

Orange County Employees Retirement System

Actuarial Valuation and Review as of
December 31, 2018

The logo for Segal Consulting is a large, dark blue, stylized shape resembling a compass needle or a stylized 'S' with a sharp point at the bottom. It is positioned on the right side of the page, pointing towards the top right.

 Segal Consulting

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June 6, 2019

Board of Retirement
Orange County Employees Retirement System
2223 Wellington Avenue
Santa Ana, CA 92701

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 year 2020-2021.

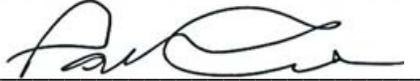
This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the System.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

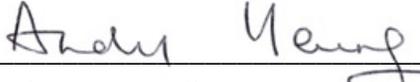
The actuarial calculations were directed under the supervision of Andy Yeung, ASA, MAAA, FCA and Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our 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 System.

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: 
Paul Angelo, FSA, EA, MAAA, FCA
Senior Vice President and Actuary


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

AW/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 Orange County Employees Retirement System (“OCERS” or “the System”) 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 current Plan assets to cover the estimated cost of settling the Plan’s accrued 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 December 31, 2018, provided by OCERS;
- The assets of the Plan as of December 31, 2018, provided by OCERS;
- 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 System’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 System’s liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the System’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. The System'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 in 2014 (and reaffirmed in 2018). Details of the funding policy are provided in *Section 4, Exhibit I on page 109*.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit H beginning on page 81*. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit I on pages 93 and 94*.

The rates calculated in this report may be adopted by the Board for the fiscal year that extends from July 1, 2020 through June 30, 2021.

Significant Issues

- Ref: Pg. 48*
1. The ratio of the Valuation Value of Assets to Actuarial Accrued Liabilities increased from 72.3% to 72.4%. The funded ratio measured on a market value basis decreased from 74.6% to 69.3%. The UAAL increased from \$5,438.3 million as of December 31, 2017 to \$5,708.9 million as of December 31, 2018. The increase in UAAL is primarily due to the investment return (after “smoothing”) lower than the 7.00% return assumption and actual contributions less than expected. A complete reconciliation of the System’s UAAL is provided in *Section 2, Subsection E*. A schedule of the current UAAL amortization amounts is provided in *Section 3, Exhibit H*. A graphical projection of the UAAL amortization bases and payments is provided in *Section 3, Exhibit I*.
- Ref: Pg. 27*
Ref: Pgs. 81-92
Ref: Pgs. 93-94
2. The aggregate employer contribution rate calculated in this valuation increased from 37.66% of payroll to 40.02% of payroll. This change was primarily due to the second year of the three-year phase-in of the UAAL cost impact due to assumption changes in the December 31, 2017 valuation and the investment return (after “smoothing”) lower than the 7.00% return assumption. A complete reconciliation of the System’s aggregate employer rate is provided in *Section 2, Subsection F*.

The Board approved a three-year phase-in of the UAAL employer cost impact due to assumption changes in the December 31, 2017 valuation. The employer contribution rates as of December 31, 2018 and December 31, 2017 shown in this report have been adjusted to reflect two-thirds and one-third, respectively, of the UAAL cost impact.
3. The employer rates in this report do not include the amounts required to be paid by O.C. Vector Control and Cypress Recreation and Parks that are subject to the Board’s Withdrawing Employer Policy. The employer rates also do not include the amounts required to be paid by U.C.I. and Department of Education that are subject to the Board’s Declining Employer Payroll Policy. The contribution rates for these employers will be provided in separate side letters following the administrative practice established by OCERS in the prior valuations.
- Ref: Pg. 31*
- We have included a footnote to the detailed recommended employer contribution rate exhibit to show what the UAAL contribution rates would be for the other active employers in Rate Group #1 (i.e., the County and O.C. IHSS Public Authority) after adjustments to reflect the UAAL paid by O.C. Vector Control, Cypress Recreation and Parks, U.C.I. and Department of Education.
- Ref: Pg. 30*
4. The aggregate member rate calculated in this valuation has increased from 12.46% of payroll to 12.47% of payroll. This change was due to the demographic changes. A complete reconciliation of the System’s average member rate is provided in *Section 2, Subsection F*.

Starting with this valuation, we no longer include the entry age based Safety Plan E (i.e., Tier 1) member rates in *Section 4, Exhibit III* as there are no active employees enrolled in that Plan in the Probation, Law and Fire Rate Groups.

5. As indicated in *Section 2, Subsection B* of this report, the total unrecognized investment loss as of December 31, 2018 was \$644.7 million (as compared to an unrecognized gain of \$455.4 million in the December 31, 2017 valuation). This investment loss will be recognized in the determination of the Actuarial Value of Assets for funding purposes over the next few years, and will offset a portion of any investment gains that may occur after December 31, 2018. This implies that earning the assumed rate of investment return of 7.00% per year (net of expenses) on a market value basis will result in investment losses on the Actuarial Value of Assets in the next few years. Therefore, if the actual market return is equal to the assumed 7.00% rate and all other actuarial assumptions are met, the employer contribution requirements would generally increase over the next few years. The potential impact associated with the net deferred investment loss may be illustrated as follows:
 - a. If the net deferred losses in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the funded ratio would decrease from 72.4% to 69.3%.

For comparison purposes, if all the net deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the funded ratio in last year's valuation would have increased from 72.3% to 74.6%.
 - b. If the net deferred losses in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the aggregate employer contribution rate would increase from 40.02 to 42.5% of payroll.

For comparison purposes, if all the net deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the aggregate employer contribution rate in last year's valuation would have decreased from 37.97% to 36.2% of payroll.
6. 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.
7. The balance in the O.C. Sanitation District UAAL Deferred Account as of December 31, 2018 before any transfer to offset their UAAL was \$14.6 million. As of December 31, 2018, a transfer of the remaining \$14.6 balance was required from this account to partially offset the actuarial losses (primarily from investment returns after smoothing) during 2018.
8. This report reflects the \$23.4 million additional contributions made by OCFA towards their UAAL. The \$23.4 million¹ of additional contributions made by OCFA has been amortized as a level percent of pay over a period of twenty years effective on December 31, 2018 and used to reduce their UAAL rates for fiscal year 2020-2021.

¹ \$23.4 million in additional contributions were made by OCFA continuously throughout the year. After adjusting with interest, those contributions have a value of \$23.6 million as of December 31, 2018.

9. The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 is effective with OCERS' 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 assessment report including the analysis recommended by Segal in consultation with OCERS staff will be available later in 2019.

Summary of Key Valuation Results

	December 31, 2018		December 31, 2017	
	Total Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Total Rate ^{(1),(3),(4)}	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Aggregate Employer Contribution Rates:				
• Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	18.89%	\$16,654	18.23%	\$16,072
• Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	37.36%	421,384	35.00%	394,740
• Rate Group #3 – Plans B, G, H and U (OCSD)	12.98%	9,549	12.27%	9,029
• Rate Group #5 – Plans A, B and U (OCTA)	30.53%	32,153	27.93%	29,413
• Rate Group #9 – Plans M, N and U (TCA)	27.57%	1,947	24.36%	1,720
• Rate Group #10 – Plans I, J, M, N and U (OCFA)	28.00%	7,623	28.86%	7,857
• Rate Group #11 – Plans M and N, future service, and U (Cemetery)	12.11%	199	12.49%	205
• Rate Group #12 – Plans G, H, future service, and U (Law Library)	15.29%	168	13.33%	146
• Rate Group #6 – Plans E, F and V (Probation)	55.37%	35,563	52.07%	33,442
• Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	65.24%	160,943	62.01%	152,974
• Rate Group #8 – Plans E, F, Q, R and V (OCFA)	48.60%	64,346	45.81%	60,644
All Categories Combined	40.02%	\$750,529	37.66%	\$706,242
Average Member Contribution Rates:				
• Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	9.63%	\$8,491	9.62%	\$8,483
• Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	11.27%	127,120	11.26%	127,007
• Rate Group #3 – Plans B, G, H and U (OCSD)	11.81%	8,688	11.83%	8,703
• Rate Group #5 – Plans A, B and U (OCTA)	10.16%	10,701	10.16%	10,701
• Rate Group #9 – Plans M, N and U (TCA)	10.95%	773	10.85%	766
• Rate Group #10 – Plans I, J, M, N and U (OCFA)	11.64%	3,169	11.67%	3,177
• Rate Group #11 – Plans M and N, future service, and U (Cemetery)	10.02%	165	9.86%	162
• Rate Group #12 – Plans G, H, future service, and U (Law Library)	13.31%	146	13.42%	147
• Rate Group #6 – Plans E, F and V (Probation)	16.66%	10,701	16.61%	10,669
• Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	17.22%	42,483	17.23%	42,508
• Rate Group #8 – Plans E, F, Q, R and V (OCFA)	16.14%	21,368	16.16%	21,395
All Categories Combined	12.47%	\$233,805	12.46%	\$233,718

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and 2017 valuations, respectively.

⁽²⁾ Based on December 31, 2018 projected annual compensation.

⁽³⁾ For those Rate Groups with plan specific contribution rates, the total rates shown above have been recalculated by applying the plan specific contribution rates determined in the December 31, 2017 valuation to the corresponding projected payrolls reported as of December 31, 2018.

⁽⁴⁾ Average December 31, 2017 member contribution rates have been recalculated by applying the individual entry age based rates determined in the December 31, 2017 valuation to the System membership as of December 31, 2018.

Summary of Key Valuation Results (continued)

		December 31, 2018 (\$ in '000s)	December 31, 2017 (\$ in '000s)
Actuarial Accrued Liability as of December 31:	• Retired members and beneficiaries	\$11,569,064	\$10,633,213
	• Inactive vested members ⁽¹⁾	449,290	488,752
	• Active members	8,684,995	8,513,462
	• Total Actuarial Accrued Liability	20,703,349	19,635,427
	• Normal Cost for plan year beginning December 31	516,408	508,328
Assets as of December 31:	• Market Value of Assets (MVA) ^{(2),(3)}	\$14,349,705	\$14,652,521
	• Valuation Value of Assets (VVA) ⁽²⁾	14,994,420	14,197,125
Funded status as of December 31:	• Unfunded Actuarial Accrued Liability on Market Value of Assets basis	\$6,353,644	\$4,982,906
	• Funded percentage on MVA basis	69.31%	74.62%
	• Unfunded Actuarial Accrued Liability on Valuation Value of Assets basis	\$5,708,929	\$5,438,302
	• Funded percentage on VVA basis	72.43%	72.30%
Key assumptions:	• Net investment return	7.00%	7.00%
	• Price Inflation	2.75%	2.75%
	• Payroll growth increase	3.25%	3.25%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes County Investment Account (funded by pension obligation bond proceeds held by OCERS), prepaid employer contributions account, O.C. Sanitation District UAAL Deferred Account (after transfer) and non-valuation reserves.

⁽³⁾ Based on the preliminary unaudited financial statement provided by OCERS for this valuation.

Summary of Key Valuation Results (continued)

		December 31, 2018	December 31, 2017	Change From Prior Year
Demographic data as of December 31:	Active Members:			
	• Number of members	21,929	21,721	1.0%
	• Average age	45.1	45.3	-0.2
	• Average service	12.8	12.9	-0.1
	• Total projected compensation	\$1,875,371,661	\$1,811,879,510	3.5%
	• Average projected compensation	\$85,520	\$83,416	2.5%
	Retired Members and Beneficiaries:			
	• Number of members:			
	– Service retired	13,827	13,240	4.4%
	– Disability retired	1,482	1,446	2.5%
	– Beneficiaries	2,365	2,261	4.6%
	– Total	17,674	16,947	4.3%
	• Average age	70.0	69.8	0.2
	• Average monthly benefit ⁽¹⁾	\$3,913	\$3,745	4.5%
	Inactive Vested Members:			
	• Number of members ⁽²⁾	6,026	5,803	3.8%
	• Average Age	44.9	44.8	0.1
Total Members:	45,629	44,471	2.6%	

⁽¹⁾ Excludes monthly benefits payable from the STAR COLA.

⁽²⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

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 Consulting (“Segal”) relies on a number of input items. These include:

Plan of benefits	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.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the System. 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.
Assets	The valuation is based on the Market Value of Assets as of the valuation date, as provided by the System. The System uses a “Valuation Value of Assets” that differs from market value to gradually reflect year-to-year changes in the Market Value of Assets in determining the contribution requirements.
Actuarial assumptions	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 System. 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 System 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 System should look to their other advisors for expertise in these areas.

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

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 ⁽¹⁾	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives	Ratio of Retired Members and Beneficiaries to Actives
2009	22,633	4,094	12,243	16,337	0.72	0.54
2010	21,742	4,308	12,762	17,070	0.79	0.59
2011	21,421	4,406	13,289	17,695	0.83	0.62
2012	21,256	4,415	13,947	18,362	0.86	0.66
2013	21,368	4,613	14,505	19,118	0.89	0.68
2014	21,459	4,789	15,169	19,958	0.93	0.71
2015	21,525	5,091	15,810	20,901	0.97	0.73
2016	21,746	5,370	16,369	21,739	1.00	0.75
2017	21,721	5,803	16,947	22,750	1.05	0.78
2018	21,929	6,026	17,674	23,700	1.08	0.81

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

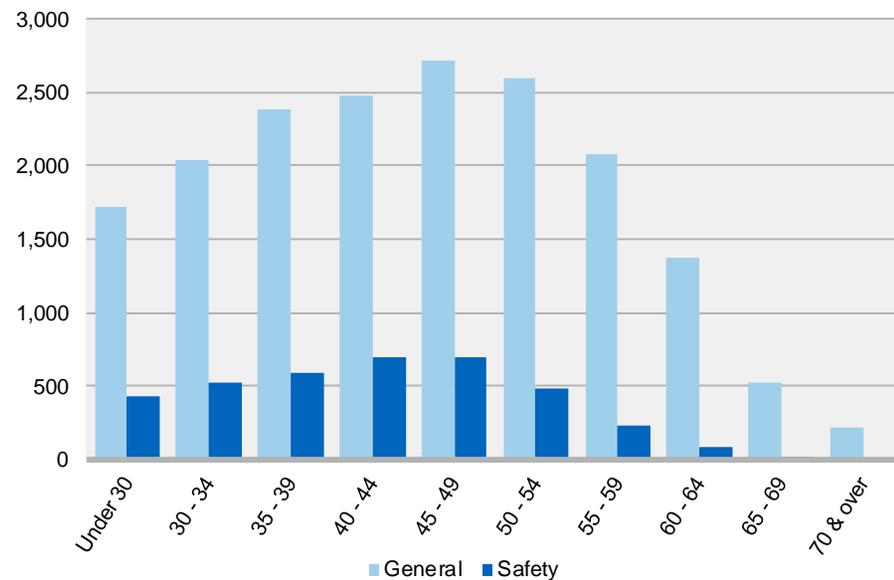
Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 21,929 active members with an average age of 45.1, average years of service of 12.8 years and average compensation of \$85,520. The 21,721 active members in the prior valuation had an average age of 45.3, average service of 12.9 years and average compensation of \$83,416.

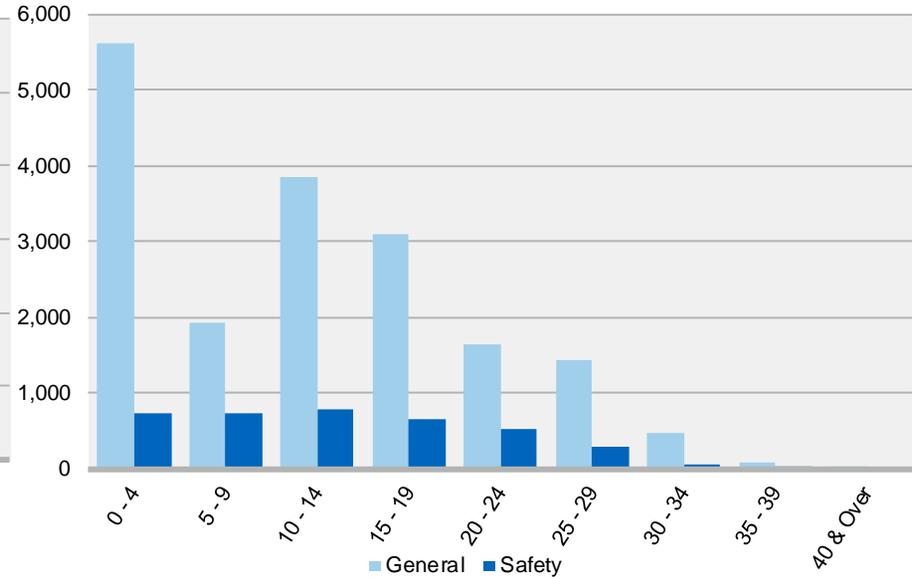
Among the active members, there were none with unknown age information.

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 6,026 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their member contributions versus 5,803 in the prior valuation.

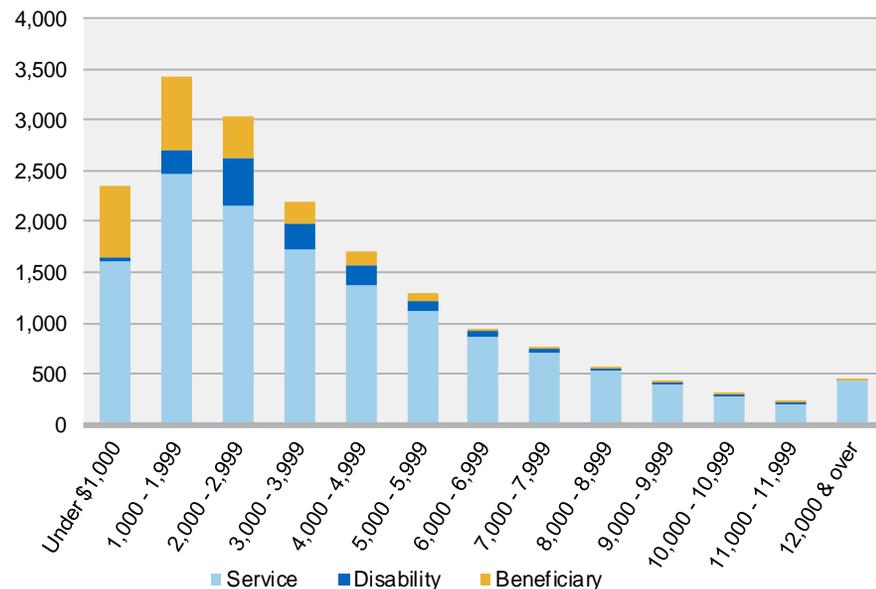
Retired Members and Beneficiaries

As of December 31, 2018, 15,309 retired members and 2,365 beneficiaries were receiving total monthly benefits of \$69,152,036. For comparison, in the previous valuation, there were 14,686 retired members and 2,261 beneficiaries receiving monthly benefits of \$63,464,718. These monthly benefits exclude benefits payable from the Supplemental Targeted Adjustment for Retirees Cost of Living Adjustment (STAR COLA).

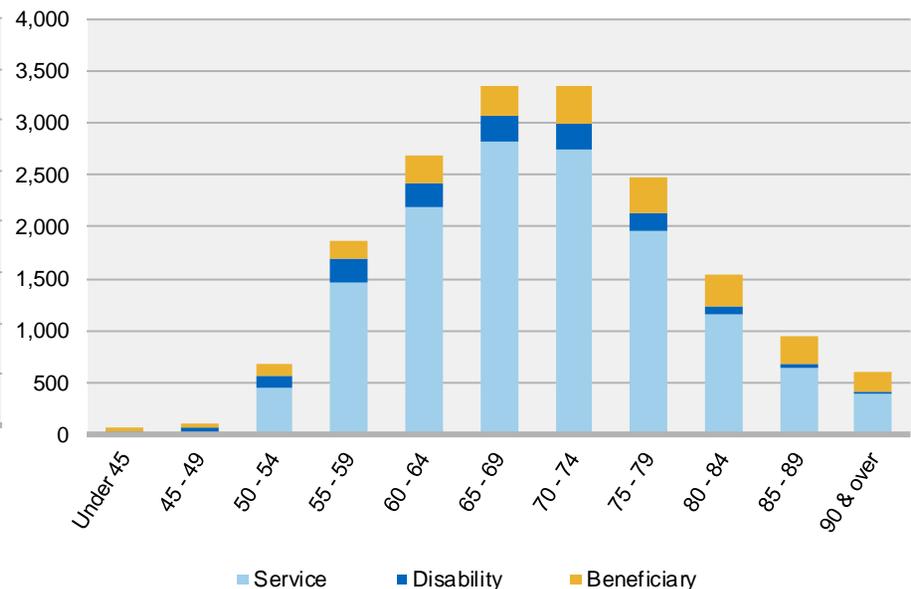
As of December 31, 2018, the average monthly benefit for retired members and beneficiaries is \$3,913, compared to \$3,745 in the previous valuation. The average age for retired members and beneficiaries is 70.0 in the current valuation, compared with 69.8 in the prior valuation.

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 stability 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 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	22,633	44.6	11.9	12,243	68.7	2,854
2010	21,742	45.1	12.6	12,762	68.8	2,988
2011	21,421	45.4	13.0	13,289	69.0	3,099
2012	21,256	45.5	13.1	13,947	69.0	3,247
2013	21,368	45.6	13.2	14,505	69.2	3,366
2014	21,459	45.6	13.2	15,169	69.4	3,455
2015	21,525	45.5	13.1	15,810	69.5	3,560
2016	21,746	45.4	12.9	16,369	69.7	3,637
2017	21,721	45.3	12.9	16,947	69.8	3,745
2018	21,929	45.1	12.8	17,674	70.0	3,913

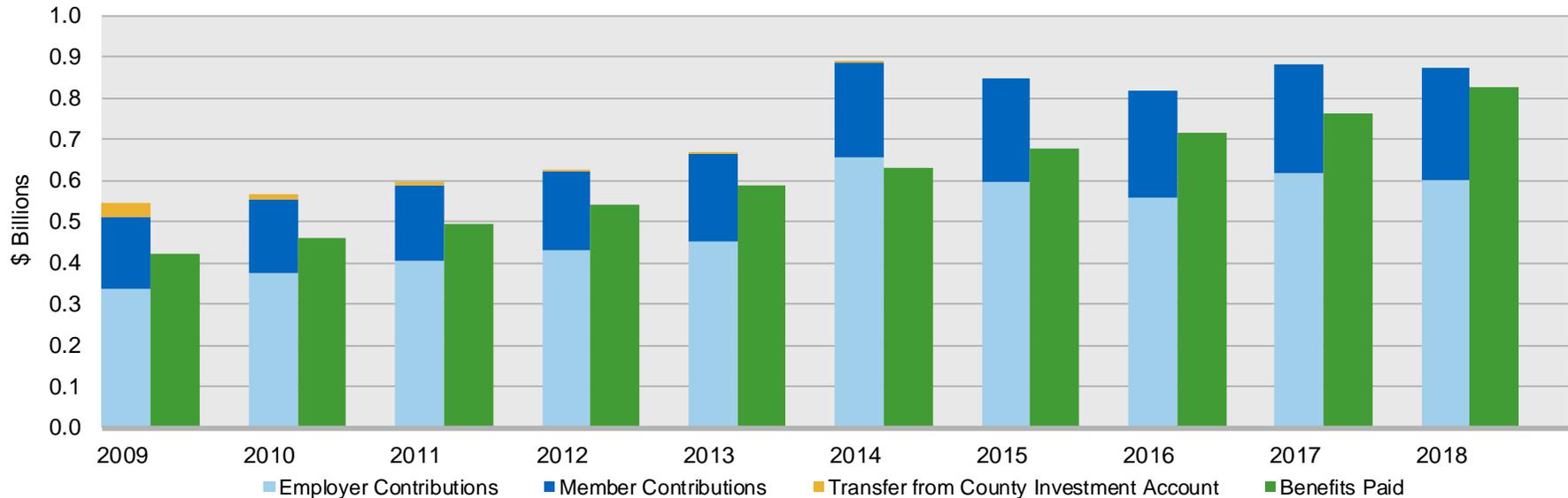
B. Financial Information

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 valuation asset value and hence 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 AND EXPENSES
FOR YEARS ENDED DECEMBER 31, 2009 – 2018**



DETERMINATION OF ACTUARIAL VALUE OF ASSETS

1	Market Value of Assets^{(1),(2)}					\$14,349,790,000
2	Calculation of unrecognized return	Actual Return	Expected Return	Investment Gain / (Loss)	Percent Deferred	Unrecognized Amount
a)	Year ended December 31, 2014	\$487,104,000	\$780,627,000	\$(293,523,000)	0%	\$0
b)	Year ended December 31, 2015	(51,601,000)	833,757,000	(885,358,000)	20	(177,072,000)
c)	Year ended December 31, 2016	1,010,548,000	840,469,000	170,079,000	40	68,032,000
d)	Year ended December 31, 2017	1,878,172,000	920,426,000	957,746,000	60	574,648,000
e)	Year ended December 31, 2018	(361,321,000)	1,026,583,000	(1,387,904,000)	80	(1,110,323,000)
f)	Total unrecognized return ⁽³⁾					<u>\$(644,715,000)</u>
3	Actuarial Value of Assets 1 - 2f					<u>\$14,994,505,000</u>
4	Actuarial Value of Assets as a percentage of Market Value of Assets 3 / 1					104.5%
5	Non-valuation reserves:					
a)	Unclaimed member deposit					\$0
b)	Medicare medical insurance reserve					<u>85,000</u>
c)	Subtotal					<u>\$85,000</u>
6	Valuation Value of Assets 3 - 5c					<u>\$14,994,420,000</u>

⁽¹⁾ Excludes \$131,890,000 in County Investment Account (funded by pension obligation bond proceeds held by OCERS) and \$246,133,000 in Prepaid Employer Contributions.

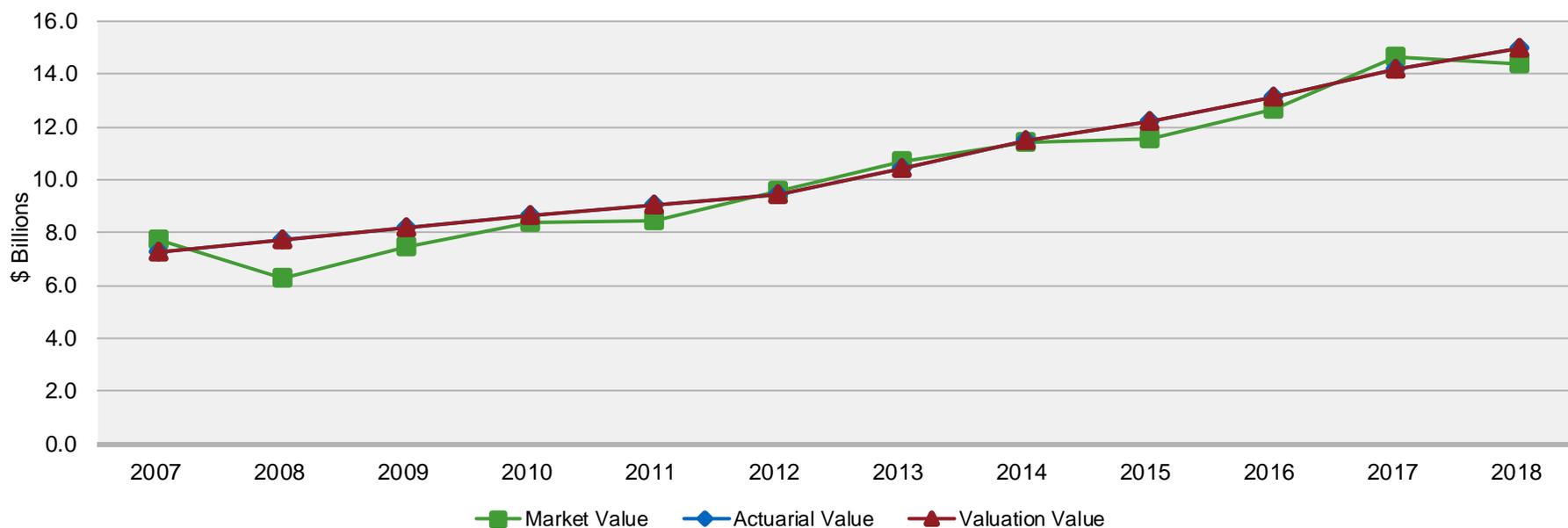
⁽²⁾ Based on the preliminary unaudited financial statement provided by OCERS for this valuation.

⁽³⁾ Deferred return as of December 31, 2018 recognized in each of the next four years:

(a) Amount recognized on December 31, 2019	\$(229,086,000)
(b) Amount recognized on December 31, 2020	(52,016,000)
(c) Amount recognized on December 31, 2021	(86,032,000)
(d) Amount recognized on December 31, 2022	<u>(277,581,000)</u>
(f) Subtotal	\$(644,715,000)

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 \$351.5 million, which includes \$255.9 million from investment losses, a net loss of \$78.7 million from contribution experience (including a gain of \$27.7 million from additional UAAL payments from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and U.C.I.², a gain of \$14.6 million from transfer from O.C. Sanitation UAAL Deferred Account and a loss of \$120.9 million from all other contribution experience) and \$16.9 million in losses from all other sources. The net experience variation from individual sources other than investments and contributions was 0.1% 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

1	Net loss from investments ⁽¹⁾	\$(255,908,000)
2	Net loss from contribution experience ⁽²⁾	(78,676,000)
3	Net loss from other experience ⁽²⁾	<u>(16,867,000)</u>
4	Net experience loss: 1 + 2 + 3	\$(351,451,000)

⁽¹⁾ Details on next page.

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

² Segal provided separate letters for DOE and UCI with regard to their required UAAL contributions based on the Board's withdrawing employer policy. These contributions have not been reflected in the valuation.

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 -2.46% for the year ended December 31, 2018.

For valuation purposes, the assumed rate of return on the Valuation Value of Assets is 7.00%. The actual rate of return on a valuation basis for the 2018 plan year was 5.20%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended December 31, 2018 with regard to its investments.

INVESTMENT EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2018

	Market Value	Actuarial Value	Valuation Value
1 Net investment income	\$(361,321,000)	\$738,790,000	\$738,791,000
2 Average value of assets	14,665,473,000 ⁽¹⁾	14,210,077,000	14,209,991,000
3 Rate of return: 1 ÷ 2	-2.46% ⁽¹⁾	5.20%	5.20%
4 Assumed rate of return	7.00%	7.00%	7.00%
5 Expected investment income: 2 × 4	<u>\$1,026,583,000</u>	<u>\$994,705,000</u>	<u>\$994,699,000</u>
6 Actuarial gain/(loss): 1 – 5	<u>\$(1,387,904,000)</u>	<u>\$(255,915,000)</u>	<u>\$(255,908,000)</u>

⁽¹⁾ Return on market value was calculated using a modified dollar-weighted approach based on pension plan assets net of accounting liabilities. Actual investment loss on net pension plan assets was \$361,321,000 during 2018 after including both the administrative expenses and discount for prepaid contributions while excluding the losses credited to County Investment Account and O.C. Sanitation District UAAL Deferred Account. Without these adjustments, the actual investment loss was \$324,628,000.

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 ⁽¹⁾		Actuarial Value Investment Return ⁽¹⁾		Valuation Value Investment Return ⁽¹⁾	
	Amount ⁽²⁾	Percent	Amount ⁽²⁾	Percent	Amount ⁽²⁾	Percent
2009	\$1,092,660,000	17.32%	\$281,360,000	3.60%	\$282,764,000	3.62%
2010	787,215,000	10.47%	411,960,000	5.02%	412,046,000	5.02%
2011	3,236,000	0.04%	286,585,000	3.28%	287,241,000	3.29%
2012	1,014,471,000	11.92%	318,033,000	3.49%	318,043,000	3.49%
2013	1,031,118,000	10.73%	866,402,000	9.11%	866,402,000	9.11%
2014	487,104,000	4.52%	771,049,000	7.34%	771,174,000	7.34%
2015	(51,601,000)	-0.45%	606,190,000	5.26%	606,191,000	5.26%
2016	1,010,548,000	8.72%	776,627,000	6.33%	776,628,000	6.33%
2017	1,878,172,000	14.79%	977,128,000	7.44%	977,130,000	7.44%
2018	(361,321,000)	-2.46%	738,790,000	5.20%	738,791,000	5.20%
Most recent five-year geometric average return		4.84%		6.31%		6.31%
Most recent ten-year geometric average return		7.36%		5.59%		5.59%

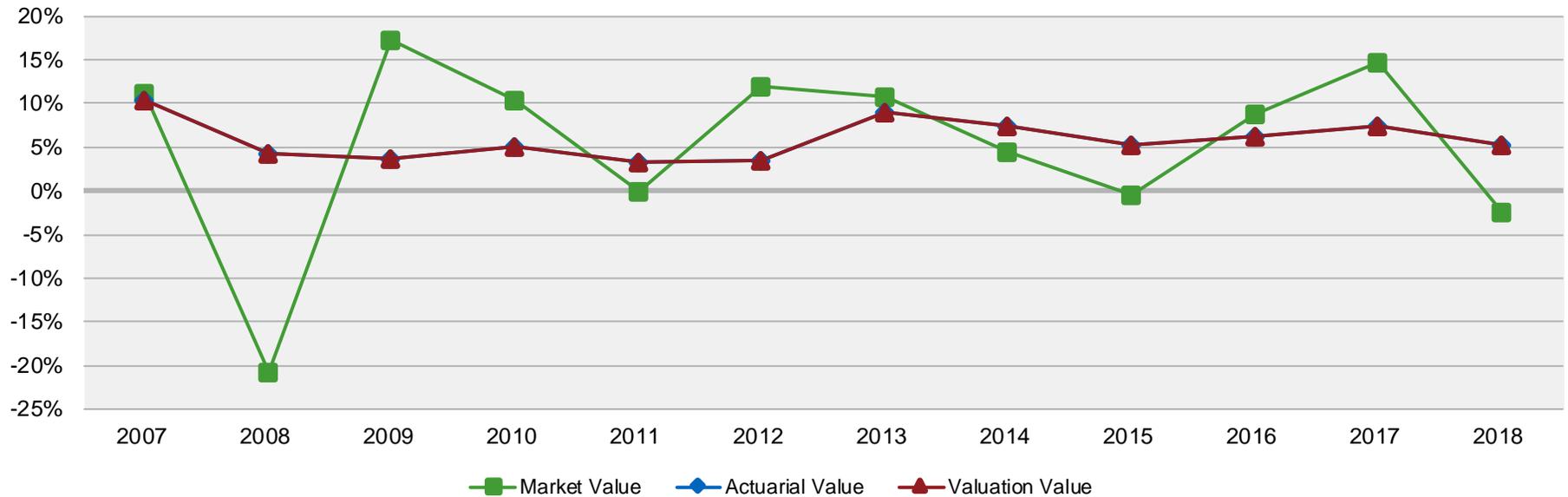
Note: Return on market value was calculated using a modified dollar-weighted approach based on pension plan assets net of accounting liabilities. Each year's yield is weighted by the average asset value in that year.

⁽¹⁾ Net of administrative and investment expenses.

⁽²⁾ The dollar amount of return on market value is net of the return on the County Investment Account (funded by pension obligation bond proceeds held by OCERS), prepaid employer contributions account and O.C. Sanitation District UAAL Deferred Account (after transfer), if any.

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 RATES OF RETURN FOR YEARS ENDING DECEMBER 31, 2007 – 2018



Contributions

Contributions for the year ended December 31, 2018 totaled \$886.8 million (including the \$14.6 million transfer from O.C. Sanitation District UAAL Deferred Account), compared to the projected amount of \$961.7 million. This resulted in a net loss of \$78.7 million from contribution experience for the year, 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 loss from this other experience for the year ended December 31, 2018 amounted to \$16.9 million, which is 0.1% of the Actuarial Accrued Liability. See *Subsection E* for a detailed development of the Unfunded Actuarial Accrued Liability.

D. Other Changes in the Actuarial Accrued Liability

The Actuarial Accrued Liability as of December 31, 2018 is 20.7 billion, an increase of \$1.1 billion, or 5.4%, 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 Actuarial Accrued Liability

DEVELOPMENT FOR YEAR ENDED DECEMBER 31, 2018

1	Unfunded Actuarial Accrued Liability at beginning of year	\$5,438,302,000
2	Total Normal Cost at middle of year	508,322,000
3	Expected employer and member contributions	(961,688,000)
4	Interest	<u>372,542,000</u>
5	Expected Unfunded Actuarial Accrued Liability at end of year	\$5,357,478,000
6	Changes due to:	
	a) Investment losses (on smoothed value of assets)	\$255,908,000
	b) Difference in actual versus expected contributions (including loss from phase-in)	120,939,000 ⁽¹⁾
	c) Additional UAAL payments from Cypress Parks and Recreation and OCFA and anticipated payments ⁽²⁾ from DOE and U.C.I.	(27,674,000)
	d) Transfer from O.C. Sanitation District UAAL Deferred Account	(14,589,000)
	e) Difference in actual versus expected salary increases	(71,908,000)
	f) Difference in actual versus expected COLA increases	24,279,000
	g) Other experience loss	<u>64,496,000</u>
	Total changes	<u>\$351,451,000</u>
7	Unfunded Actuarial Accrued Liability at end of year	<u>\$5,708,929,000</u>

Note: The sum of items 6b, 6c and 6d equals the "Net loss from contribution experience" shown in Subsection C.

The sum of items 6e, 6f and 6g equals the "Net loss from other experience" shown in Subsection C.

⁽¹⁾ Includes \$46 million contribution loss from the phase-in of the UAAL cost impact due to changes in actuarial assumptions in 2017.

⁽²⁾ Segal provided separate letters for DOE and UCI with regard to their required UAAL contributions based on the Board's withdrawing employer policy. These contributions have not been anticipated in 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 40.02% 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 FOR YEAR ENDING DECEMBER 31

All Tiers Combined	December 31, 2018		December 31, 2017	
	Amount (\$ in '000s)	% of Projected Compensation	Amount (\$ in '000s)	% of Projected Compensation
1 Total Normal Cost	\$516,408	27.54%	\$508,328	28.05%
2 Expected member Normal Cost contributions	(233,805)	(12.47%)	(228,888)	(12.63%)
3 Employer Normal Cost: 1 + 2	\$282,603	15.07%	\$279,440	15.42%
4 Actuarial Accrued Liability	20,703,349		19,635,427	
5 Valuation Value of Assets	14,994,420		14,197,125	
6 Unfunded Actuarial Accrued Liability (UAAL): 4 - 5	\$5,708,929		\$5,438,302	
7 Payment on UAAL ⁽¹⁾	\$467,926	24.95%	\$408,555	22.55%
8 Total average recommended employer contribution: 3 + 7	\$750,529	40.02%	\$687,995	37.97%
9 Projected compensation	\$1,875,370		\$1,811,877	

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

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

Reconciliation of Average Recommended Employer Contribution Rate

The chart below details the changes in the average recommended employer contribution 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 ⁽¹⁾ (\$ in '000s)
Average Recommended Employer Contribution as of December 31, 2017 (before adjustments for phase-in)	40.13%	\$752,555
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>(2.47%)</u>	(46,313)
Average Recommended Employer Contribution as of December 31, 2017 (after adjustments for phase-in)	37.66%	\$706,242
• Effect of investment loss (after smoothing)	0.97%	18,191
• Effect of additional UAAL contributions from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and UCI	(0.11%)	(2,063)
• Effect of \$14.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	(0.06%)	(1,125)
• Effect of difference in actual versus expected contributions (including loss from phase-in)	0.46% ⁽²⁾	8,627
• Effect of difference in actual versus expected COLA increases	0.09%	1,688
• Effect of difference in actual versus expected salary increases	(0.27%)	(5,063)
• Effect of growth in total payroll greater than expected	(0.04%)	(750)
• Effect of other experience loss	0.08% ⁽³⁾	1,631
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>1.24%</u>	<u>23,151</u>
Total change	2.36%	\$44,287
Average Recommended Employer Contribution as of December 31, 2018	40.02%	\$750,529

⁽¹⁾ Based on December 31, 2018 projected annual compensation of \$1,875,370,000.

⁽²⁾ Includes 0.18% of pay contribution loss from the phase-in of the UAAL cost impact due to changes in actuarial assumptions in 2017.

⁽³⁾ Net of an adjustment of -0.12% to reflect a change in 18-month delay between date of valuation and date of rate implementation for all actuarial experience.

Reconciliation of Average Recommended Member Contribution Rate

The chart below details the changes in the average recommended member contribution 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 ⁽¹⁾ (\$ in ‘000s)
Average Recommended Member Contribution as of December 31, 2017 ⁽²⁾	12.46%	\$233,718
• Effect of changes in member demographics	<u>0.01%</u>	<u>87</u>
Total change	0.01%	\$87
Average Recommended Member Contribution as of December 31, 2018	12.47%	\$233,805

⁽¹⁾ Based on December 31, 2018 projected annual compensation of \$1,875,370,000.

⁽²⁾ Rates have been recalculated by applying the individual entry age based rates determined in the December 31, 2017 valuation to the System membership as of December 31, 2018.

Recommended Employer Contribution Rates

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #1 – Plans A and B (2.0% @ 57 and 1.6667% @ 57.5 – non-OCTA, non-OCSD)				
Normal Cost	10.73%	\$4,822	10.73%	\$4,822
UAAL ^{(3),(4),(5)}	<u>8.55%</u>	<u>3,843</u>	<u>7.89%</u>	<u>3,546</u>
Total Contributions	19.28%	\$8,665	18.62%	\$8,368
Rate Group #1 – Plan U (2.5% @ 67 PEPRA)⁽⁶⁾				
Normal Cost	9.93%	\$4,293	9.93%	\$4,293
UAAL ^{(3),(4),(5)}	<u>8.55%</u>	<u>3,696</u>	<u>7.89%</u>	<u>3,411</u>
Total Contributions	18.48%	\$7,989	17.82%	\$7,704
Rate Group #1 – Plans A, B and U Combined				
Normal Cost	10.34%	\$9,115	10.34%	\$9,115
UAAL ^{(3),(4),(5)}	<u>8.55%</u>	<u>7,539</u>	<u>7.89%</u>	<u>6,957</u>
Total Contributions	18.89%	\$16,654	18.23%	\$16,072

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ The net UAAL contribution rates for County and IHSS Public Authority when calculated after excluding the UAAL for U.C.I., Department of Education and Cypress Recreation and Parks is 5.06% for the December 31, 2018 valuation.

⁽⁵⁾ The net UAAL contribution rates for County and IHSS Public Authority when calculated after excluding the UAAL for U.C.I., Department of Education and Cypress Recreation and Parks is 4.61% for the December 31, 2017 valuation.

⁽⁶⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #2 – Plans I and J (2.7% @ 55 – non-OCFA, non-Children and Families Commission)				
Normal Cost	14.36%	\$115,805	14.39%	\$116,047
UAAL ⁽³⁾	<u>25.05%</u>	<u>202,014</u>	<u>22.67%</u>	<u>182,821</u>
Total Contributions	39.41%	\$317,819	37.06%	\$298,868
Rate Group #2 – Plans I and J (2.7% @ 55 – non-OCFA, Children and Families Commission)				
Normal Cost	14.36%	\$78	14.39%	\$79
UAAL ^{(3),(4)}	<u>3.26%</u>	<u>18</u>	<u>1.04%</u>	<u>6</u>
Total Contributions	17.62%	\$96	15.43%	\$85
Rate Group #2 – Plans O and P (1.62% @ 65)				
Normal Cost	6.23%	\$938	6.21%	\$935
UAAL ⁽³⁾	<u>25.05%</u>	<u>3,770</u>	<u>22.67%</u>	<u>3,412</u>
Total Contributions	31.28%	\$4,708	28.88%	\$4,347
Rate Group #2 – Plan S (2.0% @ 57)				
Normal Cost ⁽⁵⁾	12.13%	\$249	11.51%	\$236
UAAL ⁽³⁾	<u>25.05%</u>	<u>513</u>	<u>22.67%</u>	<u>465</u>
Total Contributions	37.18%	\$762	34.18%	\$701
Rate Group #2 – Plan T (1.62% @ 65 PEPR A)⁽⁶⁾				
Normal Cost	7.12%	\$20,038	7.11%	\$20,009
UAAL ⁽³⁾	<u>25.05%</u>	<u>70,497</u>	<u>22.67%</u>	<u>63,799</u>
Total Contributions	32.17%	\$90,535	29.78%	\$83,808

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ UAAL rate has been adjusted to reflect future service only benefit improvement under 2.7% @ 55.

⁽⁵⁾ The increase in the employer Normal Cost rate from last year to this year is primarily due to the change in the average entry age from 31.9 (for 17 members) to 32.8 for (for 16 members).

⁽⁶⁾ Applicable for members hired on or after January 1, 2013 except for County Attorneys, San Juan Capistrano members, OCERS management members and Children and Families members.

Note: For Orange County Employees Retirement System (the employer) with future service only benefit improvements under 2.7% @ 55, refer to the employer rates on page 44. For Local Agency Formation Commission (LAFCO), there is no adjustment in their December 31, 2018 UAAL rate for future service only benefit improvements under 2.7% @ 55. This is as a result of a data correction made by OCERS to reflect that the sole active employee covered under 2.7% @ 55 and assumed in our prior valuations to receive future service only improvement should instead be values as an all service improvement because the member has paid some contributions to upgrade the past service.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #2 – Plan U (2.5% @ 67 PEPRA, non-Children and Families Commission)⁽⁵⁾				
Normal Cost	8.78%	\$1,906	8.78%	\$1,906
UAAL ⁽³⁾	<u>25.05%</u>	<u>5,438</u>	<u>22.67%</u>	<u>4,921</u>
Total Contributions	33.83%	\$7,344	31.45%	\$6,827
Rate Group #2 – Plan U (2.5% @ 67 PEPRA, Children and Families Commission)⁽⁵⁾				
Normal Cost	8.78%	\$51	8.78%	\$51
UAAL ^{(3),(4)}	<u>3.26%</u>	<u>19</u>	<u>1.04%</u>	<u>6</u>
Total Contributions	12.04%	\$70	9.82%	\$57
Rate Group #2 – Plan W (1.62% @ 65 PEPRA)⁽⁶⁾				
Normal Cost	8.73%	\$13	8.56%	\$13
UAAL ⁽³⁾	<u>25.05%</u>	<u>37</u>	<u>22.67%</u>	<u>34</u>
Total Contributions	33.78%	\$50	31.23%	\$47
Rate Group #2 – Plans I, J, O, P, S, T, U and W Combined				
Normal Cost	12.33%	\$139,078	12.35%	\$139,276
UAAL ⁽³⁾	<u>25.03%</u>	<u>282,306</u>	<u>22.65%</u>	<u>255,464</u>
Total Contributions	37.36%	\$421,384	35.00%	\$394,740

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ UAAL rate has been adjusted to reflect future service only benefit improvement under 2.7% @ 55.

⁽⁵⁾ Applicable for County Attorneys, San Juan Capistrano members, OCERS management members and Children and Families members hired on or after January 1, 2013.

⁽⁶⁾ Applicable for San Juan Capistrano members hired on or after January 1, 2016 if they elect to be covered under Plan W (1.62% @ 65 formula).

Note: For Orange County Employees Retirement System (the employer) with future service only benefit improvements under 2.7% @ 55, refer to the employer rates on page 44. For Local Agency Formation Commission (LAFCO), there is no adjustment in their December 31, 2018 UAAL rate for future service only benefit improvements under 2.7% @ 55. This is as a result of a data correction made by OCERS to reflect that the sole active employee covered under 2.7% @ 55 and assumed in our prior valuations to receive future service only improvement should instead be values as an all service improvement because the member has paid some contributions to upgrade the past service.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽³⁾ (\$ in '000s)	Contribution Rate ⁽²⁾	Estimated Annual Dollar Amount ⁽³⁾ (\$ in '000s)
Rate Group #3 – Plans G and H (2.5% @ 55 – OCSD)				
Normal Cost	13.24%	\$6,073	13.30%	\$6,101
UAAL ⁽⁴⁾	<u>0.86%</u>	<u>394</u>	<u>0.00%</u>	<u>0</u>
Total Contributions	14.10%	\$6,467	13.30%	\$6,101
Rate Group #3 – Plan B (1.64% @ 57 – OCSD)				
Normal Cost	11.11%	\$701	11.25%	\$710
UAAL ⁽⁴⁾	<u>0.86%</u>	<u>54</u>	<u>0.00%</u>	<u>0</u>
Total Contributions	11.97%	\$755	11.25%	\$710
Rate Group #3 – Plan U (2.5% @ 67 PEPRA)⁽⁵⁾				
Normal Cost	10.02%	\$2,143	10.37%	\$2,218
UAAL ⁽⁴⁾	<u>0.86%</u>	<u>184</u>	<u>0.00%</u>	<u>0</u>
Total Contributions	10.88%	\$2,327	10.37%	\$2,218
Rate Group #3 – Plans B, G, H and U Combined				
Normal Cost	12.12%	\$8,917	12.27%	\$9,029
UAAL ⁽⁴⁾	<u>0.86%</u>	<u>632</u>	<u>0.00%</u>	<u>0</u>
Total Contributions	12.98%	\$9,549	12.27%	\$9,029

⁽¹⁾ These rates are after adjustment for \$14,589,000 asset transfer from O.C. Sanitation District UAAL Deferred Account.

⁽²⁾ These rates are after adjustment for \$24,042,000 asset transfer from O.C. Sanitation District UAAL Deferred Account.

⁽³⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽⁴⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁵⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #5 – Plans A and B (2.0% @ 57 and 1.6667% @ 57.5 – OCTA)				
Normal Cost	12.03%	\$10,813	12.10%	\$10,875
UAAL ⁽³⁾	<u>18.60%</u>	<u>16,718</u>	<u>15.94%</u>	<u>14,327</u>
Total Contributions	30.63%	\$27,531	28.04%	\$25,202
Rate Group #5 – Plan U (2.5% @ 67 PEPRA)⁽⁴⁾				
Normal Cost	11.32%	\$1,749	11.32%	\$1,749
UAAL ⁽³⁾	<u>18.60%</u>	<u>2,873</u>	<u>15.94%</u>	<u>2,462</u>
Total Contributions	29.92%	\$4,622	27.26%	\$4,211
Rate Group #5 – Plans A, B and U Combined				
Normal Cost	11.93%	\$12,562	11.99%	\$12,624
UAAL ⁽³⁾	<u>18.60%</u>	<u>19,591</u>	<u>15.94%</u>	<u>16,789</u>
Total Contributions	30.53%	\$32,153	27.93%	\$29,413

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ Applicable for members hired on or after January 1, 2015.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #9 – Plans M and N (2.0% @ 55 – TCA)				
Normal Cost	14.51%	\$543	14.51%	\$543
UAAL ⁽³⁾	<u>14.66%</u>	<u>549</u>	<u>11.49%</u>	<u>430</u>
Total Contributions	29.17%	\$1,092	26.00%	\$973
Rate Group #9 – Plan U (2.5% @ 67 PEPR A)⁽⁴⁾				
Normal Cost	11.13%	\$369	11.02%	\$366
UAAL ⁽³⁾	<u>14.66%</u>	<u>486</u>	<u>11.49%</u>	<u>381</u>
Total Contributions	25.79%	\$855	22.51%	\$747
Rate Group #9 – Plans M, N and U Combined				
Normal Cost	12.91%	\$912	12.87%	\$909
UAAL ⁽³⁾	<u>14.66%</u>	<u>1,035</u>	<u>11.49%</u>	<u>811</u>
Total Contributions	27.57%	\$1,947	24.36%	\$1,720

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #10 – Plans I and J (2.7% @ 55 – OCFA)				
Normal Cost	14.71%	\$2,092	14.72%	\$2,093
UAAL ⁽³⁾	<u>14.96%</u>	<u>2,127</u>	<u>15.74%</u>	<u>2,238</u>
Total Contributions	29.67%	\$4,219	30.46%	\$4,331
Rate Group #10 – Plans M and N (2.0% @ 55 – OCFA)				
Normal Cost	13.50%	\$558	13.46%	\$556
UAAL ⁽³⁾	<u>14.96%</u>	<u>618</u>	<u>15.74%</u>	<u>651</u>
Total Contributions	28.46%	\$1,176	29.20%	\$1,207
Rate Group #10 – Plan U (2.5% @ 67 PEPRA)⁽⁴⁾				
Normal Cost	10.16%	\$901	10.41%	\$923
UAAL ⁽³⁾	<u>14.96%</u>	<u>1,327</u>	<u>15.74%</u>	<u>1,396</u>
Total Contributions	25.12%	\$2,228	26.15%	\$2,319
Rate Group #10 – Plans I, J, M, N and U Combined				
Normal Cost	13.04%	\$3,551	13.12%	\$3,572
UAAL ⁽³⁾	<u>14.96%</u>	<u>4,072</u>	<u>15.74%</u>	<u>4,285</u>
Total Contributions	28.00%	\$7,623	28.86%	\$7,857

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #11 – Plans M and N, future service (2.0% @ 55 – Cemetery)				
Normal Cost	12.05%	\$155	11.98%	\$154
UAAL ^{(3),(4)}	<u>0.00%</u>	<u>0</u>	<u>0.48%</u>	<u>6</u>
Total Contributions	12.05%	\$155	12.46%	\$160
Rate Group #11 – Plan U (2.5% @ 67 PEPR A)⁽⁵⁾				
Normal Cost	12.33%	\$44	12.03%	\$43
UAAL ^{(3),(4)}	<u>0.00%</u>	<u>0</u>	<u>0.48%</u>	<u>2</u>
Total Contributions	12.33%	\$44	12.51%	\$45
Rate Group #11 – Plans M, N and U Combined				
Normal Cost	12.11%	\$199	11.99%	\$197
UAAL ^{(3),(4)}	<u>0.00%</u>	<u>0</u>	<u>0.48%</u>	<u>8</u>
Total Contributions	12.11%	\$199	12.47%	\$205

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ December 31, 2018 UAAL rates after the phase-in is negative. Under CalPEPRA, the employer's contribution rate cannot be less than the Normal Cost unless the funded ratio is over 120% and other conditions in CalPEPRA are met.

⁽⁵⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

General Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)	Contribution Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)
Rate Group #12 – Plans G and H, future service (2.5% @ 55 – Law Library)				
Normal Cost	14.28%	\$128	14.11%	\$127
UAAL ^{(2),(3)}	<u>1.77%</u>	<u>16</u>	<u>0.00%</u>	<u>0</u>
Total Contributions	16.05%	\$144	14.11%	\$127
Rate Group #12 – Plan U (2.5% @ 67 PEPR)⁽⁴⁾				
Normal Cost ⁽⁵⁾	10.32%	\$20	9.36%	\$19
UAAL ^{(2),(3)}	<u>1.77%</u>	<u>4</u>	<u>0.00%</u>	<u>0</u>
Total Contributions	12.09%	\$24	9.36%	\$19
Rate Group #12 – Plans G, H, future service, and U Combined				
Normal Cost	13.52%	\$148	13.33%	\$146
UAAL ^{(2),(3)}	<u>1.77%</u>	<u>20</u>	<u>0.00%</u>	<u>0</u>
Total Contributions	15.29%	\$168	13.33%	\$146

⁽¹⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽²⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽³⁾ UAAL rate has been adjusted to reflect future service only benefit improvement under 2.7% @ 55.

⁽⁴⁾ Applicable for members hired on or after January 1, 2013.

⁽⁵⁾ There are two active members in Plan U this year instead of one active member last year. The increase in the employer Normal Cost rate from last year to this year is primarily due to change in the average entry age from 32.5 (for 1 member) to 39.4 (for 2 members).

Recommended Employer Contribution Rates (continued)

Safety Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #6 – Plans E and F (3% @ 50 – Probation)				
Normal Cost	23.45%	\$14,246	23.71%	\$14,404
UAAL ⁽³⁾	<u>32.28%</u>	<u>19,611</u>	<u>28.74%</u>	<u>17,460</u>
Total Contributions	55.73%	\$33,857	52.45%	\$31,864
Rate Group #6 – Plan V (2.7% @ 57 PEPRV)⁽⁴⁾				
Normal Cost	16.76%	\$583	16.63%	\$578
UAAL ⁽³⁾	<u>32.28%</u>	<u>1,123</u>	<u>28.74%</u>	<u>1,000</u>
Total Contributions	49.04%	\$1,706	45.37%	\$1,578
Rate Group #6 – Plans E, F and V Combined				
Normal Cost	23.09%	\$14,829	23.33%	\$14,982
UAAL ⁽³⁾	<u>32.28%</u>	<u>20,734</u>	<u>28.74%</u>	<u>18,460</u>
Total Contributions	55.37%	\$35,563	52.07%	\$33,442

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

Safety Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #7 – Plans E and F (3% @ 50 – Law Enforcement)				
Normal Cost	26.64%	\$40,447	26.69%	\$40,523
UAAL ⁽³⁾	<u>40.71%</u>	<u>61,809</u>	<u>37.36%</u>	<u>56,723</u>
Total Contributions	67.35%	\$102,256	64.05%	\$97,246
Rate Group #7 – Plans Q and R (3% @ 55 – Law Enforcement)				
Normal Cost	23.48%	\$10,560	23.69%	\$10,654
UAAL ⁽³⁾	<u>40.71%</u>	<u>18,309</u>	<u>37.36%</u>	<u>16,802</u>
Total Contributions	64.19%	\$28,869	61.05%	\$27,456
Rate Group #7 – Plan V (2.7% @ 57 PEPRA)⁽⁴⁾				
Normal Cost	19.04%	\$9,502	19.29%	\$9,627
UAAL ⁽³⁾	<u>40.71%</u>	<u>20,316</u>	<u>37.36%</u>	<u>18,645</u>
Total Contributions	59.75%	\$29,818	56.65%	\$28,272
Rate Group #7 – Plans E, F, Q, R and V Combined				
Normal Cost	24.53%	\$60,509	24.65%	\$60,804
UAAL ⁽³⁾	<u>40.71%</u>	<u>100,434</u>	<u>37.36%</u>	<u>92,170</u>
Total Contributions	65.24%	\$160,943	62.01%	\$152,974

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

Safety Employers	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Group #8 – Plans E and F (3% @ 50 – OCFA)				
Normal Cost	26.97%	\$27,220	27.24%	\$27,492
UAAL ⁽³⁾	<u>23.84%</u>	<u>24,061</u>	<u>20.80%</u>	<u>20,993</u>
Total Contributions	50.81%	\$51,281	48.04%	\$48,485
Rate Group #8 – Plans Q and R (3% @ 55 – OCFA)				
Normal Cost	21.83%	\$2,523	21.97%	\$2,540
UAAL ⁽³⁾	<u>23.84%</u>	<u>2,756</u>	<u>20.80%</u>	<u>2,404</u>
Total Contributions	45.67%	\$5,279	42.77%	\$4,944
Rate Group #8 – Plan V (2.7% @ 57 PEPRA)⁽⁴⁾				
Normal Cost	15.27%	\$3,040	15.44%	\$3,074
UAAL ⁽³⁾	<u>23.84%</u>	<u>4,746</u>	<u>20.80%</u>	<u>4,141</u>
Total Contributions	39.11%	\$7,786	36.24%	\$7,215
Rate Group #8 – Plans E, F, Q, R and V Combined				
Normal Cost	24.76%	\$32,783	25.01%	\$33,106
UAAL ⁽³⁾	<u>23.84%</u>	<u>31,563</u>	<u>20.80%</u>	<u>27,538</u>
Total Contributions	48.60%	\$64,346	45.81%	\$60,644

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation as shown on the page 43.

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁴⁾ Applicable for members hired on or after January 1, 2013.

Recommended Employer Contribution Rates (continued)

General and Safety Combined	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾ (\$ in '000s)
Rate Groups #1 – #12				
Normal Cost	15.07%	\$282,603	15.13%	\$283,760
UAAL ⁽³⁾	<u>24.95%</u>	<u>467,926</u>	<u>22.53%</u>	<u>422,482</u>
Total Contributions	40.02%	\$750,529	37.66%	\$706,242

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ Amounts are based on December 31, 2018 projected compensation (\$ in '000s):

General Employers		General Employers		Safety Employers	
Rate Group #1 – Plans A and B	\$44,944	Rate Group #3 – Plans G and H	\$45,869	Rate Group #6 – Plans E and F	\$60,752
Rate Group #1 – Plan U	43,232	Rate Group #3 – Plan B	6,310	Rate Group #6 – Plan V	3,478
Rate Group #2 – Plans I and J		Rate Group #3 – Plan U	21,384	Rate Group #7 – Plans E and F	151,828
non-Children and Families Commission	806,444	Rate Group #5 – Plans A and B	89,880	Rate Group #7 – Plans Q and R	44,974
Rate Group #2 – Plans I and J		Rate Group #5 – Plan U	15,447	Rate Group #7 – Plan V	49,905
Children and Families Commission	546	Rate Group #9 – Plans M and N	3,744	Rate Group #8 – Plans E and F	100,926
Rate Group #2 – Plans O and P	15,050	Rate Group #9 – Plan U	3,318	Rate Group #8 – Plans Q and R	11,559
Rate Group #2 – Plan S	2,049	Rate Group #10 – Plans I and J	14,220	Rate Group #8 – Plan V	19,909
Rate Group #2 – Plan T	281,426	Rate Group #10 – Plans M and N	4,134		
Rate Group #2 – Plan U		Rate Group #10 – Plan U	8,868		
non-Children and Families Commission	21,708	Rate Group #11 – Plans M and N	1,286		
Rate Group #2 – Plan U		Rate Group #11 – Plan U	357		
Children and Families Commission	579	Rate Group #12 – Plans G and H	897		
Rate Group #2 – Plan W	149	Rate Group #12 – Plan U	198		
				Total Combined	\$1,875,370

⁽³⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

Recommended Employer Contribution Rates (continued)

General Employers - Orange County Employees Retirement System	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate ^{(1),(2)}	Contribution Rate ^{(1),(3)}	Contribution Rate ^{(1),(2)}	Contribution Rate ^{(1),(3)}
Rate Group #2 – Plans I and J (2.7% @ 55 – non-OCFA)				
Normal Cost	14.36%	14.36%	14.39%	14.39%
UAAL ⁽⁴⁾	<u>23.91%</u>	<u>25.05%</u>	<u>21.06%</u>	<u>22.67%</u>
Total Contributions	38.27%	39.41%	35.45%	37.06%
Rate Group #2 – Plan U (2.5% @ 67 PEPRA)⁽⁵⁾				
Normal Cost	8.78%	8.78%	8.78%	8.78%
UAAL ⁽⁴⁾	<u>23.91%</u>	<u>25.05%</u>	<u>21.06%</u>	<u>22.67%</u>
Total Contributions	32.69%	33.83%	29.84%	31.45%

⁽¹⁾ These rates reflect the 2/3 and 1/3 phase-ins of changes in actuarial assumptions in the December 31, 2018 and December 31, 2017 valuations, respectively.

⁽²⁾ These rates are after reflecting future service only benefit improvements under 2.7% @ 55.

⁽³⁾ These rates are before reflecting future service only benefit improvements under 2.7% @ 55.

⁽⁴⁾ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁽⁵⁾ Applicable for Orange County Employees Retirement System members hired on or after January 1, 2013.

Note: For Local Agency Formation Commission (LAFCO), there is no adjustment in their December 31, 2018 UAAL rate for future service only benefit improvements under 2.7% @ 55. This is as a result of a data correction made by OCERS to reflect that the sole active employee covered under 2.7% @ 55 and assumed in our prior valuations to receive future service only improvement should instead be values as an all service improvement because the member has paid some contributions to upgrade the past service.

“Pick-Up” Discount Percentages for Non-PEPRA Tier Members

For every dollar of member contribution “picked up” by the employer for non-PEPRA tier members and not deposited in the member’s contribution account, the employer can contribute less than a dollar. This is because the “pick-up” amount is not deposited in the member’s contribution account and so is not payable to a member who withdraws his or her contributions following termination of employment, and is not payable as an additional death benefit. The contribution discount percentages are as follows:

	December 31, 2018 Pick-Up Percentage		December 31, 2017 Pick-Up Percentage	
General Members				
Rate Group #1 Plan A/B (non-OCTA, non-OCSD)	Plan A: 100.00%	Plan B: 98.28%	Plan A: 100.00%	Plan B: 98.16%
Rate Group #2 (2.7% @ 55 – non-OCFA)	Plan I: 99.38%	Plan J: 98.45%	Plan I: 99.37%	Plan J: 98.38%
Rate Group #2 (1.62% @ 65)	Plan O: N/A	Plan P: 97.56%	Plan O: N/A	Plan P: 97.33%
Rate Group #2 (2.0% @ 57)		Plan S: 97.92%		Plan S: 97.70%
Rate Group #3 (2.5% @ 55 – OCSD)	Plan G: 100.00%	Plan H: 98.61%	Plan G: 100.00%	Plan H: 98.53%
Rate Group #3 (1.64% @ 57 – OCSD)		Plan B: 97.71%		Plan B: 97.48%
Rate Group #5 Plan A/B (OCTA)	Plan A: 100.00%	Plan B: 97.63%	Plan A: 98.82%	Plan B: 97.46%
Rate Group #9 (2.0% @ 55 – TCA)	Plan M: N/A	Plan N: 98.39%	Plan M: N/A	Plan N: 98.34%
Rate Group #10 (2.7% @ 55 – OCFA)	Plan I: N/A	Plan J: 98.62%	Plan I: N/A	Plan J: 98.53%
Rate Group #10 (2.0% @ 55 – OCFA)	Plan M: N/A	Plan N: 97.50%	Plan M: N/A	Plan N: 97.57%
Rate Group #11 (2.0% @ 55 – Cemetery)	Plan M: N/A	Plan N: 98.61%	Plan M: N/A	Plan N: 98.52%
Rate Group #12 (2.5% @ 55 – Law Library)	Plan G: N/A	Plan H: 98.86%	Plan G: N/A	Plan H: 98.82%
Safety Members				
Rate Group #6 (3.0% @ 50 – Probation)	Plan E: N/A	Plan F: 99.47%	Plan E: N/A	Plan F: 99.43%
Rate Group #7 (3.0% @ 50 – Law Enforcement)	Plan E: N/A	Plan F: 99.71%	Plan E: N/A	Plan F: 99.69%
Rate Group #7 (3.0% @ 55 – Law Enforcement)	Plan Q: N/A	Plan R: 99.42%	Plan Q: N/A	Plan R: 99.37%
Rate Group #8 (3.0% @ 50 – OCFA)	Plan E: N/A	Plan F: 99.64%	Plan E: N/A	Plan F: 99.61%
Rate Group #8 (3.0% @ 55 – OCFA)	Plan Q: N/A	Plan R: 99.43%	Plan Q: N/A	Plan R: 99.38%

“Pick-Up” Average Entry Age

The following table provides the average entry age by employer used in determining the “pick-up” contributions under Section 31581.1.

Employer	Code	Average Entry Age for All non-PEPRA Members
General		
Orange County	101	32
Cemetery District	102	30
Law Library	103	41
Retirement System	105	31
OCFA	106	32
Transportation Corridor Agency	109	38
City of San Juan Capistrano	110	33
Sanitation District	111	33
OCTA	112	35
Children & Families Commission	118	27
Local Agency Formation Commission	119	38
Superior Court	121	32
IHSS Public Authority	122	39
Safety		
Probation	101	27
Law Enforcement	101	27
OCFA	106	29

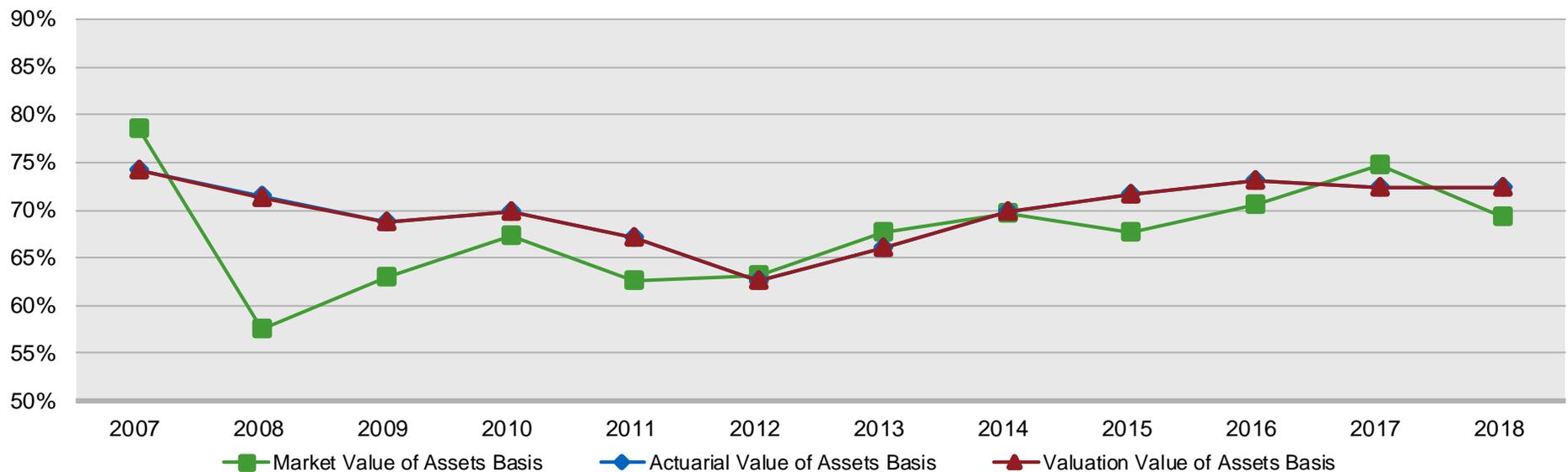
G. Funded Status

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 current Plan assets to cover the estimated cost of settling the accrued 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



**SCHEDULE OF FUNDING PROGRESS
FOR PLAN YEARS ENDING DECEMBER 31, 2009 - 2018**

Actuarial Valuation Date as of December 31	Valuation Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)	Projected Covered Payroll (c)	UAAL as a Percentage of Projected Covered Payroll (%) [(b) - (a)] / (c)
2009	\$8,154,687,000	\$11,858,578,000	\$3,703,891,000	68.77%	\$1,618,491,000	228.85%
2010	8,672,592,000	12,425,873,000	3,753,281,000	69.79%	1,579,239,000	237.66%
2011	9,064,355,000	13,522,978,000	4,458,623,000	67.03%	1,619,474,000	275.31%
2012	9,469,208,000	15,144,888,000	5,675,680,000	62.52%	1,609,600,000	352.55%
2013	10,417,125,000	15,785,042,000	5,367,917,000	65.99%	1,604,496,000	334.55%
2014	11,449,911,000	16,413,124,000	4,963,213,000	69.76%	1,648,160,000	301.14%
2015	12,228,009,000	17,050,357,000	4,822,348,000	71.72%	1,633,112,000	295.29%
2016	13,102,978,000	17,933,461,000	4,830,483,000	73.06%	1,759,831,000	274.49%
2017	14,197,125,000	19,635,427,000	5,438,302,000	72.30%	1,811,877,000	300.15%
2018	14,994,420,000	20,703,349,000	5,708,929,000	72.43%	1,875,370,000	304.42%

For informational purposes only, we have also developed the funded ratio determined using the historical market value of assets after adjustment for amounts in the County Investment Account (funded by pension obligation bond proceeds held by OCERS), prepaid employer contributions, O.C. Sanitation District UAAL Deferred Account (after transfer), unclaimed member reserve and Medicare Medical Insurance Reserve.

Actuarial Valuation Date December 31	Funded Ratio Based on Net Market Value of Assets	Actuarial Valuation Date December 31	Funded Ratio Based on Net Market Value of Assets
2009	62.94%	2014	69.63%
2010	67.25%	2015	67.73%
2011	62.60%	2016	70.58%
2012	63.17%	2017	74.62%
2013	67.65%	2018	69.31%

H. Actuarial Balance Sheet

An overview of the Plan’s funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Plan for current participants is determined. 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

	Year Ended	
	December 31, 2018 (\$ in '000s)	December 31, 2017 (\$ in '000s)
Actuarial Present Value of Future Benefits		
• Present value of benefits for retired members and beneficiaries	\$11,569,064	\$10,633,213
• Present value of benefits for inactive vested members ⁽¹⁾	449,290	488,752
• Present value of benefits for active members	<u>13,159,391</u>	<u>12,923,392</u>
Total Actuarial Present Value of Future Benefits	<u>\$25,177,745</u>	<u>\$24,045,357</u>
Current and future assets		
• Total Valuation Value of Assets	\$14,994,420	\$14,197,125
• Present value of future contributions by members	2,048,080	2,003,365
• Present value of future employer contributions for:		
» Entry age Normal Cost	2,426,316	2,406,565
» Unfunded Actuarial Accrued Liability	<u>5,708,929</u>	<u>5,438,302</u>
Total of current and future assets	<u>\$25,177,745</u>	<u>\$24,045,357</u>

⁽¹⁾ This includes members who chose to leave their contributions on deposit even though they have less than five years of service.

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 7.7. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 7.7% of one year's payroll. Since actuarial gains and losses are amortized over 20 years, there would be a 0.5% 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.

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 total plan LVR is about 11.0, but is 9.8 for General compared to 15.2 for Safety. This means that assumption changes will have a greater impact on employer contribution rates for Safety than for General.

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			Liability Volatility Ratio		
	General	Safety	Total	General	Safety	Total
2009	4.2	6.1	4.6	6.6	10.0	7.3
2010	4.7	7.3	5.3	7.0	10.9	7.9
2011	4.7	7.1	5.2	7.6	10.9	8.4
2012	5.3	8.1	5.9	8.6	12.3	9.4
2013	6.0	8.9	6.7	9.0	12.6	9.8
2014	6.2	9.4	6.9	8.9	13.6	10.0
2015	6.3	9.6	7.1	9.3	14.3	10.4
2016	6.4	9.9	7.2	9.0	14.2	10.2
2017	7.2	11.0	8.1	9.6	14.8	10.8
2018	6.8	10.5	7.7	9.8	15.2	11.0

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE TOTAL PLAN

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	21,929	21,721	1.0%
• Average age	45.1	45.3	-0.2
• Average years of service	12.8	12.9	-0.1
• Total projected compensation	\$1,875,371,661	\$1,811,879,510	3.5%
• Average projected compensation	\$85,520	\$83,416	2.5%
• Account balances	\$2,980,107,630	\$2,815,839,196	5.8%
• Total active vested members	15,903	16,040	-0.9%
Inactive vested members:⁽¹⁾			
• Number	6,026	5,803	3.8%
• Average age	44.9	44.8	0.1
Retired members:			
• Number in pay status	13,827	13,240	4.4%
• Average age	70.0	69.8	0.2
• Average monthly benefit ⁽²⁾	\$4,237	\$4,060	4.4%
Disabled members:			
• Number in pay status	1,482	1,446	2.5%
• Average age	65.5	65.3	0.2
• Average monthly benefit ⁽²⁾	\$3,750	\$3,540	5.9%
Beneficiaries:			
• Number in pay status	2,365	2,261	4.6%
• Average age	72.9	72.8	0.1
• Average monthly benefit ⁽²⁾	\$2,116	\$2,032	4.1%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #1 FOR PLANS A, B AND U (NON-OCTA, NON-OCSD)

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	1,613	1,555	3.7%
• Average age	43.0	43.1	-0.1
• Average years of service	9.7	9.8	-0.1
• Total projected compensation	\$88,176,419	\$83,675,611	5.4%
• Average projected compensation	\$54,666	\$53,811	1.6%
• Account balances	\$60,833,185	\$55,414,963	9.8%
• Total active vested members	911	817	11.5%
Inactive vested members:⁽¹⁾			
• Number	516	496	4.0%
• Average age	41.8	41.6	0.2
Retired members:			
• Number in pay status	636	627	1.4%
• Average age	75.0	74.9	0.1
• Average monthly benefit ⁽²⁾	\$2,709	\$2,645	2.4%
Disabled members:			
• Number in pay status	37	37	0.0%
• Average age	67.2	67.6	-0.4
• Average monthly benefit ⁽²⁾	\$2,408	\$2,337	3.0%
Beneficiaries:			
• Number in pay status	98	96	2.1%
• Average age	76.5	76.7	-0.2
• Average monthly benefit ⁽²⁾	\$1,438	\$1,360	5.7%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #2 FOR PLANS I, J, O, P, S, T, U AND W

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	14,267	14,097	1.2%
• Average age	45.6	45.7	-0.1
• Average years of service	12.8	12.9	-0.1
• Total projected compensation	\$1,127,951,040	\$1,093,044,342	3.2%
• Average projected compensation	\$79,060	\$77,537	2.0%
• Account balances	\$2,035,013,710	\$1,930,686,878	5.4%
• Total active vested members	10,201	10,337	-1.3%
Inactive vested members:⁽¹⁾			
• Number	4,078	3,928	3.8%
• Average age	44.9	44.9	0.0
Retired members:			
• Number in pay status	9,432	9,067	4.0%
• Average age	71.0	70.9	0.1
• Average monthly benefit ⁽²⁾	\$3,787	\$3,628	4.4%
Disabled members:			
• Number in pay status	575	582	-1.2%
• Average age	67.0	66.8	0.2
• Average monthly benefit ⁽²⁾	\$2,558	\$2,477	3.3%
Beneficiaries:			
• Number in pay status	1,489	1,433	3.9%
• Average age	75.0	75.0	0.0
• Average monthly benefit ⁽²⁾	\$1,907	\$1,829	4.3%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #3 FOR PLANS B, G, H AND U (OCSD)**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	616	592	4.1%
• Average age	47.3	48.0	-0.7
• Average years of service	12.3	12.7	-0.4
• Total projected compensation	\$73,563,905	\$69,138,987	6.4%
• Average projected compensation	\$119,422	\$116,789	2.3%
• Account balances	\$93,152,393	\$89,050,369	4.6%
• Total active vested members	433	438	-1.1%
Inactive vested members:⁽¹⁾			
• Number	117	112	4.5%
• Average age	47.3	46.8	0.5
Retired members:			
• Number in pay status	390	372	4.8%
• Average age	68.2	67.8	0.4
• Average monthly benefit ⁽²⁾	\$5,575	\$5,321	4.8%
Disabled members:			
• Number in pay status	17	15	13.3%
• Average age	65.8	66.6	-0.8
• Average monthly benefit ⁽²⁾	\$3,586	\$3,633	-1.3%
Beneficiaries:			
• Number in pay status	79	72	9.7%
• Average age	70.3	69.3	1.0
• Average monthly benefit ⁽²⁾	\$2,406	\$2,282	5.4%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #5 FOR PLANS A, B AND U (OCTA)**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	1,279	1,313	-2.6%
• Average age	50.1	50.4	-0.3
• Average years of service	13.7	13.8	-0.1
• Total projected compensation	\$105,327,147	\$102,731,350	2.5%
• Average projected compensation	\$82,351	\$78,242	5.3%
• Account balances	\$130,715,191	\$128,751,586	1.5%
• Total active vested members	993	1,021	-2.7%
Inactive vested members:⁽¹⁾			
• Number	590	584	1.0%
• Average age	49.6	49.6	0.0
Retired members:			
• Number in pay status	965	903	6.9%
• Average age	70.1	69.8	0.3
• Average monthly benefit ⁽²⁾	\$2,568	\$2,463	4.3%
Disabled members:			
• Number in pay status	261	258	1.2%
• Average age	66.5	65.9	0.6
• Average monthly benefit ⁽²⁾	\$2,373	\$2,304	3.0%
Beneficiaries:			
• Number in pay status	176	167	5.4%
• Average age	71.4	71.2	0.2
• Average monthly benefit ⁽²⁾	\$1,380	\$1,349	2.3%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #9 FOR PLANS M, N AND U (TCA)

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	62	64	-3.1%
• Average age	48.8	49.2	-0.4
• Average years of service	8.3	8.4	-0.1
• Total projected compensation	\$7,061,833	\$7,317,008	-3.5%
• Average projected compensation	\$113,901	\$114,328	-0.4%
• Account balances	\$5,011,037	\$5,438,441	-7.9%
• Total active vested members	31	34	-8.8%
Inactive vested members:⁽¹⁾			
• Number	62	61	1.6%
• Average age	44.9	44.5	0.4
Retired members:			
• Number in pay status	50	44	13.6%
• Average age	68.9	68.6	0.3
• Average monthly benefit ⁽²⁾	\$3,073	\$2,944	4.4%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ⁽²⁾	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	4	4	0.0%
• Average age	71.0	70.0	1.0
• Average monthly benefit ⁽²⁾	\$464	\$451	2.9%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #10 FOR PLANS I, J, M, N AND U (OCFA)**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	274	281	-2.5%
• Average age	45.5	45.5	0.0
• Average years of service ⁽¹⁾	11.2	10.8	0.4
• Total projected compensation	\$27,222,325	\$26,691,539	2.0%
• Average projected compensation	\$99,352	\$94,988	4.6%
• Account balances	\$28,959,317	\$27,364,974	5.8%
• Total active vested members	171	176	-2.8%
Inactive vested members:⁽²⁾			
• Number	178	154	15.6%
• Average age	42.1	41.9	0.2
Retired members:			
• Number in pay status	162	157	3.2%
• Average age	66.0	65.3	0.7
• Average monthly benefit ⁽³⁾	\$4,550	\$4,424	2.8%
Disabled members:			
• Number in pay status	11	10	10.0%
• Average age	61.2	61.4	-0.2
• Average monthly benefit ⁽³⁾	\$2,660	\$2,522	5.5%
Beneficiaries:			
• Number in pay status	12	12	0.0%
• Average age	65.7	64.7	1.0
• Average monthly benefit ⁽³⁾	\$1,311	\$1,273	3.0%

⁽¹⁾ For some former Santa Ana members, service used in calculating the average above is only used for vesting purposes. Benefit service starts to accrue only effective April 2012.

⁽²⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽³⁾ Excludes monthly benefits payable from the STAR COLA.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #11 FOR PLANS M AND N, FUTURE SERVICE, AND U (CEMETERY)

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	25	25	0.0%
• Average age	50.3	49.3	1.0
• Average years of service	16.7	15.7	1.0
• Total projected compensation	\$1,643,501	\$1,637,025	0.4%
• Average projected compensation	\$65,740	\$65,481	0.4%
• Account balances	\$2,483,310	\$2,227,789	11.5%
• Total active vested members	18	18	0.0%
Inactive vested members:⁽¹⁾			
• Number	2	2	0.0%
• Average age	40.1	39.1	1.0
Retired members:			
• Number in pay status	4	5	-20.0%
• Average age	76.2	75.8	0.4
• Average monthly benefit ⁽²⁾	\$2,730	\$2,455	11.2%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ⁽²⁾	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	5	4	25.0%
• Average age	80.2	79.0	1.2
• Average monthly benefit ⁽²⁾	\$1,523	\$1,598	-4.7%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #12 FOR PLANS G, H, FUTURE SERVICE, AND U (LAW LIBRARY)

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	14	14	0.0%
• Average age	57.2	57.5	-0.3
• Average years of service	16.4	17.5	-1.1
• Total projected compensation	\$1,095,420	\$1,119,773	-2.2%
• Average projected compensation	\$78,244	\$79,984	-2.2%
• Account balances	\$2,390,529	\$2,634,092	-9.2%
• Total active vested members	12	13	-7.7%
Inactive vested members:⁽¹⁾			
• Number	4	4	0.0%
• Average age	49.6	48.6	1.0
Retired members:			
• Number in pay status	12	11	9.1%
• Average age	72.2	71.8	0.4
• Average monthly benefit ^{(2),(3)}	\$3,058	\$2,200	39.0%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ⁽²⁾	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ⁽²⁾	N/A	N/A	N/A

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

⁽³⁾ The increase in average monthly benefit is due to the retirement of one member with a substantial amount of benefit based on the member's age and service at OCERS.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #6 FOR PLANS E, F AND V (PROBATION)**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	764	763	0.1%
• Average age	44.6	44.6	0.0
• Average years of service	17.1	17.1	0.0
• Total projected compensation	\$64,229,791	\$64,062,602	0.3%
• Average projected compensation	\$84,070	\$83,961	0.1%
• Account balances	\$145,104,870	\$137,781,996	5.3%
• Total active vested members	713	743	-4.0%
Inactive vested members:⁽¹⁾			
• Number	222	220	0.9%
• Average age	41.9	41.1	0.8
Retired members:			
• Number in pay status	332	306	8.5%
• Average age	66.0	65.9	0.1
• Average monthly benefit ⁽²⁾	\$5,632	\$5,444	3.5%
Disabled members:			
• Number in pay status	31	29	6.9%
• Average age	55.9	54.8	1.1
• Average monthly benefit ⁽²⁾	\$2,973	\$2,872	3.5%
Beneficiaries:			
• Number in pay status	27	25	8.0%
• Average age	64.9	64.6	0.3
• Average monthly benefit ⁽²⁾	\$2,444	\$2,473	-1.2%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #7 FOR PLANS E, F, Q, R AND V (LAW ENFORCEMENT)

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	2,027	2,010	0.8%
• Average age	40.9	41.0	-0.1
• Average years of service	13.1	13.4	-0.3
• Total projected compensation	\$246,706,193	\$236,373,080	4.4%
• Average projected compensation	\$121,710	\$117,599	3.5%
• Account balances	\$324,646,722	\$298,704,270	8.7%
• Total active vested members	1,608	1,607	0.1%
Inactive vested members:⁽¹⁾			
• Number	179	175	2.3%
• Average age	43.3	43.4	-0.1
Retired members:			
• Number in pay status	1,402	1,333	5.2%
• Average age	64.0	63.9	0.1
• Average monthly benefit ⁽²⁾	\$7,128	\$6,876	3.7%
Disabled members:			
• Number in pay status	368	351	4.8%
• Average age	63.4	63.2	0.2
• Average monthly benefit ⁽²⁾	\$5,266	\$4,977	5.8%
Beneficiaries:			
• Number in pay status	370	351	5.4%
• Average age	68.1	67.3	0.8
• Average monthly benefit ⁽²⁾	\$3,114	\$3,011	3.4%

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽²⁾ Excludes monthly benefits payable from the STAR COLA.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
RATE GROUP #8 FOR PLANS E, F, Q, R AND V (OCFA)**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	988	1,007	-1.9%
• Average age	43.2	43.3	-0.1
• Average years of service ⁽¹⁾	13.9	13.9	0.0
• Total projected compensation	\$132,394,088	\$126,088,193	5.0%
• Average projected compensation	\$134,002	\$125,212	7.0%
• Account balances	\$151,797,366	\$137,783,839	10.2%
• Total active vested members	812	836	-2.9%
Inactive vested members:⁽²⁾			
• Number	78	67	16.4%
• Average age	43.5	43.1	0.4
Retired members:			
• Number in pay status	441	414	6.5%
• Average age	64.9	64.5	0.4
• Average monthly benefit ⁽³⁾	\$8,376	\$7,976	5.0%
Disabled members:			
• Number in pay status	182	164	11.0%
• Average age	65.0	65.2	-0.2
• Average monthly benefit ⁽³⁾	\$6,912	\$6,628	4.3%
Beneficiaries:			
• Number in pay status	105	97	8.2%
• Average age	62.8	62.8	0.0
• Average monthly benefit ⁽³⁾	\$3,305	\$3,206	3.1%

⁽¹⁾ For some former Santa Ana members, service used in calculating the average above is only used for vesting purposes. Benefit service starts to accrue only effective April 2012.

⁽²⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

⁽³⁾ Excludes monthly benefits payable from the STAR COLA.

**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	385	382	3	--	--	--	--	--	--	--
	\$58,458	\$58,279	\$81,206	--	--	--	--	--	--	--
25 - 29	1,776	1,578	197	1	--	--	--	--	--	--
	64,903	62,325	85,650	\$46,204	--	--	--	--	--	--
30 - 34	2,562	1,532	638	390	2	--	--	--	--	--
	75,776	69,230	88,732	80,361	\$63,093	--	--	--	--	--
35 - 39	2,978	940	581	1,200	255	2	--	--	--	--
	84,273	75,911	91,049	88,265	81,121	\$53,218	--	--	--	--
40 - 44	3,179	603	346	1,050	939	238	3	--	--	--
	88,390	75,989	95,129	91,136	88,611	96,979	\$92,075	--	--	--
45 - 49	3,410	439	291	718	949	711	298	4	--	--
	93,874	79,734	94,676	90,945	94,126	103,434	97,548	\$80,424	--	--
50 - 54	3,092	389	231	519	623	523	662	143	2	--
	94,815	88,812	95,467	87,369	90,720	103,067	100,377	99,298	\$75,954	--
55 - 59	2,319	260	202	393	488	327	410	198	41	--
	91,884	86,617	104,823	87,401	85,235	97,240	96,094	94,508	86,166	--
60 - 64	1,458	155	118	243	290	236	241	129	39	7
	84,842	83,960	97,057	81,539	81,071	85,413	84,342	87,614	89,749	\$88,950
65 - 69	550	52	46	87	132	89	81	43	15	5
	82,144	92,981	85,583	83,046	80,846	81,169	76,083	83,429	76,307	78,426
70 & over	220	10	14	41	68	34	29	16	4	4
	73,922	52,857	90,442	71,570	77,381	72,112	64,989	84,647	58,878	86,355
Total	21,929	6,340	2,667	4,642	3,746	2,160	1,724	533	101	16
	\$85,520	\$71,656	\$92,604	\$87,885	\$88,334	\$98,270	\$94,877	\$92,829	\$84,803	\$85,012

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #1 FOR PLANS A, B AND U (NON-OCTA, NON-OCSD)**

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	57	57	--	--	--	--	--	--	--	--
	\$61,248	\$61,248	--	--	--	--	--	--	--	--
25 - 29	219	203	16	--	--	--	--	--	--	--
	51,374	51,113	\$54,680	--	--	--	--	--	--	--
30 - 34	241	173	47	21	--	--	--	--	--	--
	52,171	50,446	56,499	\$56,697	--	--	--	--	--	--
35 - 39	226	96	59	51	19	1	--	--	--	--
	54,189	49,571	56,437	58,765	\$58,210	\$55,134	--	--	--	--
40 - 44	190	53	22	53	49	13	--	--	--	--
	55,196	48,224	57,265	58,338	57,775	57,581	--	--	--	--
45 - 49	220	43	32	60	43	24	18	--	--	--
	56,262	48,813	56,418	58,702	57,588	59,119	\$58,667	--	--	--
50 - 54	143	32	21	28	23	10	27	2	--	--
	55,722	47,875	55,751	57,261	58,034	60,052	59,700	\$57,510	--	--
55 - 59	127	28	24	20	18	8	23	5	1	--
	55,469	50,255	54,833	57,218	56,853	56,886	58,858	57,564	\$57,107	--
60 - 64	118	18	14	15	16	9	35	8	2	1
	56,471	50,181	55,121	58,807	56,720	56,944	57,952	60,352	60,406	\$54,613
65 - 69	50	5	6	9	4	5	17	4	--	--
	56,862	49,338	56,951	56,856	56,483	58,103	59,007	55,862	--	--
70 & over	22	1	3	3	3	3	8	1	--	--
	55,915	33,081	53,582	57,668	54,710	56,276	59,465	54,613	--	--
Total	1,613	709	244	260	175	73	128	20	3	1
	\$54,666	\$50,959	\$56,091	\$58,139	\$57,537	\$58,219	\$58,819	\$58,186	\$59,306	\$54,613

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #2 FOR PLANS I, J, O, P, S, T, U AND W**

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	224	223	1	--	--	--	--	--	--	--
	\$50,118	\$50,029	\$69,952	--	--	--	--	--	--	--
25 - 29	1,088	1,008	79	1	--	--	--	--	--	--
	57,653	57,176	63,886	\$46,204	--	--	--	--	--	--
30 - 34	1,638	1,064	321	251	2	--	--	--	--	--
	68,446	66,748	75,983	66,046	\$63,093	--	--	--	--	--
35 - 39	1,906	630	322	785	168	1	--	--	--	--
	77,559	73,274	83,397	80,011	71,132	\$51,302	--	--	--	--
40 - 44	2,026	450	194	685	563	131	3	--	--	--
	80,906	74,203	85,326	83,869	80,833	81,951	\$92,075	--	--	--
45 - 49	2,194	306	161	492	642	405	184	4	--	--
	86,505	78,528	86,139	86,247	89,918	89,050	83,401	\$80,424	--	--
50 - 54	2,057	240	139	367	425	345	435	104	2	--
	86,870	85,049	85,573	82,965	85,233	94,177	87,605	86,165	\$75,954	--
55 - 59	1,564	166	80	296	337	242	274	139	30	--
	86,622	86,842	91,218	86,430	83,711	91,307	86,922	84,150	78,670	--
60 - 64	990	106	55	178	202	182	147	95	20	5
	80,922	84,959	85,113	77,884	77,960	80,028	83,068	84,014	82,752	\$80,531
65 - 69	409	37	29	64	109	73	52	31	10	4
	81,713	94,334	83,505	81,699	80,507	83,545	74,339	83,345	64,591	77,611
70 & over	171	7	7	34	58	30	16	12	4	3
	73,974	51,979	92,258	74,030	77,623	71,498	58,909	86,160	58,878	87,926
Total	14,267	4,237	1,388	3,153	2,506	1,409	1,111	385	66	12
	\$79,060	\$68,700	\$81,933	\$81,496	\$83,309	\$88,182	\$85,118	\$84,620	\$76,492	\$81,406

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #3 FOR PLANS B, G, H AND U (OCSD)**

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	1	1	--	--	--	--	--	--	--	--
	\$82,293	\$82,293	--	--	--	--	--	--	--	--
25 - 29	32	29	3	--	--	--	--	--	--	--
	89,437	89,020	\$93,473	--	--	--	--	--	--	--
30 - 34	57	42	11	4	--	--	--	--	--	--
	100,257	94,804	113,227	\$121,848	--	--	--	--	--	--
35 - 39	97	48	22	22	5	--	--	--	--	--
	109,621	103,485	110,808	121,774	\$109,830	--	--	--	--	--
40 - 44	73	23	17	22	11	--	--	--	--	--
	113,867	108,461	115,928	117,370	114,978	--	--	--	--	--
45 - 49	84	22	17	17	13	5	10	--	--	--
	124,050	116,346	126,188	119,877	132,111	\$144,623	\$123,692	--	--	--
50 - 54	108	14	8	21	17	13	34	1	--	--
	133,498	105,064	132,137	135,199	133,003	149,536	137,647	\$165,617	--	--
55 - 59	90	12	16	18	11	9	18	6	--	--
	129,739	105,061	116,090	112,941	130,622	143,344	164,488	139,615	--	--
60 - 64	51	6	7	7	12	11	7	1	--	--
	132,041	111,982	124,799	131,290	133,953	141,374	128,604	206,803	--	--
65 - 69	14	5	--	2	2	1	3	--	1	--
	126,186	122,776	--	105,425	141,205	96,928	148,557	--	\$116,863	--
70 & over	9	--	1	1	1	1	3	2	--	--
	104,918	--	117,498	82,187	95,421	138,033	109,323	91,577	--	--
Total	616	202	102	114	72	40	75	10	1	--
	\$119,422	\$102,399	\$117,503	\$121,672	\$127,979	\$143,681	\$140,687	\$139,327	\$116,863	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #5 FOR PLANS A, B AND U (OCTA)**

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	22	22	--	--	--	--	--	--	--	--
	\$58,094	\$58,094	--	--	--	--	--	--	--	--
25 - 29	53	49	4	--	--	--	--	--	--	--
	57,923	56,948	\$69,865	--	--	--	--	--	--	--
30 - 34	66	39	22	5	--	--	--	--	--	--
	72,662	66,084	82,954	\$78,685	--	--	--	--	--	--
35 - 39	108	46	13	42	7	--	--	--	--	--
	82,258	75,785	89,066	86,670	\$85,673	--	--	--	--	--
40 - 44	141	30	24	45	37	5	--	--	--	--
	84,218	76,974	89,474	82,358	90,609	\$71,889	--	--	--	--
45 - 49	173	33	29	43	49	12	7	--	--	--
	82,841	71,471	86,161	84,399	83,527	95,214	\$87,107	--	--	--
50 - 54	218	38	26	58	51	22	21	2	--	--
	83,997	76,238	99,877	84,690	77,838	85,333	90,462	\$79,370	--	--
55 - 59	249	24	21	43	76	21	39	19	6	--
	85,152	64,776	107,217	83,078	77,361	94,084	99,479	83,156	\$84,926	--
60 - 64	189	15	18	33	40	20	33	18	11	1
	88,051	76,177	94,848	81,552	81,678	104,439	90,064	96,919	78,407	\$165,381
65 - 69	47	2	4	8	12	7	5	5	3	1
	82,115	106,529	74,423	95,970	81,399	67,980	89,921	72,235	78,596	81,686
70 & over	13	2	2	1	5	--	2	--	--	1
	82,928	65,815	107,284	69,219	88,514	--	69,220	--	--	81,644
Total	1,279	300	163	278	277	87	107	44	20	3
	\$82,351	\$69,129	\$91,879	\$84,106	\$81,519	\$91,031	\$92,984	\$87,373	\$80,391	\$109,571

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #9 FOR PLANS M, N AND U (TCA)**

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	1	1	--	--	--	--	--	--	--	--
	\$64,117	\$64,117	--	--	--	--	--	--	--	--
25 - 29	1	1	--	--	--	--	--	--	--	--
	66,557	66,557	--	--	--	--	--	--	--	--
30 - 34	2	1	--	1	--	--	--	--	--	--
	100,080	82,653	--	\$117,506	--	--	--	--	--	--
35 - 39	10	9	--	1	--	--	--	--	--	--
	91,579	96,025	--	51,562	--	--	--	--	--	--
40 - 44	6	2	--	3	1	--	--	--	--	--
	100,694	114,887	--	102,304	\$67,479	--	--	--	--	--
45 - 49	11	8	2	--	1	--	--	--	--	--
	120,691	118,834	\$134,819	--	107,297	--	--	--	--	--
50 - 54	14	6	1	4	2	1	--	--	--	--
	125,421	137,255	141,930	127,644	90,487	\$98,894	--	--	--	--
55 - 59	10	2	1	4	3	--	--	--	--	--
	117,605	98,503	128,012	115,631	129,503	--	--	--	--	--
60 - 64	6	2	1	--	2	1	--	--	--	--
	151,381	149,016	292,211	--	90,239	137,566	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	1	--	--	1	--	--	--	--	--	--
	43,204	--	--	43,204	--	--	--	--	--	--
Total	62	32	5	14	9	2	--	--	--	--
	\$113,901	\$111,767	\$166,358	\$106,592	\$102,749	\$118,230	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #10 FOR PLANS I, J, M, N AND U (OCFA)**

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	4	4	--	--	--	--	--	--	--	--
	\$69,430	\$69,430	--	--	--	--	--	--	--	--
25 - 29	23	23	--	--	--	--	--	--	--	--
	67,949	67,949	--	--	--	--	--	--	--	--
30 - 34	28	26	2	--	--	--	--	--	--	--
	85,920	85,493	\$91,481	--	--	--	--	--	--	--
35 - 39	36	20	5	9	2	--	--	--	--	--
	92,389	90,035	101,719	\$93,806	\$86,227	--	--	--	--	--
40 - 44	37	11	7	14	5	--	--	--	--	--
	97,262	94,203	76,337	110,167	97,154	--	--	--	--	--
45 - 49	35	15	4	3	10	2	1	--	--	--
	116,753	117,428	131,068	117,084	112,874	\$116,535	\$87,623	--	--	--
50 - 54	53	10	7	4	13	9	7	3	--	--
	106,007	111,480	115,271	100,692	94,252	117,255	100,982	\$102,158	--	--
55 - 59	36	5	6	4	11	6	4	--	--	--
	111,912	98,443	136,431	122,453	95,071	133,577	95,244	--	--	--
60 - 64	17	3	1	1	11	1	--	--	--	--
	114,614	113,008	263,875	79,055	101,322	151,941	--	--	--	--
65 - 69	4	1	1	--	1	1	--	--	--	--
	77,914	70,647	73,597	--	75,110	92,302	--	--	--	--
70 & over	1	--	--	--	1	--	--	--	--	--
	57,638	--	--	--	57,638	--	--	--	--	--
Total	274	118	33	35	54	19	12	3	--	--
	\$99,352	\$90,495	\$112,520	\$105,985	\$98,246	\$122,846	\$97,956	\$102,158	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #11 FOR PLANS M AND N, FUTURE SERVICE, AND U (CEMETERY)**

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	--	--	--	--	--	--	--	--
	\$46,531	\$46,531	--	--	--	--	--	--	--	--
30 - 34	2	2	--	--	--	--	--	--	--	--
	45,679	45,679	--	--	--	--	--	--	--	--
35 - 39	2	--	1	--	1	--	--	--	--	--
	57,728	--	\$51,885	--	\$63,572	--	--	--	--	--
40 - 44	4	--	--	2	1	1	--	--	--	--
	70,631	--	--	\$56,875	71,968	\$96,806	--	--	--	--
45 - 49	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
50 - 54	8	2	--	1	1	2	1	1	--	--
	69,156	56,005	--	154,940	72,313	53,497	\$53,497	\$53,497	--	--
55 - 59	2	1	--	--	--	1	--	--	--	--
	76,213	55,620	--	--	--	96,806	--	--	--	--
60 - 64	3	--	--	--	--	2	1	--	--	--
	67,014	--	--	--	--	73,773	53,497	--	--	--
65 - 69	3	1	--	--	--	--	1	1	--	--
	66,971	51,859	--	--	--	--	53,497	95,557	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	25	7	1	3	3	6	3	2	--	--
	\$65,740	\$51,054	\$51,885	\$89,563	\$69,284	\$74,692	\$53,497	\$74,527	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #12 FOR PLANS G, H, FUTURE SERVICE, AND U (LAW LIBRARY)**

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	1	1	--	--	--	--	--	--	--	--
40 - 44	2	--	--	1	1	--	--	--	--	--
45 - 49	2	1	--	--	1	--	--	--	--	--
50 - 54	--	--	--	--	--	--	--	--	--	--
55 - 59	3	--	--	--	2	--	1	--	--	--
60 - 64	2	--	1	--	--	1	--	--	--	--
65 - 69	2	--	--	--	1	1	--	--	--	--
70 & over	2	--	--	1	--	--	--	1	--	--
Total	14	2	1	2	5	2	1	1	--	--
	\$78,244	\$99,025	\$53,680	\$77,187	\$76,777	\$73,807	\$75,164	\$82,658	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #6 FOR PLANS E, F AND V (PROBATION)**

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	9	9	--	--	--	--	--	--	--	--
	\$55,636	\$55,636	--	--	--	--	--	--	--	--
25 - 29	20	19	1	--	--	--	--	--	--	--
	62,475	61,593	\$79,234	--	--	--	--	--	--	--
30 - 34	40	12	14	14	--	--	--	--	--	--
	71,066	67,721	69,911	\$75,088	--	--	--	--	--	--
35 - 39	112	7	7	80	18	--	--	--	--	--
	76,730	64,819	65,579	76,840	\$85,212	--	--	--	--	--
40 - 44	219	1	4	54	134	26	--	--	--	--
	83,281	54,658	63,694	79,462	84,364	\$89,745	--	--	--	--
45 - 49	193	3	--	14	72	89	15	--	--	--
	87,841	59,609	--	71,154	79,807	97,072	\$92,846	--	--	--
50 - 54	101	2	--	7	25	31	29	7	--	--
	91,135	70,969	--	75,691	82,504	92,028	101,580	\$95,933	--	--
55 - 59	44	--	2	--	9	12	12	8	1	--
	101,077	--	84,618	--	80,016	98,806	97,868	129,993	\$157,984	--
60 - 64	21	--	1	1	5	4	9	1	--	--
	84,361	--	78,837	74,205	83,786	73,092	90,880	89,322	--	--
65 - 69	5	--	--	1	2	1	1	--	--	--
	85,560	--	--	72,493	77,407	104,844	95,651	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	764	53	29	171	265	163	66	16	1	--
	\$84,070	\$62,506	\$69,652	\$76,971	\$82,797	\$94,531	\$97,371	\$112,550	\$157,984	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #7 FOR PLANS E, F, Q, R AND V (LAW ENFORCEMENT)**

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	53	51	2	--	--	--	--	--	--	--
	\$81,860	\$81,665	\$86,833	--	--	--	--	--	--	--
25 - 29	263	175	88	--	--	--	--	--	--	--
	93,325	85,219	109,446	--	--	--	--	--	--	--
30 - 34	354	93	185	76	--	--	--	--	--	--
	107,314	85,907	112,649	\$120,523	--	--	--	--	--	--
35 - 39	303	28	99	147	29	--	--	--	--	--
	118,781	98,372	114,520	122,849	\$132,406	--	--	--	--	--
40 - 44	297	12	30	96	103	56	--	--	--	--
	127,801	112,679	117,707	122,471	129,857	\$141,804	--	--	--	--
45 - 49	357	5	15	53	81	152	51	--	--	--
	138,717	107,484	126,790	134,520	134,354	143,194	\$143,238	--	--	--
50 - 54	261	45	3	21	35	67	78	12	--	--
	139,996	134,308	137,699	136,971	128,565	138,043	147,551	\$162,329	--	--
55 - 59	104	21	17	6	10	12	24	13	1	--
	142,341	142,297	144,638	131,618	121,157	134,618	149,002	157,088	\$121,486	--
60 - 64	30	3	8	8	--	3	3	4	1	--
	143,938	139,260	149,596	163,129	--	125,331	121,864	133,806	121,766	--
65 - 69	5	1	--	2	1	--	--	1	--	--
	140,763	148,536	--	143,342	116,591	--	--	152,003	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	2,027	434	447	409	259	290	156	30	2	--
	\$121,710	\$95,184	\$115,177	\$125,582	\$130,987	\$141,196	\$145,870	\$155,910	\$121,626	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
RATE GROUP #8 FOR PLANS E, F, Q, R AND V (OCFA)**

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	14	14	--	--	--	--	--	--	--	--
	\$89,079	\$89,079	--	--	--	--	--	--	--	--
25 - 29	76	70	6	--	--	--	--	--	--	--
	103,807	102,979	\$113,460	--	--	--	--	--	--	--
30 - 34	134	80	36	18	--	--	--	--	--	--
	115,015	106,945	124,806	\$131,303	--	--	--	--	--	--
35 - 39	177	55	53	63	6	--	--	--	--	--
	126,456	110,122	127,601	137,966	\$145,212	--	--	--	--	--
40 - 44	184	21	48	75	34	6	--	--	--	--
	138,811	114,178	138,813	143,283	143,176	\$144,378	--	--	--	--
45 - 49	141	3	31	36	37	22	12	--	--	--
	149,565	127,119	146,369	144,404	145,455	161,550	\$169,616	--	--	--
50 - 54	129	--	26	8	31	23	30	11	--	--
	155,892	--	152,753	133,452	151,233	157,745	164,496	\$165,425	--	--
55 - 59	90	1	35	2	11	16	15	8	2	--
	142,399	149,016	139,349	136,839	136,315	142,558	145,396	153,517	\$163,287	--
60 - 64	31	2	12	--	2	2	6	2	5	--
	137,528	117,728	127,800	--	133,252	123,885	162,952	131,095	148,025	--
65 - 69	11	--	6	1	--	--	2	1	1	--
	137,821	--	133,691	146,760	--	--	124,757	171,575	146,038	--
70 & over	1	--	1	--	--	--	--	--	--	--
	127,575	--	127,575	--	--	--	--	--	--	--
Total	988	246	254	203	121	69	65	22	8	--
	\$134,002	\$106,632	\$135,627	\$140,336	\$145,250	\$153,293	\$159,668	\$158,253	\$151,592	--

EXHIBIT C – RECONCILIATION OF MEMBER DATA

	Active Members	Inactive Vested Members ⁽¹⁾	Retired Members	Disableds	Beneficiaries	Total
Number as of December 31, 2017	21,721	5,803	13,240	1,446	2,261	44,471
• New members	1,577	118	N/A	N/A	195	1,890
• Terminations – with vested rights	(481)	481	N/A	N/A	N/A	0
• Contribution refunds	(144)	(135)	N/A	N/A	N/A	(279)
• Retirements	(727)	(182)	909	N/A	N/A	0
• New disabilities	(41)	(6)	(31)	78	N/A	0
• Return to work	42	(42)	0	0	N/A	0
• Died with or without beneficiary	(16)	(8)	(288)	(41)	(82)	(435)
• Data adjustments	(2)	(3)	(3)	(1)	(9)	(18)
Number as of December 31, 2018	21,929	6,026	13,827	1,482	2,365	45,629

⁽¹⁾ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

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 ⁽¹⁾	\$14,652,607,000	\$12,657,418,000
Contribution income:		
• Employer contributions ⁽²⁾	\$595,494,000	\$596,146,000
• Member contributions	270,070,000	262,294,000
• Discount for prepaid contributions	21,218,000	22,921,000
• Transfer from County Investment Account ⁽³⁾	<u>0</u>	<u>0</u>
Net contribution income	\$886,782,000	\$881,361,000
Investment income:		
• Interest, dividends, asset appreciation and other income	\$(241,629,000)	\$1,974,550,000
• Less investment and administrative fees	<u>(119,692,000)</u>	<u>(96,378,000)</u>
Net investment income	<u>(\$361,321,000)</u>	<u>\$1,878,172,000</u>
Total income available for benefits	\$525,461,000	\$2,759,533,000
Less benefit payments:		
• Benefits paid	\$(814,345,000)	\$(750,478,000)
• Withdrawal of contributions	<u>(13,933,000)</u>	<u>(13,866,000)</u>
Net benefit payments	<u>\$(828,278,000)</u>	<u>\$(764,344,000)</u>
Change in net assets at market value	\$(302,817,000)	\$1,995,189,000
Net assets at market value at the end of the year⁽¹⁾	\$14,349,790,000	\$14,652,607,000

Note: Results may be slightly off due to rounding.

⁽¹⁾ See footnote 1 on next page for further detail.

⁽²⁾ Includes asset transfers of \$14,589,000 and \$24,042,000 as of December 31, 2018 and December 31, 2017, respectively, from O.C. Sanitation District UAAL Deferred Account to valuation assets.

⁽³⁾ Funded by pension obligation bond proceeds held by OCERS.

EXHIBIT E – SUMMARY STATEMENT OF PLAN ASSETS

	Year Ended December 31, 2018	Year Ended December 31, 2017
Cash equivalents	\$463,805,000	\$486,846,000
Accounts receivable:		
• Contributions	\$20,834,000	\$21,361,000
• Investment income	19,170,000	13,727,000
• Securities settlements	115,567,000	150,619,000
• All other	<u>3,223,000</u>	<u>199,651,000</u>
Total accounts receivable	\$158,794,000	\$385,358,000
Investments:		
• Equities	\$6,773,591,000	\$7,305,333,000
• Fixed income investments	2,578,702,000	2,011,101,000
• Alternative investments and diversified credit	5,062,529,000	5,115,269,000
• Security lending collateral	314,333,000	189,948,000
• Fixed assets net of accumulated depreciation	<u>18,542,000</u>	<u>20,670,000</u>
Total investments at market value	\$14,747,697,000	\$14,642,321,000
Total assets	\$15,370,296,000	\$15,514,525,000
Accounts payable:		
• Securities settlements	\$(228,647,000)	\$(194,266,000)
• Securities lending liability	(314,333,000)	(189,948,000)
• All other	<u>(99,503,000)</u>	<u>(83,864,000)</u>
Total accounts payable	\$(642,483,000)	\$(468,078,000)
Net assets at market value⁽¹⁾	\$14,349,790,000	\$14,652,607,000
Net assets at actuarial value	\$14,994,505,000	\$14,197,211,000
Net assets at valuation value	\$14,994,420,000	\$14,197,125,000

Note: Results may be slightly off due to rounding.

⁽¹⁾ The market value excludes \$131,890,000 and \$134,417,000 as of December 31, 2018 and December 31, 2017, respectively, in the County Investment Account (funded by pension obligation bond proceeds held by OCERS), \$246,133,000 and \$244,552,000 as of December 31, 2018 and December 31, 2017, respectively, in the prepaid employer contributions account, \$0 and \$14,871,000 as of December 31, 2018 and December 31, 2017, respectively in the O.C. Sanitation District UAAL Deferred Account (after transfer).

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

	Reserves
Used in Development of Valuation Value of Assets:	
• Active Members Reserve (Book Value)	\$3,261,626,000
• Retired Members Reserve (Book Value)	10,763,840,000
• Employer Advanced Reserve (Book Value)	2,640,782,000
• O.C. Sanitation District UAAL Deferred Account Transfer	14,589,000
• ERI Contribution Reserve	11,447,000
• STAR COLA Contribution Reserve	0
• Unrealized Appreciation/(Depreciation) Included in Valuation Value of Assets	<u>(1,697,864,000)</u>
Subtotal: Valuation Value of Assets	\$14,994,420,000
Not Used in Development of Valuation Value of Assets:	
• RMBR	\$0
• Unclaimed Member Deposit	0
• Medicare Medical Insurance Reserve	<u>85,000</u>
Subtotal	\$85,000
Subtotal: Actuarial Value of Assets	\$14,994,505,000
• Unrecognized Investment Income	<u>(644,715,000)</u>
Subtotal: Market Value of Assets (Net of County Investment Account ⁽¹⁾ and Prepaid Employer Contributions)	\$14,349,790,000
• County Investment Account ⁽¹⁾	131,890,000
• Prepaid Employer Contributions	246,133,000
• O.C. Sanitation District UAAL Deferred Account ⁽²⁾	<u>0</u>
Total: Gross Market Value of Assets	\$14,727,813,000

Note: Results may be slightly off due to rounding.

⁽¹⁾ Funded by pension obligation bond proceeds held by OCERS.

⁽²⁾ After asset transfer of \$14,589,000 from O.C. Sanitation District UAAL Deferred Account to valuation assets.

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

Year Ended December 31	Employer Contributions ⁽¹⁾	Member Contributions	Net Investment Return ^{(2),(3)}	Benefit Payments	Market Value of Assets at Year-End	Valuation Value of Assets at Year-End	Valuation Value as a Percent of Market Value
2009	\$376,614,000	\$171,928,000	\$1,092,660,000	\$421,672,000	\$7,464,761,000	\$8,154,687,000	109.24%
2010	387,313,000	177,929,000	787,215,000	459,383,000	8,357,835,000	8,672,592,000	103.77%
2011	414,451,000	183,820,000	3,236,000	493,749,000	8,465,593,000	9,064,355,000	107.07%
2012	436,895,000	191,069,000	1,014,471,000	541,154,000	9,566,874,000	9,469,208,000	98.98%
2013	458,487,000	209,301,000	1,031,118,000	586,273,000	10,679,507,000	10,417,125,000	97.54%
2014	659,634,000	232,656,000	487,104,000	630,678,000	11,428,223,000	11,449,911,000	100.19%
2015	598,599,000	249,271,000	(51,601,000)	675,963,000	11,548,529,000	12,228,009,000	105.88%
2016	558,020,000	258,297,000	1,010,548,000	717,976,000	12,657,418,000	13,102,978,000	103.52%
2017	619,067,000	262,294,000	1,878,172,000	764,344,000	14,652,607,000	14,197,125,000	96.89%
2018	616,712,000	270,070,000	(361,321,000)	828,278,000	14,349,790,000	14,994,420,000	104.49%

⁽¹⁾ Includes discount for prepaid contributions, asset transfers from County Investment Account and asset transfer from O.C. Sanitation District UAAL Deferred Account, if any.

⁽²⁾ On a market basis, net of investment fees and administrative expenses.

⁽³⁾ Actual investment loss on net pension plan assets includes both the administrative expenses and discount for prepaid contributions while excluding the investment gains or losses credited to County Investment Account and O.C. Sanitation District UAAL Deferred Account, if any.

EXHIBIT H – TABLE OF AMORTIZATION BASES

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Orange County and IHSS						
	December 31, 2012	Restart amortization	\$70,164	15	\$67,575	\$5,928
	December 31, 2013	Actuarial (gain) or loss	(5,744)	15	(5,532)	(485)
	December 31, 2014	Actuarial (gain) or loss	(2,744)	16	(2,676)	(224)
	December 31, 2014	Assumption changes	(6,545)	16	(6,382)	(533)
	December 31, 2015	Actuarial (gain) or loss	(1,650)	17	(1,626)	(130)
	December 31, 2016	Actuarial (gain) or loss	(9,719)	18	(9,640)	(740)
	December 31, 2017	Actuarial (gain) or loss	(5,386)	19	(5,368)	(396)
	December 31, 2017	Assumption changes	21,899	19	21,823	1,612
	December 31, 2018	Actuarial (gain) or loss	44	20	<u>44</u>	<u>3</u>
Subtotal					\$58,218	\$5,035
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for O.C. Vector Control ⁽¹⁾					\$1,748	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Department of Education ⁽¹⁾					\$3,376	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for U.C.I. ⁽¹⁾					\$32,770	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Cypress Recreation and Parks ⁽¹⁾					\$344	
Rate Group #1 Subtotal					\$96,456	

⁽¹⁾ In determining the UAALs for the O.C. Vector Control District, Department of Education, U.C.I and Cypress Recreation and Parks, we first start by rolling forward the VVAs of these employers as of December 31, 2017 to December 31, 2018 to reflect the actual contributions, benefit payments and return on their VVAs during 2018. The AALs for these employers are obtained from internal valuation results.

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #2 – Plans I, J, O, P, S, T, U and W						
	December 31, 2012	Restart amortization	\$3,438,555	15	\$3,311,648	\$290,506
	December 31, 2013	Actuarial (gain) or loss	(173,790)	15	(167,376)	(14,683)
	December 31, 2014	Actuarial (gain) or loss	(78,001)	16	(76,067)	(6,358)
	December 31, 2014	Assumption changes	(246,714)	16	(240,596)	(20,110)
	December 31, 2015	Actuarial (gain) or loss	(65,063)	17	(64,098)	(5,124)
	December 31, 2016	Actuarial (gain) or loss	39,445	18	<u>39,125</u>	<u>3,002</u>
Subtotal ⁽¹⁾					\$2,802,636	\$247,233
	December 31, 2017	Actuarial (gain) or loss	\$(59,911)	19	\$(59,700)	\$(4,409)
	December 31, 2017	Assumption changes	481,098	19	479,406	35,402
	December 31, 2018	Actuarial (gain) or loss	207,573	20	<u>207,573</u>	<u>14,794</u>
Subtotal ⁽²⁾					\$627,279	\$45,787
Rate Group #2 Subtotal					\$3,429,915	\$293,020

Note:

We have made an adjustment to the amortization bases to reflect the \$1.7 million additional contributions made by Children and Families Commission to pay off their UAAL as of December 31, 2016. With that adjustment, we have reduced the amortization layers established on or before December 31, 2016 for Rate Group #2 by that amount on a pro-rata basis. The UAAL contribution rate for Children and Families Commission is determined based on the amortization layers established on or after December 31, 2017.

⁽¹⁾ This amount is spread over the payroll for all employers in Rate Group #2 excluding the payroll for Children and Families Commission.

⁽²⁾ This amount is spread over the payroll for all employers in Rate Group #2 including the payroll for Children and Families Commission.

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #3 – Plans B, G, H and U (OCSD)						
	December 31, 2018	Restart amortization ⁽¹⁾	7,753	20	<u>\$7,753</u>	<u>\$553</u>
Rate Group #3 Subtotal					\$7,753	\$553

⁽¹⁾ After transfer of the remaining balance of \$14.6 million from O.C. Sanitation District UAAL Deferred Account.

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #5 – Plans A, B and U (OCTA)						
	December 31, 2012	Restart amortization	\$232,513	15	\$224,116	\$19,660
	December 31, 2013	Actuarial (gain) or loss	(13,471)	15	(12,984)	(1,139)
	December 31, 2014	Actuarial (gain) or loss	4,522	16	4,414	369
	December 31, 2014	Assumption changes	(19,944)	16	(19,466)	(1,627)
	December 31, 2015	Actuarial (gain) or loss	(933)	17	(920)	(74)
	December 31, 2016	Actuarial (gain) or loss	(9,743)	18	(9,672)	(742)
	December 31, 2017	Actuarial (gain) or loss	(9,948)	19	(9,913)	(732)
	December 31, 2017	Assumption changes	43,481	19	43,328	3,200
	December 31, 2018	Actuarial (gain) or loss	22,318	20	<u>22,318</u>	<u>1,591</u>
Rate Group #5 Subtotal					\$241,221	\$20,506

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #9 – Plans M, N and U (TCA)						
	December 31, 2012	Restart amortization	\$11,906	15	\$11,476	\$1,007
	December 31, 2013	Actuarial (gain) or loss	(684)	15	(659)	(58)
	December 31, 2014	Actuarial (gain) or loss	496	16	485	41
	December 31, 2014	Assumption changes	(1,032)	16	(1,007)	(84)
	December 31, 2015	Actuarial (gain) or loss	778	17	767	61
	December 31, 2016	Actuarial (gain) or loss	(1,535)	18	(1,524)	(117)
	December 31, 2017	Actuarial (gain) or loss	(257)	19	(256)	(19)
	December 31, 2017	Assumption changes	1,665	19	1,659	123
	December 31, 2018	Actuarial (gain) or loss	1,449	20	<u>1,449</u>	<u>103</u>
Rate Group #9 Subtotal					\$12,390	\$1,057

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #10 – Plans I, J, M, N and U (OCFA)						
	December 31, 2012	Restart amortization	\$72,750	15	\$70,122	\$6,151
	December 31, 2013	Actuarial (gain) or loss	(2,659)	15	(2,563)	(225)
	December 31, 2014	Actuarial (gain) or loss	(3,755)	16	(3,665)	(306)
	December 31, 2014	Assumption changes	(4,489)	16	(4,382)	(366)
	December 31, 2015	Actuarial (gain) or loss	626	17	617	49
	December 31, 2016	Actuarial (gain) or loss	134	18	133	10
	December 31, 2017	Actuarial (gain) or loss	(15,281)	19	(15,227)	(1,124)
	December 31, 2017	Assumption changes	9,159	19	9,127	674
	December 31, 2018	Actuarial (gain) or loss	(6,934)	20	<u>(6,934)</u>	<u>(494)</u>
Rate Group #10 Subtotal					\$47,228	\$4,369

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #11 – Plans M and N, future service, and U (Cemetery)						
	December 31, 2017	Restart amortization & Assumption changes	\$281	19	\$280	\$21
	December 31, 2018	Actuarial (gain) or loss	(244)	20	<u>(244)</u>	<u>(17)</u>
Rate Group #11 Subtotal					\$36	\$4

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #12 – Plans G, H, future service, and U (Law Library)						
	December 31, 2017	Restart amortization & Assumption changes	\$13	19	\$12	\$1
	December 31, 2018	Actuarial (gain) or loss	221	20	<u>221</u>	<u>16</u>
Rate Group #12 Subtotal					\$233	\$17

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #6 – Plans E, F and V (Probation)						
	December 31, 2012	Restart amortization	\$192,912	15	\$185,944	\$16,311
	December 31, 2013	Actuarial (gain) or loss	(14,039)	15	(13,533)	(1,187)
	December 31, 2014	Actuarial (gain) or loss	(2,596)	16	(2,534)	(212)
	December 31, 2014	Assumption changes	36,260	16	35,390	2,958
	December 31, 2015	Actuarial (gain) or loss	(10,703)	17	(10,553)	(844)
	December 31, 2016	Actuarial (gain) or loss	13,799	18	13,698	1,051
	December 31, 2017	Actuarial (gain) or loss	(6,566)	19	(6,543)	(483)
	December 31, 2017	Assumption changes	50,030	19	49,854	3,681
	December 31, 2018	Actuarial (gain) or loss	8,046	20	<u>8,046</u>	<u>573</u>
Rate Group #6 Subtotal					\$259,769	\$21,848

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)						
	December 31, 2012	Restart amortization	\$988,833	15	\$953,119	\$83,610
	December 31, 2013	Actuarial (gain) or loss	(51,652)	15	(49,786)	(4,367)
	December 31, 2014	Actuarial (gain) or loss	(34,729)	16	(33,896)	(2,833)
	December 31, 2014	Assumption changes	102,262	16	99,808	8,342
	December 31, 2015	Actuarial (gain) or loss	23,666	17	23,334	1,865
	December 31, 2016	Actuarial (gain) or loss	39,724	18	39,434	3,025
	December 31, 2017	Actuarial (gain) or loss	(27,922)	19	(27,824)	(2,055)
	December 31, 2017	Assumption changes	161,417	19	160,849	11,878
	December 31, 2018	Actuarial (gain) or loss	69,329	20	<u>69,329</u>	<u>4,941</u>
Rate Group #7 Subtotal					\$1,234,367	\$104,406

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
Rate Group #8 – Plans E, F, Q, R and V (OCFA)						
	December 31, 2012	Restart amortization	\$399,947	15	\$385,502	\$33,817
	December 31, 2013	Actuarial (gain) or loss	(20,177)	15	(19,448)	(1,706)
	December 31, 2014	Actuarial (gain) or loss	(35,400)	16	(34,550)	(2,888)
	December 31, 2014	Assumption changes	35,957	16	35,095	2,933
	December 31, 2015	Actuarial (gain) or loss	(22,228)	17	(21,917)	(1,752)
	December 31, 2016	Actuarial (gain) or loss	(15,736)	18	(15,621)	(1,198)
	December 31, 2017	Actuarial (gain) or loss	(43,031)	19	(42,880)	(3,166)
	December 31, 2017	Assumption changes	53,637	19	53,448	3,947
	December 31, 2018	Actuarial (gain) or loss	39,932	20	<u>39,932</u>	<u>2,846</u>
Rate Group #8 Subtotal					\$379,561	\$32,833

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Rate Groups	Date Established	Source	Initial Base (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Amortization Amount (\$ in '000s)
All Rate Groups Combined Excluding O.C. Vector Control, Department of Education, U.C.I. and Cypress Recreation and Parks						
	December 31, 2012	Restart amortization	\$5,407,593	15	\$5,209,515	\$456,990
	December 31, 2013	Actuarial (gain) or loss	(282,229)	15	(271,894)	(23,850)
	December 31, 2014	Actuarial (gain) or loss	(152,205)	16	(148,487)	(12,411)
	December 31, 2014	Assumption changes	(104,247)	16	(101,542)	(8,487)
	December 31, 2015	Actuarial (gain) or loss	(75,507)	17	(74,396)	(5,949)
	December 31, 2016	Actuarial (gain) or loss	56,369	18	55,933	4,291
	December 31, 2017	Actuarial (gain) or loss	(168,305)	19	(167,713)	(12,384)
	December 31, 2017	Assumption changes	822,683	19	819,788	60,539
	December 31, 2018	Actuarial (gain) or loss	349,487	20	<u>349,487</u>	<u>24,909</u>
Subtotal					\$5,670,691	\$483,648
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for O.C. Vector Control					\$1,748	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Department of Education					\$3,376	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for U.C.I.					\$32,770	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Cypress Recreation and Parks					\$344	
Total					\$5,708,929	

EXHIBIT I – PROJECTION OF UAAL BALANCES AND PAYMENTS

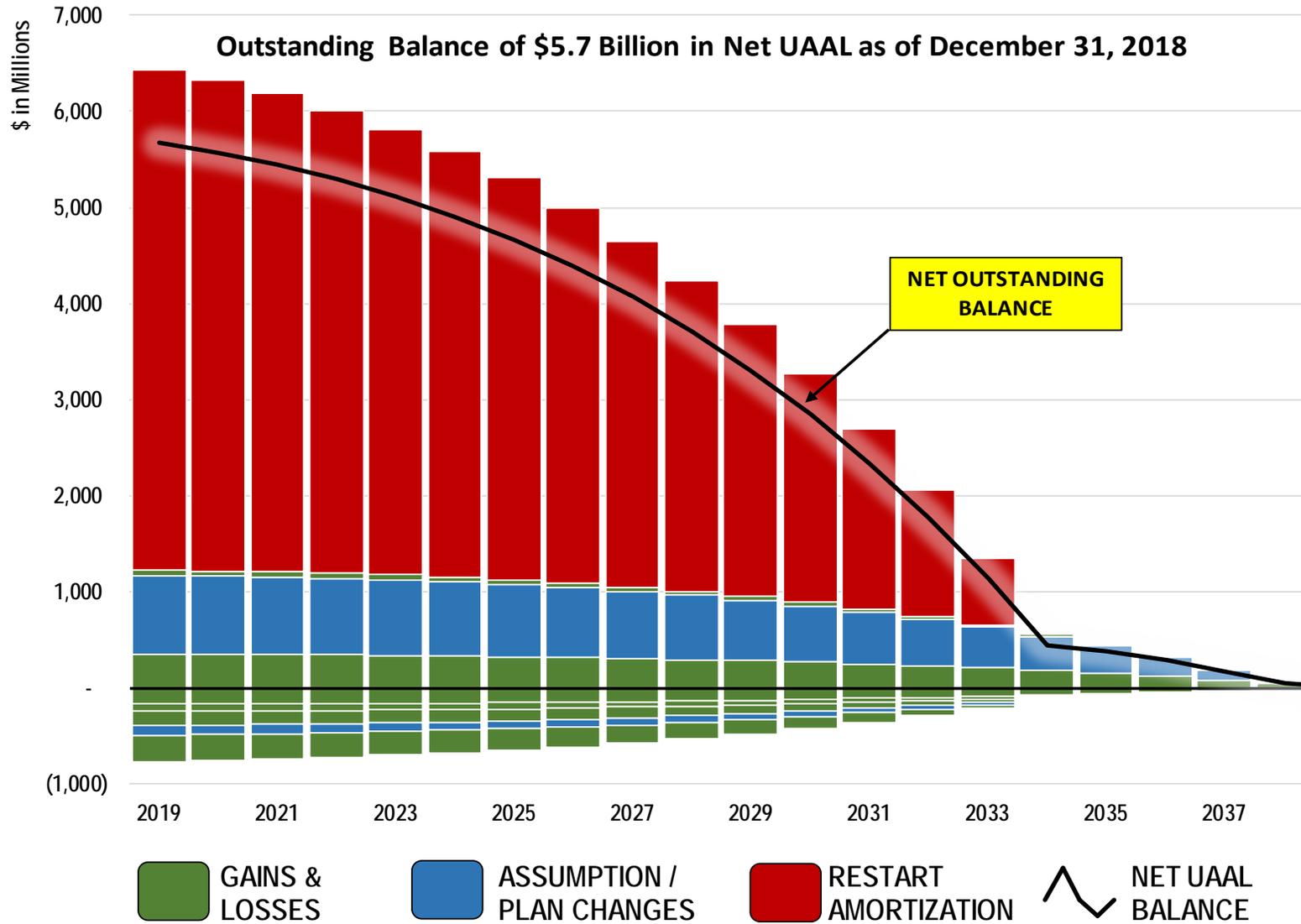


EXHIBIT I – PROJECTION OF UAAL BALANCES AND PAYMENTS (CONTINUED)

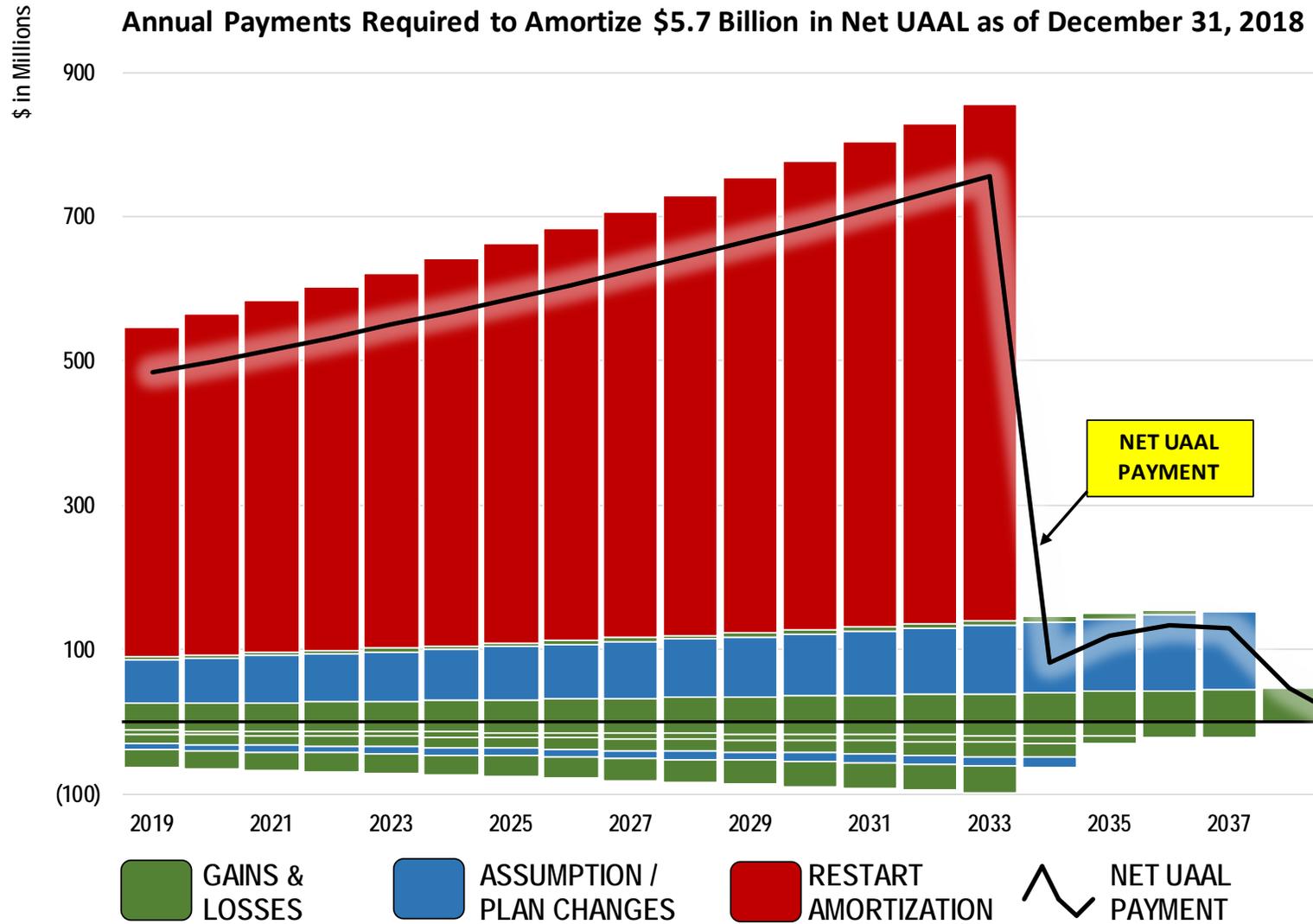


EXHIBIT J – DEFINITION OF PENSION TERMS

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

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated Normal Costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	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.
Actuarial Cost Method:	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.
Actuarial Gain or Loss:	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.
Actuarially Equivalent:	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	<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"> Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Benefits:	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.
Actuarial Valuation:	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.
Actuarial Value of Assets (AVA):	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.
Actuarially Determined:	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.
Actuarially Determined Contribution (ADC):	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.
Amortization Method:	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.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is intended to payoff the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions:	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.
Closed Amortization Period:	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.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula based on the member's compensation, age and/or years of service.
Defined Contribution Plan:	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.
Experience Study:	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.
Funded Ratio:	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.
Investment Return:	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.
Normal Cost:	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.

Open Amortization Period:	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.
Unfunded Actuarial Accrued Liability:	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.
Valuation Date or Actuarial Valuation Date:	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.
Valuation Value of Assets:	The Actuarial Value of Assets reduced by the value of non-valuation reserves.

Section 4: Actuarial Valuation Basis

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND METHODS

Rationale for Assumptions	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the January 1, 2014 through December 31, 2016 Actuarial Experience Study dated August 14, 2017 and PowerPoint presentation dated October 16, 2017. Unless otherwise noted, all actuarial assumptions and methods shown below apply to members for all tiers. These assumptions were adopted by the Board.
<u>Economic Assumptions</u>	
Net Investment Return:	7.00%; net of administrative and investment expenses. Based on the Actuarial Experience Study reference above, expected administrative and investment expenses represent about 0.80% of the Actuarial Value of Assets.
Member Contribution Crediting Rate:	5.00%, compounded semi-annually.
Consumer Price Index:	Increase of 2.75% per year, retiree COLA increases due to CPI subject to a 3.0% maximum change per year.
Payroll Growth:	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.75% per year from the valuation date.

Salary Increases:

The annual rate of compensation increase includes: inflation at 2.75%, 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	9.00	14.00
1-2	7.25	10.00
2-3	6.00	7.75
3-4	5.00	6.00
4-5	4.00	5.50
5-6	3.50	4.50
6-7	2.50	3.75
7-8	2.25	3.25
8-9	1.75	2.50
9-10	1.50	2.25
10-11	1.50	1.75
11-12	1.50	1.75
12-13	1.50	1.75
13-14	1.50	1.75
14-15	1.50	1.75
15-16	1.50	1.75
16-17	1.00	1.50
17-18	1.00	1.50
18-19	1.00	1.50
19-20	1.00	1.50
20 & Over	1.00	1.50

In addition to the individual salary increase assumptions, we have applied an average of two hours of additional salary annually for leap-year salary adjustment.

Demographic Assumptions

Post-Retirement Mortality Rates:

Healthy

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

Disabled

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

The RP-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 ⁽¹⁾		Safety ⁽¹⁾	
	Male	Female	Male	Female
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 General pre-retirement deaths are assumed to be non-service connected. For Safety, 90% of pre-retirement deaths are assumed to be non-service connected. The other 10% are assumed to be service connected.

⁽¹⁾ 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, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 40% male and 60% female.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, setback four years for males and females, weighted 80% male and 20% female.

Mortality Rates for Optional Form of Benefits:

- **General Service Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 40% male and 60% female.
- **Safety Service Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, setback four years for males and females, weighted 80% male and 20% female.
- **General Disabled Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, set forward five years for males and females, weighted 40% male and 60% female.
- **Safety Disabled Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 80% male and 20% female.
- **General Service Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 60% male and 40% female.
- **Safety Service Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 20% male and 80% female.

Disability Incidence:

Disability Incidence				
Rate (%)				
Age	General All Other	General OCTA	Safety Law & Fire	Safety Probation
20	0.00	0.00	0.00	0.00
25	0.00	0.00	0.01	0.03
30	0.01	0.03	0.04	0.08
35	0.03	0.20	0.14	0.10
40	0.08	0.36	0.23	0.13
45	0.13	0.43	0.40	0.21
50	0.18	0.48	1.10	0.28
55	0.23	0.65	2.40	0.42
60	0.31	1.26	4.80	0.20

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

65% of General OCTA disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected.

100% of Safety Law Enforcement and Fire disabilities are assumed to be service connected disabilities.

75% of Safety Probation disabilities are assumed to be service connected disabilities. The other 25% are assumed to be non-service connected.

Termination:

Termination				
Rate (%)				
Years of Service	General All Other	General OCTA	Safety Law & Fire	Safety Probation
0-1	11.00	17.50	4.50	14.00
1-2	7.50	11.00	2.50	13.00
2-3	6.50	9.00	2.00	10.00
3-4	5.00	8.50	1.50	5.00
4-5	4.50	7.50	1.25	4.00
5-6	4.25	7.00	1.00	3.50
6-7	3.75	4.50	0.95	2.75
7-8	3.25	4.00	0.90	2.00
8-9	3.00	3.50	0.85	2.00
9-10	2.75	3.00	0.80	1.75
10-11	2.50	3.00	0.75	1.75
11-12	2.00	3.00	0.65	1.50
12-13	2.00	3.00	0.60	1.25
13-14	1.75	2.50	0.55	1.00
14-15	1.50	2.50	0.50	0.75
15-16	1.40	2.50	0.45	0.75
16-17	1.30	2.00	0.40	0.75
17-18	1.20	1.80	0.35	0.25
18-19	1.10	1.60	0.30	0.25
19-20	1.00	1.40	0.25	0.25
20 & Over	0.90	1.20	0.20	0.25

Termination				
Election for Withdrawal of Contributions (%)				
Years of Service	General All Other	General OCTA	Safety Law & Fire	Safety Probation
0-4	35.00	40.00	20.00	25.00
5-9	30.00	35.00	20.00	25.00
10-14	25.00	30.00	20.00	25.00
15 & Over	20.00	20.00	20.00	25.00

Retirement Rates:

Age	Retirement Rates ⁽¹⁾ (%)			
	General Enhanced	General Non-Enhanced ⁽²⁾	General SJC (31676.12)	Safety Law (31664.1) ⁽³⁾
48	0.00	0.00	0.00	0.00
49	30.00	25.00	0.00	12.00
50	2.50	2.00	3.00	18.00
51	2.00	2.00	3.00	18.00
52	2.50	2.00	3.00	17.00
53	2.50	2.75	3.00	17.00
54	5.50	2.75	3.00	22.00
55	15.00	3.25	4.00	22.00
56	10.00	3.50	5.00	20.00
57	10.00	5.50	6.00	20.00
58	11.00	5.50	7.00	20.00
59	11.00	6.50	9.00	26.00
60	12.00	9.25	11.00	35.00
61	12.00	12.00	13.00	35.00
62	14.00	16.00	15.00	40.00
63	16.00	16.00	15.00	40.00
64	16.00	18.00	20.00	40.00
65	22.00	22.00	20.00	100.00
66	22.00	28.00	24.00	100.00
67	23.00	24.00	24.00	100.00
68	23.00	24.00	24.00	100.00
69	23.00	20.00	24.00	100.00
70	25.00	20.00	50.00	100.00
71	25.00	25.00	50.00	100.00
72	25.00	25.00	50.00	100.00
73	25.00	25.00	50.00	100.00
74	25.00	25.00	50.00	100.00
75	100.00	100.00	100.00	100.00

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

⁽²⁾ These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (Plan T and Plan W).

⁽³⁾ Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Retirement Rates (continued):

Age	Retirement Rates ⁽¹⁾ (%)			
	Safety Law (31664.2) ⁽²⁾	Safety Fire (31664.1)	Safety Fire (31664.2)	Safety Probation ⁽²⁾
48	0.00	0.00	0.00	0.00
49	0.00	2.00	0.00	0.00
50	11.50	5.00	8.00	3.25
51	12.00	7.00	10.00	3.25
52	12.70	9.50	11.00	4.25
53	17.90	10.50	12.00	4.25
54	18.80	15.00	14.00	7.00
55	30.70	18.00	24.00	12.00
56	20.00	20.00	23.00	12.00
57	20.00	21.00	27.00	18.00
58	25.00	28.00	27.00	18.00
59	30.00	28.00	36.00	18.00
60	40.00	30.00	40.00	20.00
61	40.00	30.00	40.00	20.00
62	40.00	35.00	40.00	25.00
63	40.00	35.00	40.00	40.00
64	40.00	35.00	40.00	40.00
65	100.00	100.00	100.00	100.00
66	100.00	100.00	100.00	100.00
67	100.00	100.00	100.00	100.00
68	100.00	100.00	100.00	100.00
69	100.00	100.00	100.00	100.00
70	100.00	100.00	100.00	100.00
71	100.00	100.00	100.00	100.00
72	100.00	100.00	100.00	100.00
73	100.00	100.00	100.00	100.00
74	100.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00

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

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

Retirement Rates (continued):

Age	Retirement Rates ⁽¹⁾ (%)			
	CalPEPRA 2.5% @ 67 General Formula	CalPEPRA 2.7% @ 57 Safety Formula Probation ⁽²⁾	CalPEPRA 2.7% @ 57 Safety Formula Law ⁽²⁾	CalPEPRA 2.7% @ 57 Safety Formula Fire
50	0.00	2.50	11.00	6.00
51	0.00	2.50	11.50	7.00
52	4.00	3.00	12.00	9.00
53	1.50	3.00	16.00	10.00
54	1.50	5.50	17.00	11.50
55	2.50	10.00	28.00	21.00
56	3.50	10.00	18.00	20.00
57	5.50	15.00	17.50	22.00
58	7.50	20.00	22.00	25.00
59	7.50	20.00	26.00	30.00
60	7.50	40.00	40.00	40.00
61	7.50	40.00	40.00	40.00
62	14.00	40.00	40.00	40.00
63	14.00	40.00	40.00	40.00
64	14.00	40.00	40.00	40.00
65	18.00	100.00	100.00	100.00
66	22.00	100.00	100.00	100.00
67	23.00	100.00	100.00	100.00
68	23.00	100.00	100.00	100.00
69	23.00	100.00	100.00	100.00
70	25.00	100.00	100.00	100.00
71	25.00	100.00	100.00	100.00
72	25.00	100.00	100.00	100.00
73	25.00	100.00	100.00	100.00
74	25.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00

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

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

Retirement Age and Benefit for Deferred Vested Members:	<p>General Retirement Age: 59 Safety Retirement Age: 53</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. 15% of future General and 25% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 4.25% and 4.75% compensation increases are assumed per annum for General and Safety, respectively.</p>
Liability Calculation for Current Deferred Vested Members:	<p>Liability for a current deferred vested member is calculated based on salary (adjusted with the additional cashout assumptions for non-CalPEPRA members), service, and eligibility for reciprocal benefit as provided by the Retirement System. For those members without salary information that have 3 or more years of service, we used an average salary. For those members without salary information that have less than 3 years of service or for those members without service information, we assumed a refund of account balance.</p>
Future Benefit Accruals:	<p>1.0 year of service per year of employment. There is no assumption to anticipate conversion of unused sick leave at retirement.</p>
Unknown Data for Members:	<p>Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.</p>
Form of Payment:	<p>All active and inactive members are assumed to elect the unmodified option at retirement.</p>
Percent Married:	<p>For all active and inactive members, 75% of male members and 55% of female members are assumed to be married at pre-retirement death or retirement.</p>
Age and Gender of Spouse:	<p>For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 3 years older than the member.</p>

Terminal Pay Assumptions:

Additional compensation amounts are expected to be received during a member's final average earnings period. The percentages used in this valuation are:

	Final One Year Salary	Final Three Year Salary
General Non-CalPEPRA	3.00%	2.80%
Safety Probation Non-CalPEPRA	3.80%	3.40%
Safety Law Non-CalPEPRA	5.20%	4.60%
Safety Fire Non-CalPEPRA	2.00%	1.70%
General CalPEPRA	N/A	N/A
Safety Probation CalPEPRA	N/A	N/A
Safety Law CalPEPRA	N/A	N/A
Safety Fire CalPEPRA	N/A	N/A

The additional cashout assumptions are the same for service and disability retirements.

Actuarial Funding Policy**Actuarial Cost Method:**

Entry Age Actuarial Cost Method. Entry Age is the age on the valuation date minus Vesting Credit. 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 (i.e., "replacement life within a plan").

For Probation members who have prior benefit service in another OCERS plan, the normal cost rate for the current plan is calculated assuming their Entry Age is the date they entered service with their current plan.

Actuarial Value of Assets:

Market value of assets (MVA) less unrecognized returns in each of the last five annual accounting periods. Unrecognized returns are equal to the difference between the actual market return and the expected return on the market value, and are recognized annually over a five-year period.

Valuation Value of Assets:

The Actuarial Value of Assets reduced by the value of the non-valuation reserves.

Amortization Policy:

Effective December 31, 2013, the outstanding balance of the UAAL from the December 31, 2012 valuation was combined and re-amortized over a declining 20-year period (15 years remaining as of December 31, 2018).

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.

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 determined 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 System) 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 payroll growth rate assumption

The amortization policy is described on the previous page.

The recommended employer contributions are provided in *Section 2, Subsection F*.

Member Contributions:

Non-CalPEPRA 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 General members 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:

- 1/200 of Final Average Salary for General Plan A;
- 1/120 of Final Average Salary for General Plan B;
- 1/100 of Final Average Salary for General Plans G, H, I, J, and S;
- 1/120 of Final Average Salary for General Plans M, N, O, and P;
- 1/200 of Final Average Salary for Safety Plans E and Q, and;
- 1/100 of Final Average Salary for Safety Plans F and R.

The annuity age is 60 for General Plans A, B, M, N, O, P and S, 55 for Plans G, H, I, and J, and 50 for Safety Plans E, F, Q, and R. It is assumed that contributions are made annually at the same rate, starting at entry age.

In addition to the basic contributions, members also pay one-half of the total normal cost necessary to fund cost-of-living benefits which is calculated separately for each rate group, with the exception of Rate Groups #9 and #11, which are developed on a combined or pooled basis as described in our Cost Sharing Structure letter dated July 30, 2010. Within each rate group, the COLA normal cost is either pooled for Tiers 1 and 2 because the same 3% COLA is provided for both Tiers, or it differs by a set formula based on past practice we carried over from the OCERS' prior actuary. Accumulation includes crediting of interest at the assumed investment earnings rate.

Effective with the December 31, 2014 valuation, for determining the cost of the total benefit (i.e., basic and COLA components), the effect of the assumed additional cashouts are recognized in the valuation as an employer and member cost.

CalPEPRA Members

Pursuant to Section 7522.30(a) of the Government Code, members in Plans T, U, V and W are required to contribute at least 50% of the Normal Cost rate. We have assumed that exactly 50% of the Normal Cost would be paid by the new members. Also of note is that based on our recommendation, OCERS decided to use the discretion made available by AB1380 to not round the member's contribution rate to the nearest ¼% as previously required by CalPEPRA.

For members in Plan T and Plan W, their basic rates have been calculated using a methodology similar to that used for Plan P. For members in Plan U or Plan V, their basic rates have been calculated using a methodology outlined in our letter dated December 4, 2012 that was previously approved by the Board.

The member contribution rates for all members are provided in *Section 4, Exhibit III*.

Internal Revenue Code Section 415:

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.

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.

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 \$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.

Non-CalPEPRA benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.

Non-CalPEPRA contribution rates determined in this valuation have not been reduced for the Section 415 limitations. Actual limitations will result in gains as they occur.

Justification for Change in Actuarial Assumptions:

There have been no changes in actuarial assumptions since the last valuation.

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.

Plan Year:	January 1 through December 31
Membership Eligibility:	Membership with OCERS begins with the day of employment in an eligible position by the County or a participating employer.
Non-CalPEPRA General Plans	<u>2.5% @ 55 Plans (Orange County Sanitation District⁽¹⁾ and Law Library⁽²⁾)</u>
Plan G	General members hired before September 21, 1979.
Plan H	General members hired on or after September 21, 1979.
	<u>2.7% @ 55 Plans (City of San Juan Capistrano, Orange County Members except bargaining unit AFSCME members, Orange County Superior Court, Local Agency Formation Commission⁽²⁾, Orange County Employees Retirement System⁽³⁾, Children and Families Commission⁽⁴⁾ and Orange County OCFA)</u>
Plan I	General members hired before September 21, 1979.
Plan J	General members hired on or after September 21, 1979.
	<u>2.0% @ 55 Plans (Transportation Corridor Agency, Cemetery District⁽⁵⁾ and General OCFA)</u>
Plan M	General members hired before September 21, 1979 and General OCFA members hired on or after July 1, 2011.
Plan N	General members hired on or after September 21, 1979.
	<u>1.62% @ 65 Plans (Orange County Members, Orange County Superior Court, Local Agency Formation Commission and County Managers unit)</u>
Plan O	County OCEA members and Superior Court members rehired on or after May 7, 2010, LAFCO members rehired on or after July 1, 2010 and County Managers unit members rehired on or after August 17, 2010 and not electing to rejoin Plan I.
Plan P	County OCEA members and Superior Court members hired on or after May 7, 2010, LAFCO members hired on or after July 1, 2010 and County Managers unit members hired on or after August 17, 2010 and not electing Plan J.
	(1) Sanitation District members within Supervisors and Professional unit hired on or after October 1, 2010 are in Plan B.
	(2) Improvement is prospective only for service after June 23, 2005.
	(3) Improvement for management members is prospective only for service after June 30, 2005.
	(4) Improvement is prospective only for service after December 22, 2005.
	(5) Improvement is prospective only for service after December 7, 2007.

<i>Plan S</i>	<u>2.0% @ 57 Plan (City of San Juan Capistrano)</u> General members hired on or after July 1, 2012.
	<u>All Other General Employers</u>
<i>Plan A</i>	General members hired before September 21, 1979.
<i>Plan B</i>	General members hired on or after September 21, 1979 and Sanitation District members within Supervisors and Professional unit hired on or after October 1, 2010.
Non-CalPEPRA Safety Plans	<u>3.0% @ 50 Plans (Law Enforcement, OCFA and Probation Members)</u>
<i>Plan E</i>	Safety members hired before September 21, 1979.
<i>Plan F</i>	Safety members hired on or after September 21, 1979 and before April 9, 2010 for Law Enforcement, before July 1, 2011 for Safety members of OCFA Executive Management, and before July 1, 2012 for other OCFA Safety members.
	<u>3% @ 55 Plans (Law Enforcement, OCFA)</u>
<i>Plan Q</i>	Safety Law Enforcement members rehired on or after April 9, 2010, Safety members of OCFA Executive Management rehired on or after July 1, 2011, and other OCFA Safety members rehired on or after July 1, 2012 and previously in Plan E.
<i>Plan R</i>	Safety Law Enforcement members hired on or after April 9, 2010, Safety members of OCFA Executive Management hired on or after July 1, 2011, and other OCFA Safety members hired on or after July 1, 2012.
CalPEPRA General Plans	<u>1.62% @ 65 Plan (Orange County Members except County Attorneys, Orange County Employees Retirement System except Management Members, Local Agency Formation Commission, and Orange County Superior Court)</u>
<i>Plan T</i>	General members with membership dates on or after January 1, 2013.
	<u>2.5% @ 67 Plan (All Other General Employers, Orange County Attorneys, Orange County Employees Retirement System Management Members)</u>
<i>Plan U</i>	General Non-Orange County Transportation Authority members with membership dates on or after January 1, 2013 and Orange County Transportation Authority members with membership dates on or after January 1, 2015.
	<u>1.62% @ 65 Plan (City of San Juan Capistrano)</u>
<i>Plan W</i>	General members with membership dates on or after January 1, 2016 and not electing Plan U.
CalPEPRA Safety Plans	<u>2.7% @ 57 Plan (Law Enforcement, OCFA and Probation Members)</u>
<i>Plan V</i>	Safety members with membership dates on or after January 1, 2013.

Final Compensation for Benefit Determination:		
<i>Plans A, E, G, I, M, O and Q</i>	Highest consecutive 12 months of compensation earnable (§31462.1) (FAS1).	
<i>Plans B, F, H, J, N, P, R and S</i>	Highest consecutive 36 months of compensation earnable (§31462) (FAS3).	
<i>Plans T</i>	Highest consecutive 36 months of pensionable compensation (§7522.32 and §7522.34) (FAS3).	
<i>Plans U, V and W</i>	Highest consecutive 36 months of pensionable compensation (§7522.10(c), §7522.32 and §7522.34) (FAS3).	
Service:		
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.		
Service Retirement Eligibility:		
<i>General</i>		
<i>Plans A, B, G, H, I, J, M, N, O, P, S, T and W</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years regardless of age (§31672). All part time members over age 55 with 10 years of employment may retire with 5 years of service.	
<i>Plan U</i>	Age 52 with 5 years of service (§7522.20(a)) or age 70 regardless of service (§31672.3).	
<i>Safety</i>		
<i>Plans E, F, Q and R</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 20 years regardless of age (§31663.25). All part time members over age 55 with 10 years of employment may retire with 5 years of service.	
<i>Plan V</i>	Age 50 with 5 years of service (§7522.25(d)) or age 70 regardless of service (§31672.3).	
Benefit Formula:		
<i>General Plan G</i>	Retirement Age	Benefit Formula
<i>2.5% @ 55 (§31676.18)</i>	50	2.00% x FAS1 x Yrs
	55	2.50% x FAS1 x Yrs
	60	2.50% x FAS1 x Yrs
	62 ⁽¹⁾	2.62% x FAS1 x Yrs
	65 and over ⁽¹⁾	2.62% x FAS1 x Yrs
	⁽¹⁾ Reflects benefit factors from Plan A as they provide a better benefit than those under 2.5% @ 55.	

General Plan H

Retirement Age

Benefit Formula

<i>General Plan O</i> 1.62% @ 65 (§31676.01)	Retirement Age	Benefit Formula
	50	0.79% x FAS1 x Yrs
	55	0.99% x FAS1 x Yrs
	60	1.28% x FAS1 x Yrs
	62	1.39% x FAS1 x Yrs
	65 and over	1.62% x FAS1 x Yrs
<i>General Plans P, T and W</i> 1.62% @ 65 (§31676.01)	Retirement Age	Benefit Formula
	50	0.79% x FAS3 x Yrs
	55	0.99% x FAS3 x Yrs
	60	1.28% x FAS3 x Yrs
	62	1.39% x FAS3 x Yrs
	65 and over	1.62% x FAS3 x Yrs
<i>General Plan S</i> 2.0% @ 57 (§31676.12)	Retirement Age	Benefit Formula
	50	1.34% x FAS3 x Yrs
	55	1.77% x FAS3 x Yrs
	60	2.34% x FAS3 x Yrs
	62	2.62% x FAS3 x Yrs
	65 and over	2.62% x FAS3 x Yrs
<i>General Plan A</i> 2.0% @ 57 (§31676.12)	Retirement Age	Benefit Formula
	50	1.34% x FAS1 x Yrs
	55	1.77% x FAS1 x Yrs
	60	2.34% x FAS1 x Yrs
	62	2.62% x FAS1 x Yrs
	65 and over	2.62% x FAS1 x Yrs

<i>General Plan B (§31676.1)</i>	Retirement Age	Benefit Formula
	50	1.18% x FAS3 x Yrs
	55	1.49% x FAS3 x Yrs
	60	1.92% x FAS3 x Yrs
	62	2.09% x FAS3 x Yrs
	65 and over	2.43% x FAS3 x Yrs
<i>General Plan U (§7522.20(a))</i>	Retirement Age	Benefit Formula
	52	1.00% x FAS3 x Yrs
	55	1.30% x FAS3 x Yrs
	60	1.80% x FAS3 x Yrs
	62	2.00% x FAS3 x Yrs
	65	2.30% x FAS3 x Yrs
	67 and over	2.50% x FAS3 x Yrs
<i>Safety Plan E 3.0% @ 50 (§31664.1)</i>	Retirement Age	Benefit Formula
	50 and over	3.00% x FAS1 x Yrs
<i>Safety Plan F 3.0% @ 50 (§31664.1)</i>	Retirement Age	Benefit Formula
	50 and over	3.00% x FAS3 x Yrs
<i>Safety Plan Q 3.0% @ 55 (§31664.2)</i>	Retirement Age	Benefit Formula
	50	2.29% x FAS1 x Yrs
	55 and over	3.00% x FAS1 x Yrs
<i>Safety Plan R 3.0% @ 55 (§31664.2)</i>	Retirement Age	Benefit Formula
	50	2.29% x FAS3 x Yrs
	55 and over	3.00% x FAS3 x Yrs
<i>Safety Plan V (§7522.25(d))</i>	Retirement Age	Benefit Formula
	50	2.00% x FAS3 x Yrs
	55	2.50% x FAS3 x Yrs
	57 and over	2.70% x FAS3 x Yrs

Maximum Benefit:	
<i>Plans A, B, E, F, G, H, I, J, M, N, O, P, Q, R, S, T and W</i>	100% of Highest Average Compensation (§31676.01, §31676.1, §31676.12, §31676.16, §31676.18, §31676.19, §31664.1, §31664.2).
<i>Plans U and V</i>	None.
Ordinary Disability:	
<i>General</i>	
<i>Eligibility</i>	Five years of service (§31720).
<i>Benefit Formula</i>	Plans A, G, I, M and O: 1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 62, but the total benefit cannot be more than one-third of Final Compensation. (§31727.1). Plans B, H, J, N, P, S, T, U and W: 1.5% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 65, but the total benefit cannot be more than one-third of Final Compensation. (§31727). For all members, 100% of the Service Retirement benefit will be paid, if greater.
<i>Safety</i>	
<i>Eligibility</i>	Five years of service (§31720).
<i>Benefit Formula</i>	1.8% 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). For all members, 100% of the Service Retirement benefit will be paid, if greater.
Line-of-Duty Disability:	
<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).

Pre-Retirement Death:	
<i>All Members</i>	
<i>Eligibility</i>	None.
<i>Basic lump sum benefit</i>	Refund of member contributions with interest, plus one month's compensation for each year of service, to a maximum of six months' compensation (§31781). A lump sum benefit in the amount of \$1,000 is payable upon the death of a member (with 10 years of service) to his/her eligible beneficiary (§31790).
<i>Death in line of duty</i>	50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor children (§31787).
<i>Vested Members</i>	
<i>Eligibility</i>	Five years of service.
<i>Basic benefit</i>	60% of the greater of Service or Ordinary Disability Retirement benefit payable to surviving eligible spouse (§31765.1, §31781.1), in lieu of the basic lump sum benefit above (§31781).
Death After Retirement:	
<i>All Members</i>	
<i>Service Retirement or Ordinary Disability Retirement</i>	Unless another option was selected at retirement, 60% of member's unmodified allowance continues to eligible spouse (§31760.1). A lump sum benefit amount of \$1,000 is payable upon the death of a member (with 10 years of service) to his/her eligible beneficiary (§31790). 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). Certain surviving spouses or domestic partners may also be eligible if marriage or domestic partnership was at least two years prior to the date of death and the surviving spouse or domestic partner has attained age 55.
<i>Line of Duty Disability</i>	Unless another option was selected at retirement, 100% of member's allowance continued to eligible spouse (§31786). A lump sum benefit in the amount of \$1,000 is payable upon the death of a member (with 10 years of service) to his/her eligible beneficiary (§31790).
Withdrawal Benefits:	
<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, a member is entitled to earned benefits commencing at any time after eligible to retire (§31700).
Post-retirement Cost-of-Living Benefits:	Annual adjustment based on Consumer Price Index to a maximum of 3% per year; excess "banked" (§31870.1).
Supplemental Benefit:	Non-vested supplemental COLA benefit is also paid by the System to eligible retirees and survivors. This benefit has been excluded from this valuation.

Member Contributions:	Please refer to Section 4, Exhibit III for the specific rates.
<i>Plan A</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/200 of FAS1 (\$31621.5).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plan B</i>	
<i>Basic</i>	Entry-age based rates that provide for an 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>Plans G, H, I and J</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 55 equal to 1/100 of FAS3 (FAS1 for Plans G and I) (\$31621.8).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans M, N, O and P</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/120 of FAS3 (FAS1 for Plans M and O) (\$31621).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plan S</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/100 of FAS3 (\$31621.2).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans E and Q</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/200 of FAS1 (\$31639.5).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans F and R</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/100 of FAS3 (\$31639.25).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans T, U, V and W</i>	Entry-age based rates that provide for one-half of the total Normal Cost rate.
Other Information:	Non-CalPEPRA Safety members with 30 or more years of service are exempt from paying member contributions. This also applies for General members hired on or before March 7, 1973.
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

Note: The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the System should find the plan summary not in accordance with the actual provisions, the System should alert the actuary so they can both be sure the proper provisions are valued.

EXHIBIT III – MEMBER CONTRIBUTION RATES

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

Entry Age	Plan I (2.7% @ 55)		Plan G (2.5% @ 55)		Plan M (2.0% @ 55) ⁽¹⁾		Plan A (OCTA)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	7.51%	10.52%	7.51%	10.31%	5.46%	7.94%	3.28%	5.46%
16	7.51%	10.52%	7.51%	10.31%	5.46%	7.94%	3.28%	5.46%
17	7.63%	10.69%	7.63%	10.48%	5.55%	8.06%	3.33%	5.55%
18	7.75%	10.86%	7.75%	10.65%	5.64%	8.19%	3.38%	5.64%
19	7.87%	11.03%	7.87%	10.82%	5.73%	8.33%	3.44%	5.73%
20	8.00%	11.21%	8.00%	10.99%	5.82%	8.46%	3.49%	5.83%
21	8.13%	11.39%	8.13%	11.17%	5.92%	8.60%	3.55%	5.92%
22	8.26%	11.57%	8.26%	11.35%	6.01%	8.73%	3.61%	6.01%
23	8.39%	11.76%	8.39%	11.53%	6.11%	8.87%	3.67%	6.11%
24	8.53%	11.95%	8.53%	11.71%	6.21%	9.02%	3.72%	6.21%
25	8.66%	12.14%	8.66%	11.90%	6.31%	9.16%	3.78%	6.31%
26	8.81%	12.34%	8.81%	12.09%	6.41%	9.31%	3.84%	6.41%
27	8.95%	12.54%	8.95%	12.29%	6.51%	9.46%	3.91%	6.51%
28	9.09%	12.74%	9.09%	12.49%	6.61%	9.61%	3.97%	6.62%
29	9.24%	12.95%	9.24%	12.70%	6.72%	9.76%	4.03%	6.72%
30	9.39%	13.16%	9.39%	12.90%	6.83%	9.92%	4.10%	6.83%
31	9.55%	13.38%	9.55%	13.12%	6.94%	10.08%	4.16%	6.94%
32	9.71%	13.60%	9.71%	13.34%	7.05%	10.24%	4.23%	7.06%
33	9.87%	13.83%	9.87%	13.56%	7.17%	10.41%	4.30%	7.17%
34	10.04%	14.07%	10.04%	13.79%	7.28%	10.58%	4.37%	7.29%
35	10.21%	14.31%	10.21%	14.03%	7.40%	10.76%	4.44%	7.41%
36	10.39%	14.56%	10.39%	14.28%	7.53%	10.93%	4.52%	7.53%
37	10.58%	14.83%	10.58%	14.53%	7.65%	11.12%	4.59%	7.66%
38	10.77%	15.10%	10.77%	14.80%	7.78%	11.30%	4.67%	7.78%
39	10.92%	15.31%	10.92%	15.01%	7.91%	11.50%	4.75%	7.92%
40	11.08%	15.53%	11.08%	15.22%	8.05%	11.70%	4.83%	8.05%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan I (2.7% @ 55)		Plan G (2.5% @ 55)		Plan M (2.0% @ 55) ⁽¹⁾		Plan A (OCTA)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
41	11.24%	15.75%	11.24%	15.44%	8.19%	11.90%	4.92%	8.20%
42	11.41%	15.99%	11.41%	15.68%	8.34%	12.11%	5.00%	8.34%
43	11.59%	16.25%	11.59%	15.93%	8.49%	12.34%	5.10%	8.50%
44	11.79%	16.52%	11.79%	16.19%	8.61%	12.51%	5.17%	8.61%
45	12.00%	16.81%	12.00%	16.48%	8.73%	12.69%	5.24%	8.74%
46	12.20%	17.10%	12.20%	16.76%	8.86%	12.87%	5.32%	8.87%
47	12.37%	17.34%	12.37%	17.00%	9.00%	13.07%	5.40%	9.00%
48	12.54%	17.57%	12.54%	17.23%	9.14%	13.28%	5.48%	9.14%
49	12.63%	17.69%	12.63%	17.34%	9.29%	13.50%	5.58%	9.30%
50	12.68%	17.77%	12.68%	17.42%	9.46%	13.74%	5.67%	9.46%
51	12.66%	17.73%	12.66%	17.38%	9.62%	13.97%	5.77%	9.62%
52	12.55%	17.58%	12.55%	17.24%	9.75%	14.17%	5.85%	9.76%
53	12.32%	17.27%	12.32%	16.93%	9.88%	14.36%	5.93%	9.89%
54	11.86%	16.62%	11.86%	16.29%	9.95%	14.46%	5.97%	9.96%
55	11.86%	16.62%	11.86%	16.29%	10.00%	14.52%	6.00%	10.00%
56	11.86%	16.62%	11.86%	16.29%	9.98%	14.49%	5.99%	9.98%
57	11.86%	16.62%	11.86%	16.29%	9.89%	14.37%	5.93%	9.89%
58	11.86%	16.62%	11.86%	16.29%	9.71%	14.11%	5.83%	9.72%
59	11.86%	16.62%	11.86%	16.29%	9.35%	13.58%	5.61%	9.35%
60	11.86%	16.62%	11.86%	16.29%	9.35%	13.58%	5.61%	9.35%
<i>COLA Loading:</i>		40.12%	37.36%		45.26%		66.73%	

⁽¹⁾ Payable by members in Rate Group #9 and Rate Group #11.

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan A (Non-OCTA)	
	Normal	Total
15	3.28%	5.37%
16	3.28%	5.37%
17	3.33%	5.46%
18	3.38%	5.55%
19	3.44%	5.64%
20	3.49%	5.73%
21	3.55%	5.82%
22	3.61%	5.91%
23	3.67%	6.01%
24	3.72%	6.10%
25	3.78%	6.20%
26	3.84%	6.30%
27	3.91%	6.40%
28	3.97%	6.50%
29	4.03%	6.61%
30	4.10%	6.72%
31	4.16%	6.82%
32	4.23%	6.93%
33	4.30%	7.05%
34	4.37%	7.16%
35	4.44%	7.28%
36	4.52%	7.40%
37	4.59%	7.52%
38	4.67%	7.65%
39	4.75%	7.78%
40	4.83%	7.92%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan A (Non-OCTA)	
	Normal	Total
41	4.92%	8.06%
42	5.00%	8.20%
43	5.10%	8.35%
44	5.17%	8.47%
45	5.24%	8.59%
46	5.32%	8.71%
47	5.40%	8.85%
48	5.48%	8.99%
49	5.58%	9.14%
50	5.67%	9.30%
51	5.77%	9.46%
52	5.85%	9.59%
53	5.93%	9.72%
54	5.97%	9.78%
55	6.00%	9.83%
56	5.99%	9.81%
57	5.93%	9.72%
58	5.83%	9.55%
59	5.61%	9.19%
60	5.61%	9.19%

COLA Loading: 63.87%

Interest: 7.00% per annum
 Mortality: See Section 4, Exhibit I
 Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
 Additional Cashouts: See Section 4, Exhibit I

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan J (2.7% @ 55 non-OCFA)		Plan H (2.5% @ 55 OCSD)		Plan N (2.0% @ 55) ⁽¹⁾		Plan B (OCTA)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	7.18%	10.07%	7.18%	9.87%	5.23%	7.60%	5.23%	7.32%
16	7.18%	10.07%	7.18%	9.87%	5.23%	7.60%	5.23%	7.32%
17	7.30%	10.23%	7.30%	10.03%	5.31%	7.72%	5.31%	7.44%
18	7.42%	10.39%	7.42%	10.19%	5.40%	7.84%	5.40%	7.56%
19	7.54%	10.56%	7.54%	10.35%	5.49%	7.97%	5.49%	7.68%
20	7.66%	10.73%	7.66%	10.52%	5.57%	8.10%	5.57%	7.81%
21	7.78%	10.90%	7.78%	10.68%	5.66%	8.23%	5.66%	7.93%
22	7.90%	11.07%	7.90%	10.86%	5.75%	8.36%	5.75%	8.06%
23	8.03%	11.25%	8.03%	11.03%	5.85%	8.49%	5.85%	8.19%
24	8.16%	11.43%	8.16%	11.21%	5.94%	8.63%	5.94%	8.32%
25	8.29%	11.62%	8.29%	11.39%	6.03%	8.77%	6.03%	8.45%
26	8.42%	11.80%	8.42%	11.57%	6.13%	8.91%	6.13%	8.59%
27	8.56%	11.99%	8.56%	11.76%	6.23%	9.05%	6.23%	8.72%
28	8.70%	12.19%	8.70%	11.95%	6.33%	9.19%	6.33%	8.86%
29	8.84%	12.39%	8.84%	12.14%	6.43%	9.34%	6.43%	9.01%
30	8.98%	12.59%	8.98%	12.34%	6.53%	9.49%	6.53%	9.15%
31	9.13%	12.79%	9.13%	12.54%	6.64%	9.64%	6.64%	9.30%
32	9.28%	13.01%	9.28%	12.75%	6.75%	9.80%	6.75%	9.45%
33	9.44%	13.22%	9.44%	12.96%	6.86%	9.96%	6.86%	9.60%
34	9.60%	13.45%	9.60%	13.18%	6.97%	10.12%	6.97%	9.76%
35	9.76%	13.68%	9.76%	13.41%	7.08%	10.29%	7.08%	9.92%
36	9.93%	13.92%	9.93%	13.64%	7.20%	10.45%	7.20%	10.08%
37	10.09%	14.14%	10.09%	13.86%	7.32%	10.63%	7.32%	10.25%
38	10.24%	14.35%	10.24%	14.07%	7.44%	10.81%	7.44%	10.42%
39	10.38%	14.55%	10.38%	14.26%	7.56%	10.99%	7.56%	10.59%
40	10.53%	14.75%	10.53%	14.46%	7.69%	11.18%	7.69%	10.78%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan J (2.7% @ 55 non-OCFA)		Plan H (2.5% @ 55 OCSD)		Plan N (2.0% @ 55) ⁽¹⁾		Plan B (OCTA)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
41	10.68%	14.97%	10.68%	14.67%	7.83%	11.37%	7.83%	10.96%
42	10.84%	15.19%	10.84%	14.89%	7.95%	11.56%	7.95%	11.14%
43	11.01%	15.42%	11.01%	15.12%	8.07%	11.73%	8.07%	11.31%
44	11.18%	15.66%	11.18%	15.35%	8.18%	11.89%	8.18%	11.46%
45	11.34%	15.88%	11.34%	15.57%	8.30%	12.06%	8.30%	11.62%
46	11.48%	16.08%	11.48%	15.76%	8.42%	12.23%	8.42%	11.79%
47	11.58%	16.22%	11.58%	15.90%	8.54%	12.41%	8.54%	11.96%
48	11.63%	16.30%	11.63%	15.98%	8.68%	12.60%	8.68%	12.15%
49	11.63%	16.29%	11.63%	15.97%	8.81%	12.80%	8.81%	12.34%
50	11.56%	16.19%	11.56%	15.87%	8.93%	12.98%	8.93%	12.51%
51	11.40%	15.97%	11.40%	15.66%	9.05%	13.14%	9.05%	12.67%
52	11.12%	15.59%	11.12%	15.28%	9.12%	13.25%	9.12%	12.78%
53	11.48%	16.09%	11.48%	15.77%	9.17%	13.32%	9.17%	12.84%
54	11.86%	16.62%	11.86%	16.29%	9.17%	13.31%	9.17%	12.83%
55	11.86%	16.62%	11.86%	16.29%	9.11%	13.23%	9.11%	12.76%
56	11.86%	16.62%	11.86%	16.29%	8.98%	13.05%	8.98%	12.58%
57	11.86%	16.62%	11.86%	16.29%	8.77%	12.74%	8.77%	12.28%
58	11.86%	16.62%	11.86%	16.29%	9.05%	13.15%	9.05%	12.68%
59	11.86%	16.62%	11.86%	16.29%	9.35%	13.58%	9.35%	13.09%
60	11.86%	16.62%	11.86%	16.29%	9.35%	13.58%	9.35%	13.09%
<i>COLA Loading:</i>		40.12%	37.36%		45.26%		40.04%	

⁽¹⁾ Payable by members in Rate Group #9 and Rate Group #11.

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan B (non-OCTA, non-OCSD)		Plan J (2.7% @ 55 OCFA)		Plan P (1.62% @ 65)		Plan B (OCSD)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	5.23%	7.23%	7.18%	10.06%	5.23%	6.63%	5.23%	7.28%
16	5.23%	7.23%	7.18%	10.06%	5.23%	6.63%	5.23%	7.28%
17	5.31%	7.35%	7.30%	10.22%	5.31%	6.74%	5.31%	7.40%
18	5.40%	7.47%	7.42%	10.38%	5.40%	6.85%	5.40%	7.52%
19	5.49%	7.59%	7.54%	10.55%	5.49%	6.96%	5.49%	7.64%
20	5.57%	7.71%	7.66%	10.72%	5.57%	7.07%	5.57%	7.76%
21	5.66%	7.83%	7.78%	10.89%	5.66%	7.18%	5.66%	7.88%
22	5.75%	7.96%	7.90%	11.06%	5.75%	7.30%	5.75%	8.01%
23	5.85%	8.09%	8.03%	11.24%	5.85%	7.41%	5.85%	8.14%
24	5.94%	8.22%	8.16%	11.42%	5.94%	7.53%	5.94%	8.27%
25	6.03%	8.35%	8.29%	11.61%	6.03%	7.65%	6.03%	8.40%
26	6.13%	8.48%	8.42%	11.79%	6.13%	7.78%	6.13%	8.54%
27	6.23%	8.62%	8.56%	11.98%	6.23%	7.90%	6.23%	8.67%
28	6.33%	8.75%	8.70%	12.18%	6.33%	8.03%	6.33%	8.81%
29	6.43%	8.89%	8.84%	12.38%	6.43%	8.16%	6.43%	8.95%
30	6.53%	9.04%	8.98%	12.58%	6.53%	8.29%	6.53%	9.10%
31	6.64%	9.18%	9.13%	12.78%	6.64%	8.42%	6.64%	9.24%
32	6.75%	9.33%	9.28%	13.00%	6.75%	8.56%	6.75%	9.39%
33	6.86%	9.48%	9.44%	13.21%	6.86%	8.69%	6.86%	9.54%
34	6.97%	9.64%	9.60%	13.44%	6.97%	8.84%	6.97%	9.70%
35	7.08%	9.79%	9.76%	13.67%	7.08%	8.98%	7.08%	9.86%
36	7.20%	9.96%	9.93%	13.91%	7.20%	9.13%	7.20%	10.02%
37	7.32%	10.12%	10.09%	14.13%	7.32%	9.28%	7.32%	10.19%
38	7.44%	10.29%	10.24%	14.34%	7.44%	9.43%	7.44%	10.36%
39	7.56%	10.46%	10.38%	14.54%	7.56%	9.59%	7.56%	10.53%
40	7.69%	10.64%	10.53%	14.74%	7.69%	9.76%	7.69%	10.71%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan B (non-OCTA, non-OCSD)		Plan J (2.7% @ 55 OCFA)		Plan P (1.62% @ 65)		Plan B (OCSD)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
41	7.83%	10.83%	10.68%	14.95%	7.83%	9.93%	7.83%	10.90%
42	7.95%	11.00%	10.84%	15.18%	7.95%	10.09%	7.95%	11.08%
43	8.07%	11.17%	11.01%	15.41%	8.07%	10.24%	8.07%	11.24%
44	8.18%	11.32%	11.18%	15.65%	8.18%	10.38%	8.18%	11.40%
45	8.30%	11.48%	11.34%	15.87%	8.30%	10.53%	8.30%	11.55%
46	8.42%	11.64%	11.48%	16.07%	8.42%	10.68%	8.42%	11.72%
47	8.54%	11.82%	11.58%	16.21%	8.54%	10.84%	8.54%	11.90%
48	8.68%	12.00%	11.63%	16.29%	8.68%	11.00%	8.68%	12.08%
49	8.81%	12.19%	11.63%	16.28%	8.81%	11.17%	8.81%	12.27%
50	8.93%	12.36%	11.56%	16.18%	8.93%	11.33%	8.93%	12.44%
51	9.05%	12.51%	11.40%	15.96%	9.05%	11.47%	9.05%	12.59%
52	9.12%	12.62%	11.12%	15.57%	9.12%	11.57%	9.12%	12.70%
53	9.17%	12.68%	11.48%	16.08%	9.17%	11.63%	9.17%	12.77%
54	9.17%	12.68%	11.86%	16.61%	9.17%	11.62%	9.17%	12.76%
55	9.11%	12.60%	11.86%	16.61%	9.11%	11.55%	9.11%	12.68%
56	8.98%	12.43%	11.86%	16.61%	8.98%	11.39%	8.98%	12.51%
57	8.77%	12.13%	11.86%	16.61%	8.77%	11.12%	8.77%	12.21%
58	9.05%	12.52%	11.86%	16.61%	9.05%	11.48%	9.05%	12.60%
59	9.35%	12.93%	11.86%	16.61%	9.35%	11.86%	9.35%	13.02%
60	9.35%	12.93%	11.86%	16.61%	9.35%	11.86%	9.35%	13.02%

<i>COLA Loading:</i>	38.32%	40.01%	26.83%	39.23%
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Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Additional Cashouts: See Section 4, Exhibit I

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan N (OCFA)		Plan S (City of SJC)		Plan H (2.5% @ 55 Law Library)	
	Normal	Total	Normal	Total	Normal	Total
15	5.23%	7.71%	6.28%	8.70%	7.18%	9.90%
16	5.23%	7.71%	6.28%	8.70%	7.18%	9.90%
17	5.31%	7.83%	6.38%	8.84%	7.30%	10.05%
18	5.40%	7.96%	6.48%	8.98%	7.42%	10.22%
19	5.49%	8.09%	6.58%	9.12%	7.54%	10.38%
20	5.57%	8.22%	6.69%	9.27%	7.66%	10.54%
21	5.66%	8.35%	6.80%	9.42%	7.78%	10.71%
22	5.75%	8.48%	6.90%	9.57%	7.90%	10.88%
23	5.85%	8.62%	7.02%	9.72%	8.03%	11.06%
24	5.94%	8.75%	7.13%	9.88%	8.16%	11.24%
25	6.03%	8.89%	7.24%	10.03%	8.29%	11.42%
26	6.13%	9.04%	7.36%	10.19%	8.42%	11.60%
27	6.23%	9.18%	7.47%	10.36%	8.56%	11.79%
28	6.33%	9.33%	7.59%	10.52%	8.70%	11.98%
29	6.43%	9.48%	7.72%	10.69%	8.84%	12.17%
30	6.53%	9.63%	7.84%	10.86%	8.98%	12.37%
31	6.64%	9.78%	7.97%	11.04%	9.13%	12.58%
32	6.75%	9.94%	8.10%	11.22%	9.28%	12.79%
33	6.86%	10.10%	8.23%	11.40%	9.44%	13.00%
34	6.97%	10.27%	8.36%	11.58%	9.60%	13.22%
35	7.08%	10.44%	8.50%	11.77%	9.76%	13.45%
36	7.20%	10.61%	8.64%	11.97%	9.93%	13.68%
37	7.32%	10.78%	8.78%	12.17%	10.09%	13.90%
38	7.44%	10.96%	8.93%	12.37%	10.24%	14.11%
39	7.56%	11.15%	9.08%	12.58%	10.38%	14.30%
40	7.69%	11.34%	9.23%	12.79%	10.53%	14.50%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan N (OCFA)		Plan S (City of SJC)		Plan H (2.5% @ 55 Law Library)	
	Normal	Total	Normal	Total	Normal	Total
41	7.83%	11.54%	9.39%	13.02%	10.68%	14.71%
42	7.95%	11.72%	9.55%	13.23%	10.84%	14.93%
43	8.07%	11.90%	9.69%	13.43%	11.01%	15.16%
44	8.18%	12.06%	9.82%	13.61%	11.18%	15.39%
45	8.30%	12.23%	9.96%	13.80%	11.34%	15.61%
46	8.42%	12.41%	10.10%	14.00%	11.48%	15.81%
47	8.54%	12.59%	10.25%	14.21%	11.58%	15.94%
48	8.68%	12.79%	10.41%	14.43%	11.63%	16.02%
49	8.81%	12.98%	10.57%	14.65%	11.63%	16.02%
50	8.93%	13.17%	10.72%	14.86%	11.56%	15.92%
51	9.05%	13.33%	10.85%	15.04%	11.40%	15.70%
52	9.12%	13.45%	10.95%	15.17%	11.12%	15.32%
53	9.17%	13.51%	11.00%	15.25%	11.48%	15.82%
54	9.17%	13.51%	11.00%	15.24%	11.86%	16.34%
55	9.11%	13.43%	10.93%	15.15%	11.86%	16.34%
56	8.98%	13.24%	10.78%	14.94%	11.86%	16.34%
57	8.77%	12.92%	10.52%	14.58%	11.86%	16.34%
58	9.05%	13.34%	10.86%	15.05%	11.86%	16.34%
59	9.35%	13.78%	11.22%	15.55%	11.86%	16.34%
60	9.35%	13.78%	11.22%	15.55%	11.86%	16.34%
COLA Loading:		47.39%		38.57%		37.73%
Interest:	7.00% per annum					
Mortality:	See Section 4, Exhibit I					
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)					
Additional Cashouts:	See Section 4, Exhibit I					

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Rate Group 1 (Plan U)		Rate Group 2 (Plan T)		Rate Group 2 (Plan U)		Rate Group 2 (Plan W)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	6.29%	8.51%	3.89%	5.22%	5.59%	7.59%	3.90%	5.10%
16	6.29%	8.51%	3.89%	5.22%	5.59%	7.59%	3.90%	5.10%
17	6.00%	8.12%	3.95%	5.30%	5.33%	7.24%	3.96%	5.18%
18	5.70%	7.71%	4.02%	5.39%	5.06%	6.88%	4.03%	5.26%
19	5.79%	7.84%	4.08%	5.47%	5.14%	6.99%	4.09%	5.35%
20	5.89%	7.97%	4.15%	5.56%	5.23%	7.10%	4.16%	5.43%
21	5.98%	8.10%	4.22%	5.65%	5.31%	7.22%	4.22%	5.52%
22	6.08%	8.23%	4.28%	5.74%	5.40%	7.34%	4.29%	5.61%
23	6.18%	8.36%	4.35%	5.84%	5.49%	7.46%	4.36%	5.70%
24	6.28%	8.50%	4.42%	5.93%	5.57%	7.58%	4.43%	5.79%
25	6.38%	8.63%	4.49%	6.02%	5.66%	7.70%	4.50%	5.88%
26	6.48%	8.77%	4.57%	6.12%	5.76%	7.82%	4.57%	5.98%
27	6.59%	8.91%	4.64%	6.22%	5.85%	7.95%	4.65%	6.07%
28	6.69%	9.06%	4.71%	6.32%	5.94%	8.08%	4.72%	6.17%
29	6.80%	9.20%	4.79%	6.42%	6.04%	8.21%	4.80%	6.27%
30	6.91%	9.35%	4.87%	6.53%	6.14%	8.34%	4.88%	6.37%
31	7.02%	9.50%	4.95%	6.63%	6.23%	8.47%	4.96%	6.48%
32	7.14%	9.65%	5.03%	6.74%	6.33%	8.61%	5.04%	6.58%
33	7.25%	9.81%	5.11%	6.85%	6.44%	8.75%	5.12%	6.69%
34	7.37%	9.97%	5.19%	6.96%	6.54%	8.89%	5.20%	6.80%
35	7.48%	10.13%	5.28%	7.08%	6.64%	9.03%	5.29%	6.91%
36	7.61%	10.29%	5.37%	7.19%	6.75%	9.18%	5.38%	7.03%
37	7.73%	10.46%	5.45%	7.31%	6.86%	9.32%	5.47%	7.14%
38	7.85%	10.63%	5.55%	7.44%	6.97%	9.47%	5.56%	7.26%
39	7.98%	10.80%	5.64%	7.57%	7.09%	9.63%	5.65%	7.39%
40	8.11%	10.98%	5.74%	7.70%	7.20%	9.79%	5.75%	7.52%
41	8.24%	11.16%	5.84%	7.83%	7.32%	9.95%	5.85%	7.65%
42	8.38%	11.34%	5.94%	7.96%	7.44%	10.11%	5.95%	7.77%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Rate Group 1 (Plan U)		Rate Group 2 (Plan T)		Rate Group 2 (Plan U)		Rate Group 2 (Plan W)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
43	8.52%	11.53%	6.03%	8.08%	7.56%	10.28%	6.04%	7.89%
44	8.66%	11.72%	6.11%	8.20%	7.69%	10.45%	6.12%	8.00%
45	8.81%	11.92%	6.20%	8.31%	7.82%	10.63%	6.21%	8.12%
46	8.96%	12.12%	6.29%	8.44%	7.95%	10.81%	6.31%	8.24%
47	9.12%	12.33%	6.39%	8.57%	8.09%	11.00%	6.40%	8.37%
48	9.28%	12.55%	6.49%	8.71%	8.24%	11.19%	6.51%	8.50%
49	9.43%	12.76%	6.60%	8.85%	8.37%	11.38%	6.61%	8.64%
50	9.57%	12.95%	6.70%	8.98%	8.50%	11.55%	6.71%	8.77%
51	9.71%	13.14%	6.79%	9.10%	8.62%	11.71%	6.80%	8.89%
52	9.85%	13.33%	6.85%	9.19%	8.74%	11.88%	6.87%	8.98%
53	9.99%	13.52%	6.90%	9.25%	8.87%	12.06%	6.91%	9.03%
54	10.15%	13.73%	6.91%	9.27%	9.01%	12.24%	6.92%	9.05%
55	10.31%	13.95%	6.89%	9.24%	9.15%	12.44%	6.90%	9.02%
56	10.48%	14.18%	6.82%	9.15%	9.30%	12.64%	6.83%	8.93%
57	10.64%	14.39%	6.70%	8.98%	9.44%	12.83%	6.71%	8.77%
58	10.78%	14.58%	6.92%	9.27%	9.57%	13.00%	6.93%	9.06%
59	10.89%	14.73%	7.14%	9.58%	9.66%	13.13%	7.16%	9.36%
60	10.96%	14.83%	7.14%	9.58%	9.73%	13.22%	7.16%	9.36%
61	10.98%	14.85%	7.14%	9.58%	9.74%	13.24%	7.16%	9.36%
62	10.94%	14.80%	7.14%	9.58%	9.71%	13.20%	7.16%	9.36%
63	10.83%	14.66%	7.14%	9.58%	9.62%	13.07%	7.16%	9.36%
64	10.64%	14.40%	7.14%	9.58%	9.45%	12.84%	7.16%	9.36%
65	10.98%	14.86%	7.14%	9.58%	9.75%	13.25%	7.16%	9.36%
66 & Over	11.35%	15.35%	7.14%	9.58%	10.07%	13.69%	7.16%	9.36%
<i>COLA Loading:</i>		35.31%		34.09%		35.89%		30.69%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Interest:	7.00% per annum
Mortality:	See <i>Section 4, Exhibit I</i>
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See <i>Section 4, Exhibit I</i>)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.5% at 67 formula and the Plan W 1.62% at 65 formula, the compensation that can be taken into account for 2019 is equal to \$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)).

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Rate Group 3 (Plan U)		Rate Group 5 (Plan U)		Rate Group 9 (Plan U)		Rate Group 10 (Plan U)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	5.89%	7.96%	6.57%	8.90%	6.04%	8.11%	6.06%	8.20%
16	5.89%	7.96%	6.57%	8.90%	6.04%	8.11%	6.06%	8.20%
17	5.62%	7.60%	6.26%	8.49%	5.76%	7.73%	5.78%	7.82%
18	5.34%	7.22%	5.95%	8.06%	5.47%	7.35%	5.49%	7.43%
19	5.43%	7.33%	6.05%	8.20%	5.56%	7.47%	5.58%	7.55%
20	5.51%	7.45%	6.14%	8.33%	5.65%	7.59%	5.67%	7.67%
21	5.60%	7.57%	6.24%	8.46%	5.74%	7.71%	5.76%	7.80%
22	5.69%	7.70%	6.35%	8.60%	5.84%	7.84%	5.86%	7.92%
23	5.79%	7.82%	6.45%	8.74%	5.93%	7.96%	5.95%	8.05%
24	5.88%	7.95%	6.55%	8.88%	6.03%	8.09%	6.05%	8.18%
25	5.97%	8.08%	6.66%	9.02%	6.12%	8.22%	6.14%	8.31%
26	6.07%	8.21%	6.76%	9.17%	6.22%	8.35%	6.24%	8.45%
27	6.17%	8.34%	6.87%	9.32%	6.32%	8.49%	6.34%	8.58%
28	6.27%	8.47%	6.98%	9.47%	6.42%	8.62%	6.45%	8.72%
29	6.37%	8.61%	7.10%	9.62%	6.53%	8.76%	6.55%	8.86%
30	6.47%	8.75%	7.21%	9.77%	6.63%	8.90%	6.65%	9.01%
31	6.58%	8.89%	7.33%	9.93%	6.74%	9.05%	6.76%	9.15%
32	6.68%	9.03%	7.44%	10.09%	6.85%	9.19%	6.87%	9.30%
33	6.79%	9.18%	7.56%	10.25%	6.96%	9.34%	6.98%	9.45%
34	6.90%	9.32%	7.69%	10.42%	7.07%	9.49%	7.09%	9.60%
35	7.01%	9.47%	7.81%	10.59%	7.18%	9.64%	7.21%	9.75%
36	7.12%	9.63%	7.94%	10.76%	7.30%	9.80%	7.32%	9.91%
37	7.24%	9.78%	8.06%	10.93%	7.42%	9.96%	7.44%	10.07%
38	7.35%	9.94%	8.19%	11.11%	7.54%	10.12%	7.56%	10.23%
39	7.47%	10.10%	8.33%	11.29%	7.66%	10.28%	7.68%	10.40%
40	7.60%	10.27%	8.46%	11.47%	7.79%	10.45%	7.81%	10.57%
41	7.72%	10.44%	8.60%	11.66%	7.91%	10.62%	7.94%	10.74%
42	7.85%	10.61%	8.74%	11.85%	8.04%	10.80%	8.07%	10.92%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Rate Group 3 (Plan U)		Rate Group 5 (Plan U)		Rate Group 9 (Plan U)		Rate Group 10 (Plan U)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
43	7.98%	10.78%	8.89%	12.05%	8.18%	10.98%	8.20%	11.10%
44	8.11%	10.96%	9.04%	12.25%	8.31%	11.16%	8.34%	11.29%
45	8.25%	11.15%	9.19%	12.46%	8.45%	11.35%	8.48%	11.48%
46	8.39%	11.34%	9.35%	12.67%	8.60%	11.54%	8.63%	11.68%
47	8.54%	11.54%	9.51%	12.89%	8.75%	11.75%	8.78%	11.88%
48	8.69%	11.74%	9.68%	13.12%	8.90%	11.95%	8.93%	12.09%
49	8.83%	11.94%	9.84%	13.34%	9.05%	12.15%	9.08%	12.29%
50	8.96%	12.12%	9.99%	13.54%	9.19%	12.33%	9.22%	12.47%
51	9.09%	12.29%	10.13%	13.73%	9.32%	12.51%	9.35%	12.65%
52	9.22%	12.46%	10.27%	13.93%	9.45%	12.69%	9.48%	12.83%
53	9.36%	12.65%	10.43%	14.13%	9.59%	12.88%	9.62%	13.02%
54	9.50%	12.84%	10.59%	14.35%	9.74%	13.07%	9.77%	13.22%
55	9.65%	13.05%	10.76%	14.58%	9.90%	13.29%	9.93%	13.44%
56	9.81%	13.26%	10.93%	14.82%	10.06%	13.50%	10.09%	13.65%
57	9.96%	13.46%	11.10%	15.04%	10.21%	13.70%	10.24%	13.86%
58	10.09%	13.64%	11.25%	15.24%	10.34%	13.89%	10.38%	14.05%
59	10.19%	13.78%	11.36%	15.40%	10.45%	14.03%	10.48%	14.19%
60	10.26%	13.87%	11.43%	15.50%	10.52%	14.12%	10.55%	14.28%
61	10.28%	13.89%	11.45%	15.52%	10.53%	14.14%	10.57%	14.30%
62	10.24%	13.85%	11.41%	15.47%	10.50%	14.09%	10.53%	14.25%
63	10.14%	13.71%	11.30%	15.32%	10.40%	13.96%	10.43%	14.12%
64	9.96%	13.47%	11.10%	15.05%	10.21%	13.71%	10.24%	13.86%
65	10.29%	13.90%	11.46%	15.54%	10.54%	14.15%	10.58%	14.31%
66 & Over	10.62%	14.36%	11.84%	16.05%	10.89%	14.62%	10.92%	14.79%
<i>COLA Loading:</i>		35.17%		35.55%		34.25%		35.34%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Interest:	7.00% per annum
Mortality:	See Section 4, Exhibit I
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.5% at 67 formula and the Plan W 1.62% at 65 formula, the compensation that can be taken into account for 2019 is equal to \$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)).

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Rate Group 11 (Plan U)		Rate Group 12 (Plan U)	
	Normal	Total	Normal	Total
15	6.36%	8.90%	5.66%	7.57%
16	6.36%	8.90%	5.66%	7.57%
17	6.07%	8.49%	5.40%	7.22%
18	5.76%	8.06%	5.13%	6.86%
19	5.86%	8.19%	5.21%	6.97%
20	5.95%	8.32%	5.29%	7.08%
21	6.05%	8.46%	5.38%	7.20%
22	6.15%	8.60%	5.47%	7.32%
23	6.25%	8.74%	5.56%	7.43%
24	6.35%	8.88%	5.65%	7.55%
25	6.45%	9.02%	5.74%	7.68%
26	6.55%	9.17%	5.83%	7.80%
27	6.66%	9.31%	5.92%	7.93%
28	6.77%	9.46%	6.02%	8.05%
29	6.88%	9.61%	6.11%	8.18%
30	6.99%	9.77%	6.21%	8.31%
31	7.10%	9.93%	6.31%	8.45%
32	7.21%	10.09%	6.41%	8.58%
33	7.33%	10.25%	6.52%	8.72%
34	7.45%	10.41%	6.62%	8.86%
35	7.57%	10.58%	6.73%	9.00%
36	7.69%	10.75%	6.84%	9.15%
37	7.81%	10.92%	6.95%	9.30%
38	7.94%	11.10%	7.06%	9.45%
39	8.07%	11.28%	7.18%	9.60%
40	8.20%	11.47%	7.29%	9.76%
41	8.34%	11.65%	7.41%	9.92%
42	8.47%	11.85%	7.53%	10.08%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Rate Group 11 (Plan U)		Rate Group 12 (Plan U)	
	Normal	Total	Normal	Total
43	8.61%	12.04%	7.66%	10.25%
44	8.76%	12.25%	7.79%	10.42%
45	8.91%	12.45%	7.92%	10.60%
46	9.06%	12.67%	8.06%	10.78%
47	9.22%	12.89%	8.20%	10.97%
48	9.38%	13.11%	8.34%	11.16%
49	9.53%	13.33%	8.48%	11.34%
50	9.68%	13.53%	8.61%	11.52%
51	9.81%	13.72%	8.73%	11.68%
52	9.96%	13.92%	8.85%	11.85%
53	10.10%	14.13%	8.98%	12.02%
54	10.26%	14.34%	9.12%	12.21%
55	10.42%	14.58%	9.27%	12.40%
56	10.59%	14.81%	9.42%	12.61%
57	10.75%	15.03%	9.56%	12.80%
58	10.90%	15.24%	9.69%	12.97%
59	11.01%	15.39%	9.79%	13.10%
60	11.08%	15.49%	9.85%	13.18%
61	11.10%	15.51%	9.87%	13.20%
62	11.06%	15.46%	9.83%	13.16%
63	10.95%	15.31%	9.74%	13.03%
64	10.76%	15.04%	9.56%	12.80%
65	11.10%	15.53%	9.87%	13.21%
66 & Over	11.47%	16.04%	10.20%	13.65%
<i>COLA Loading:</i>		39.83%		33.82%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Interest:	7.00% per annum
Mortality:	See <i>Section 4, Exhibit I</i>
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See <i>Section 4, Exhibit I</i>)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.5% at 67 formula and the Plan W 1.62% at 65 formula, the compensation that can be taken into account for 2019 is equal to \$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)).

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan F (OCFA)		Plan F (Law Enforcement)		Plan F (Probation)	
	Normal	Total	Normal	Total	Normal	Total
15	8.87%	15.03%	9.11%	15.57%	9.01%	14.99%
16	8.87%	15.03%	9.11%	15.57%	9.01%	14.99%
17	8.99%	15.23%	9.22%	15.77%	9.13%	15.19%
18	9.10%	15.43%	9.34%	15.98%	9.24%	15.39%
19	9.22%	15.63%	9.47%	16.19%	9.37%	15.59%
20	9.35%	15.84%	9.59%	16.40%	9.49%	15.80%
21	9.47%	16.05%	9.72%	16.62%	9.62%	16.00%
22	9.60%	16.27%	9.85%	16.84%	9.74%	16.22%
23	9.73%	16.49%	9.98%	17.06%	9.87%	16.44%
24	9.86%	16.71%	10.11%	17.29%	10.01%	16.66%
25	10.00%	16.94%	10.25%	17.53%	10.14%	16.88%
26	10.13%	17.17%	10.39%	17.77%	10.28%	17.12%
27	10.28%	17.41%	10.53%	18.01%	10.43%	17.36%
28	10.42%	17.66%	10.68%	18.27%	10.57%	17.60%
29	10.57%	17.92%	10.83%	18.53%	10.73%	17.85%
30	10.73%	18.18%	10.99%	18.80%	10.88%	18.11%
31	10.89%	18.46%	11.15%	19.07%	11.05%	18.38%
32	11.05%	18.73%	11.31%	19.35%	11.21%	18.65%
33	11.21%	19.00%	11.47%	19.62%	11.36%	18.91%
34	11.37%	19.26%	11.63%	19.89%	11.52%	19.18%
35	11.53%	19.54%	11.80%	20.17%	11.69%	19.45%
36	11.71%	19.84%	11.97%	20.47%	11.86%	19.74%
37	11.90%	20.16%	12.16%	20.79%	12.05%	20.06%
38	12.08%	20.48%	12.34%	21.10%	12.23%	20.36%
39	12.26%	20.78%	12.51%	21.39%	12.41%	20.65%
40	12.41%	21.03%	12.65%	21.63%	12.55%	20.89%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan F (OCFA)		Plan F (Law Enforcement)		Plan F (Probation)	
	Normal	Total	Normal	Total	Normal	Total
41	12.52%	21.22%	12.75%	21.80%	12.65%	21.06%
42	12.59%	21.33%	12.80%	21.89%	12.71%	21.16%
43	12.60%	21.35%	12.79%	21.87%	12.71%	21.16%
44	12.56%	21.29%	12.72%	21.76%	12.66%	21.07%
45	12.44%	21.08%	12.57%	21.49%	12.52%	20.83%
46	12.21%	20.69%	12.28%	21.00%	12.25%	20.39%
47	11.77%	19.95%	11.77%	20.13%	11.77%	19.59%
48	12.14%	20.58%	12.14%	20.77%	12.14%	20.21%
49	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
50	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
51	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
52	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
53	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
54	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
55	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
56	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
57	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
58	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
59	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
60	12.54%	21.24%	12.54%	21.43%	12.54%	20.86%
COLA Loading:		69.47%		71.00%		66.44%
Interest:	7.00% per annum					
Mortality:	See Section 4, Exhibit I					
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)					
Additional Cashouts:	See Section 4, Exhibit I					

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan R (OCFA)		Plan R (Law Enforcement)	
	Normal	Total	Normal	Total
15	8.87%	14.24%	9.11%	14.58%
16	8.87%	14.24%	9.11%	14.58%
17	8.99%	14.43%	9.22%	14.77%
18	9.10%	14.62%	9.34%	14.97%
19	9.22%	14.81%	9.47%	15.16%
20	9.35%	15.01%	9.59%	15.36%
21	9.47%	15.21%	9.72%	15.57%
22	9.60%	15.41%	9.85%	15.77%
23	9.73%	15.62%	9.98%	15.98%
24	9.86%	15.83%	10.11%	16.20%
25	10.00%	16.05%	10.25%	16.42%
26	10.13%	16.27%	10.39%	16.64%
27	10.28%	16.50%	10.53%	16.87%
28	10.42%	16.73%	10.68%	17.11%
29	10.57%	16.97%	10.83%	17.35%
30	10.73%	17.22%	10.99%	17.61%
31	10.89%	17.48%	11.15%	17.87%
32	11.05%	17.74%	11.31%	18.12%
33	11.21%	18.00%	11.47%	18.38%
34	11.37%	18.25%	11.63%	18.63%
35	11.53%	18.52%	11.80%	18.89%
36	11.71%	18.80%	11.97%	19.17%
37	11.90%	19.10%	12.16%	19.47%
38	12.08%	19.40%	12.34%	19.76%
39	12.26%	19.69%	12.51%	20.04%
40	12.41%	19.92%	12.65%	20.26%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

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

Entry Age	Plan R (OCFA)		Plan R (Law Enforcement)	
	Normal	Total	Normal	Total
41	12.52%	20.10%	12.75%	20.42%
42	12.59%	20.21%	12.80%	20.50%
43	12.60%	20.23%	12.79%	20.49%
44	12.56%	20.17%	12.72%	20.38%
45	12.44%	19.97%	12.57%	20.13%
46	12.21%	19.60%	12.28%	19.67%
47	11.77%	18.90%	11.77%	18.85%
48	12.14%	19.50%	12.14%	19.45%
49	12.54%	20.12%	12.54%	20.08%
50	12.54%	20.12%	12.54%	20.08%
51	12.54%	20.12%	12.54%	20.08%
52	12.54%	20.12%	12.54%	20.08%
53	12.54%	20.12%	12.54%	20.08%
54	12.54%	20.12%	12.54%	20.08%
55	12.54%	20.12%	12.54%	20.08%
56	12.54%	20.12%	12.54%	20.08%
57	12.54%	20.12%	12.54%	20.08%
58	12.54%	20.12%	12.54%	20.08%
59	12.54%	20.12%	12.54%	20.08%
60	12.54%	20.12%	12.54%	20.08%
<i>COLA Loading:</i>		60.55%	60.17%	
Interest:	7.00% per annum			
Mortality:	See Section 4, Exhibit I			
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)			
Additional Cashouts:	See Section 4, Exhibit I			

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety CalPEPRA Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of monthly payroll)

Entry Age	Rate Group 6 (Plan V)		Rate Group 7 (Plan V)		Rate Group 8 (Plan V)	
	Normal	Total	Normal	Total	Normal	Total
15	9.72%	13.83%	10.75%	15.38%	9.00%	12.95%
16	9.72%	13.83%	10.75%	15.38%	9.00%	12.95%
17	9.84%	14.01%	10.89%	15.58%	9.12%	13.12%
18	9.97%	14.19%	11.03%	15.79%	9.24%	13.29%
19	10.10%	14.37%	11.18%	15.99%	9.36%	13.47%
20	10.23%	14.56%	11.32%	16.20%	9.48%	13.64%
21	10.37%	14.75%	11.47%	16.41%	9.60%	13.82%
22	10.50%	14.94%	11.62%	16.63%	9.73%	14.00%
23	10.64%	15.14%	11.78%	16.85%	9.86%	14.19%
24	10.78%	15.34%	11.93%	17.07%	9.99%	14.37%
25	10.92%	15.54%	12.09%	17.29%	10.12%	14.56%
26	11.07%	15.75%	12.25%	17.52%	10.25%	14.75%
27	11.22%	15.96%	12.41%	17.76%	10.39%	14.95%
28	11.37%	16.17%	12.58%	17.99%	10.53%	15.15%
29	11.52%	16.39%	12.75%	18.24%	10.67%	15.36%
30	11.68%	16.61%	12.92%	18.48%	10.82%	15.56%
31	11.84%	16.84%	13.10%	18.74%	10.96%	15.78%
32	12.00%	17.07%	13.28%	18.99%	11.11%	15.99%
33	12.17%	17.31%	13.46%	19.26%	11.27%	16.22%
34	12.34%	17.56%	13.65%	19.53%	11.43%	16.45%
35	12.52%	17.81%	13.85%	19.81%	11.59%	16.68%
36	12.70%	18.07%	14.05%	20.10%	11.76%	16.93%
37	12.89%	18.34%	14.26%	20.40%	11.94%	17.18%
38	13.08%	18.62%	14.48%	20.71%	12.12%	17.44%
39	13.28%	18.89%	14.69%	21.02%	12.30%	17.70%
40	13.47%	19.17%	14.91%	21.32%	12.48%	17.96%
41	13.66%	19.44%	15.12%	21.63%	12.66%	18.21%
42	13.87%	19.73%	15.34%	21.95%	12.85%	18.48%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety CalPEPRA Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of monthly payroll)

Entry Age	Rate Group 6 (Plan V)		Rate Group 7 (Plan V)		Rate Group 8 (Plan V)	
	Normal	Total	Normal	Total	Normal	Total
43	14.08%	20.04%	15.58%	22.29%	13.05%	18.77%
44	14.32%	20.37%	15.84%	22.66%	13.26%	19.08%
45	14.55%	20.70%	16.10%	23.03%	13.47%	19.39%
46	14.77%	21.01%	16.34%	23.38%	13.68%	19.68%
47	14.95%	21.27%	16.54%	23.66%	13.85%	19.93%
48	15.10%	21.48%	16.70%	23.90%	13.98%	20.12%
49	15.19%	21.61%	16.81%	24.04%	14.07%	20.24%
50	15.22%	21.65%	16.84%	24.09%	14.10%	20.28%
51	15.19%	21.61%	16.81%	24.04%	14.07%	20.25%
52	15.07%	21.44%	16.68%	23.86%	13.96%	20.09%
53	14.82%	21.09%	16.40%	23.46%	13.73%	19.76%
54	14.35%	20.41%	15.88%	22.71%	13.29%	19.13%
55	14.80%	21.06%	16.38%	23.43%	13.71%	19.73%
56 & Over	15.28%	21.74%	16.91%	24.18%	14.15%	20.37%
<i>COLA Loading:</i>		<i>42.28%</i>		<i>43.06%</i>		<i>43.90%</i>

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.7% at 57 formula, the compensation that can be taken into account for 2019 is equal to \$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)).

EXHIBIT IV – FUNDED PERCENTAGES BY RATE GROUP

The funded percentages on a valuation value of assets basis by rate group provided for informational purposes only are as follows:

	December 31, 2018 Valuation	December 31, 2017 Valuation
General Members		
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	80.75%	80.19%
Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	70.14%	70.12%
Rate Group #3 – Plans B, G, H and U (OCSD) ⁽¹⁾	98.91%	100.00%
Rate Group #5 – Plans A, B and U (OCTA)	75.00%	75.74%
Rate Group #9 – Plans M, N and U (TCA)	74.02%	74.76%
Rate Group #10 – Plans I, J, M, N and U (OCFA)	80.62%	76.08%
Rate Group #11 – Plans M and N, future service, and U (Cemetery)	99.65%	97.16%
Rate Group #12 – Plans G, H, future service, and U (Law Library)	97.84%	99.87%
Safety Members		
Rate Group #6 – Plans E, F and V (Probation)	70.34%	69.20%
Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	69.67%	69.30%
Rate Group #8 – Plans E, F, Q, R and V (OCFA)	78.70%	79.03%

⁽¹⁾ Reflects asset transfers of \$14,589,000 and \$24,042,000 as of December 31, 2018 and December 31, 2017, respectively, from O.C. Sanitation District UAAL Deferred Account to valuation assets.

EXHIBIT V – RECONCILIATION OF EMPLOYER CONTRIBUTION RATES BY RATE GROUP

The reconciliation of the employer contribution rates for the General Rate Groups #1 to #5 are as follows:

	RG #1 ⁽¹⁾	RG #2	RG #3	RG #5
Average Recommended Employer Contribution as of December 31, 2017 (before adjustments for phase-in)	19.92%	37.38%	12.27%	30.25%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>(1.69%)</u>	<u>(2.38%)</u>	<u>0.00%</u>	<u>(2.32%)</u>
Average Recommended Employer Contribution as of December 31, 2017 (after adjustments for phase-in)	18.23% ⁽²⁾	35.00%	12.27%	27.93%
• Effect of investment loss (after smoothing)	0.56%	0.87%	1.15%	0.84%
• Effect of additional UAAL contributions from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and UCI	(0.33%)	0.00%	0.00%	0.00%
• Effect of \$14.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	0.00%	0.00%	(1.41%)	0.00%
• Effect of difference in actual versus expected contributions (including loss from phase-in)	0.36%	0.52%	0.15%	0.53%
• Effect of difference in actual versus expected COLA increases	0.04%	0.08%	0.09%	0.09%
• Effect of difference in actual versus expected salary increases	(0.36%)	(0.47%)	(0.10%)	0.09%
• Effect of growth in total payroll greater than expected	(0.19%)	0.01%	0.00%	0.13%
• Effect of other experience (gain)/loss ^{(3),(4)}	(0.27%)	0.16%	0.83%	(0.24%)
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>0.85%</u>	<u>1.19%</u>	<u>0.00%</u>	<u>1.16%</u>
Total change	0.66%	2.36%	0.71%	2.60%
Average Recommended Employer Contribution as of December 31, 2018	18.89% ⁽⁵⁾	37.36%	12.98%	30.53%

⁽¹⁾ Liability associated with Vector Control has been excluded in determining rates for Rate Group #1.

⁽²⁾ As of December 31, 2017, the net contribution rate for County and IHSS Public Authority after reflecting Board's UAAL contribution rate policies for Cypress Parks and Recreation, U.C.I. and DOE is 14.95% after adjustment for phase-in.

⁽³⁾ Net of an adjustment to reflect 18-month delay between date of valuation and date of rate implementation for all actuarial experience.

⁽⁴⁾ Effect of other experience (gain)/loss for Rate Group #3 includes: 0.38% due to payee mortality losses.

⁽⁵⁾ As of December 31, 2018, the net contribution rate for County and IHSS Public Authority after reflecting Board's UAAL contribution rate policy for Cypress Parks and Recreation, U.C.I. and DOE is 15.40% after adjustment for phase-in.

EXHIBIT V – RECONCILIATION OF EMPLOYER CONTRIBUTION RATES BY RATE GROUP (CONTINUED)

The reconciliation of the employer contribution rates for the General Rate Groups #9 to #12 are as follows:

	RG #9	RG #10	RG #11	RG #12
Average Recommended Employer Contribution as of December 31, 2017 (before adjustments for phase-in)	25.61%	30.74%	13.45%	13.33%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>(1.25%)</u>	<u>(1.88%)</u>	<u>(0.96%)</u>	<u>0.00%</u>
Average Recommended Employer Contribution as of December 31, 2017 (after adjustments for phase-in)	24.36%	28.86%	12.49%	13.33%
• Effect of investment loss (after smoothing)	0.60%	0.83%	0.75%	1.18%
• Effect of additional UAAL contributions from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and UCI	0.00%	(2.63%)	0.00%	0.00%
• Effect of \$14.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	0.00%	0.00%	0.00%	0.00%
• Effect of difference in actual versus expected contributions (including loss from phase-in)	0.21%	0.03%	0.33%	(0.14%)
• Effect of difference in actual versus expected COLA increases	0.06%	0.10%	0.03%	0.05%
• Effect of difference in actual versus expected salary increases	0.22%	(0.04%)	(1.70%)	(0.66%)
• Effect of growth in total payroll greater than expected	0.88%	0.22%	0.04%	0.00%
• Effect of other experience (gain)/loss ^{(1),(2)}	0.61%	(0.31%)	(0.31%)	1.53%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>0.63%</u>	<u>0.94%</u>	<u>0.48%</u>	<u>0.00%</u>
Total change	3.21%	(0.86%)	(0.38%)	1.96%
Average Recommended Employer Contribution as of December 31, 2018	27.57%	28.00%	12.11%	15.29%

⁽¹⁾ Net of an adjustment to reflect 18-month delay between date of valuation and date of rate implementation for all actuarial experience.

⁽²⁾ Effect of other experience (gain)/loss for Rate Group #9 includes: 0.19% due to change in contribution delay adjustment. Rate Group #12 includes: 1.25% due to retirement loss for one member with a substantial amount of benefit based on the member's age and service at OCERS.

EXHIBIT V – RECONCILIATION OF EMPLOYER CONTRIBUTION RATES BY RATE GROUP (CONTINUED)

The reconciliation of the employer contribution rates for the Safety Rate Groups are as follows:

	RG #6	RG #7	RG #8
Average Recommended Employer Contribution as of December 31, 2017 (before adjustments for phase-in)	56.33%	65.72%	48.10%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>(4.26%)</u>	<u>(3.71%)</u>	<u>(2.29%)</u>
Average Recommended Employer Contribution as of December 31, 2017 (after adjustments for phase-in)	52.07%	62.01%	45.81%
• Effect of investment loss (after smoothing)	1.16%	1.40%	1.27%
• Effect of additional UAAL contributions from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and UCI	0.00%	0.00%	(0.73%)
• Effect of \$14.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	0.00%	0.00%	0.00%
• Effect of difference in actual versus expected contributions (including loss from phase-in)	1.05%	0.42%	0.06%
• Effect of difference in actual versus expected COLA increases	0.07%	0.14%	0.13%
• Effect of difference in actual versus expected salary increases	(1.47%)	0.08%	0.92%
• Effect of growth in total payroll greater than expected	0.96%	(0.44%)	(0.38%)
• Effect of other experience (gain)/loss ^{(1),(2)}	(0.60%)	(0.22%)	0.37%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>2.13%</u>	<u>1.85%</u>	<u>1.15%</u>
Total change	3.30%	3.23%	2.79%
Average Recommended Employer Contribution as of December 31, 2018	55.37%	65.24%	48.60%

⁽¹⁾ Net of an adjustment to reflect 18-month delay between date of valuation and date of rate implementation for all actuarial experience.

⁽²⁾ Effect of other experience (gain)/loss for Rate Group #6 includes: -0.45% due to change in contribution delay adjustment.

EXHIBIT VI – RECONCILIATION OF UAAL BY RATE GROUP

The reconciliation of UAAL for the General Rate Groups #1 to #5 are as follows (\$ in '000s):

	RG #1	RG #2	RG #3	RG #5
1 Unfunded Actuarial Accrued Liability at beginning of year	\$95,943	\$3,271,320	\$0	\$222,244
2 Total Normal Cost at middle of year	16,726	264,995	17,002	22,725
3 Expected employer and member contributions	(24,742)	(538,587)	(17,002)	(41,484)
4 Interest	<u>6,519</u>	<u>224,614</u>	<u>0</u>	<u>15,418</u>
5 Expected Unfunded Actuarial Accrued Liability at end of year	\$94,446	\$3,222,342	\$0	\$218,903
6 Changes due to:				
a) Investment losses (on smoothed value of assets)	\$6,920	\$138,109	\$11,899	\$12,442
b) Difference in actual versus expected contributions (including loss from phase-in)	4,442	81,756	1,500	7,863
c) Additional UAAL payments from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and UCI	(4,047)	0	0	0
d) Transfer from O.C. Sanitation District UAAL Deferred Account	0	0	(14,589)	0
e) Difference in actual versus expected salary increases	(4,473)	(73,793)	(1,042)	1,296
f) Difference in actual versus expected COLA increases	513	12,980	968	1,348
g) Other experience (gain)/loss ⁽¹⁾	<u>(1,345)</u>	<u>48,521</u>	<u>9,017</u>	<u>(631)</u>
Total changes	\$2,010	\$207,573	\$7,753	\$22,318
7 Unfunded Actuarial Accrued Liability at end of year	\$96,456	\$3,429,915	\$7,753	\$241,221

⁽¹⁾ Effect of other experience (gain)/loss for Rate Group #3 includes: \$3.9 million due to payee mortality losses.

EXHIBIT VI – RECONCILIATION OF UAAL BY RATE GROUP (CONTINUED)

The reconciliation of UAAL for the Safety Rate Groups are as follows (\$ in '000s):

	RG #9	RG #10	RG #11	RG #12
1 Unfunded Actuarial Accrued Liability at beginning of year	\$11,115	\$55,160	\$281	\$13
2 Total Normal Cost at middle of year	1,752	6,689	360	308
3 Expected employer and member contributions	(2,684)	(11,392)	(384)	(308)
4 Interest	<u>758</u>	<u>3,705</u>	<u>23</u>	<u>1</u>
5 Expected Unfunded Actuarial Accrued Liability at end of year	\$10,941	\$54,162	\$280	\$14
6 Changes due to:				
a) Investment losses (on smoothed value of assets)	\$599	\$3,186	\$174	\$181
b) Difference in actual versus expected contributions (including loss from phase-in)	210	111	75	(21)
c) Additional UAAL payments from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and UCI	0	(10,058)	0	0
d) Transfer from O.C. Sanitation District UAAL Deferred Account	0	0	0	0
e) Difference in actual versus expected salary increases	217	(144)	(391)	(102)
f) Difference in actual versus expected COLA increases	60	397	6	8
g) Other experience (gain)/loss	<u>363</u>	<u>(426)</u>	<u>(108)</u>	<u>153</u>
Total changes	\$1,449	\$(6,934)	\$(244)	\$219
7 Unfunded Actuarial Accrued Liability at end of year	\$12,390	\$47,228	\$36	\$233

EXHIBIT VI – RECONCILIATION OF UAAL BY RATE GROUP (CONTINUED)

The reconciliation of UAAL for the General Rate Groups #9 to #12 are as follows (\$ in '000s):

	RG #6	RG #7	RG #8
1 Unfunded Actuarial Accrued Liability at beginning of year	\$255,122	\$1,181,694	\$345,410
2 Total Normal Cost at middle of year	25,703	99,669	52,393
3 Expected employer and member contributions	(46,850)	(196,748)	(81,507)
4 Interest	<u>17,748</u>	<u>80,423</u>	<u>23,333</u>
5 Expected Unfunded Actuarial Accrued Liability at end of year	\$251,723	\$1,165,038	\$339,629
6 Changes due to:			
a) Investment losses (on smoothed value of assets)	\$10,430	\$48,313	\$23,655
b) Difference in actual versus expected contributions (including loss from phase-in)	9,491	14,417	1,095
c) Additional UAAL payments from Cypress Parks and Recreation and OCFA and anticipated payments from DOE and UCI	0	0	(13,569)
d) Transfer from O.C. Sanitation District UAAL Deferred Account	0	0	0
e) Difference in actual versus expected salary increases	(13,206)	2,710	17,020
f) Difference in actual versus expected COLA increases	675	4,868	2,456
g) Other experience (gain)/loss	<u>656</u>	<u>(979)</u>	<u>9,275</u>
Total changes	\$8,046	\$69,329	\$39,932
7 Unfunded Actuarial Accrued Liability at end of year	\$259,769	\$1,234,367	\$379,561

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