	165,501	20	159,636	14	14,773
Experience Gain	December 31, 2013	(75,003)	20	(73,320)	15	(6,437)
Experience Gain	December 31, 2014	(156,281)	20	(154,157)	16	(12,895)
Change in Assumptions	December 31, 2014	350,827	20	346,061	16	28,946
Experience Gain	December 31, 2015	(98,619)	20	(97,999)	17	(7,840)
Experience Loss	December 31, 2016	3,655	20	3,647	18	280
Experience Gain	December 31, 2017	(27,249)	20	(27,218)	19	(2,011)
Change in Assumptions	December 31, 2017	260,437	20	260,140	19	19,222
Experience Gain <sup>(2)</sup>	December 31, 2018	(6,121)	20	<u>(6,121)</u>	20	<u>(437)</u>
<b>Subtotal</b>				<b>\$1,269,655</b>		<b>\$113,094</b>

<sup>(1)</sup> Level percentage of payroll.

<sup>(2)</sup> Includes the impact of transferring the allocated UAAL for LARPD Tier 1 members to the LARPD cost group and the allocated UAAL for Office of Education Tier 1 members to the Office of Education cost group.

## EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment <sup>(1)</sup> (\$ in '000s)
<b>General (LARPD)<sup>(2)</sup></b>						
Combined Bases	December 31, 2011	\$7,060	21	\$6,852	14	\$634
Experience Loss	December 31, 2012	370	20	356	14	33
Experience Gain	December 31, 2013	(534)	20	(522)	15	(46)
Experience Gain	December 31, 2014	(1,562)	20	(1,541)	16	(129)
Change in Assumptions	December 31, 2014	1,303	20	1,286	16	108
Experience Gain <sup>(3)</sup>	December 31, 2015	(1,506)	20	(1,498)	17	(120)
Experience Loss	December 31, 2016	139	20	139	18	11
Experience Gain <sup>(4)</sup>	December 31, 2017	(622)	20	(622)	19	(46)
Change in Assumptions	December 31, 2017	1,418	20	1,417	19	105
Experience Loss <sup>(5)</sup>	December 31, 2018	1,058	20	1,058	20	75
UAAL for Tier 1 members <sup>(6)</sup>	December 31, 2018	6,576	20	<u>6,576</u>	20	<u>469</u>
<b>Subtotal</b>				<b>\$13,501</b>		<b>\$1,094</b>

<sup>(1)</sup> Level percentage of payroll.

<sup>(2)</sup> When LARPD General Tier 3 was established in 2008, they were classified as a stand-alone group since they were the only employer with the higher 2.5% at 55 benefit (i.e., Section 31676.18), and the cost to upgrade the past service under that formula was only to be paid by LARPD. (reference: Segal's letter dated October 7, 2008). The initial UAAL rate for that group was based on an allocation of assets needed to maintain the total employer rate from the December 31, 2007 valuation before any benefit improvements for General Tier 3. The UAAL rate for LARPD General Tier 3 was then increased to reflect the benefit improvement. When LARPD General Tier 4 was later established in 2013, that tier was combined with LARPD General Tier 3 for purpose of determining their UAAL rate only (as normal cost for LARPD General Tier 4 has continued to be developed on a pooled basis with other General employers offering General Tier 4 benefits), in order to continue with the open-group level percentage of payroll approach for paying off the UAAL amount for General Tier 3 (that is now closed to new entrants because of CalPEPRA). Furthermore, the Board adopted the declining employer payroll policy in 2018 and determined that the policy applies to LARPD Tier 1. As a result, the UAAL (and associated assets) of LARPD Tier 1 was combined with the UAAL for LARPD Tiers 3 and 4.

<sup>(3)</sup> There is a liability gain from the death of one of LARPD's Tier 3 retirees and the withdrawal of one of LARPD's Tier 3 actives.

<sup>(4)</sup> There is a liability gain from the death of one of LARPD's Tier 3 retirees.

<sup>(5)</sup> There is a liability loss mainly from retiree mortality experience for LARPD's Tier 1 and Tier 3 retirees as a result of no actual deaths.

<sup>(6)</sup> The allocated UAAL for LARPD Tier 1 of \$6,167,000 determined as of December 31, 2017 is rolled forward to December 31, 2018 to be amortized starting with the December 31, 2018 valuation.



## EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment <sup>(1)</sup> (\$ in '000s)
<b>General Combined (Excluding Office of Education)</b>						
Combined Bases	December 31, 2011	\$892,096	21	865,838	14	80,127
Experience Loss	December 31, 2012	165,871	20	159,992	14	14,806
Experience Gain	December 31, 2013	(75,537)	20	(73,842)	15	(6,483)
Experience Gain	December 31, 2014	(157,843)	20	(155,698)	16	(13,024)
Change in Assumptions	December 31, 2014	352,130	20	347,347	16	29,054
Experience Gain	December 31, 2015	(100,125)	20	(99,497)	17	(7,960)
Experience Loss	December 31, 2016	3,794	20	3,786	18	291
Experience Gain	December 31, 2017	(27,871)	20	(27,840)	19	(2,057)
Change in Assumptions	December 31, 2017	261,855	20	261,557	19	19,327
Experience Loss	December 31, 2018	1,513	20	1,513	20	107
<b>Subtotal</b>				<b>\$1,283,156</b>		<b>\$114,188</b>
<b>Safety</b>						
Combined Bases	December 31, 2011	\$598,698	21	\$581,079	14	\$53,775
Experience Loss	December 31, 2012	63,130	20	60,894	14	5,635
Experience Gain	December 31, 2013	(9,350)	20	(9,141)	15	(802)
Experience Gain	December 31, 2014	(43,238)	20	(42,651)	16	(3,568)
Change in Assumptions	December 31, 2014	107,552	20	106,091	16	8,874
Experience Gain	December 31, 2015	(12,850)	20	(12,770)	17	(1,022)
Experience Loss	December 31, 2016	19,183	20	19,141	18	1,469
Experience Loss	December 31, 2017	6,354	20	6,347	19	469
Change in Assumptions	December 31, 2017	134,184	20	134,031	19	9,904
Experience Loss	December 31, 2018	9,377	20	9,377	20	669
<b>Subtotal</b>				<b>\$852,398</b>		<b>\$75,403</b>

<sup>(1)</sup> Level percentage of payroll.

## EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment <sup>(1)</sup> (\$ in '000s)
<b>Total (Excluding Office of Education)</b>						
Combined Bases	December 31, 2011	\$1,490,794	21	\$1,446,917	14	\$133,902
Experience Loss	December 31, 2012	229,001	20	220,886	14	20,441
Experience Gain	December 31, 2013	(84,887)	20	(82,983)	15	(7,285)
Experience Gain	December 31, 2014	(201,081)	20	(198,349)	16	(16,592)
Change in Assumptions	December 31, 2014	459,682	20	453,438	16	37,928
Experience Gain	December 31, 2015	(112,975)	20	(112,267)	17	(8,982)
Experience Loss	December 31, 2016	22,977	20	22,927	18	1,760
Experience Gain	December 31, 2017	(21,517)	20	(21,493)	19	(1,588)
Change in Assumptions	December 31, 2017	396,039	20	395,588	19	29,231
Experience Loss	December 31, 2018	10,890	20	<u>10,890</u>	20	<u>776</u>
<b>Total</b>				<b>\$2,135,554</b>		<b>\$189,591</b>

<sup>(1)</sup> Level percentage of payroll.

## EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Annual Payment <sup>(1)</sup> (\$ in '000s)
<b>General (Office of Education)</b>						
UAAL for Tier 1 members	December 31, 2017	\$1,357	20	718 <sup>(2)</sup>	19	72
Experience Loss	December 31, 2018	61	20	<u>61</u>	20	<u>6</u>
<b>Subtotal</b>				<b>\$779</b>		<b>\$78</b>
Credit for Expected UAAL Contribution				<u>737<sup>(3)</sup></u>		
<b>Total</b>				<b>\$1,516</b>		

<sup>(1)</sup> Level dollar, and reflects timing of payment (i.e., next scheduled on April 1, 2020).

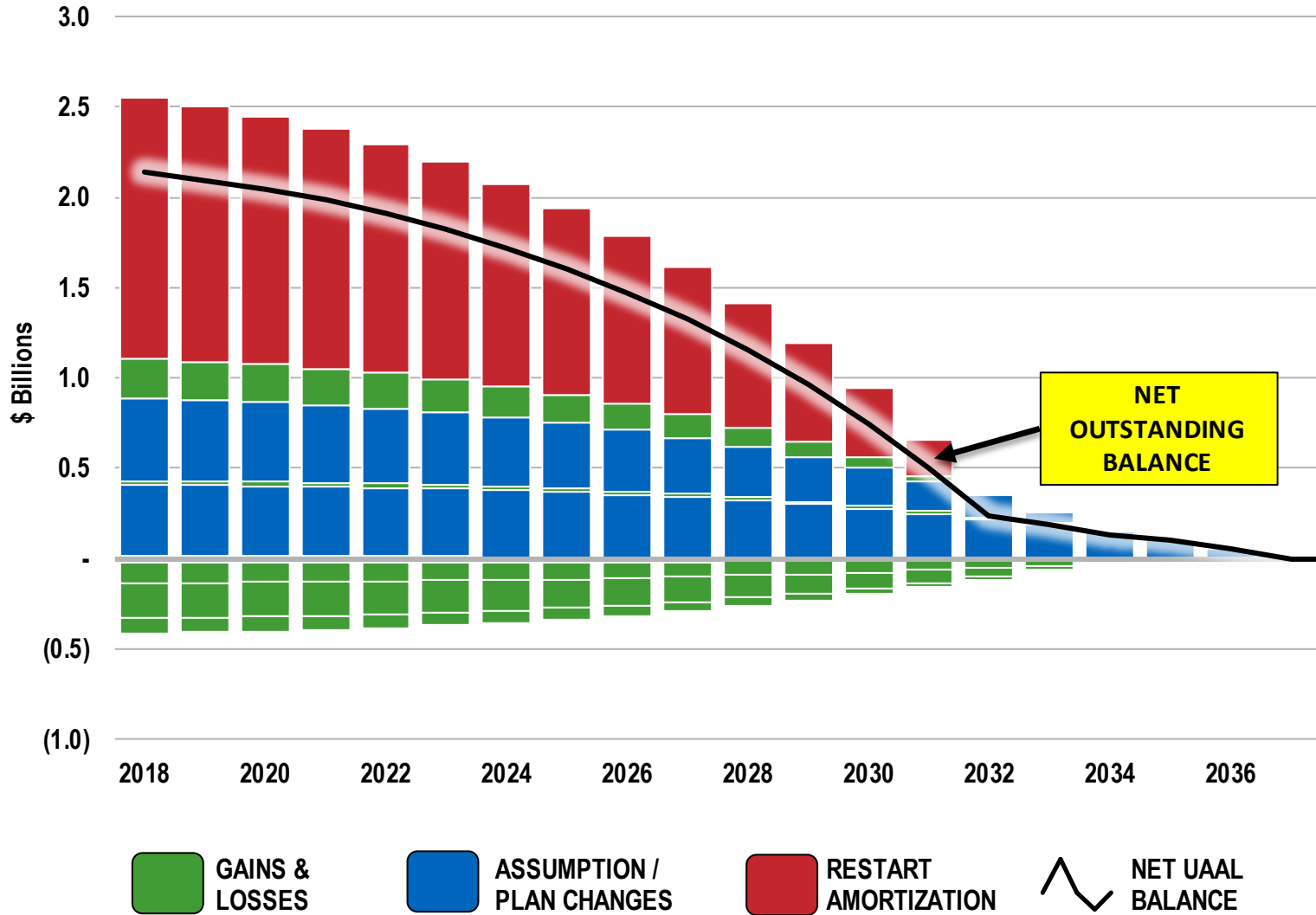
<sup>(2)</sup> Reflects expected UAAL contribution discussed in footnote (3) below.

<sup>(3)</sup> \$750,000 payable April 1, 2019, discounted at 7.25% to December 31, 2018.

Note: The equivalent single amortization period for the entire Plan is about 15 years.

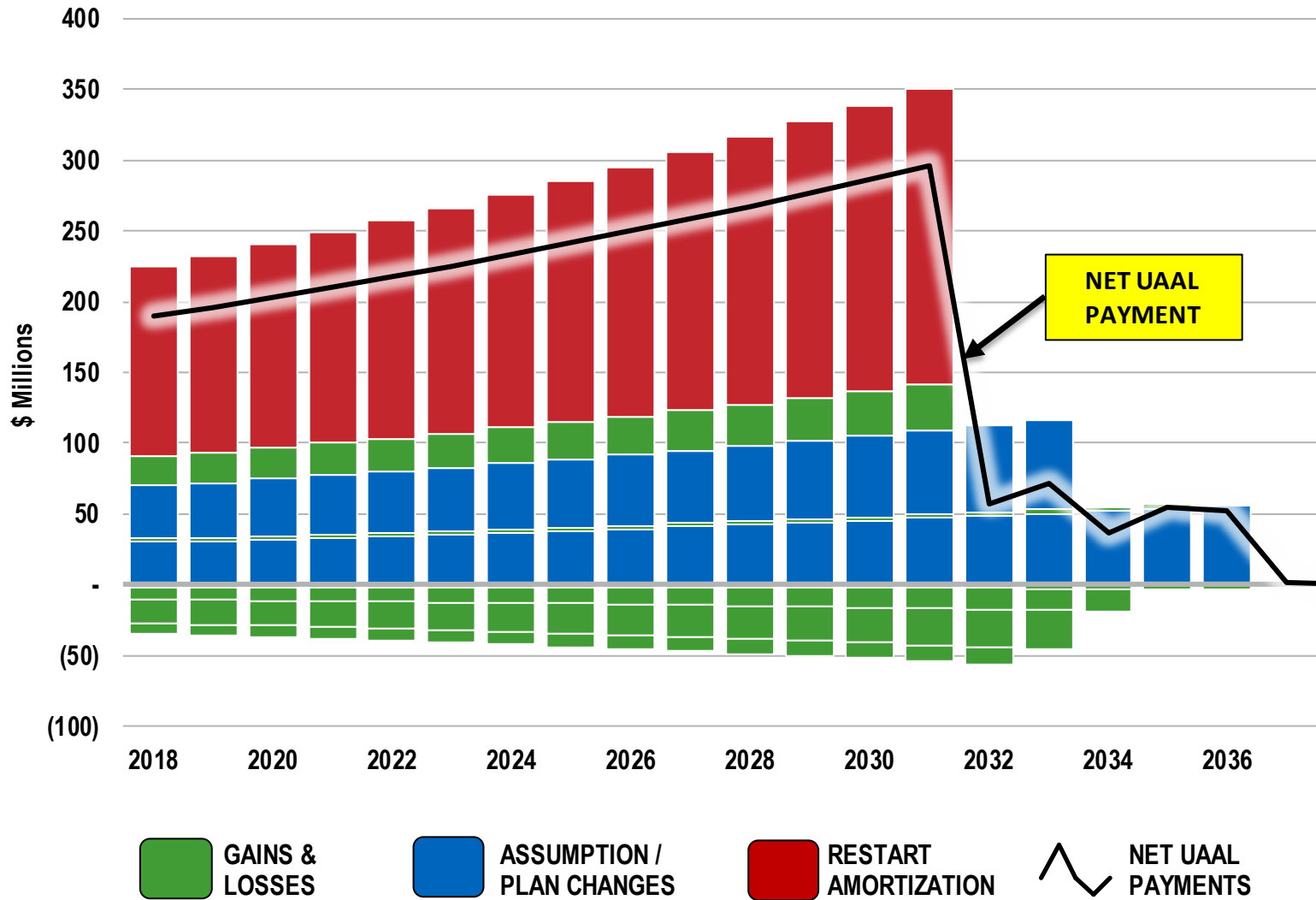
## EXHIBIT I – PROJECTION OF UAAL BALANCES AND PAYMENTS

Outstanding Balance of \$2,137 Million in Net UAAL as of December 31, 2018



## EXHIBIT I – PROJECTION OF UAAL BALANCES AND PAYMENTS (CONTINUED)

**Annual Payments Required to Amortize \$2,137 Million in Net UAAL as of December 31, 2018**



## EXHIBIT J – DEFINITION OF PENSION TERMS

The following list defines certain technical terms for the convenience of the reader:

<b>Actuarial Accrued Liability for Actives:</b>	The equivalent of the accumulated Normal Costs allocated to the years before the valuation date.
<b>Actuarial Accrued Liability for Pensioners and Beneficiaries:</b>	Actuarial Present Value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
<b>Actuarial Cost Method:</b>	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the recommended contribution.
<b>Actuarial Gain or Loss:</b>	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected.
<b>Actuarially Equivalent:</b>	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
<b>Actuarial Present Value (APV):</b>	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <ul style="list-style-type: none"> <li>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</li> <li>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and</li> <li>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</li> </ul>

<b>Actuarial Present Value of Future Benefits:</b>	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
<b>Actuarial Valuation:</b>	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan, as well as Actuarially Determined Contributions.
<b>Actuarial Value of Assets (AVA):</b>	The value of the Plan's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution.
<b>Actuarially Determined:</b>	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the Plan.
<b>Actuarially Determined Contribution (ADC):</b>	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the employer Normal Cost and the Amortization Payment.
<b>Amortization Method:</b>	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
<b>Amortization Payment:</b>	The portion of the pension plan contribution, or ADC, that is designed to amortize the Unfunded Actuarial Accrued Liability.

<b>Assumptions or Actuarial Assumptions:</b>	The estimates upon which the cost of the Plan is calculated, including: <u>Investment return</u> - the rate of investment yield that the Plan will earn over the long-term future; <u>Mortality rates</u> - the rate or probability of death at a given age for employees and pensioners; <u>Retirement rates</u> - the rate or probability of retirement at a given age or service; <u>Disability rates</u> – the rate or probability of disability retirement at a given age; <u>Withdrawal rates</u> - the rate or probability at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; <u>Salary increase rates</u> - the rates of salary increase due to inflation, real wage growth and merit and promotion increases.
<b>Closed Amortization Period:</b>	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 20 years, it is 19 years at the end of one year, 18 years at the end of two years, etc. See Open Amortization Period.
<b>Decrements:</b>	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
<b>Defined Benefit Plan:</b>	A retirement plan in which benefits are defined by a formula based on the member's compensation, age and/or years of service.
<b>Defined Contribution Plan:</b>	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
<b>Experience Study:</b>	A periodic review and analysis of the actual experience of the Plan that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified based on recommendations from the Actuary.
<b>Funded Ratio:</b>	The ratio of the Valuation Value of Assets (VVA) to the Actuarial Accrued Liability (AAL). Plans sometimes also calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the VVA.
<b>Investment Return:</b>	The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
<b>Normal Cost:</b>	The portion of the Actuarial Present Value of Future Benefits allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of the Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of member contributions and employer Normal Cost unless otherwise specifically stated.



<b>Open Amortization Period:</b>	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in each future year in determining the Amortization Period.
<b>Unfunded Actuarial Accrued Liability:</b>	The excess of the Actuarial Accrued Liability over the Valuation Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus or an Overfunded Actuarial Accrued Liability.
<b>Valuation Date or Actuarial Valuation Date:</b>	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Benefits is determined. The expected benefits to be paid in the future are discounted to this date.
<b>Valuation Value of Assets:</b>	The Actuarial Value of Assets reduced by the value of non-valuation reserves.

## Section 4: Actuarial Valuation Basis

### EXHIBIT I – ACTUARIAL ASSUMPTIONS AND METHODS

<b>Rationale for Assumptions</b>	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the December 1, 2013 through November 30, 2016 Actuarial Experience Study report dated September 6, 2017. Unless otherwise noted, all actuarial assumptions and methods shown below apply to all tiers. These assumptions were adopted by the Board.
<b><u>Economic Assumptions</u></b>	
<b>Net Investment Return:</b>	7.25%; net of administrative and investment expenses. Based on the Actuarial Experience Study referenced above, expected administrative and investment expenses represent about 0.90% of the Market Value of Assets.
<b>Employee Contribution Crediting Rate:</b>	7.25%, compounded semi-annually.
<b>Consumer Price Index:</b>	Increase of 3.00% per year. Retiree COLA increases due to CPI are subject to a 3% maximum change per year for General Tier 1, General Tier 3, and Safety Tier 1, and 2% maximum change per year for General Tier 2, General Tier 4, Safety Tier 2, Safety Tier 2C, Safety Tier 2D, and Safety Tier 4.
<b>Payroll Growth:</b>	Inflation of 3.00% per year plus real “across the board” salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
<b>Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit:</b>	Increase of 3.00% per year from the valuation date.
<b>Increase in Section 7522.10 Compensation Limit:</b>	Increase of 3.00% per year from the valuation date.

**Salary Increases:**

The annual rate of compensation increase includes: inflation at 3.00%, plus “across the board” salary increases of 0.50% per year, plus the following merit and promotion increases:

Merit and Promotion Increases		
Years of Service	Rate (%)	
	General	Safety
0-1	4.80%	7.80%
1-2	4.80	7.80
2-3	3.90	7.00
3-4	2.40	4.40
4-5	1.90	3.50
5-6	1.60	2.30
6-7	1.50	1.60
7-8	1.10	1.00
8-9	0.80	1.00
9-10	0.80	0.90
10-11	0.50	0.80
11 & Over	0.40	0.80

**Terminal Pay Assumptions:**

Additional pay elements are expected to be received during a member’s final average earnings period. The percentages, added to the final average salary, used in this valuation are:

	Service Retirement	Disability Retirement
General Tier 1	8.0%	6.5%
General Tier 2	3.0%	1.4%
General Tier 3	8.0%	6.5%
General Tier 4	N/A	N/A
Safety Tier 1	8.5%	6.4%
Safety Tier 2	3.5%	2.1%
Safety Tier 2C	3.5%	2.1%
Safety Tier 2D	3.5%	2.1%
Safety Tier 4	N/A	N/A

## Demographic Assumptions

### Post-Retirement Mortality Rates:

#### Healthy

- **General Members and All Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected generationally with the two-dimensional MP-2016 projection scale.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected generationally with the two-dimensional MP-2016 projection scale.

#### Disabled

- **General Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, set forward seven years for males and set forward four years for females, projected generationally with the two-dimensional MP-2016 projection scale.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, set forward two years for males and with no set forward for females, projected generationally with the two-dimensional MP-2016 projection scale.

The RPH-2014 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

### Pre-Retirement Mortality Rates:

- **General and Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Employee Mortality Tables multiplied by 80%, projected generationally with the two-dimensional MP-2016 projection scale.

Age	Rate (%)			
	General <sup>(1)</sup>		Safety <sup>(1)</sup>	
	Male	Female	Male	Female
20	0.05	0.02	0.05	0.02
25	0.05	0.02	0.05	0.02
30	0.05	0.02	0.05	0.02
35	0.05	0.03	0.05	0.03
40	0.06	0.04	0.06	0.04
45	0.10	0.07	0.10	0.07
50	0.17	0.11	0.17	0.11
55	0.27	0.17	0.27	0.17
60	0.45	0.24	0.45	0.24
65	0.78	0.36	0.78	0.36

All pre-retirement deaths are assumed to be non-service connected.

<sup>(1)</sup> Generational projections beyond the base year (2014) are not reflected in the above mortality rates.

**Mortality Rates for Member Contributions:**

- **General Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 30% male and 70% female.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 75% male and 25% female.

**Optional Forms of Benefit:**

*Service Retirement and All Beneficiaries*

- **General Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 30% male and 70% female.
- **General Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 70% male and 30% female.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 75% male and 25% female.
- **Safety Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, with no setback for males and females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 25% male and 75% female.

*Disability Retirement*

- **General Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, set forward seven years for males and set forward four years for females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 30% male and 70% female.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, set forward two years for males and with no set forward for females, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, weighted 75% male and 25% female.

**Disability Incidence:**

Disability Incidence		
	Rate (%)	
Age	General	Safety
20	0.00%	0.00%
25	0.01	0.03
30	0.03	0.26
35	0.05	0.58
40	0.08	0.73
45	0.19	0.78
50	0.31	1.52
55	0.38	2.00
60	0.43	2.60

60% of General disabilities are assumed to be service connected disabilities. The other 40% are assumed to be non-service connected disabilities.

100% of Safety disabilities are assumed to be service connected disabilities.

**Termination:**

Termination (< 5 Years of Service)		
Years of Service	Rate (%)	
	General	Safety
0-1	11.00%	4.00%
1-2	9.00	3.50
2-3	8.00	3.50
3-4	6.00	2.50
4-5	6.00	2.00

60% of all terminated members with less than 5 years of service are assumed to choose a refund of contributions. The other 40% are assumed to choose a deferred vested benefit.

Termination (5+ Years of Service)		
Age	Rate (%)	
	General	Safety
20	6.00%	2.00%
25	6.00	2.00
30	5.40	2.00
35	4.40	1.70
40	3.40	1.20
45	3.00	1.00
50	3.00	1.00
55	3.00	1.00
60	3.00	0.40

35% of all terminated members with 5 or more years of service are assumed to choose a refund of contributions. The other 65% are assumed to choose a deferred vested benefit.

No termination is assumed after a member is eligible for retirement (as long as a retirement rate is present).

**Retirement Rates:**

Age	Retirement Rates <sup>(1)</sup> (%)			
	General Tier 1	General Tier 2	General Tier 3	General Tier 4
49	0.00%	0.00%	0.00%	0.00%
50	4.00	2.00	6.00	0.00
51	4.00	2.00	3.00	0.00
52	4.00	2.00	5.00	4.00
53	4.00	2.00	6.00	1.50
54	4.00	2.00	6.00	1.50
55	6.00	2.00	12.00	2.00
56	8.00	3.00	13.00	2.50
57	10.00	4.00	13.00	3.50
58	12.00	4.00	14.00	3.50
59	14.00	5.00	16.00	4.50
60	20.00	7.00	21.00	6.00
61	20.00	9.00	20.00	8.00
62	35.00	15.00	30.00	18.00
63	30.00	16.00	25.00	15.00
64	30.00	18.00	25.00	17.00
65	35.00	25.00	30.00	22.00
66	35.00	25.00	25.00	25.00
67	30.00	25.00	25.00	25.00
68	30.00	30.00	25.00	30.00
69	35.00	35.00	50.00	35.00
70	65.00	50.00	65.00	50.00
71	65.00	50.00	65.00	50.00
72	65.00	50.00	65.00	50.00
73	65.00	50.00	65.00	50.00
74	65.00	50.00	65.00	50.00
75	100.00	100.00	100.00	100.00

<sup>(1)</sup> The retirement rates only apply to members that are eligible to retire at the age shown.



Retirement Rates (continued):	Retirement Rates <sup>(1)</sup> (%)				
	Age	Safety Tier 1 <sup>(2)</sup>	Safety Tier 2, 2D <sup>(2)</sup>	Safety Tier 2C <sup>(2)</sup>	Safety Tier 4
	49	0.00	10.00	0.00	0.00
	50	35.00	15.00	4.00	4.00
	51	30.00	15.00	2.00	2.00
	52	25.00	15.00	2.00	2.00
	53	35.00	15.00	3.00	3.00
	54	45.00	15.00	6.00	6.00
	55	45.00	15.00	10.00	10.00
	56	45.00	15.00	12.00	12.00
	57	45.00	15.00	20.00	20.00
	58	45.00	20.00	10.00	10.00
	59	45.00	20.00	15.00	15.00
	60	45.00	30.00	60.00	60.00
	61	45.00	30.00	60.00	60.00
	62	45.00	30.00	60.00	60.00
	63	45.00	30.00	60.00	60.00
	64	45.00	50.00	60.00	60.00
	65	100.00	100.00	100.00	100.00

<sup>(1)</sup> The retirement rates only apply to members that are eligible to retire at the age shown.

<sup>(2)</sup> Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

<b>Retirement Age and Benefit for Deferred Vested Members:</b>	<p>General Retirement Age: 61</p> <p>Safety Retirement Age: 56</p> <p>Future deferred vested members who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit. 30% of future General and 60% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 3.90% and 4.30% compensation increases are assumed per annum for General and Safety, respectively.</p>
<b>Future Benefit Accruals:</b>	1.0 year of service per year of employment, plus 0.003 years of additional service for General members and 0.006 years of additional service for Safety members, to anticipate conversion of unused sick leave for each year of employment.
<b>Unknown Data for Members:</b>	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

<b>Inclusion of Deferred Vested Members:</b>	All deferred vested members are included in the valuation.
<b>Data Adjustments:</b>	Data as of November 30 has been adjusted to December 31 by adding one month of age and, for active members, one month of service.
<b>Form of Payment:</b>	All active and inactive vested members are assumed to elect the unmodified option at retirement.
<b>Percent Married:</b>	70% of male members; 50% of female members.
<b>Age of Spouse:</b>	Female spouses are 3 years younger than their male member spouses. Male spouses are 2 years older than their female member spouses.
<b><u>Actuarial Funding Policy</u></b>	
<b>Actuarial Cost Method:</b>	Entry Age Actuarial Cost Method. Entry Age is the age on the valuation date minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percentage of compensation, as if the current benefit formula for each individual has always been in effect.
<b>Actuarial Value of Assets:</b>	Market value of assets (MVA) less unrecognized returns in each of the last ten six-month interest crediting periods. Unrecognized returns are equal to the difference between the actual market return and the expected return on the market value, and are recognized semi-annually over a five-year period. The actuarial value of assets (AVA) is limited by a 40% corridor; the AVA cannot be less than 60% of MVA, nor greater than 140% of MVA.
<b>Valuation Value of Assets:</b>	The Actuarial Value of Assets reduced by the value of the non-valuation reserves.
<b>Amortization Policy:</b>	<p>Prior to January 1, 2012, the total UAAL was amortized on a 30-year decreasing period, with 21 years remaining as of December 31, 2011 (and 14 years remaining as of December 31, 2018).</p> <p>On or after January 1, 2012, any new UAAL resulting from plan amendments are amortized over separate decreasing 15-year periods; early retirement incentive programs (ERIPs) are amortized over separate decreasing 5-year periods; assumption and method changes are amortized over separate decreasing 20-year periods; and experience gains/losses are also amortized over separate decreasing 20-year periods.</p> <p>ACOE's UAAL amortization under the declining employer payroll policy is level dollar.</p>

## Other Actuarial Methods

### **Employer Contributions:**

Employer contributions consist of two components:

#### *Normal Cost*

The annual contribution rate that, if paid annually from a member's first year of membership through the year of retirement, would accumulate to the amount necessary to fully fund the member's retirement-related benefits. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution rate is expressed as a level percentage of the member's compensation.

#### *Contribution to the Unfunded Actuarial Accrued Liability (UAAL)*

The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the Association) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase at the annual rate of 3.50% (i.e., 3.00% inflation plus 0.50% across-the-board salary increase).

The amortization policy is described on the previous page.

Alameda County previously issued pension obligation bonds (POB) and the net bond proceeds were contributed to ACERA. When the POBs were issued, AHS, Court and First 5 were part of the County and, consequently, they share in the proceeds. The net bond proceeds contributed to ACERA allow the Association to provide a "Pension Obligation Bond Credit" to these employers, thereby reducing their employer contribution rate. As of December 31, 2018, the outstanding balances of the POBs were \$513.5 million for the General employers (County, AHS, Court, and First 5) and \$96.1 million for the Safety employers (County).

For several years, the Board of Retirement has approved transfers from the SRBR to the Employer Advance Reserve to reimburse the County for their payment of the implicit retiree health benefit subsidy. The amortization credits resulting from these transfers have served to reduce the County's employer contribution rates.

The recommended employer contributions are provided in *Section 2, Subsection F*. These rates reflect the POB credits for the County, AHS, Court, and First 5, and the retiree health benefit subsidy credits for the County, noted above.

## Member Contributions:

### *Non-Tier 4 Members*

Articles 6 and 6.8 of the 1937 Act define the methodology to be used in the calculation of member basic contribution rates for non-Tier 4 General and Safety members, respectively. The basic contribution rate is determined so that the accumulation of a member's basic contributions made in a given year until a certain age will be sufficient to fund an annuity at that age that is equal to 1/100 of Final Average Salary for General Tier 1, General Tier 3, and all Safety non-Tier 4 members and 1/120 of Final Average Salary for General Tier 2 members. That age is 60 for General Tier 1 and Tier 2, 55 for General Tier 3, and 50 for all Safety non-Tier 4 members. It is assumed that contributions are made annually at the same rate, starting at entry age. In addition to the basic contributions, members pay one-half of the total normal cost necessary to fund cost-of-living benefits. As instructed by ACERA, we have also included a 3% cost-sharing contribution that we understand will be paid by Safety Tier 1 and Tier 2 members. For Safety Tier 2C members, there are no cost-sharing contributions. For Safety Tier 2D members, the cost-sharing contribution rate is 5% of salary for the first 5 years of vesting service and 3% of salary for each subsequent year of vesting service. (The 3% cost-sharing contribution for Safety Tiers 1, 2, and 2D (after 5 years of service) will continue even after the member attains 30 years of service.)

Accumulation includes semi-annual crediting of interest at the assumed investment earnings rate. Following the procedure established by the Board, basic member rates have been adjusted to anticipate conversion of terminal pay at retirement.

### *Tier 4 Members*

Pursuant to Section 7522.30(a) of the Government Code, Tier 4 members are required to contribute at least 50% of the Normal Cost rate.

When previously calculating member rates, there were certain additional requirements that had to be met such as requiring the employee rates be rounded to the nearest one quarter of one percent and requiring the new employees to pay the contribution rate of "similarly situated employees", if it is greater. (reference: Section 7522.30(c)). Furthermore, Section 7522.30(d) indicated that "once established, the employee contribution rate described in subdivision (c) shall not be adjusted on account of a change to the normal cost rate unless the normal cost rate increases or decreases by more than 1 percent of payroll above or below the normal cost rate in effect at the time the employee contribution rate is first established or, if later, the normal cost rate in effect at the time of the last adjustment to the employee contribution rate under this section."

However, as we referenced in our letter dated February 26, 2014, Assembly Bill 1380 (AB 1380) was approved by the Governor on September 6, 2013. In particular, Section 31620.5(a) was added to the Government Code to provide the Board with the discretion to not apply the rounding previously required under Section 7522.30(c). We understand that our recommendation in that letter to no longer apply the rounding rule effective with the December 31, 2013 valuation was adopted by the Board, and the results in this valuation reflect that action taken by the Board.

Section 31620.5(b) of AB 1380 also stipulates that the "one percent rule" under Section 7522.30(d) "shall not apply to the contribution rates of members of retirement systems established pursuant to this chapter."

	<p>Therefore, in preparing the Normal Cost rates in this report, we have assumed that exactly 50% of the Normal Cost would be paid by the Tier 4 members.</p> <p>The member contribution rates for all members are provided in <i>Section 4, Exhibit III</i>.</p>
<p><b>Internal Revenue Code Section 415:</b></p>	<p>Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.</p> <p>A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.</p> <p>In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$220,000 for 2018 and \$225,000 for 2019. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions.</p> <p>Non-Tier 4 benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).</p> <p>Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.</p> <p>Non-Tier 4 contribution rates determined in this valuation have not been reduced for the Section 415 limitations. Actual limitations will result in gains as they occur.</p>
<p><b>Justification for Change in Actuarial Assumptions:</b></p>	<p>There have been no changes in actuarial assumptions since the last valuation.</p>

## EXHIBIT II – SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

<b>Plan Year:</b>	January 1 through December 31
<b>Membership Eligibility:</b>	Membership with ACERA usually begins with the second pay period following appointment to a full time County or member District position <sup>(1)</sup> . ACERA members who change from full time to part time will continue to participate at ACERA.
<i>General and Safety Tier 1</i>	All General and Safety members hired on or before June 30, 1983 <sup>(2)</sup> .
<i>General and Safety Tier 2</i>	All General and Safety members hired after June 30, 1983 <sup>(3)</sup> , and not in any of the other Tiers listed below.
<i>General Tier 3</i>	Only General LARPD members hired before October 1, 2008 who elected the 2.5% at 55 formula and all General LARPD members hired after that date.
<i>General and Safety Tier 4</i>	All General and Safety members with membership dates on or after January 1, 2013.
<i>Safety Tier 2C</i>	All Safety members in the Sheriff's Department (excluding Probation Officers) hired on or after October 17, 2010 who elected the 2% at 50 formula.
<i>Safety Tier 2D</i>	All Safety members in the Sheriff's Department (excluding Probation Officers) hired on or after October 17, 2010 who elected the 3% at 55 formula.
	<p><sup>(1)</sup> For Housing Authority and LARPD, membership with ACERA begins on the first day of hire.</p> <p><sup>(2)</sup> For Housing Authority General members, the hire date is on or before September 30, 2011 (instead of June 30, 1983). For LARPD General members, the hire date is on or before September 30, 2008 (instead of June 30, 1983).</p> <p><sup>(3)</sup> For Housing Authority General members, the hire date is after September 30, 2011 (instead of June 30, 1983).</p>
<b>Final Compensation for Benefit Determination:</b>	
<i>General Tier 1, General Tier 3 and Safety Tier 1</i>	Highest consecutive 12 months of compensation earnable (§31462.1) (FAS1).
<i>General Tier 2, General Tier 4, Safety Tier 2, Safety Tier 2C, Safety Tier 2D, and Safety Tier 4</i>	For non-Tier 4 members, highest consecutive 36 months of compensation earnable (§31462), and for Tier 4 members, highest consecutive 36 months of pensionable compensation (§7522.10(c), §7522.32 and §7522.34) (FAS3).

<b>Compensation Limit:</b>		
<i>Non-Tier 4</i>	For members with membership dates on or after July 1, 1996, compensation earnable is limited by Internal Revenue Code Section 401(a)(17). The limit for 2019 is \$280,000. The limit is indexed for inflation on an annual basis.	
<i>Tier 4</i>	Pensionable compensation is limited to \$124,180 for 2019 for an employer that is enrolled in Social Security. For an employer that is not enrolled in Social Security, the maximum amount for 2019 is 120% of \$124,180, or \$149,016. (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (reference: Section 7522.10(d)).	
<b>Service:</b>		
Years of service (Yrs) are generally based on a member's employment during a period of time for which deductions are made from their compensation.		
<b>Service Retirement Eligibility:</b>		
<i>General</i>		
<i>Non-Tier 4</i>	Age 50 with 5 years of service and a total of 10 years of qualifying membership, or age 70 regardless of service, or after 30 years of service regardless of age (§31672).	
<i>Tier 4</i>	Age 52 with 5 years of service (§7522.20(a)) or age 70 regardless of service (§31672.3).	
<i>Safety</i>		
<i>Non-Tier 4</i>	Age 50 with 5 years of service and a total of 10 years of qualifying membership, or age 70 regardless of service, or after 20 years of service regardless of age (§31663.25).	
<i>Tier 4</i>	Age 50 with 5 years of service (§7522.25(d)) or age 70 regardless of service (§31672.3).	
<b>Benefit Formula:</b>		
<i>General Tier 1 (§31676.12)</i>	<b>Retirement Age</b>	<b>Benefit Formula</b>
	50	$1.34\% \times (\text{FAS1} - \$1,400) \times \text{Yrs}$
	55	$1.77\% \times (\text{FAS1} - \$1,400) \times \text{Yrs}$
	60	$2.34\% \times (\text{FAS1} - \$1,400) \times \text{Yrs}$
	62 and over	$2.62\% \times (\text{FAS1} - \$1,400) \times \text{Yrs}$
<i>General Tier 2 (§31676.1)</i>	<b>Retirement Age</b>	<b>Benefit Formula</b>
	50	$1.18\% \times (\text{FAS3} - \$1,400) \times \text{Yrs}$
	55	$1.49\% \times (\text{FAS3} - \$1,400) \times \text{Yrs}$
	60	$1.92\% \times (\text{FAS3} - \$1,400) \times \text{Yrs}$

<i>General Tier 3 (§31676.18)</i>	62	2.09% x (FAS3 – \$1,400) x Yrs
	65 and over	2.43% x (FAS3 – \$1,400) x Yrs
<i>General Tier 4 (§7522.20(a))</i>	<b>Retirement Age</b>	<b>Benefit Formula</b>
	50	2.00% x FAS1 x Yrs
<i>Safety Tier 1 (Non-Integrated) (§31664.1)</i>	55 and over	2.50% x FAS1 x Yrs
	<b>Retirement Age</b>	<b>Benefit Formula</b>
<i>Safety Tier 2 (Non-Integrated) (§31664.1)</i>	52	1.00% x FAS3 x Yrs
	55	1.30% x FAS3 x Yrs
<i>Safety Tier 2C (Non-Integrated) (§31664)</i>	60	1.80% x FAS3 x Yrs
	62	2.00% x FAS3 x Yrs
<i>Safety Tier 2D (Non-Integrated) (§31664.2)</i>	65	2.30% x FAS3 x Yrs
	67 and over	2.50% x FAS3 x Yrs
<i>Safety Tier 4 (Non-Integrated) (§7522.25(d))</i>	<b>Retirement Age</b>	<b>Benefit Formula</b>
	50 and over	3.00% x FAS1 x Yrs
<i>Safety Tier 2 (Non-Integrated) (§31664.1)</i>	<b>Retirement Age</b>	<b>Benefit Formula</b>
	50 and over	3.00% x FAS3 x Yrs
<i>Safety Tier 2C (Non-Integrated) (§31664)</i>	<b>Retirement Age</b>	<b>Benefit Formula</b>
	50	2.00% x FAS3 x Yrs
<i>Safety Tier 2D (Non-Integrated) (§31664.2)</i>	55 and over	2.62% x FAS3 x Yrs
	<b>Retirement Age</b>	<b>Benefit Formula</b>
<i>Safety Tier 4 (Non-Integrated) (§7522.25(d))</i>	50	2.29% x FAS3 x Yrs
	55 and over	3.00% x FAS3 x Yrs
<i>Safety Tier 4 (Non-Integrated) (§7522.25(d))</i>	<b>Retirement Age</b>	<b>Benefit Formula</b>
	50	2.00% x FAS3 x Yrs
	55	2.50% x FAS3 x Yrs
	57 and over	2.70% x FAS3 x Yrs



<b>Maximum Benefit:</b>	
<i>Non-Tier 4</i>	100% of Highest Average Compensation (§31676.1, §31676.12, §31676.18, §31664, §31664.1, and §31664.2).
<i>Tier 4</i>	None.
<b>Non-Service Connected Disability:</b>	
<i>General Tier 1, Tier 2, Tier 3, and Tier 4</i>	
<i>Eligibility</i>	Five years of service (§31720).
<i>Benefit Formula</i>	1.8% of Final Compensation per year of service for General Tier 1 and Tier 3 and 1.5% of Final Compensation per year of service for General Tier 2 and Tier 4. If the benefit does not exceed one-third of Final Compensation, the service is projected to 62 for General Tier 1 and Tier 3, and to age 65 for General Tier 2 and Tier 4, but the total benefit cannot be more than one-third of Final Compensation (§31727.1 and §31727).
<i>Safety Tier 1, Tier 2, Tier 2C, Tier 2D and Tier 4</i>	
<i>Eligibility</i>	Five years of service (§31720).
<i>Benefit Formula</i>	1.8% of Final Compensation per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 55, but the total benefit cannot be more than one-third of Final Compensation (§31727.2).
<b>Service Connected Disability:</b>	
<i>All Members</i>	
<i>Eligibility</i>	No age or service requirements (§31720).
<i>Benefit Formula</i>	50% of the Final Compensation or 100% of Service Retirement benefit, if greater (§31727.4).

<b>Pre-Retirement Death:</b>	
<i>All Members</i>	
<i>Eligibility</i>	None.
<i>Basic lump sum benefit</i>	Refund of employee contributions with interest, plus one month's compensation for each year of service, to a maximum of six month's compensation (§31781).
<i>Service Connected Death</i>	50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor children (§31787).  OR
<i>Vested Members</i>	
<i>Eligibility</i>	Five years of service.
<i>Basic benefit</i>	60% of the greater of Service or Non-Service Connected Disability Retirement benefit payable to surviving eligible spouse (§31765.1, §31781.1), in lieu of the basic lump sum benefit above.
<i>Service Connected Death</i>	50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor children (§31787).
<b>Death After Retirement:</b>	
<i>All Members</i>	
<i>Service Retirement or Non-Service Connected Disability Retirement</i>	Unless another option was selected at retirement, 60% of member's unmodified allowance continues to eligible spouse (§31760.1) and lump sum death burial benefit <sup>(1)</sup> payable to member's beneficiary (§31789.3). An eligible spouse is a surviving spouse who was married to the member at least one year prior to the date of retirement (§31760.1).
<i>Service Connected Disability</i>	Unless another option was selected at retirement, 100% of member's allowance continued to eligible spouse (§31786).
	<sup>(1)</sup> Based on action taken by the Board in February 2014, we are continuing to exclude the death burial benefit from the pension valuation.
<b>Withdrawal Benefits:</b>	
<i>Less than Five Years of Service</i>	Refund of accumulated employee contributions with interest, or benefit at age 70 (§31628). Effective January 1, 2003, a member may also elect to leave contributions on deposit in the retirement fund (§31629.5).
<i>Five or More Years of Service</i>	If contributions left on deposit, entitled to earned benefits commencing at any time after eligible to retire (§31700).

<b>Post-retirement Cost-of-Living Benefits:</b>	
<i>General Tier 1, General Tier 3 and Safety Tier 1</i>	Annual adjustment based on Consumer Price Index to a maximum of 3% per year; excess “banked” (\$31870.1).
<i>General Tier 2, General Tier 4 Safety Tier 2, Safety Tier 2C, Safety Tier 2D, and Safety Tier 4</i>	Annual adjustment based on Consumer Price Index to a maximum of 2% per year; excess “banked” (\$31870).
<b>Supplemental Benefit:</b>	Non-vested supplemental COLA and medical benefits are also paid from the Supplemental Retirees Benefit Reserve to eligible retirees and survivors. These benefits have been excluded from this valuation.
<b>Member Contributions:</b>	Please refer to <i>Section 4, Exhibit III</i> for specific rates.
<i>General Tier 1</i>	
<i>Basic</i>	Entry-age based rates that provide for an average annuity at age 60 equal to 1/100 of FAS1 (\$31621.2).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>General Tier 2</i>	
<i>Basic</i>	Entry-age based rates that provide for an average annuity at age 60 equal to 1/120 of FAS3 (\$31621).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>General Tier 3</i>	
<i>Basic</i>	Entry-age based rates that provide for an average annuity at age 55 equal to 1/100 of FAS1 (\$31621.8).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>General Tier 4</i>	50% of the total Normal Cost rate.
<i>Safety Non-Tier 4</i>	
<i>Basic</i>	Entry-age based rates that provide for an average annuity at age 50 equal to 1/100 of FAS1 (FAS3 for Tier 2, Tier 2C, and Tier 2D) (\$31639.25). As instructed by ACERA, we have also included a 3% cost-sharing contribution that we understand will be paid by Safety Tier 1 and Tier 2 members. For Safety Tier 2C members, there are no cost-sharing contributions. For Safety Tier 2D members, the cost-sharing contribution rate is 5% of salary for the first 5 years of employment and 3% of salary for each subsequent year of employment. (The 3% cost-sharing contribution for Safety Tiers 1, 2, and 2D (after 5 years of service) will continue even after the member attains 30 years of service.)
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Safety Tier 4</i>	50% of the total Normal Cost rate.

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<b>Other Information:</b>	Except for the 3% cost-sharing contribution described above, non-Tier 4 Safety members are exempt from paying member contributions after 30 or more years of service. This exemption also applies for General members hired on or before March 7, 1973.
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<b>Changes in Plan Provisions:</b>	There have been no changes in plan provisions since the last valuation.
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**Note:** The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the Association should find the plan summary not in accordance with the actual provisions, the Association should alert the actuary so they can both be sure the proper provisions are valued.

## EXHIBIT III – MEMBER CONTRIBUTION RATES

Comparison of Total Member Rate<sup>(1)</sup> from December 31, 2018 (New) and December 31, 2017 (Current) Valuations

General Tier 1				General Tier 2			
Entry Age	Current	New	Change	Entry Age	Current	New	Change
25	9.41%	9.36%	<b>-0.05%</b>	25	6.45%	6.45%	<b>0.00%</b>
35	11.37%	11.31%	<b>-0.06%</b>	35	7.78%	7.78%	<b>0.00%</b>
45	13.72%	13.65%	<b>-0.07%</b>	45	9.39%	9.38%	<b>-0.01%</b>
General Tier 3				General Tier 4			
Entry Age	Current	New	Change	Entry Age <sup>(2)</sup>	Current	New	Change
25	10.93%	10.97%	<b>0.04%</b>	Any	8.76%	8.80%	<b>0.04%</b>
35	13.18%	13.24%	<b>0.06%</b>				
45	15.97%	16.04%	<b>0.07%</b>				
Safety Tier 1				Safety Tier 2			
Entry Age	Current	New	Change	Entry Age	Current	New	Change
25	18.12%	17.99%	<b>-0.13%</b>	25	15.13%	15.14%	<b>0.01%</b>
30	19.43%	19.29%	<b>-0.14%</b>	30	16.18%	16.20%	<b>0.02%</b>
35	20.90%	20.75%	<b>-0.15%</b>	35	17.35%	17.37%	<b>0.02%</b>
Safety Tier 2C				Safety Tier 2D (with less than 5 years of vesting service)			
Entry Age	Current	New	Change	Entry Age	Current	New	Change
25	11.59%	11.60%	<b>0.01%</b>	25	16.94%	16.97%	<b>0.03%</b>
30	12.60%	12.61%	<b>0.01%</b>	30	17.98%	18.02%	<b>0.04%</b>
35	13.72%	13.73%	<b>0.01%</b>	35	19.14%	19.17%	<b>0.03%</b>
Safety Tier 2D (with 5 or more years of vesting service)				Safety Tier 4			
Entry Age	Current	New	Change	Entry Age <sup>(2)</sup>	Current	New	Change
25	14.94%	14.97%	<b>0.03%</b>	Any	15.75%	15.58%	<b>-0.17%</b>
30	15.98%	16.02%	<b>0.04%</b>				
35	17.14%	17.17%	<b>0.03%</b>				

<sup>(1)</sup> For the non-CalPEPRA tiers, contributions for the first \$161 of biweekly payroll are based on 2/3 of the above rates for integrated members.

<sup>(2)</sup> Tier 4 member rates are independent of entry age.

## EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Breakdown of member rate between basic and COLA calculated in the December 31, 2018 and December 31, 2017 valuations:

	December 31, 2018 Actuarial Valuation								December 31, 2017 Actuarial Valuation <sup>(1)</sup>							
	BASIC		COLA		COST SHARING CONTRIBUTIONS <sup>(2)</sup>		TOTAL		BASIC		COLA		COST SHARING CONTRIBUTIONS <sup>(2)</sup>		TOTAL	
	Rate	Estimated Annual Amount <sup>(3)</sup>	Rate	Estimated Annual Amount <sup>(3)</sup>	Rate	Estimated Annual Amount <sup>(3)</sup>	Rate	Estimated Annual Amount <sup>(3)</sup>	Rate	Estimated Annual Amount <sup>(3)</sup>	Rate	Estimated Annual Amount <sup>(3)</sup>	Rate	Estimated Annual Amount <sup>(3)</sup>	Rate	Estimated Annual Amount <sup>(3)</sup>
General Tier 1	6.89%	\$1,014	2.65%	\$389			9.54%	\$1,403	6.89%	\$1,014	2.70%	\$397			9.59%	\$1,411
General Tier 2	6.23%	37,425	1.52%	9,130			7.75%	46,555	6.23%	37,425	1.53%	9,190			7.76%	46,615
General Tier 3	10.00%	205	3.99%	82			13.99%	287	10.00%	205	3.93%	81			13.93%	286
General Tier 4	7.18%	21,783	1.62%	4,915			8.80%	26,698	7.13%	21,631	1.63%	4,946			8.76%	26,577
Safety Tier 1	3.49%	34	2.06%	20	3.00%	\$29	8.55%	83	3.49%	34	2.12%	21	3.00%	\$29	8.61%	84
Safety Tier 2	9.10%	10,881	3.75%	4,484	3.00%	3,587	15.85%	18,952	9.10%	10,881	3.73%	4,460	3.00%	3,587	15.83%	18,928
Safety Tier 2C	9.91%	332	3.47%	116	0.00%	0	13.38%	448	9.91%	332	3.44%	115	0.00%	0	13.35%	447
Safety Tier 2D	9.38%	1,350	3.68%	529	3.09%	445	16.15%	2,324	9.38%	1,350	3.65%	525	3.09%	445	16.12%	2,320
Safety Tier 4	12.29%	4,251	3.29%	1,138	0.00%	0	15.58%	5,389	12.39%	4,285	3.36%	1,162	0.00%	0	15.75%	5,447
<b>All Tiers Combined</b>	<b>7.07%</b>	<b>\$77,275</b>	<b>1.90%</b>	<b>\$20,803</b>	<b>0.37%</b>	<b>\$4,061</b>	<b>9.34%</b>	<b>\$102,139</b>	<b>7.05%</b>	<b>\$77,157</b>	<b>1.92%</b>	<b>\$20,897</b>	<b>0.37%</b>	<b>\$4,061</b>	<b>9.34%</b>	<b>\$102,115</b>

- (1) These rates have been re-calculated by applying the individual entry age based member rates determined in December 31, 2017 valuation to the Association membership as of December 31, 2018.
- (2) Cost sharing contributions for Safety Tier 2D members are determined based on proportion of members contributing 5.00% (with less than 5 years of vesting service) and 3.00% (with 5 or more years of vesting service).
- (3) Amounts are in thousands and are based on December 31, 2018 annual payroll (also in thousands):

	<u>County</u>	<u>AHS, Court &amp; First 5</u>	<u>Housing Authority</u>	<u>LARPD</u>	<u>Total</u>
General Tier 1	\$8,626	\$2,145	\$3,269	\$670	\$14,710
General Tier 2	395,334	205,025	356		600,715
General Tier 3				2,051	2,051
General Tier 4	183,173	117,121	1,127	1,966	303,387
Safety Tier 1	973				973
Safety Tier 2	119,571				119,571
Safety Tier 2C	3,349				3,349
Safety Tier 2D	14,392				14,392
Safety Tier 4	34,587				34,587
<b>Total</b>	<b>\$760,005</b>	<b>\$324,291</b>	<b>\$4,752</b>	<b>\$4,687</b>	<b>\$1,093,735</b>

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Tier 1 Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

General – Tier 1						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	3.79%	5.68%	1.45%	2.18%	5.24%	7.86%
16	3.79%	5.68%	1.45%	2.18%	5.24%	7.86%
17	3.86%	5.79%	1.49%	2.23%	5.35%	8.02%
18	3.94%	5.91%	1.51%	2.27%	5.45%	8.18%
19	4.02%	6.03%	1.55%	2.32%	5.57%	8.35%
20	4.10%	6.14%	1.57%	2.36%	5.67%	8.50%
21	4.18%	6.26%	1.61%	2.41%	5.79%	8.67%
22	4.26%	6.39%	1.63%	2.45%	5.89%	8.84%
23	4.34%	6.51%	1.67%	2.50%	6.01%	9.01%
24	4.42%	6.64%	1.70%	2.55%	6.12%	9.19%
25	4.51%	6.76%	1.73%	2.60%	6.24%	9.36%
26	4.60%	6.89%	1.77%	2.65%	6.37%	9.54%
27	4.68%	7.03%	1.80%	2.70%	6.48%	9.73%
28	4.77%	7.16%	1.83%	2.75%	6.60%	9.91%
29	4.87%	7.30%	1.87%	2.80%	6.74%	10.10%
30	4.96%	7.44%	1.91%	2.86%	6.87%	10.30%
31	5.05%	7.58%	1.94%	2.91%	6.99%	10.49%
32	5.15%	7.72%	1.98%	2.97%	7.13%	10.69%
33	5.25%	7.87%	2.01%	3.02%	7.26%	10.89%
34	5.35%	8.02%	2.05%	3.08%	7.40%	11.10%
35	5.45%	8.17%	2.09%	3.14%	7.54%	11.31%
36	5.55%	8.32%	2.13%	3.20%	7.68%	11.52%
37	5.65%	8.48%	2.17%	3.26%	7.82%	11.74%
38	5.76%	8.64%	2.21%	3.32%	7.97%	11.96%
39	5.87%	8.80%	2.25%	3.38%	8.12%	12.18%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General – Tier 1 (continued)						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	5.98%	8.97%	2.30%	3.45%	8.28%	12.42%
41	6.09%	9.14%	2.34%	3.51%	8.43%	12.65%
42	6.21%	9.31%	2.39%	3.58%	8.60%	12.89%
43	6.33%	9.49%	2.43%	3.65%	8.76%	13.14%
44	6.45%	9.68%	2.48%	3.72%	8.93%	13.40%
45	6.58%	9.86%	2.53%	3.79%	9.11%	13.65%
46	6.70%	10.06%	2.57%	3.86%	9.27%	13.92%
47	6.84%	10.26%	2.63%	3.94%	9.47%	14.20%
48	6.98%	10.47%	2.68%	4.02%	9.66%	14.49%
49	7.12%	10.67%	2.73%	4.10%	9.85%	14.77%
50	7.24%	10.86%	2.78%	4.17%	10.02%	15.03%
51	7.37%	11.06%	2.83%	4.25%	10.20%	15.31%
52	7.49%	11.24%	2.88%	4.32%	10.37%	15.56%
53	7.59%	11.39%	2.92%	4.38%	10.51%	15.77%
54	7.69%	11.54%	2.95%	4.43%	10.64%	15.97%
55	7.78%	11.67%	2.99%	4.48%	10.77%	16.15%
56	7.84%	11.76%	3.01%	4.52%	10.85%	16.28%
57	7.80%	11.70%	2.99%	4.49%	10.79%	16.19%
58	7.66%	11.49%	2.95%	4.42%	10.61%	15.91%
59 & Over	7.34%	11.01%	2.82%	4.23%	10.16%	15.24%

<sup>(1)</sup> Use these rates for Non-Integrated Members

Interest: 7.25% per annum  
 COLA: 3.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 38.43%  
 Terminal Pay: 8.0%



### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

#### General Tier 2 Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

General – Tier 2						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	2.90%	4.35%	0.71%	1.06%	3.61%	5.41%
16	2.90%	4.35%	0.71%	1.06%	3.61%	5.41%
17	2.96%	4.43%	0.72%	1.08%	3.68%	5.51%
18	3.01%	4.52%	0.74%	1.11%	3.75%	5.63%
19	3.07%	4.61%	0.75%	1.13%	3.82%	5.74%
20	3.13%	4.70%	0.77%	1.15%	3.90%	5.85%
21	3.20%	4.79%	0.78%	1.17%	3.98%	5.96%
22	3.26%	4.89%	0.79%	1.19%	4.05%	6.08%
23	3.32%	4.98%	0.81%	1.22%	4.13%	6.20%
24	3.39%	5.08%	0.83%	1.24%	4.22%	6.32%
25	3.45%	5.18%	0.85%	1.27%	4.30%	6.45%
26	3.52%	5.28%	0.86%	1.29%	4.38%	6.57%
27	3.58%	5.38%	0.87%	1.31%	4.45%	6.69%
28	3.65%	5.48%	0.89%	1.34%	4.54%	6.82%
29	3.72%	5.58%	0.91%	1.37%	4.63%	6.95%
30	3.79%	5.69%	0.93%	1.39%	4.72%	7.08%
31	3.87%	5.80%	0.95%	1.42%	4.82%	7.22%
32	3.94%	5.91%	0.96%	1.44%	4.90%	7.35%
33	4.01%	6.02%	0.98%	1.47%	4.99%	7.49%
34	4.09%	6.13%	1.00%	1.50%	5.09%	7.63%
35	4.17%	6.25%	1.02%	1.53%	5.19%	7.78%
36	4.25%	6.37%	1.04%	1.56%	5.29%	7.93%
37	4.33%	6.49%	1.06%	1.59%	5.39%	8.08%
38	4.41%	6.61%	1.08%	1.62%	5.49%	8.23%
39	4.49%	6.73%	1.10%	1.65%	5.59%	8.38%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General – Tier 2 (continued)						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	4.57%	6.86%	1.12%	1.68%	5.69%	8.54%
41	4.66%	6.99%	1.14%	1.71%	5.80%	8.70%
42	4.75%	7.12%	1.16%	1.74%	5.91%	8.86%
43	4.84%	7.26%	1.19%	1.78%	6.03%	9.04%
44	4.93%	7.40%	1.21%	1.81%	6.14%	9.21%
45	5.03%	7.54%	1.23%	1.84%	6.26%	9.38%
46	5.13%	7.69%	1.25%	1.88%	6.38%	9.57%
47	5.23%	7.84%	1.28%	1.92%	6.51%	9.76%
48	5.33%	7.99%	1.30%	1.95%	6.63%	9.94%
49	5.42%	8.13%	1.33%	1.99%	6.75%	10.12%
50	5.51%	8.27%	1.35%	2.02%	6.86%	10.29%
51	5.59%	8.39%	1.37%	2.05%	6.96%	10.44%
52	5.67%	8.50%	1.39%	2.08%	7.06%	10.58%
53	5.73%	8.60%	1.40%	2.10%	7.13%	10.70%
54	5.79%	8.68%	1.41%	2.12%	7.20%	10.80%
55	5.81%	8.71%	1.42%	2.13%	7.23%	10.84%
56	5.78%	8.67%	1.41%	2.12%	7.19%	10.79%
57	5.72%	8.58%	1.40%	2.10%	7.12%	10.68%
58	5.91%	8.87%	1.45%	2.17%	7.36%	11.04%
59 & Over	6.12%	9.18%	1.49%	2.24%	7.61%	11.42%

<sup>(1)</sup> Use these rates for Non-Integrated Members

Interest: 7.25% per annum  
 COLA: 2.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 24.45%  
 Terminal Pay: 3.0%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

#### General Tier 3 Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

General – Tier 3						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	4.40%	6.60%	1.76%	2.64%	6.16%	9.24%
16	4.40%	6.60%	1.76%	2.64%	6.16%	9.24%
17	4.49%	6.73%	1.79%	2.69%	6.28%	9.42%
18	4.58%	6.86%	1.83%	2.74%	6.41%	9.60%
19	4.67%	7.00%	1.86%	2.79%	6.53%	9.79%
20	4.76%	7.13%	1.90%	2.85%	6.66%	9.98%
21	4.85%	7.27%	1.93%	2.90%	6.78%	10.17%
22	4.94%	7.41%	1.97%	2.96%	6.91%	10.37%
23	5.03%	7.55%	2.01%	3.02%	7.04%	10.57%
24	5.13%	7.70%	2.05%	3.07%	7.18%	10.77%
25	5.23%	7.84%	2.09%	3.13%	7.32%	10.97%
26	5.33%	7.99%	2.13%	3.19%	7.46%	11.18%
27	5.43%	8.14%	2.17%	3.25%	7.60%	11.39%
28	5.53%	8.30%	2.21%	3.31%	7.74%	11.61%
29	5.64%	8.46%	2.25%	3.38%	7.89%	11.84%
30	5.74%	8.62%	2.29%	3.44%	8.03%	12.06%
31	5.85%	8.78%	2.34%	3.51%	8.19%	12.29%
32	5.96%	8.94%	2.38%	3.57%	8.34%	12.51%
33	6.07%	9.11%	2.43%	3.64%	8.50%	12.75%
34	6.19%	9.28%	2.47%	3.71%	8.66%	12.99%
35	6.31%	9.46%	2.52%	3.78%	8.83%	13.24%
36	6.43%	9.64%	2.57%	3.85%	9.00%	13.49%
37	6.55%	9.82%	2.61%	3.92%	9.16%	13.74%
38	6.67%	10.01%	2.67%	4.00%	9.34%	14.01%
39	6.80%	10.20%	2.71%	4.07%	9.51%	14.27%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General – Tier 3 (continued)						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	6.93%	10.40%	2.77%	4.15%	9.70%	14.55%
41	7.07%	10.61%	2.83%	4.24%	9.90%	14.85%
42	7.21%	10.82%	2.88%	4.32%	10.09%	15.14%
43	7.36%	11.04%	2.94%	4.41%	10.30%	15.45%
44	7.50%	11.26%	3.00%	4.50%	10.50%	15.76%
45	7.64%	11.46%	3.05%	4.58%	10.69%	16.04%
46	7.78%	11.66%	3.11%	4.66%	10.89%	16.32%
47	7.90%	11.85%	3.15%	4.73%	11.05%	16.58%
48	8.01%	12.01%	3.20%	4.80%	11.21%	16.81%
49	8.11%	12.17%	3.24%	4.86%	11.35%	17.03%
50	8.20%	12.30%	3.27%	4.91%	11.47%	17.21%
51	8.27%	12.40%	3.30%	4.95%	11.57%	17.35%
52	8.22%	12.33%	3.29%	4.93%	11.51%	17.26%
53	8.08%	12.12%	3.23%	4.84%	11.31%	16.96%
54 & Over	7.74%	11.61%	3.09%	4.64%	10.83%	16.25%

<sup>(1)</sup> Use these rates for Non-Integrated Members

Interest: 7.25% per annum  
 COLA: 3.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 39.94%  
 Terminal Pay: 8.0%

## EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

### General Tier 4 Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly eligible payroll)<sup>(1)</sup>

General – Tier 4			
	Basic	COLA	Total
Entry Age	Eligible Pay	Eligible Pay	Eligible Pay
All Ages	7.18%	1.62%	8.80%

<sup>(1)</sup> It is our understanding that in the determination of pension benefits under the CalPEPRA formulas, the compensation that can be taken into account for 2019 is equal to \$124,180. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$124,180, or \$149,016). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (reference: Section 7522.10(d))

Interest: 7.25% per annum  
 COLA: 2.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 22.56%  
 Terminal Pay: 0.0%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

#### Safety Tier 1 Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

Safety – Tier 1								
Entry Age	Basic		Cost Sharing Contributions		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	5.40%	8.11%	3.00%	3.00%	3.21%	4.81%	11.61%	15.92%
16	5.40%	8.11%	3.00%	3.00%	3.21%	4.81%	11.61%	15.92%
17	5.49%	8.24%	3.00%	3.00%	3.26%	4.89%	11.75%	16.13%
18	5.59%	8.38%	3.00%	3.00%	3.31%	4.97%	11.90%	16.35%
19	5.68%	8.52%	3.00%	3.00%	3.37%	5.05%	12.05%	16.57%
20	5.77%	8.66%	3.00%	3.00%	3.43%	5.14%	12.20%	16.80%
21	5.87%	8.81%	3.00%	3.00%	3.48%	5.22%	12.35%	17.03%
22	5.97%	8.95%	3.00%	3.00%	3.54%	5.31%	12.51%	17.26%
23	6.07%	9.10%	3.00%	3.00%	3.60%	5.40%	12.67%	17.50%
24	6.17%	9.25%	3.00%	3.00%	3.66%	5.49%	12.83%	17.74%
25	6.27%	9.41%	3.00%	3.00%	3.72%	5.58%	12.99%	17.99%
26	6.38%	9.57%	3.00%	3.00%	3.78%	5.67%	13.16%	18.24%
27	6.48%	9.73%	3.00%	3.00%	3.85%	5.77%	13.33%	18.50%
28	6.59%	9.89%	3.00%	3.00%	3.91%	5.87%	13.50%	18.76%
29	6.70%	10.05%	3.00%	3.00%	3.97%	5.96%	13.67%	19.01%
30	6.82%	10.22%	3.00%	3.00%	4.05%	6.07%	13.87%	19.29%
31	6.93%	10.40%	3.00%	3.00%	4.11%	6.17%	14.04%	19.57%
32	7.05%	10.58%	3.00%	3.00%	4.18%	6.27%	14.23%	19.85%
33	7.17%	10.76%	3.00%	3.00%	4.25%	6.38%	14.42%	20.14%
34	7.30%	10.95%	3.00%	3.00%	4.33%	6.49%	14.63%	20.44%
35	7.43%	11.14%	3.00%	3.00%	4.41%	6.61%	14.84%	20.75%
36	7.56%	11.34%	3.00%	3.00%	4.49%	6.73%	15.05%	21.07%
37	7.70%	11.55%	3.00%	3.00%	4.57%	6.85%	15.27%	21.40%
38	7.85%	11.77%	3.00%	3.00%	4.65%	6.98%	15.50%	21.75%
39	8.01%	12.01%	3.00%	3.00%	4.75%	7.12%	15.76%	22.13%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety – Tier 1 (continued)								
Entry Age	Basic		Cost Sharing Contributions		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	8.16%	12.25%	3.00%	3.00%	4.84%	7.26%	16.00%	22.51%
41	8.33%	12.49%	3.00%	3.00%	4.94%	7.41%	16.27%	22.90%
42	8.51%	12.76%	3.00%	3.00%	5.05%	7.57%	16.56%	23.33%
43	8.67%	13.00%	3.00%	3.00%	5.14%	7.71%	16.81%	23.71%
44	8.79%	13.19%	3.00%	3.00%	5.21%	7.82%	17.00%	24.01%
45	8.85%	13.27%	3.00%	3.00%	5.25%	7.87%	17.10%	24.14%
46	8.86%	13.28%	3.00%	3.00%	5.25%	7.88%	17.11%	24.16%
47	8.68%	13.02%	3.00%	3.00%	5.15%	7.73%	16.83%	23.75%
48	8.41%	12.62%	3.00%	3.00%	4.99%	7.48%	16.40%	23.10%
49 & Over	7.94%	11.91%	3.00%	3.00%	4.71%	7.07%	15.65%	21.98%

<sup>(1)</sup> Use these rates for Non-Integrated Members

Interest: 7.25% per annum  
 COLA: 3.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 59.32%  
 Terminal Pay: 8.5%

## EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

### Safety Tier 2 Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

Safety – Tier 2								
Entry Age	Basic		Cost Sharing Contributions		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	4.94%	7.42%	3.00%	3.00%	2.03%	3.05%	9.97%	13.47%
16	4.94%	7.42%	3.00%	3.00%	2.03%	3.05%	9.97%	13.47%
17	5.03%	7.54%	3.00%	3.00%	2.07%	3.10%	10.10%	13.64%
18	5.11%	7.67%	3.00%	3.00%	2.10%	3.15%	10.21%	13.82%
19	5.20%	7.79%	3.00%	3.00%	2.14%	3.21%	10.34%	14.00%
20	5.28%	7.92%	3.00%	3.00%	2.17%	3.26%	10.45%	14.18%
21	5.37%	8.05%	3.00%	3.00%	2.21%	3.31%	10.58%	14.36%
22	5.46%	8.19%	3.00%	3.00%	2.25%	3.37%	10.71%	14.56%
23	5.55%	8.32%	3.00%	3.00%	2.28%	3.42%	10.83%	14.74%
24	5.64%	8.46%	3.00%	3.00%	2.32%	3.48%	10.96%	14.94%
25	5.74%	8.60%	3.00%	3.00%	2.36%	3.54%	11.10%	15.14%
26	5.83%	8.75%	3.00%	3.00%	2.40%	3.60%	11.23%	15.35%
27	5.93%	8.89%	3.00%	3.00%	2.44%	3.66%	11.37%	15.55%
28	6.03%	9.04%	3.00%	3.00%	2.48%	3.72%	11.51%	15.76%
29	6.13%	9.19%	3.00%	3.00%	2.52%	3.78%	11.65%	15.97%
30	6.23%	9.35%	3.00%	3.00%	2.57%	3.85%	11.80%	16.20%
31	6.34%	9.51%	3.00%	3.00%	2.61%	3.91%	11.95%	16.42%
32	6.45%	9.67%	3.00%	3.00%	2.65%	3.98%	12.10%	16.65%
33	6.56%	9.83%	3.00%	3.00%	2.70%	4.05%	12.26%	16.88%
34	6.67%	10.01%	3.00%	3.00%	2.75%	4.12%	12.42%	17.13%
35	6.79%	10.18%	3.00%	3.00%	2.79%	4.19%	12.58%	17.37%
36	6.91%	10.37%	3.00%	3.00%	2.84%	4.26%	12.75%	17.63%
37	7.04%	10.56%	3.00%	3.00%	2.89%	4.34%	12.93%	17.90%
38	7.17%	10.75%	3.00%	3.00%	2.95%	4.42%	13.12%	18.17%
39	7.30%	10.95%	3.00%	3.00%	3.01%	4.51%	13.31%	18.46%



### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety – Tier 2 (continued)								
Entry Age	Basic		Cost Sharing Contributions		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	7.44%	11.16%	3.00%	3.00%	3.06%	4.59%	13.50%	18.75%
41	7.58%	11.36%	3.00%	3.00%	3.11%	4.67%	13.69%	19.03%
42	7.69%	11.54%	3.00%	3.00%	3.17%	4.75%	13.86%	19.29%
43	7.77%	11.66%	3.00%	3.00%	3.20%	4.80%	13.97%	19.46%
44	7.80%	11.70%	3.00%	3.00%	3.21%	4.82%	14.01%	19.52%
45	7.75%	11.63%	3.00%	3.00%	3.19%	4.78%	13.94%	19.41%
46	7.62%	11.43%	3.00%	3.00%	3.13%	4.70%	13.75%	19.13%
47	7.43%	11.14%	3.00%	3.00%	3.05%	4.58%	13.48%	18.72%
48	7.68%	11.52%	3.00%	3.00%	3.16%	4.74%	13.84%	19.26%
49 & Over	7.94%	11.91%	3.00%	3.00%	3.27%	4.90%	14.21%	19.81%

<sup>(1)</sup> Use these rates for Non-Integrated Members

Interest: 7.25% per annum  
 COLA: 2.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 41.14%  
 Terminal Pay: 3.5%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Tier 2C Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

Safety – Tier 2C						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	4.94%	7.42%	1.73%	2.59%	6.67%	10.01%
16	4.94%	7.42%	1.73%	2.59%	6.67%	10.01%
17	5.03%	7.54%	1.75%	2.63%	6.78%	10.17%
18	5.11%	7.67%	1.79%	2.68%	6.90%	10.35%
19	5.20%	7.79%	1.81%	2.72%	7.01%	10.51%
20	5.28%	7.92%	1.85%	2.77%	7.13%	10.69%
21	5.37%	8.05%	1.87%	2.81%	7.24%	10.86%
22	5.46%	8.19%	1.91%	2.86%	7.37%	11.05%
23	5.55%	8.32%	1.94%	2.91%	7.49%	11.23%
24	5.64%	8.46%	1.97%	2.95%	7.61%	11.41%
25	5.74%	8.60%	2.00%	3.00%	7.74%	11.60%
26	5.83%	8.75%	2.03%	3.05%	7.86%	11.80%
27	5.93%	8.89%	2.07%	3.10%	8.00%	11.99%
28	6.03%	9.04%	2.11%	3.16%	8.14%	12.20%
29	6.13%	9.19%	2.14%	3.21%	8.27%	12.40%
30	6.23%	9.35%	2.17%	3.26%	8.40%	12.61%
31	6.34%	9.51%	2.21%	3.32%	8.55%	12.83%
32	6.45%	9.67%	2.25%	3.37%	8.70%	13.04%
33	6.56%	9.83%	2.29%	3.43%	8.85%	13.26%
34	6.67%	10.01%	2.33%	3.49%	9.00%	13.50%
35	6.79%	10.18%	2.37%	3.55%	9.16%	13.73%
36	6.91%	10.37%	2.41%	3.62%	9.32%	13.99%
37	7.04%	10.56%	2.45%	3.68%	9.49%	14.24%
38	7.17%	10.75%	2.50%	3.75%	9.67%	14.50%
39	7.30%	10.95%	2.55%	3.82%	9.85%	14.77%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety – Tier 2C (continued)						
Entry Age	Basic		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	7.44%	11.16%	2.60%	3.90%	10.04%	15.06%
41	7.58%	11.36%	2.65%	3.97%	10.23%	15.33%
42	7.69%	11.54%	2.69%	4.03%	10.38%	15.57%
43	7.77%	11.66%	2.71%	4.07%	10.48%	15.73%
44	7.80%	11.70%	2.72%	4.08%	10.52%	15.78%
45	7.75%	11.63%	2.71%	4.06%	10.46%	15.69%
46	7.62%	11.43%	2.66%	3.99%	10.28%	15.42%
47	7.43%	11.14%	2.59%	3.89%	10.02%	15.03%
48	7.68%	11.52%	2.68%	4.02%	10.36%	15.54%
49 & Over	7.94%	11.91%	2.77%	4.16%	10.71%	16.07%

<sup>(1)</sup> Use these rates for Non-Integrated Members

Interest: 7.25% per annum  
 COLA: 2.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 34.90%  
 Terminal Pay: 3.5%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

#### Safety Tier 2D Members' Contribution Rates for Members with Less than 5 Years of Vesting Service Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

Safety – Tier 2D Members with Less than 5 Years of Vesting Service								
Entry Age	Basic		Cost Sharing Contributions <sup>(2)</sup>		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	4.94%	7.42%	5.00%	5.00%	1.94%	2.91%	11.88%	15.33%
16	4.94%	7.42%	5.00%	5.00%	1.94%	2.91%	11.88%	15.33%
17	5.03%	7.54%	5.00%	5.00%	1.97%	2.96%	12.00%	15.50%
18	5.11%	7.67%	5.00%	5.00%	2.01%	3.01%	12.12%	15.68%
19	5.20%	7.79%	5.00%	5.00%	2.04%	3.06%	12.24%	15.85%
20	5.28%	7.92%	5.00%	5.00%	2.07%	3.11%	12.35%	16.03%
21	5.37%	8.05%	5.00%	5.00%	2.11%	3.16%	12.48%	16.21%
22	5.46%	8.19%	5.00%	5.00%	2.14%	3.21%	12.60%	16.40%
23	5.55%	8.32%	5.00%	5.00%	2.18%	3.27%	12.73%	16.59%
24	5.64%	8.46%	5.00%	5.00%	2.21%	3.32%	12.85%	16.78%
25	5.74%	8.60%	5.00%	5.00%	2.25%	3.37%	12.99%	16.97%
26	5.83%	8.75%	5.00%	5.00%	2.29%	3.43%	13.12%	17.18%
27	5.93%	8.89%	5.00%	5.00%	2.33%	3.49%	13.26%	17.38%
28	6.03%	9.04%	5.00%	5.00%	2.37%	3.55%	13.40%	17.59%
29	6.13%	9.19%	5.00%	5.00%	2.41%	3.61%	13.54%	17.80%
30	6.23%	9.35%	5.00%	5.00%	2.45%	3.67%	13.68%	18.02%
31	6.34%	9.51%	5.00%	5.00%	2.49%	3.73%	13.83%	18.24%
32	6.45%	9.67%	5.00%	5.00%	2.53%	3.79%	13.98%	18.46%
33	6.56%	9.83%	5.00%	5.00%	2.57%	3.86%	14.13%	18.69%
34	6.67%	10.01%	5.00%	5.00%	2.61%	3.92%	14.28%	18.93%
35	6.79%	10.18%	5.00%	5.00%	2.66%	3.99%	14.45%	19.17%
36	6.91%	10.37%	5.00%	5.00%	2.71%	4.07%	14.62%	19.44%
37	7.04%	10.56%	5.00%	5.00%	2.76%	4.14%	14.80%	19.70%
38	7.17%	10.75%	5.00%	5.00%	2.81%	4.22%	14.98%	19.97%
39	7.30%	10.95%	5.00%	5.00%	2.87%	4.30%	15.17%	20.25%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety – Tier 2D Members with Less than 5 Years of Vesting Service (continued)								
Entry Age	Basic		Cost Sharing Contributions <sup>(2)</sup>		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	7.44%	11.16%	5.00%	5.00%	2.92%	4.38%	15.36%	20.54%
41	7.58%	11.36%	5.00%	5.00%	2.97%	4.46%	15.55%	20.82%
42	7.69%	11.54%	5.00%	5.00%	3.02%	4.53%	15.71%	21.07%
43	7.77%	11.66%	5.00%	5.00%	3.05%	4.57%	15.82%	21.23%
44	7.80%	11.70%	5.00%	5.00%	3.06%	4.59%	15.86%	21.29%
45	7.75%	11.63%	5.00%	5.00%	3.04%	4.56%	15.79%	21.19%
46	7.62%	11.43%	5.00%	5.00%	2.99%	4.48%	15.61%	20.91%
47	7.43%	11.14%	5.00%	5.00%	2.91%	4.37%	15.34%	20.51%
48	7.68%	11.52%	5.00%	5.00%	3.01%	4.52%	15.69%	21.04%
49 & Over	7.94%	11.91%	5.00%	5.00%	3.11%	4.67%	16.05%	21.58%

<sup>(1)</sup> Use these rates for Non-Integrated Members

<sup>(2)</sup> The 5.00% cost sharing contribution is reduced to 3.00% for members with at least 5 years of vesting service.

Interest: 7.25% per annum  
 COLA: 2.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 39.22%  
 Terminal Pay: 3.5%

## EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

### Safety Tier 2D Members' Contribution Rates for Members with 5 or More Years of Vesting Service Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly payroll)

Safety – Tier 2D Members with 5 or More Years of Vesting Service								
Entry Age	Basic		Cost Sharing Contributions		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
15	4.94%	7.42%	3.00%	3.00%	1.94%	2.91%	9.88%	13.33%
16	4.94%	7.42%	3.00%	3.00%	1.94%	2.91%	9.88%	13.33%
17	5.03%	7.54%	3.00%	3.00%	1.97%	2.96%	10.00%	13.50%
18	5.11%	7.67%	3.00%	3.00%	2.01%	3.01%	10.12%	13.68%
19	5.20%	7.79%	3.00%	3.00%	2.04%	3.06%	10.24%	13.85%
20	5.28%	7.92%	3.00%	3.00%	2.07%	3.11%	10.35%	14.03%
21	5.37%	8.05%	3.00%	3.00%	2.11%	3.16%	10.48%	14.21%
22	5.46%	8.19%	3.00%	3.00%	2.14%	3.21%	10.60%	14.40%
23	5.55%	8.32%	3.00%	3.00%	2.18%	3.27%	10.73%	14.59%
24	5.64%	8.46%	3.00%	3.00%	2.21%	3.32%	10.85%	14.78%
25	5.74%	8.60%	3.00%	3.00%	2.25%	3.37%	10.99%	14.97%
26	5.83%	8.75%	3.00%	3.00%	2.29%	3.43%	11.12%	15.18%
27	5.93%	8.89%	3.00%	3.00%	2.33%	3.49%	11.26%	15.38%
28	6.03%	9.04%	3.00%	3.00%	2.37%	3.55%	11.40%	15.59%
29	6.13%	9.19%	3.00%	3.00%	2.41%	3.61%	11.54%	15.80%
30	6.23%	9.35%	3.00%	3.00%	2.45%	3.67%	11.68%	16.02%
31	6.34%	9.51%	3.00%	3.00%	2.49%	3.73%	11.83%	16.24%
32	6.45%	9.67%	3.00%	3.00%	2.53%	3.79%	11.98%	16.46%
33	6.56%	9.83%	3.00%	3.00%	2.57%	3.86%	12.13%	16.69%
34	6.67%	10.01%	3.00%	3.00%	2.61%	3.92%	12.28%	16.93%
35	6.79%	10.18%	3.00%	3.00%	2.66%	3.99%	12.45%	17.17%
36	6.91%	10.37%	3.00%	3.00%	2.71%	4.07%	12.62%	17.44%
37	7.04%	10.56%	3.00%	3.00%	2.76%	4.14%	12.80%	17.70%
38	7.17%	10.75%	3.00%	3.00%	2.81%	4.22%	12.98%	17.97%
39	7.30%	10.95%	3.00%	3.00%	2.87%	4.30%	13.17%	18.25%

### EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety – Tier 2D Members with 5 or More Years of Vesting Service (continued)								
Entry Age	Basic		Cost Sharing Contributions		COLA		Total	
	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>	First \$161	Over \$161 <sup>(1)</sup>
40	7.44%	11.16%	3.00%	3.00%	2.92%	4.38%	13.36%	18.54%
41	7.58%	11.36%	3.00%	3.00%	2.97%	4.46%	13.55%	18.82%
42	7.69%	11.54%	3.00%	3.00%	3.02%	4.53%	13.71%	19.07%
43	7.77%	11.66%	3.00%	3.00%	3.05%	4.57%	13.82%	19.23%
44	7.80%	11.70%	3.00%	3.00%	3.06%	4.59%	13.86%	19.29%
45	7.75%	11.63%	3.00%	3.00%	3.04%	4.56%	13.79%	19.19%
46	7.62%	11.43%	3.00%	3.00%	2.99%	4.48%	13.61%	18.91%
47	7.43%	11.14%	3.00%	3.00%	2.91%	4.37%	13.34%	18.51%
48	7.68%	11.52%	3.00%	3.00%	3.01%	4.52%	13.69%	19.04%
49 & Over	7.94%	11.91%	3.00%	3.00%	3.11%	4.67%	14.05%	19.58%

<sup>(1)</sup> Use these rates for Non-Integrated Members

Interest: 7.25% per annum  
 COLA: 2.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 39.22%  
 Terminal Pay: 3.5%

## EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

### Safety Tier 4 Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of biweekly eligible payroll)<sup>(1)</sup>

General – Tier 4			
	Basic	COLA	Total
Entry Age	Eligible Pay	Eligible Pay	Eligible Pay
All Ages	12.29%	3.29%	15.58%

<sup>(1)</sup> It is our understanding that in the determination of pension benefits under the CalPEPRA formulas, the compensation that can be taken into account for 2019 is equal to \$124,180. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$124,180, or \$149,016). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (reference: Section 7522.10(d))

Interest: 7.25% per annum  
 COLA: 2.00%  
 Mortality: See Section 4, Exhibit I  
 Salary Increase: Inflation (3.00%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)  
 COLA Loading Factor: 26.77%  
 Terminal Pay: 0.0%



## EXHIBIT IV – PROJECTED EMPLOYER CONTRIBUTIONS BY EACH PARTICIPATING EMPLOYER

**Estimated Employer Contribution Requirement for Each Participating Employer in ACERA (\$000s)  
Calculated Based on Projected Employer Compensation Used in the December 31, 2018 Actuarial Valuation**

Dollar Contribution <sup>(1),(2)</sup> – Based on December 31, 2018 Valuation										
Employer Name (Code)	General				Safety					Total
	Tier 1	Tier 2	Tier 3	Tier 4	Tier 1	Tier 2	Tier 2C	Tier 2D	Tier 4	
Alameda County (101)	\$1,925	\$84,601		\$38,155	\$784	\$74,541	\$2,131	\$8,865	\$20,475	\$231,477
Health System (106)	217	37,067		21,419						58,703
Superior Court (632)	279	7,841		3,395						11,515
First 5 (714)		649		543						1,192
Housing Authority (103)	926	97		303						1,326
LARPD (104)	225		\$788	632						1,645
<b>Total</b>	<b>\$3,572</b>	<b>\$130,255</b>	<b>\$788</b>	<b>\$64,447</b>	<b>\$784</b>	<b>\$74,541</b>	<b>\$2,131</b>	<b>\$8,865</b>	<b>\$20,475</b>	<b>\$305,858</b>

Dollar Contribution <sup>(2)</sup> – Based on December 31, 2017 Valuation										
Employer Name (Code)	General				Safety					Total
	Tier 1	Tier 2	Tier 3	Tier 4	Tier 1	Tier 2	Tier 2C	Tier 2D	Tier 4	
Alameda County (101)	\$1,922	\$85,273		\$38,283	\$744	\$73,166	\$2,095	\$8,585	\$20,032	\$230,100
Health System (106)	217	37,251		21,428						58,896
Superior Court (632)	278	7,880		3,397						11,555
First 5 (714)		652		543						1,195
Housing Authority (103)	926	99		304						1,329
LARPD (104)	190		\$611	454						1,255
<b>Total</b>	<b>\$3,533</b>	<b>\$131,155</b>	<b>\$611</b>	<b>\$64,409</b>	<b>\$744</b>	<b>\$73,166</b>	<b>\$2,095</b>	<b>\$8,585</b>	<b>\$20,032</b>	<b>\$304,330</b>

<sup>(1)</sup> Includes contributions only for those employers with active member payroll. The UAAL contribution for ACOE, expressed as a level dollar amount, is \$78 K when made on April 1, 2020.

<sup>(2)</sup> Contribution calculated using projected compensation provided on the next page for the December 31, 2018 valuation:

**EXHIBIT IV – PROJECTED EMPLOYER CONTRIBUTIONS BY EACH PARTICIPATING EMPLOYER  
(CONTINUED)**

Employer Name (Code)	December 31, 2018 Projected Total Compensation (\$000s)									
	General				Safety					Total
	Tier 1	Tier 2	Tier 3	Tier 4	Tier 1	Tier 2	Tier 2C	Tier 2D	Tier 4	
Alameda County (101)	\$8,626	\$395,334		\$183,173	\$973	\$119,571	\$3,349	\$14,392	\$34,587	\$760,005
Health System (106)	938	166,816		98,933						266,687
Superior Court (632)	1,207	35,290		15,682						52,179
First 5 (714)		2,919		2,506						5,425
Housing Authority (103)	3,269	356		1,127						4,752
LARPD (104)	670		\$2,051	1,966						4,687
<b>Total</b>	<b>\$14,710</b>	<b>\$600,715</b>	<b>\$2,051</b>	<b>\$303,387</b>	<b>\$973</b>	<b>\$119,571</b>	<b>\$3,349</b>	<b>\$14,392</b>	<b>\$34,587</b>	<b>\$1,093,735</b>

**EXHIBIT V – SCHEDULE OF OUTSTANDING BALANCES OF PRIOR IMPLICIT RETIREE HEALTH BENEFIT SUBSIDY TRANSFERS (DOLLAR AMOUNTS IN THOUSANDS)**

For Year(s)	Initial Years	Initial Amount <sup>(1)</sup>	Outstanding Balance	Years Remaining	Annual Payment <sup>(2)</sup>
Prior to 2013	(3)	(3)	\$34,573	14	\$3,202
2013	20	\$6,993	6,737	15	592
2014	20	5,215	5,008	16	420
2015	20	5,325	5,171	17	415
2016	20	8,865	8,814	18	678
2017	20	5,830	5,789	19	429
2018	20	6,940	6,940	20	496
<b>Total</b>			<b>\$73,032</b>		<b>\$6,232</b>

<sup>(1)</sup> For years 2013 and later, these amounts are estimates provided by ACERA.

<sup>(2)</sup> Level percentage of payroll.

<sup>(3)</sup> Various initial years and amounts prior to 2013.

## EXHIBIT VI – ALLOCATION OF THE VALUATION VALUE OF ASSETS AS OF DECEMBER 31, 2018 (DOLLAR AMOUNTS IN THOUSANDS)

The allocation of the Valuation Value of Assets is determined by Segal based on a roll-forward of the prior year allocation using employer contributions, member contributions, benefit payments, and calculated interest credits as provided by ACERA.

	General (Excluding LARPD and Office of Education)	General (Office of Education) <sup>(1)</sup>	General (LARPD) <sup>(1)</sup>	Safety	Total
<b>Valuation Value of Assets at Beginning-of-Year</b>					
Basic Only	\$3,581,636	\$1,954	\$28,715	\$1,014,076	\$4,626,381
COLA Only	<u>1,552,171</u>	<u>1,365</u>	<u>14,200</u>	<u>636,262</u>	<u>2,203,998</u>
Total	\$5,133,807	\$3,319	\$42,915	\$1,650,338	\$6,830,379
<b>Valuation Value of Assets at End-of-Year</b>					
Basic Only <sup>(2)</sup>	\$3,791,786	\$1,771	\$29,942	\$1,088,872	\$4,912,371
COLA Only	<u>1,634,006</u>	<u>1,362</u>	<u>15,240</u>	<u>676,348</u>	<u>2,326,956</u>
Total <sup>(2)</sup>	\$5,425,792	\$3,133	\$45,182	\$1,765,220	\$7,239,327

<sup>(1)</sup> The Valuation Value of Assets at the beginning of the year include amounts allocated to this cost group subsequent to the completion of the December 31, 2017 valuation, based on the results of the declining employer payroll policy study.

<sup>(2)</sup> The Basic and Total amounts for the General (Excluding LARPD and Office of Education) and Safety groups include \$5,361 and \$1,579, respectively, to reflect the allocation of the estimated 2018 SRBR Transfer to the Employer Advance Reserve of \$6,940.

Note: Results may be slightly off due to rounding.

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