

Fresno County Employees' Retirement Association

**Actuarial Valuation and Review as of
June 30, 2018**

The logo for Segal Consulting is a large, dark blue, stylized arrow pointing to the right. It has a long, thin tail and a wider, triangular head. The text "Segal Consulting" is written in white, sans-serif font, positioned towards the right side of the arrow's head. A small white star icon is located to the left of the text.

★ Segal Consulting

This report has been prepared at the request of the Board of Retirement to assist in administering the Fund. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Retirement and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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December 10, 2018

*Board of Retirement
Fresno County Employees' Retirement Association
7772 N Palm Ave
Fresno, CA 93711*

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of June 30, 2018. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2019-2020 and analyzes the preceding year's experience.

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

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

The actuarial calculations were completed under the supervision of Andy Yeung, ASA, EA, MAAA, FCA. 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 the 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 Plan.

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
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JAC/gxk

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SECTION 1: Valuation Summary for the Fresno County Employees' Retirement Association

Purpose

This report has been prepared by Segal Consulting (Segal) to present a valuation of the Fresno County Employees' Retirement Association (FCERA or Association) as of June 30, 2018. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of the Association, as administered by the Board;
- The characteristics of covered active members, inactive vested members, retired members and beneficiaries as of June 30, 2018, provided by FCERA;
- The assets of the Plan as of June 30, 2018, provided by FCERA;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board for the June 30, 2018 valuation; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc. adopted by the Board for the June 30, 2018 valuation.

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

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

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Association's assets, liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by FCERA'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 Association's employer rates provide for both normal cost and a payment or credit to amortize any unfunded or overfunded actuarial accrued liabilities. In this valuation, we have continued with the Board's funding policy to amortize the Association's outstanding balance of the unfunded actuarial

SECTION 1: Valuation Summary for the Fresno County Employees' Retirement Association

accrued liability (UAAL) established as of June 30, 2003 over a declining period with 15 years remaining as of June 30, 2018. Any new UAAL established on each subsequent actuarial valuation after the June 30, 2003 valuation as a result of actuarial gains or losses, changes in actuarial assumptions or plan amendments⁽¹⁾ is amortized over separate 15-year declining periods.

Reference: Pgs. 89 - 95

A schedule of current amortization balances and payments may be found in Section 4, Appendix B. A graphical projection of the UAAL amortization bases and payments is shown in Appendix C. It should be noted that based on the projected UAAL payments, there will be an increase in the UAAL contribution rate in the 2019 valuation in excess of 4% of payroll. This is because the amortization credit from the 2004 Pension Obligation Bond proceeds is fully amortized as of that valuation.

The Actuarial Standards Board's Actuarial Standard of Practice (ASOP) No. 4 provides guidelines that actuaries have to follow when selecting actuarial assumptions. For a plan such as that offered by the Retirement Association that may utilize excess earnings to provide contribution rate offsets and additional settlement and non-statutory benefits, we are required to indicate in the valuation report that the possible impact of any such application of future excess earnings on the future financial condition of the plan has not been explicitly measured in the valuation.⁽²⁾

Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

Reference: Pgs. 97 - 98

- In 2016, the Board approved a three-year phase-in of the employer cost impact due to the changes in actuarial assumptions from the June 30, 2016 valuation. For the June 30, 2018 valuation, the phase-in has been completed. Note that the June 30, 2017 results shown in this valuation report other than Appendix E exclude the effect of the phase-in.

Reference: Pg. 47

- In this June 30, 2018 valuation, the UAAL has decreased from \$1,113.9 million to \$1,091.0 million when determined on a valuation (smoothed) value of assets basis. On a market value basis, the UAAL decreased from \$1,236.2 million to \$1,194.0 million. The funded ratio on a valuation value of assets basis has increased from 80.3% to 81.5%, while on a market value basis, the funded ratio has increased from 78.1% to 79.7%. A reconciliation of the Association's UAAL is provided in Section 3, Exhibit H.

⁽¹⁾ Prior to the Board's most recent review of actuarial funding policy in April 2011, a 30-year amortization period was used for plan amendments.

⁽²⁾ Under the Board's interest crediting policy, the balance of \$1,012.4 million (negative) in the Contra Tracking Account has to be fully restored before any excess earnings can be utilized in the future to provide any of the above offsets and benefits.

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Reference: Pg. 19

- Before considering the three-year employer contribution rate phase-in, the aggregate employer rate calculated in this valuation has increased from 55.10% of payroll to 55.81% of payroll. The reasons for this increase are: (i) lower than expected return on investments (based on valuation value of assets after smoothing), (ii) actual contributions less than expected,⁽³⁾ and (iii) other experience losses, offset to some degree by (iv) continuing active member salary increases less than expected and (vi) decrease in UAAL rate due to higher than expected increase in total payroll. A reconciliation of the Association's aggregate employer rate is provided in Section 2, Subsection D, Chart 15.

Reference: Pg. 20

- The aggregate member rate calculated in this valuation has decreased from 9.34% of payroll to 9.31% of payroll. The change in the aggregate member rate is due to changes in the demographics of the active membership. A reconciliation of the Association's aggregate member rate is provided in Section 2, Subsection D, see Chart 16.

Reference: Pg. 5

Reference: Pgs. 9 - 10

- As indicated in Section 2, Subsection B, Chart 7 of this report, the net total unrecognized investment losses as of June 30, 2018 are \$103.1 million compared to the net total unrecognized investment losses of \$122.3 million as of June 30, 2017. These investment losses will be recognized in the determination of the valuation value of assets for funding purposes in the next few years, and will offset any investment gains that may occur after June 30, 2018. If the Association earns the assumed net rate of investment return of 7.00% per year on a **market value** basis, that will result in investment losses on the valuation value of assets in the next few years. This means that, if the actual market return is equal to the assumed 7.00% rate and all other actuarial assumptions are met, the contribution requirements would increase in the next few years.
- The current unrecognized investment losses represent about 2.2% of the market value of assets. Unless offset by future investments gains or other favorable experience, the recognition of the \$103.1 million in past market losses is expected to have an impact on the Association's future funded ratio and the aggregate employer contributions. This potential impact may be illustrated as follows:
 - If the deferred losses were recognized immediately in the valuation value of assets, the funded percentage would decrease from 81.5% to 79.7%.

For comparison purposes, if all the deferred losses in the June 30, 2017 valuation had been recognized immediately in the June 30, 2017 valuation, the funded percentage would have decreased from 80.3% to 78.1%.

⁽³⁾ Primarily as a result of the first year of the three-year phase-in of the contribution rate impact of the assumption changes determined in the June 30, 2016 valuation, as paid in 2017-2018.

SECTION 1: Valuation Summary for the Fresno County Employees' Retirement Association

- If the deferred losses were recognized immediately in the actuarial value of assets, the aggregate employer contribution rate would increase from 55.8% of payroll to 57.9% of payroll.

For comparison purposes, if all the deferred losses in the June 30, 2017 valuation had been recognized immediately in the June 30, 2017 valuation, the aggregate employer contribution rate would have increased from 55.9% of payroll to 58.5% of payroll.

Reference: Pg. 71

- In preparing the breakdown of the total costs of the General Tier 1 plan into the cost to provide the “Regular” and the “Settlement” benefits, we have followed the FCERA practice of allocating the cost to provide a benefit under Section 31676.12 as the cost for the “Regular” benefit and allocating the difference between this “Regular” benefit cost and the cost to provide a benefit under Section 31676.14 plus Section 31627 as the “Settlement” benefit. In particular, this means that the difference between benefits under Sections 31676.12 and 31676.14 is considered “Settlement” and so under the Settlement Agreement could be funded out of future undistributed earnings. Based on discussions with Counsel, the Agreement might not be clear as to what should be considered the “Settlement” benefit. We will require guidance from the Board if and when the Board and Counsel consider the use of any future undistributed earnings to pay the cost of the “Settlement” benefit.
- The actuarial report as of June 30, 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.

SECTION 1: Valuation Summary for the Fresno County Employees' Retirement Association

Impact of Future Experience on Contribution Rates

Future contribution requirements may differ from those determined in the valuation because of:

- Difference between actual experience and anticipated experience;
- Changes in actuarial assumptions or methods;
- Changes in statutory provisions; and
- Difference between the contribution rates determined by the valuation and those adopted by the Board.

New Actuarial Standard of Practice on Risk Assessment

The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 will be effective with FCERA's June 30, 2019 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.

Prior to the next actuarial valuation, we will discuss with FCERA what information should be included in FCERA's risk report for the June 30, 2019 valuation.

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Summary of Key Valuation Results

	June 30, 2018		June 30, 2017	
Employer Contribution Rates:		Estimated		Estimated
	Total Rate	Annual Amount ⁽¹⁾	Total Rate	Annual Amount ⁽¹⁾
General Tier 1	56.69%	\$106,670,000	56.32%	\$105,973,000
General Tier 2	53.91%	4,785,000	53.52%	4,750,000
General Tier 3	53.87%	17,383,000	53.11%	17,137,000
General Tier 4	44.92%	6,355,000	44.03%	6,229,000
General Tier 5	43.05%	50,235,000	42.42%	49,500,000
Safety Tier 1	83.37%	35,184,000	81.75%	34,501,000
Safety Tier 2	83.81%	3,893,000	81.86%	3,803,000
Safety Tier 4	68.75%	2,952,000	66.59%	2,858,000
Safety Tier 5	66.02%	13,465,000	64.23%	13,100,000
All categories combined	55.81%	240,922,000	55.10%	237,851,000
Average Member Contribution Rates:		Estimated		Estimated
	Total Rate	Annual Amount ⁽¹⁾	Total Rate	Annual Amount ⁽¹⁾
General Tier 1	9.88%	\$18,590,000	9.93%	\$18,684,000
General Tier 2	7.10%	630,000	7.22%	641,000
General Tier 3	8.00%	2,581,000	7.99%	2,578,000
General Tier 4	7.08%	1,002,000	7.06%	999,000
General Tier 5	7.17%	8,367,000	7.23%	8,437,000
Safety Tier 1	13.31%	5,617,000	13.18%	5,562,000
Safety Tier 2	11.64%	541,000	11.61%	539,000
Safety Tier 4	10.08%	433,000	10.09%	433,000
Safety Tier 5	11.92%	2,431,000	12.07%	2,462,000
All categories combined	9.31%	40,192,000	9.34%	40,335,000
Funded Status:				
Actuarial accrued liability ⁽²⁾	\$5,893,909,000		\$5,643,444,000	
Valuation value of assets (VVA) ⁽³⁾	4,802,958,000		4,529,508,000	
Market value of assets (MVA) ⁽³⁾	4,699,871,000		4,407,222,000	
Funded percentage on a VVA basis	81.5%		80.3%	
Funded percentage on a MVA basis	79.7%		78.1%	
Unfunded actuarial accrued liability on a VVA basis	\$1,090,951,000		\$1,113,936,000	
Unfunded actuarial accrued liability on a MVA basis	1,194,038,000		1,236,222,000	
Key Economic Assumptions:				
Interest rate	7.00%		7.00%	
Inflation rate	3.00%		3.00%	
Across-the-board salary increase	0.50%		0.50%	

⁽¹⁾ Based on June 30, 2018 projected annual compensation.

⁽²⁾ Excludes liabilities for non-vested supplemental benefits.

⁽³⁾ Excludes non-valuation reserve: contingency reserve, if any.

SECTION 1: Valuation Summary for the Fresno County Employees' Retirement Association

Summary of Key Valuation Demographic and Financial Data

	June 30, 2018	June 30, 2017	Change From Prior Year
Active Members:			
Number of members	7,458	7,353	1.4%
Average age	42.6	43.0	-0.4
Average service	10.2	10.4	-0.2
Projected total compensation	\$431,678,317	\$413,760,698	4.3%
Average projected compensation	57,881	56,271	2.9%
Retired Member and Beneficiaries:			
Number of members:			
Service retired	6,074	5,902	2.9%
Disability retired	401	377	6.4%
Beneficiaries	970	921	5.3%
Total	7,445	7,200	3.4%
Average age	69.6	69.4	0.2
Average monthly benefit ⁽¹⁾	\$3,023	\$2,919	3.6%
Vested Terminated Members:			
Number of vested terminated members ⁽²⁾	3,627	3,411	6.3%
Average age	44.9	45.1	-0.2
Summary of Financial Data:			
Market value of assets ⁽³⁾	\$4,699,871,406	\$4,407,221,766	6.6%
Return on market value of assets	7.11%	10.44%	N/A
Actuarial value of assets ⁽³⁾	\$4,802,958,346	\$4,529,508,479	6.0%
Return on actuarial value of assets	6.49%	6.35%	N/A
Valuation value of assets	\$4,802,958,346	\$4,529,508,479	6.0%
Return on valuation value of assets	6.49%	6.36%	N/A

(1) Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

(2) Includes members who left their contributions on deposit with less than five years of service.

(3) Includes non-valuation reserve: contingency reserve, if any.

SECTION 1: Valuation Summary for the Fresno County Employees' Retirement Association

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 an actuarial 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. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan description in this report to confirm that Segal has correctly interpreted the plan provisions.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by FCERA. 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** This valuation is based on the market value of assets as of the valuation date, as provided by FCERA.
- **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 valuation is prepared at the request of the FCERA. Segal is not responsible for the use or misuse of its report, particularly by any other party.

SECTION 1: Valuation Summary for the Fresno County Employees' Retirement Association

- 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.
- If FCERA is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.

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

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

A. MEMBER DATA

The actuarial valuation and review considers the number and demographic characteristics of covered members, including active members, vested terminated 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.

A historical perspective of how the member population has changed over the past ten valuations can be seen in this chart.

CHART 1

Member Population: 2009 – 2018

Year Ended June 30	Active Members	Vested Terminated Members	Retired Members and Beneficiaries	Ratio of Non-Actives to Actives
2009	7,407	1,460	5,322	0.92
2010	6,946	1,452	5,636	1.02
2011	6,763	1,414	5,887	1.08
2012	6,677	1,375	6,235	1.14
2013	6,866	1,295	6,363	1.12
2014	6,968	1,380	6,570	1.14
2015	7,001	3,163 ⁽¹⁾	6,839	1.43
2016	7,297	3,289	7,032	1.41
2017	7,353	3,411	7,200	1.44
2018	7,458	3,627	7,445	1.48

⁽¹⁾ Effective June 30, 2015, includes terminated members under age 70 only due a refund of member contributions.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 7,458 active members with an average age of 42.6 years, average years of service of 10.2 and average compensation of \$57,881. The 7,353 active members in the prior valuation had an average age of 43.0 years, average years of service of 10.4 and average compensation of \$56,271.

Inactive Members

In this year's valuation, there were 3,627 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their member contributions versus 3,411 in the prior valuation.

These graphs show a distribution of active members by age and by years of service.

CHART 2

Distribution of Active Members by Age as of June 30, 2018

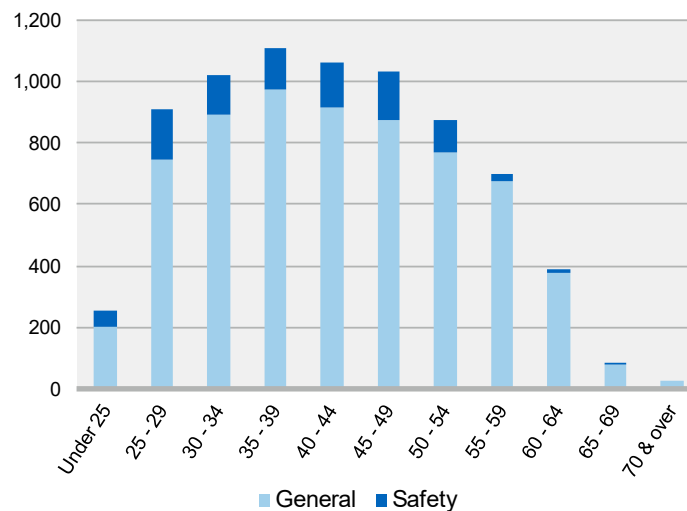
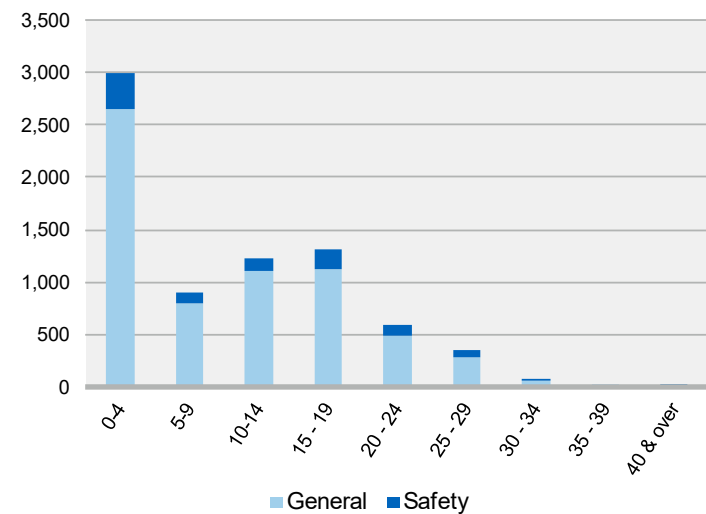


CHART 3

Distribution of Active Members by Years of Service as of June 30, 2018



SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

Retired Members and Beneficiaries

As of June 30, 2018, 6,475 retired members and 970 beneficiaries were receiving total monthly benefits of \$22,506,432. For comparison, in the previous valuation, there were 6,279 retired members and 921 beneficiaries receiving monthly benefits of \$21,013,868.

These graphs show a distribution of the current retired members based on their monthly amount and age, by type of pension.

CHART 4

Distribution of Retired Members by Type and by Monthly Amount as of June 30, 2018

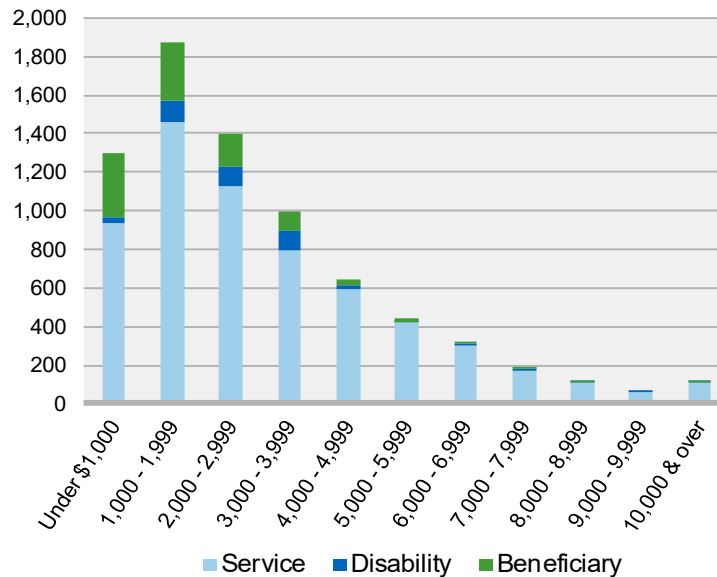
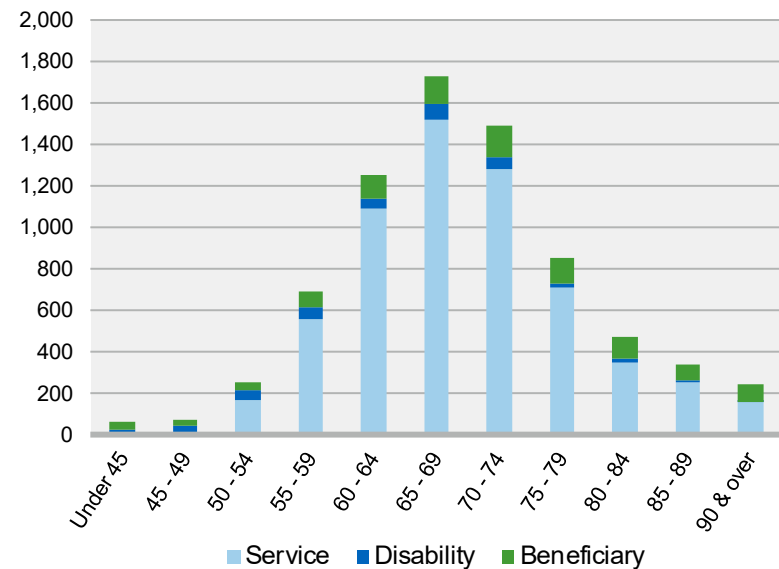


CHART 5

Distribution of Retired Members by Type and by Age as of June 30, 2018



SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

B. FINANCIAL INFORMATION

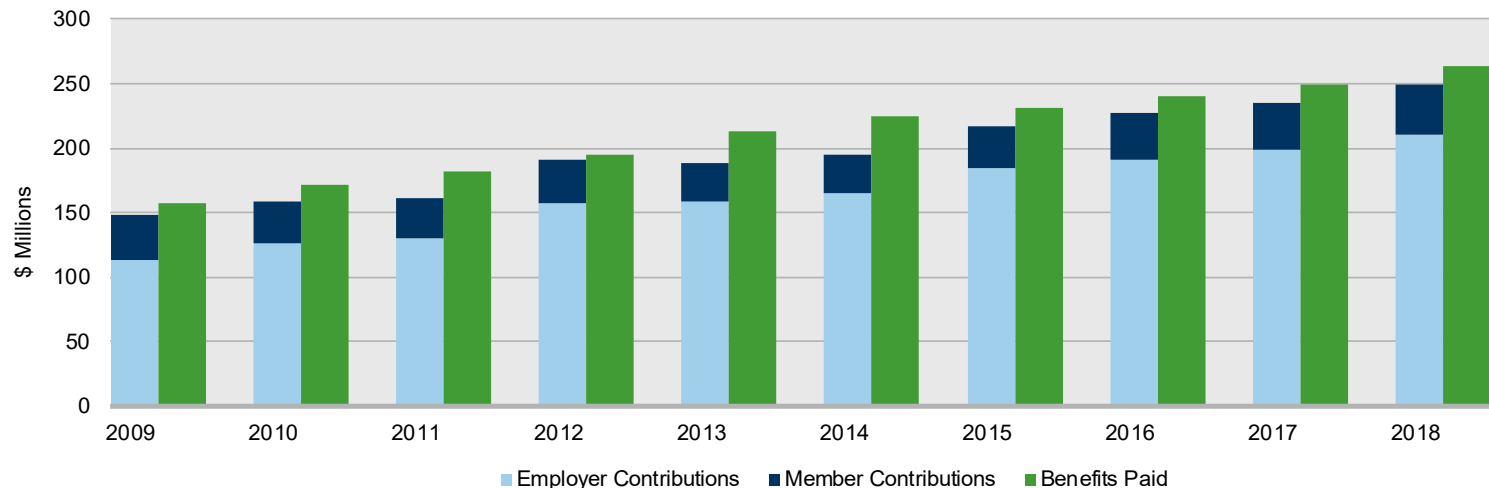
Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses starting in 2016) and net investment earnings (less investment expenses) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

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

The chart depicts two components of changes in the actuarial value of assets over the last ten years. Note: The first bar represents increases in assets due to contributions during each year while the second bar details the decreases due to benefit payments.

CHART 6

Comparison of Contributions with Benefits for Years Ended June 30, 2009 – 2018



SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

CHART 7

Determination of Actuarial Value of Assets for Year Ended June 30, 2018

Six Month Period		Total Actual	Expected Market	Investment	Deferred	Deferred	
From	To	Market Return (net)	Return (net) ⁽¹⁾	Gain (Loss)	Factor	Return	
1/1/2014	6/30/2014	\$184,000,262	\$150,143,559	\$33,856,703	0.1	\$3,385,670	
7/1/2014	12/31/2014	(49,012,922)	146,717,748	(195,730,670)	0.2	(39,146,134)	
1/1/2015	6/30/2015	45,076,629	144,685,951	(99,609,322)	0.3	(29,882,797)	
7/1/2015	12/31/2015	(150,074,689)	146,021,073	(296,095,762)	0.4	(118,438,305)	
1/1/2016	6/30/2016	145,755,632	140,249,099	5,506,533	0.5	2,753,266	
7/1/2016	12/31/2016	92,367,225	145,213,925	(52,846,700)	0.6	(31,708,020)	
1/1/2017	6/30/2017	325,236,505	148,201,950	177,034,556	0.7	123,924,189	
7/1/2017	12/31/2017	255,148,692	154,139,232	101,009,461	0.8	80,807,569	
1/1/2018	6/30/2018	57,407,321	162,721,074	(105,313,754)	0.9	(94,782,378)	
1.	Total Deferred Return ⁽²⁾						\$(103,086,939)
2.	Net Market Value						4,699,871,406
3.	Actuarial Value of Assets (Item 2 – Item 1)						4,802,958,346
4.	Actuarial Value (before corridor) as a percentage of Market Value						102.2%
5.	Actuarial Value of Assets – Corridor Limits:						
	a.	Lower Limit – 70% of Net Market Value				\$3,289,909,985	
	b.	Upper Limit – 130% of Net Market Value				6,109,832,828	
6.	Actuarial Value of Assets (within corridor)						4,802,958,346
7.	Non-valuation reserves and designations:						
	a.	Reserve for Interest Fluctuations (Contingency Reserve), Limited to No Less Than \$0				\$0	
	b.	Board Contingency Reserve/Undistributed Earnings (“Available Earnings”)				0	
	c.	Supplemental COLA				0	
	d.	Retiree Health Benefit (BOR)				0	
	e.	Subtotal				\$0	
8.	Valuation Value of Assets (Item 6 – Item 7e)						\$4,802,958,346

⁽¹⁾ The expected market return has been calculated by FCERA using an investment return assumption consistent with that used in the applicable actuarial valuation to set the employer and employee contribution rates for that period.

⁽²⁾ The amounts of deferred return that will be recognized in each subsequent valuation are as follows:

6/30/2019	\$(89,823,461)	6/30/2022	16,842,597
6/30/2020	(44,102,065)	6/30/2023	(10,531,375)
6/30/2021	24,527,366	Total	\$(103,086,939)

Note: Results may not total properly due to rounding.

The chart shows the determination of the actuarial value of assets as of the valuation date.

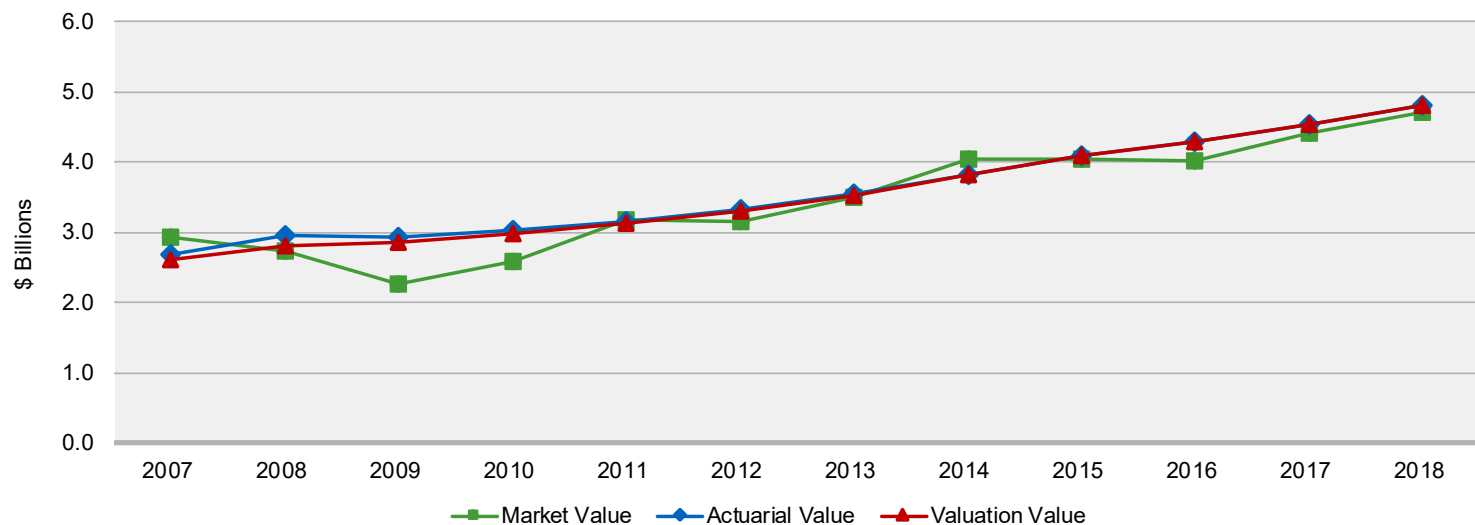
SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

The market value, actuarial value, and valuation value of assets are representations of the FCERA's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets, but with less volatility. The valuation value of assets is the actuarial value, excluding any non-valuation reserves. The valuation asset value is significant because FCERA'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.

This chart shows the change in the market value, actuarial value and valuation value over the past twelve years.

CHART 8

Relative Values of Market Value, Actuarial Value and Valuation Value of Assets for Years Ended June 30, 2007 – 2018



SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

C. ACTUARIAL EXPERIENCE

To calculate the required 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 contribution requirement will decrease from the previous year. On the other hand, the contribution requirement 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.

The total experience loss is \$56.7 million, a \$23.0 million loss from investments, a loss of \$22.3 million from contribution experience and a \$11.4 million loss from all other sources. The net experience variation from individual sources other than investment and contribution experience was 0.2% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

CHART 9

Actuarial Experience for Year Ended June 30, 2018

1. Net (loss) from investments ⁽¹⁾	\$ (23,013,000)
2. Net (loss) from contribution experience	(22,325,000)
3. Net (loss) from other experience ⁽²⁾	<u>(11,401,000)</u>
4. Net experience (loss): (1) + (2) + (3)	<u>\$ (56,739,000)</u>

⁽¹⁾ Details in Chart 10.

⁽²⁾ See Section 3, Exhibit H for further details. Does not include the effect of plan, assumption or method changes, if any.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

Investment Rate of Return

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 FCERA's investment policy. For valuation purposes, the assumed rate of return was 7.00% (based on the June 30, 2017 valuation). The actual rate of return on a valuation basis for the 2017-2018 plan year was 6.49%.

Since the actual return for the year was less than the assumed return, FCERA experienced an actuarial loss on the valuation value of assets during the year ended June 30, 2018 with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

CHART 10

Investment Experience for Year Ended June 30, 2018 – Market, Actuarial and Valuation Value of Assets

	Market Value	Actuarial Value	Valuation Value
1. Actual return	\$312,556,012	\$293,356,239	\$293,356,239
2. Average value of assets	4,397,268,580	4,519,555,293	4,519,555,293
3. Actual rate of return: (1) ÷ (2)	7.11%	6.49%	6.49%
4. Assumed rate of return	7.00%	7.00%	7.00%
5. Expected return: (2) x (4)	307,808,801	316,368,871	316,368,871
6. Actuarial gain/(loss): (1) – (5)	<u>\$4,747,211</u>	<u>\$(23,012,632)</u>	<u>\$(23,012,632)</u>

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

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 a market, actuarial, and valuation basis for the last ten years.

CHART 11

Investment Return – Market Value, Actuarial Value and Valuation Value: 2009 – 2018

Year Ended June 30	Market Value Investment Return		Actuarial Value Investment Return		Valuation Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent
2009	\$(455,354,552)	(16.73%)	\$6,924,705	0.24%	\$54,209,327	1.93%
2010	337,869,234	14.98%	100,789,315	3.44%	123,408,438	4.31%
2011	601,313,325	23.34%	144,184,272	4.78%	144,184,273	4.84%
2012	(13,839,384)	(0.44%)	187,138,723	5.94%	187,137,138	6.01%
2013	374,807,596	11.95%	229,380,360	6.91%	229,380,360	6.96%
2014	579,606,657	16.63%	318,423,932	9.03%	315,164,400	8.98%
2015	(3,936,293)	(0.10%)	278,588,356	7.29%	279,206,627	7.31%
2016	(4,319,056)	(0.11%)	203,088,149	4.97%	203,089,850	4.97%
2017	417,603,730	10.44%	271,225,694	6.35%	271,333,784	6.36%
2018	312,556,012	7.11%	293,356,239	6.49%	293,356,239	6.49%
Five-Year Average Return		6.60%		6.82%		6.81%
Ten-Year Average Return		6.13%		5.52%		5.80%

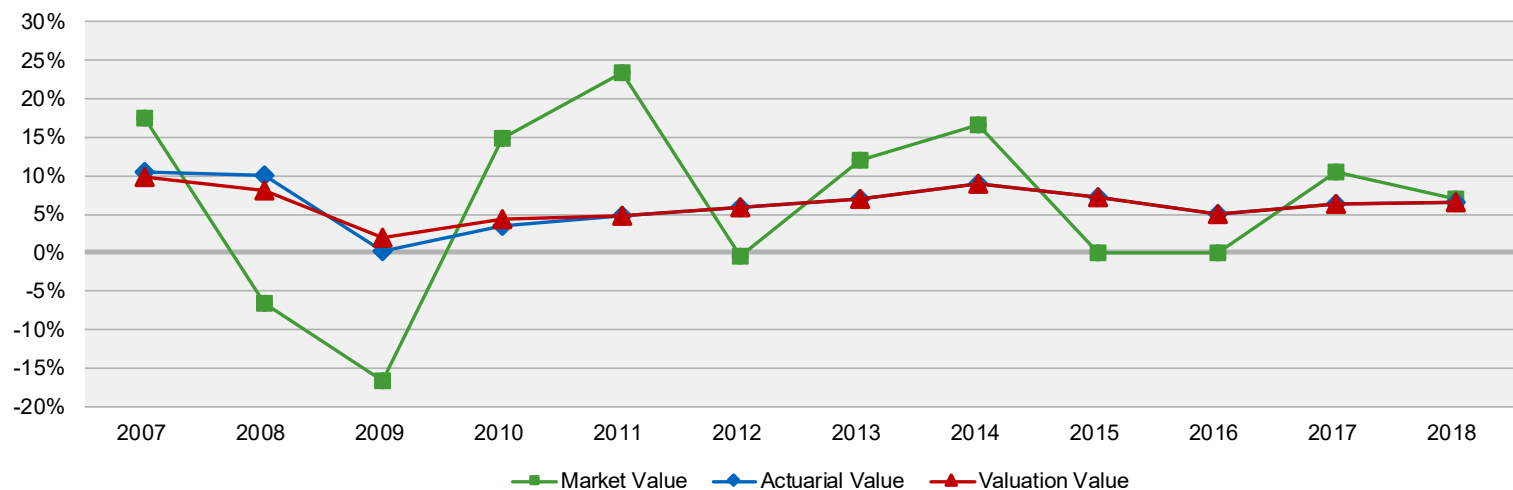
SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

This chart illustrates how this leveling effect has actually worked over the years 2007 - 2018.

CHART 12

Market, Actuarial and Valuation Rates of Return for Years Ended June 30, 2007 – 2018



SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

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 the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements,
- salary increases different than assumed, and
- COLA increases for retirees different than assumed.

The net loss from this other experience for the year ended June 30, 2018 amounted to \$11.4 million which is 0.2% of the actuarial accrued liability. See Exhibit H for a detailed development of the unfunded actuarial accrued liability.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

D. EMPLOYER AND MEMBER CONTRIBUTIONS

Employer contributions consist of two components:

Normal Cost

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

Contribution to the Unfunded Actuarial Accrued Liability (UAAL)

The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the Association) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase at the annual rate of 3.50% (i.e., 3.00% inflation plus 0.50% real across-the-board salary increase). The UAAL established as of the June 30, 2003 valuation is being amortized over a declining period with 15 years remaining as of June 30, 2018. Any new UAAL established on each subsequent valuation after June 30, 2003 as a result of actuarial gains or losses, changes in actuarial assumptions or plan amendments⁽¹⁾ are amortized over separate 15-year declining periods.

The recommended employer contributions are provided on Chart 13.

All employer contribution rates shown in this report other than Appendix E are before reflecting the three-year phase-in of the effect of the changes in actuarial assumptions from the June 30, 2016 valuation.

⁽¹⁾ Prior to the Board's most recent review of actuarial funding policy in April 2011, a 30-year amortization period was used for plan amendments.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

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 for the Regular benefit 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 One-Year Average Final Compensation at age 60 for General Tier 1
- 1/240 of One-Year Average Final Compensation at age 60 for General Tier 2
- 1/200 of Three-Year Average Final Compensation at age 55 for General Tier 3
- 1/120 of Three-Year Average Final Compensation at age 60 for General Tier 4
- 1/200 of One-Year Average Final Compensation at age 50 for Safety Tiers 1 and 2
- 1/100 of Three-Year Average Final Compensation at age 50 for Safety Tier 4

In addition, as a result of the Settlement Agreement, General Tier 1 and Safety Tier 1 members are required to make additional basic contributions in order to receive the Settlement Benefit. The total basic Regular plus Settlement rate is:

- 1/160 of One-Year Average Final Compensation at age 55 for General Tier 1
- 1/160 of One-Year Average Final Compensation at age 50 for Safety Tier 1

It is assumed that contributions are made annually at the same rate, starting at entry age. In addition to their basic contributions, members in Tiers 1, 2 and 3 pay one-half of the total normal cost necessary to fund their cost-of-living benefits. There are no cost-of-living benefits provided in General and Safety Tiers 4. Accumulation includes semi-annual crediting of interest at the assumed investment earning rate.

CalPEPRA Members

Pursuant to Section 7522.30(a) of the Government Code, General and Safety Tiers 5 (i.e., CalPEPRA tiers) members are required to contribute at least 50% of the Normal Cost rate. In addition, there are certain additional requirements that would have to be met such as requiring the new employees to pay the contribution rate of "similarly situated employees", if it is greater. (reference: Section 7522.30(c)). We further

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

understand that different rules may have to be applied for collectively bargained employees, non-represented, managerial or other supervisory employees. (reference: Section 7522.30(e)). In preparing the Normal Cost rates in this report, we have assumed that exactly 50% of the Normal Cost would be paid by the new members and we have taken into account in this valuation only the requirements of Section 7522.30(c), but not requirements of Section 7522.30(e).

The member contribution rates are provided in Appendix A.

Administrative Expense

The Board adopted an explicit administrative expense assumption of 1.10% of payroll effective with the June 30, 2014 valuation. At the last review of the Economic Actuarial Assumptions Report as of June 30, 2016, the Board acted to continue the same administrative expense assumption of 1.10% of payroll.

This explicit administrative expense is allocated to both the employer and member based on the components of the total average contribution rate (before expenses) for the employer and member. This results in an administrative expense load shown in the following table:

	<u>Average Contribution Rates Before Administrative Expense</u>	<u>Weighting</u>	<u>Total Loading</u>
Employer	54.87%	85.71%	0.94%
Member	9.15%	<u>14.29%</u>	<u>0.16%</u>
		100.00%	1.10%

Under this approach, the employer Normal Cost rate is then increased by the same percent of payroll as the member rate with the remaining employer loading allocated to the employer UAAL rate. The administrative expense load has been added to the Regular rates. The table below shows this allocation.

<u>Allocation of Administrative Expense Load as % of Payroll</u>	
Addition to Employer Basic Normal Cost Rate	0.16%
Addition to Employer Basic UAAL Rate	0.78%
Addition to Member Basic Rate	<u>0.16%</u>
Total Addition to Contribution Rates	1.10%

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

CHART 13

Recommended Employer Contribution Rates (Dollar Amounts in Thousands)

	June 30, 2018 ⁽¹⁾						June 30, 2017 ⁽¹⁾	
	REGULAR		SETTLEMENT		TOTAL		REGULAR & SETTLEMENT	
	Rate	Estimated Annual Amount ⁽²⁾	Rate	Estimated Annual Amount ⁽²⁾	Rate	Estimated Annual Amount ⁽²⁾	Rate	Estimated Annual Amount ⁽²⁾
General Tier 1 Members								
Normal Cost	15.85%	\$29,825	4.96%	\$9,332	20.81%	\$39,157	21.13%	\$39,759
UAAL	<u>30.72%</u>	<u>57,804</u>	<u>5.16%</u>	<u>9,709</u>	<u>35.88%</u>	<u>67,513</u>	<u>35.19%</u>	<u>66,214</u>
Total Contribution	46.57%	\$87,629	10.12%	\$19,041	56.69%	\$106,670	56.32%	\$105,973
General Tier 2 Members								
Normal Cost	17.80%	\$1,580	0.23%	\$20	18.03%	\$1,600	18.33%	\$1,627
UAAL	<u>30.72%</u>	<u>2,727</u>	<u>5.16%</u>	<u>458</u>	<u>35.88%</u>	<u>3,185</u>	<u>35.19%</u>	<u>3,123</u>
Total Contribution	48.52%	\$4,307	5.39%	\$478	53.91%	\$4,785	53.52%	\$4,750
General Tier 3 Members								
Normal Cost	17.67%	\$5,702	0.32%	\$103	17.99%	\$5,805	17.92%	\$5,782
UAAL	<u>30.72%</u>	<u>9,913</u>	<u>5.16%</u>	<u>1,665</u>	<u>35.88%</u>	<u>11,578</u>	<u>35.19%</u>	<u>11,355</u>
Total Contribution	48.39%	\$15,615	5.48%	\$1,768	53.87%	\$17,383	53.11%	\$17,137
General Tier 4 Members								
Normal Cost	9.04%	\$1,279	0.00%	\$0	9.04%	\$1,279	8.84%	\$1,251
UAAL	<u>30.72%</u>	<u>4,346</u>	<u>5.16%</u>	<u>730</u>	<u>35.88%</u>	<u>5,076</u>	<u>35.19%</u>	<u>4,978</u>
Total Contribution	39.76%	\$5,625	5.16%	\$730	44.92%	\$6,355	44.03%	\$6,229
General Tier 5 Members								
Normal Cost	7.17%	\$8,367	0.00%	\$0	7.17%	\$8,367	7.23%	\$8,437
UAAL	<u>30.72%</u>	<u>35,847</u>	<u>5.16%</u>	<u>6,021</u>	<u>35.88%</u>	<u>41,868</u>	<u>35.19%</u>	<u>41,063</u>
Total Contribution	37.89%	\$44,214	5.16%	\$6,021	43.05%	\$50,235	42.42%	\$49,500

⁽¹⁾ The Regular Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense of 0.16% and 0.78% of payroll, respectively.

⁽²⁾ Amounts are in thousands and are based on June 30, 2018 projected annual compensation shown on the following page.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

CHART 13 (continued)

Recommended Employer Contribution Rates (Dollar Amounts in Thousands)

	June 30, 2018 ⁽¹⁾						June 30, 2017 ⁽¹⁾	
	REGULAR		SETTLEMENT		TOTAL		REGULAR & SETTLEMENT	
	Rate	Estimated Annual Amount ⁽²⁾	Rate	Estimated Annual Amount ⁽²⁾	Rate	Estimated Annual Amount ⁽²⁾	Rate	Estimated Annual Amount ⁽²⁾
Safety Tier 1 Members								
Normal Cost	23.55%	\$9,939	5.72%	\$2,414	29.27%	\$12,353	29.59%	\$12,488
UAAL	<u>47.42%</u>	<u>20,012</u>	<u>6.68%</u>	<u>2,819</u>	<u>54.10%</u>	<u>22,831</u>	<u>52.16%</u>	<u>22,013</u>
Total Contribution	70.97%	\$29,951	12.40%	\$5,233	83.37%	\$35,184	81.75%	\$34,501
Safety Tier 2 Members								
Normal Cost	29.46%	\$1,368	0.25%	\$12	29.71%	\$1,380	29.70%	\$1,380
UAAL	<u>47.42%</u>	<u>2,202</u>	<u>6.68%</u>	<u>311</u>	<u>54.10%</u>	<u>2,513</u>	<u>52.16%</u>	<u>2,423</u>
Total Contribution	76.88%	\$3,570	6.93%	\$323	83.81%	\$3,893	81.86%	\$3,803
Safety Tier 4 Members								
Normal Cost	14.45%	\$620	0.20%	\$9	14.65%	\$629	14.43%	\$619
UAAL	<u>47.42%</u>	<u>2,036</u>	<u>6.68%</u>	<u>287</u>	<u>54.10%</u>	<u>2,323</u>	<u>52.16%</u>	<u>2,239</u>
Total Contribution	61.87%	\$2,656	6.88%	\$296	68.75%	\$2,952	66.59%	\$2,858
Safety Tier 5 Members								
Normal Cost	11.92%	\$2,431	0.00%	\$0	11.92%	\$2,431	12.07%	\$2,462
UAAL	<u>47.42%</u>	<u>9,671</u>	<u>6.68%</u>	<u>1,363</u>	<u>54.10%</u>	<u>11,034</u>	<u>52.16%</u>	<u>10,638</u>
Total Contribution	59.34%	\$12,102	6.68%	\$1,363	66.02%	\$13,465	64.23%	\$13,100
All Categories Combined								
Normal Cost	14.16%	\$61,111	2.75%	\$11,890	16.91%	\$73,001	17.10%	\$73,805
UAAL	<u>33.49%</u>	<u>144,558</u>	<u>5.41%</u>	<u>23,363</u>	<u>38.90%</u>	<u>167,921</u>	<u>38.00%</u>	<u>164,046</u>
Total Contribution	47.65%	\$205,669	8.16%	\$35,253	55.81%	\$240,922	55.10%	\$237,851

⁽¹⁾ The Regular Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense of 0.16% and 0.78% of payroll, respectively.

⁽²⁾ Amounts are in thousands and are based on June 30, 2018 projected annual compensation (also in thousands):

General Tier 1	\$188,162	Safety Tier 1	42,202
General Tier 2	8,876	Safety Tier 2	4,645
General Tier 3	32,268		
General Tier 4	14,147	Safety Tier 4	4,293
General Tier 5	116,690	Safety Tier 5	20,395
Total Compensation		\$431,678	

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

CHART 14

Breakdown of Employer Contribution Rate Into Basic and COLA

	General									
	June 30, 2018					June 30, 2017				
	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Normal Cost										
Regular - Basic	12.48%	14.41%	14.12%	8.88%	7.01%	12.67%	14.68%	14.08%	8.68%	7.07%
Regular - COLA	3.21%	3.23%	3.39%	0.00%	0.00%	3.24%	3.23%	3.36%	0.00%	0.00%
Section 6	4.59%	0.00%	0.00%	0.00%	0.00%	4.68%	0.00%	0.00%	0.00%	0.00%
Section 8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Section 9	0.37%	0.23%	0.32%	0.00%	0.00%	0.38%	0.26%	0.32%	0.00%	0.00%
Administrative Expense	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%
Subtotal	20.81%	18.03%	17.99%	9.04%	7.17%	21.13%	18.33%	17.92%	8.84%	7.23%
UAAL										
Regular – Basic	19.37%	19.37%	19.37%	19.37%	19.37%	19.01%	19.01%	19.01%	19.01%	19.01%
Regular – COLA	10.57%	10.57%	10.57%	10.57%	10.57%	10.23%	10.23%	10.23%	10.23%	10.23%
Section 6	4.16%	4.16%	4.16%	4.16%	4.16%	4.20%	4.20%	4.20%	4.20%	4.20%
Section 8	-0.09%	-0.09%	-0.09%	-0.09%	-0.09%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%
Section 9	1.09%	1.09%	1.09%	1.09%	1.09%	1.00%	1.00%	1.00%	1.00%	1.00%
Administrative Expense	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%
Subtotal	35.88%	35.88%	35.88%	35.88%	35.88%	35.19%	35.19%	35.19%	35.19%	35.19%
Total	56.69%	53.91%	53.87%	44.92%	43.05%	56.32%	53.52%	53.11%	44.03%	42.42%

Note: Please refer to Section 4, Exhibit III for definition of Regular and Settlement Sections 6, 8 and 9 benefits.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

CHART 14 (continued)

Breakdown of Employer Contribution Rate Into Basic and COLA

	Safety							
	June 30, 2018				June 30, 2017			
	Tier 1	Tier 2	Tier 4	Tier 5	Tier 1	Tier 2	Tier 4	Tier 5
Normal Cost								
Regular - Basic	18.53%	23.20%	14.29%	11.76%	18.71%	23.18%	14.07%	11.91%
Regular - COLA	4.86%	6.10%	0.00%	0.00%	4.97%	6.11%	0.00%	0.00%
Section 6	5.40%	0.00%	0.00%	0.00%	5.43%	0.00%	0.00%	0.00%
Section 8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Section 9	0.32%	0.25%	0.20%	0.00%	0.32%	0.25%	0.20%	0.00%
Administrative Expense	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%
Subtotal	29.27%	29.71%	14.65%	11.92%	29.59%	29.70%	14.43%	12.07%
UAAL								
Regular – Basic	21.17%	21.17%	21.17%	21.17%	20.92%	20.92%	20.92%	20.92%
Regular – COLA	25.47%	25.47%	25.47%	25.47%	23.91%	23.91%	23.91%	23.91%
Section 6	5.68%	5.68%	5.68%	5.68%	5.58%	5.58%	5.58%	5.58%
Section 8	-0.09%	-0.09%	-0.09%	-0.09%	-0.03%	-0.03%	-0.03%	-0.03%
Section 9	1.09%	1.09%	1.09%	1.09%	1.00%	1.00%	1.00%	1.00%
Administrative Expense	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%
Subtotal	54.10%	54.10%	54.10%	54.10%	52.16%	52.16%	52.16%	52.16%
Total	83.37%	83.81%	68.75%	66.02%	81.75%	81.86%	66.59%	64.23%

Note: Please refer to Section 4, Exhibit III for definition of Regular and Settlement Sections 6, 8 and 9 benefits.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

The employer contribution rates as of June 30, 2018 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

Reconciliation of Recommended Average Employer Contribution

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

CHART 15

Reconciliation of Recommended Average Employer Contribution from June 30, 2017 to June 30, 2018 (Dollars in Thousands)

	Contribution Rate	Estimated Amount ⁽¹⁾
Recommended Contribution Rate as of June 30, 2017	55.10% ⁽²⁾	\$237,851
Effect of actuarial experience during 2017-2018:		
1. Effect of investment loss on valuation value of assets ⁽³⁾	0.46%	\$1,986
2. Effect of actual contributions less than expected ⁽⁴⁾	0.45%	1,943
3. Effect of salary increases less than expected during 2017-2018	(0.07%)	(302)
4. Effect of decrease in UAAL rate due to higher than expected increase in total payroll	(0.30%)	(1,295)
5. Effect of other experience losses ⁽⁵⁾	<u>0.17%</u>	<u>739</u>
Subtotal	0.71%	\$3,071
Recommended Contribution Rate as of June 30, 2018	55.81%	\$240,922

⁽¹⁾ Based on June 30, 2018 projected annual compensation of \$431,678.

⁽²⁾ Before reflecting three-year phase-in of the employer cost impact due to the changes in actuarial assumptions from the June 30, 2016 valuation.

⁽³⁾ Return on valuation value of assets of 6.49% was less than the 7.00% assumed rate of return.

⁽⁴⁾ Primarily as a result of the first year of the three-year phase-in of the contribution rate impact of the assumption changes determined in the June 30, 2016 valuation, as paid in 2017-2018.

⁽⁵⁾ Includes a reduction in normal cost of 0.19% from change in active member demographics.

The chart reconciles the employer contribution from the prior valuation to the amount determined in this valuation.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

The member contribution rates as of June 30, 2018 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

Reconciliation of Recommended Average Member Contribution Rate

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

CHART 16

Reconciliation of Recommended Average Member Contribution from June 30, 2017 to June 30, 2018 (Dollar Amounts in Thousands)

	Contribution Rate	Estimated Amount ⁽¹⁾
Average Contribution Rate as of June 30, 2017	9.34%	\$40,335
Effect of change in active member demographics	<u>(0.03%)</u>	<u>\$(143)</u>
Subtotal	(0.03%)	\$(143)
Average Contribution Rate as of June 30, 2018	9.31%	\$40,192

⁽¹⁾ Based on June 30, 2018 projected annual compensation of \$431,678.

The chart reconciles the member contribution from the prior valuation to the amount determined in this valuation.

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

E. FUNDED RATIO

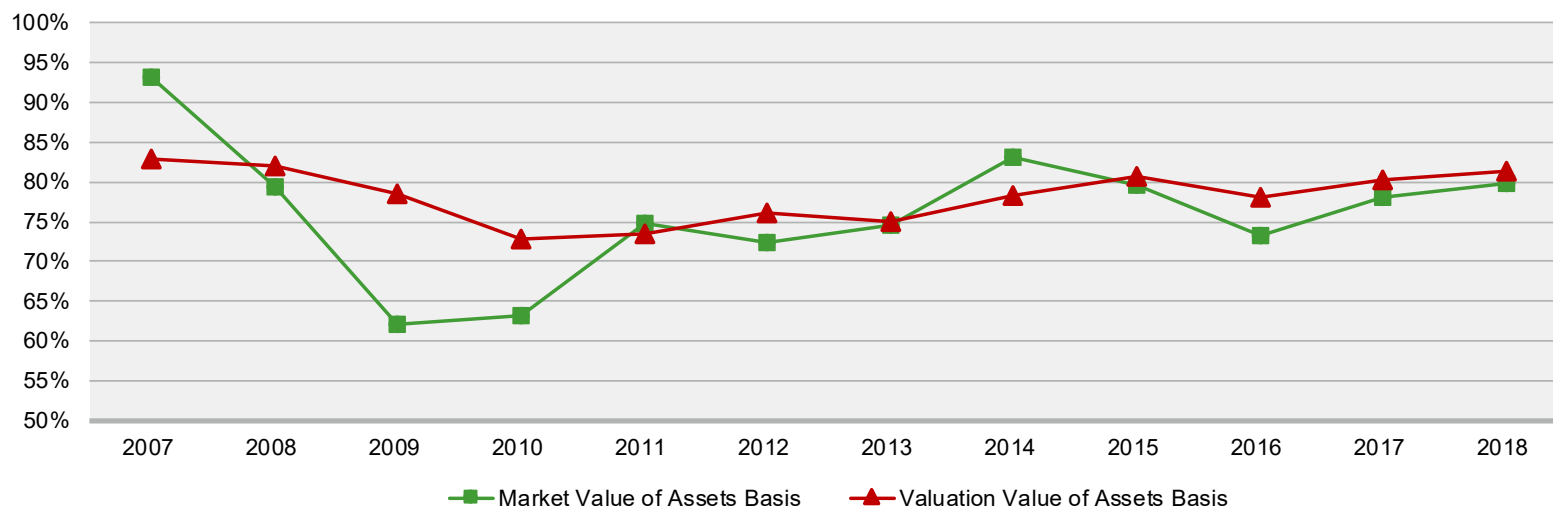
A commonly reported piece of information regarding the Plan's financial status is the funded ratio. These ratios compare the valuation value of assets and market value of assets to the actuarial accrued liabilities of the Plan as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors. The chart below depicts a history of the funded

ratio for this plan. Chart 18 on the next page shows the Plan's schedule of funding progress for the last ten years.

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

CHART 17

Funded Ratio for Plan Years Ending June 30, 2007 - 2018



SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

CHART 18

Schedule of Funding Progress (Dollar Amounts in Thousands)

Actuarial Valuation Date	Valuation Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (a) – (b)	Funded Ratio (%) (a) / (b)	Projected Total Compensation (c)	UAAL as a Percentage of Projected Total Compensation (%) [(a) – (b)] / (c)
6/30/2009	\$2,864,956	\$3,644,743	\$779,787	78.6	\$422,519	184.6
6/30/2010	2,983,044	4,092,464	1,109,420	72.9	408,861	271.3
6/30/2011	3,114,483	4,237,961	1,123,478	73.5	398,976	281.6
6/30/2012	3,305,045	4,345,402	1,040,357	76.1	365,596	284.6
6/30/2013	3,518,982	4,694,780	1,175,798	75.0	370,079	317.7
6/30/2014	3,824,221	4,876,754	1,052,533	78.4	373,774	281.6
6/30/2015	4,092,647	5,074,333	981,686	80.7	383,775	255.8
6/30/2016	4,278,001	5,472,149	1,194,148	78.2	402,535	296.7
6/30/2017	4,529,508	5,643,444	1,113,936	80.3	413,760	269.2
6/30/2018	4,802,958	5,893,909	1,090,951	81.5	431,678	252.7

SECTION 2: Valuation Results for the Fresno County Employees' Retirement Association

F. 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 measure since it is based on the current level of assets.

For FCERA, the current AVR is 10.9. This means that a 1% asset gain/(loss) (relative to the assumed investment return) translates to 10.9% of one-year's payroll. Since FCERA amortizes actuarial gains and losses over a period of 15 years as of June 30, 2018, there would be a 0.9% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

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

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions.

For FCERA, the current LVR is about 13.7. This is about 26% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long-term.

This chart shows how the asset and liability volatility ratios have varied over time, both for the plan in total and separately for General and Safety.

CHART 19

Volatility Ratios for Years Ended June 30, 2009 – 2018

Year Ended June 30	Asset Volatility Ratios			Liability Volatility Ratios		
	General	Safety	Total	General	Safety	Total
2009	5.2	6.0	5.4	8.3	10.2	8.6
2010	6.1	7.4	6.3	9.6	12.3	10.0
2011	7.6	9.9	7.9	10.1	13.6	10.6
2012	8.3	10.4	8.6	11.3	14.9	11.9
2013	9.1	11.2	9.5	12.1	15.6	12.7
2014	10.4	13.0	10.8	12.4	16.1	13.0
2015	10.0	13.1	10.5	12.5	16.8	13.2
2016	9.5	12.0	10.0	12.9	16.8	13.6
2017	10.2	13.0	10.7	13.0	17.0	13.6
2018	10.4	13.5	10.9	12.9	17.2	13.7

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

i. General Tier 1

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	2,890	3,147	-8.2%
Average age	49.5	49.0	0.5
Average service	17.9	17.1	0.8
Projected total compensation	\$188,162,141	\$196,683,398	-4.3%
Projected average compensation	\$65,108	\$62,499	4.2%
Member account balances	\$213,563,105	\$212,044,475	0.7%
Vested terminated members			
Number	1,996	2,033	-1.8%
Average age	49.5	49.1	0.4
Retired members			
Number in pay status	5,361	5,240	2.3%
Average age	70.3	69.9	0.4
Average monthly benefit ⁽¹⁾	\$3,036	\$2,930	3.6%
Disabled members			
Number in pay status	220	208	5.8%
Average age	66.0	66.4	-0.4
Average monthly benefit ⁽¹⁾	\$2,073	\$1,998	3.8%
Beneficiaries			
Number in pay status	772	738	4.6%
Average age	72.2	72.3	-0.1
Average monthly benefit ⁽¹⁾	\$1,823	\$1,721	5.9%

⁽¹⁾ Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

ii. General Tier 2

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	115	127	-9.4%
Average age	44.9	45.4	-0.5
Average service	9.1	8.2	0.9
Projected total compensation	\$8,875,812	\$9,190,782	-3.4%
Projected average compensation	\$77,181	\$72,368	6.7%
Member account balances	\$4,276,519	\$4,124,463	3.7%
Vested terminated members			
Number	118	118	0.0%
Average age	45.0	44.2	0.8
Retired members			
Number in pay status	24	17	41.2%
Average age	65.3	64.5	0.8
Average monthly benefit ⁽¹⁾	\$1,783	\$1,985	-10.2%
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	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 ⁽¹⁾	N/A	N/A	N/A

⁽¹⁾ Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

iii. General Tier 3

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	619	669	-7.5%
Average age	43.2	42.3	0.9
Average service	9.1	8.2	0.9
Projected total compensation	\$32,267,725	\$32,946,840	-2.1%
Projected average compensation	\$52,129	\$49,248	5.8%
Member account balances	\$17,219,634	\$15,634,918	10.1%
Vested terminated members			
Number	264	253	4.3%
Average age	41.1	40.7	0.4
Retired members			
Number in pay status	30	19	57.9%
Average age	64.4	64.1	0.3
Average monthly benefit ⁽¹⁾	\$1,278	\$1,184	7.9%
Disabled members			
Number in pay status	7	4	75.0%
Average age	56.9	52.8	4.1
Average monthly benefit ⁽¹⁾	\$1,406	\$1,454	-3.3%
Beneficiaries			
Number in pay status	5	5	0.0%
Average age	55.1	54.1	1.0
Average monthly benefit ⁽¹⁾	\$1,056	\$1,026	2.9%

⁽¹⁾ Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

iv. General Tier 4

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	261	275	-5.1%
Average age	43.0	42.0	1.0
Average service	4.9	4.0	0.9
Projected total compensation	\$14,147,420	\$13,782,376	2.6%
Projected average compensation	\$54,205	\$50,118	8.2%
Member account balances	\$3,879,923	\$3,107,694	24.8%
Vested terminated members			
Number	131	121	8.3%
Average age	41.2	40.5	0.7
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	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 ⁽¹⁾	N/A	N/A	N/A

⁽¹⁾ Benefits include regular benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

v. General Tier 5

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	2,635	2,203	19.6%
Average age	35.9	35.9	0.0
Average service	2.2	1.9	0.3
Projected total compensation	\$116,689,715	\$92,205,924	26.6%
Projected average compensation	\$44,285	\$41,855	5.8%
Member account balances	\$16,400,094	\$10,524,010	55.8%
Vested terminated members			
Number	798	580	37.6%
Average age	36.1	35.6	0.5
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	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 ⁽¹⁾	N/A	N/A	N/A

⁽¹⁾ Benefits include regular benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

vi. Safety Tier 1

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	475	526	-9.7%
Average age	46.4	46.0	0.4
Average service	18.7	18.2	0.5
Projected total compensation	\$42,202,210	\$44,701,770	-5.6%
Projected average compensation	\$88,847	\$84,984	4.5%
Member account balances	\$61,546,172	\$61,859,609	-0.5%
Vested terminated members			
Number	206	209	-1.4%
Average age	47.9	47.2	0.7
Retired members			
Number in pay status	659	626	5.3%
Average age	66.4	66.4	0.0
Average monthly benefit ⁽¹⁾	\$4,887	\$4,711	3.7%
Disabled members			
Number in pay status	173	165	4.8%
Average age	59.8	59.9	-0.1
Average monthly benefit ⁽¹⁾	\$3,518	\$3,415	3.0%
Beneficiaries			
Number in pay status	193	178	8.4%
Average age	66.5	66.0	0.5
Average monthly benefit ⁽¹⁾	\$2,275	\$2,225	2.2%

⁽¹⁾ Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

vii. Safety Tier 2

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	59	62	-4.8%
Average age	38.7	37.7	1.0
Average service	8.8	7.9	0.9
Projected total compensation	\$4,645,296	\$4,626,143	0.4%
Projected average compensation	\$78,734	\$74,615	5.5%
Member account balances	\$3,583,985	\$3,171,951	13.0%
Vested terminated members			
Number	23	22	4.5%
Average age	36.9	35.2	1.7
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	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 ⁽¹⁾	N/A	N/A	N/A

⁽¹⁾ Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

viii. Safety Tier 4

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	60	61	-1.6%
Average age	35.5	34.6	0.9
Average service	5.2	4.3	0.9
Projected total compensation	\$4,293,022	\$4,049,227	6.0%
Projected average compensation	\$71,550	\$66,381	7.8%
Member account balances	\$1,759,593	\$1,350,757	30.3%
Vested terminated members			
Number	19	17	11.8%
Average age	36.9	35.8	1.1
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	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 ⁽¹⁾	N/A	N/A	N/A

⁽¹⁾ Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

ix. Safety Tier 5

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active members in valuation			
Number	344	283	21.6%
Average age	30.8	30.5	0.3
Average service	2.4	1.9	0.5
Projected total compensation	\$20,394,976	\$15,574,238	31.0%
Projected average compensation	\$59,288	\$55,033	7.7%
Member account balances	\$5,013,838	\$3,101,382	61.7%
Vested terminated members			
Number	72	58	24.1%
Average age	32.0	30.7	1.3
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	N/A	N/A	N/A
Disabled members			
Number in pay status	1	0	N/A
Average age	44.5	N/A	N/A
Average monthly benefit ⁽¹⁾	\$2,051	N/A	N/A
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit ⁽¹⁾	N/A	N/A	N/A

⁽¹⁾ Benefits include regular and settlement benefits but exclude non-vested supplemental benefits.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

i. General Tier 1

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	4	--	4	--	--	--	--	--	--	--
	\$48,056	--	\$48,056	--	--	--	--	--	--	--
30 - 34	72	2	25	45	--	--	--	--	--	--
	54,033	\$42,246	48,713	\$57,512	--	--	--	--	--	--
35 - 39	334	1	33	221	77	2	--	--	--	--
	60,843	30,025	57,259	62,566	\$57,701	\$65,933	--	--	--	--
40 - 44	520	2	24	168	297	29	--	--	--	--
	64,992	77,751	69,854	64,802	64,324	68,030	--	--	--	--
45 - 49	618	1	20	148	268	146	35	--	--	--
	67,255	43,979	64,951	65,548	66,568	72,437	\$60,097	--	--	--
50 - 54	534	1	7	93	186	134	100	12	1	--
	66,889	43,500	52,670	65,439	61,377	71,419	72,906	\$73,795	\$58,497	--
55 - 59	473	1	9	78	133	102	109	36	5	--
	67,521	30,138	61,018	60,203	66,593	63,346	75,531	77,736	62,532	--
60 - 64	264	--	7	47	98	58	36	9	9	--
	61,272	--	49,660	61,357	57,979	64,059	63,385	81,588	58,978	--
65 - 69	52	1	3	11	23	2	7	3	1	1
	66,819	38,753	34,012	72,860	65,431	65,388	85,915	61,359	33,528	\$77,625
70 & over	19	--	--	4	7	2	3	1	1	1
	57,479	--	--	51,112	64,985	36,177	42,865	78,711	92,351	60,752
Total	2,890	9	132	815	1,089	475	290	61	17	2
	\$65,108	\$47,376	\$57,899	\$63,404	\$63,638	\$68,696	\$71,168	\$76,740	\$60,461	\$69,189

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

ii. General Tier 2

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	2	--	2	--	--	--	--	--	--	--
	\$71,683	--	\$71,683	--	--	--	--	--	--	--
30 - 34	17	1	15	1	--	--	--	--	--	--
	70,877	\$56,352	72,104	\$66,995	--	--	--	--	--	--
35 - 39	25	--	17	8	--	--	--	--	--	--
	73,623	--	66,879	87,955	--	--	--	--	--	--
40 - 44	22	1	10	11	--	--	--	--	--	--
	89,815	251,114	80,203	83,889	--	--	--	--	--	--
45 - 49	14	--	5	7	1	1	--	--	--	--
	70,609	--	73,119	63,191	\$100,013	\$80,586	--	--	--	--
50 - 54	12	--	7	5	--	--	--	--	--	--
	70,855	--	58,174	88,609	--	--	--	--	--	--
55 - 59	13	--	8	4	1	--	--	--	--	--
	70,320	--	79,482	56,358	52,868	--	--	--	--	--
60 - 64	7	--	4	3	--	--	--	--	--	--
	95,310	--	76,948	119,793	--	--	--	--	--	--
65 - 69	1	--	--	1	--	--	--	--	--	--
	76,321	--	--	76,321	--	--	--	--	--	--
70 & over	2	--	--	1	1	--	--	--	--	--
	107,292	--	--	154,564	60,020	--	--	--	--	--
Total	115	2	68	41	3	1	--	--	--	--
	\$77,181	\$153,733	\$71,770	\$82,793	\$70,967	\$80,586	--	--	--	--

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

iii. General Tier 3

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	10	2	8	--	--	--	--	--	--	--
	\$40,256	\$28,422	\$43,215	--	--	--	--	--	--	--
30 - 34	114	3	78	33	--	--	--	--	--	--
	50,915	35,540	51,747	\$50,344	--	--	--	--	--	--
35 - 39	170	3	97	69	1	--	--	--	--	--
	52,235	31,075	50,289	55,993	\$45,180	--	--	--	--	--
40 - 44	98	3	37	51	7	--	--	--	--	--
	55,290	68,948	52,199	57,950	46,396	--	--	--	--	--
45 - 49	67	1	32	30	4	--	--	--	--	--
	54,526	39,933	49,240	59,724	61,472	--	--	--	--	--
50 - 54	65	4	31	21	6	3	--	--	--	--
	49,332	51,073	49,224	48,310	42,654	\$68,636	--	--	--	--
55 - 59	57	2	28	21	5	1	--	--	--	--
	51,050	62,355	52,129	50,767	41,441	52,225	--	--	--	--
60 - 64	28	--	16	10	2	--	--	--	--	--
	53,158	--	51,638	56,542	48,391	--	--	--	--	--
65 - 69	8	--	5	3	--	--	--	--	--	--
	50,485	--	49,706	51,784	--	--	--	--	--	--
70 & over	2	1	--	1	--	--	--	--	--	--
	50,258	30,906	--	69,610	--	--	--	--	--	--
Total	619	19	332	239	25	4	--	--	--	--
	\$52,129	\$45,441	\$50,685	\$54,992	\$47,030	\$64,533	--	--	--	--

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

iv. General Tier 4

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	13	5	8	--	--	--	--	--	--	--
	\$56,024	\$55,205	\$56,537	--	--	--	--	--	--	--
30 - 34	63	17	46	--	--	--	--	--	--	--
	56,858	54,800	57,619	--	--	--	--	--	--	--
35 - 39	50	11	37	2	--	--	--	--	--	--
	57,497	49,124	59,517	\$66,185	--	--	--	--	--	--
40 - 44	37	16	21	--	--	--	--	--	--	--
	51,649	48,630	53,949	--	--	--	--	--	--	--
45 - 49	29	11	18	--	--	--	--	--	--	--
	45,395	40,442	48,422	--	--	--	--	--	--	--
50 - 54	27	10	17	--	--	--	--	--	--	--
	53,026	55,412	51,622	--	--	--	--	--	--	--
55 - 59	22	13	9	--	--	--	--	--	--	--
	59,638	66,945	49,084	--	--	--	--	--	--	--
60 - 64	16	7	9	--	--	--	--	--	--	--
	45,911	41,552	49,301	--	--	--	--	--	--	--
65 - 69	4	2	2	--	--	--	--	--	--	--
	64,100	73,938	54,263	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	261	92	167	2	--	--	--	--	--	--
	\$54,205	\$52,544	\$54,976	\$66,185	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

v. General Tier 5

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	202	202	--	--	--	--	--	--	--	--
	\$35,957	\$35,957	--	--	--	--	--	--	--	--
25 - 29	715	702	13	--	--	--	--	--	--	--
	42,558	42,342	\$54,227	--	--	--	--	--	--	--
30 - 34	624	595	29	--	--	--	--	--	--	--
	46,075	45,733	53,104	--	--	--	--	--	--	--
35 - 39	392	372	20	--	--	--	--	--	--	--
	45,061	44,753	50,785	--	--	--	--	--	--	--
40 - 44	236	222	12	1	1	--	--	--	--	--
	45,683	45,553	49,370	\$43,795	\$32,115	--	--	--	--	--
45 - 49	146	136	10	--	--	--	--	--	--	--
	44,988	45,134	43,005	--	--	--	--	--	--	--
50 - 54	130	124	6	--	--	--	--	--	--	--
	46,903	46,937	46,217	--	--	--	--	--	--	--
55 - 59	108	104	4	--	--	--	--	--	--	--
	48,577	48,711	45,094	--	--	--	--	--	--	--
60 - 64	64	58	6	--	--	--	--	--	--	--
	47,458	47,062	51,288	--	--	--	--	--	--	--
65 - 69	15	12	3	--	--	--	--	--	--	--
	41,534	38,012	55,619	--	--	--	--	--	--	--
70 & over	3	3	--	--	--	--	--	--	--	--
	76,351	76,351	--	--	--	--	--	--	--	--
Total	2,635	2,530	103	1 ⁽¹⁾	1 ⁽¹⁾	--	--	--	--	--
	\$44,285	\$44,031	\$50,635	\$43,795	\$32,115	--	--	--	--	--

⁽¹⁾ These members have prior service with General Tier 1.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

vi. Safety Tier 1

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
30 - 34	2	--	--	2	--	--	--	--	--	--
	\$86,730	--	--	\$86,730	--	--	--	--	--	--
35 - 39	74	1	1	50	22	--	--	--	--	--
	83,746	\$56,172	\$63,118	82,207	\$89,436	--	--	--	--	--
40 - 44	125	--	2	28	85	10	--	--	--	--
	88,030	--	70,094	80,235	90,726	\$90,520	--	--	--	--
45 - 49	143	--	3	16	62	53	9	--	--	--
	89,872	--	69,311	83,266	89,158	94,559	\$85,795	--	--	--
50 - 54	99	--	1	6	18	36	37	1	--	--
	91,158	--	66,180	77,343	82,644	90,719	98,485	\$96,938	--	--
55 - 59	21	--	--	2	6	6	7	--	--	--
	89,352	--	--	86,404	86,250	84,999	96,584	--	--	--
60 - 64	8	--	--	--	4	--	3	1	--	--
	91,665	--	--	--	74,888	--	84,485	180,311	--	--
65 - 69	3	--	--	1	--	1	--	--	--	1
	113,917	--	--	97,036	--	94,916	--	--	--	\$149,799
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	475	1	7	105	197	106	56	2	--	1
	\$88,847	\$56,172	\$68,203	\$81,872	\$88,892	\$92,336	\$95,458	\$138,625	--	\$149,799

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

vii. Safety Tier 2

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	4	--	4	--	--	--	--	--	--	--
	\$70,313	--	\$70,313	--	--	--	--	--	--	--
30 - 34	20	--	13	7	--	--	--	--	--	--
	75,170	--	68,252	\$88,016	--	--	--	--	--	--
35 - 39	15	--	2	13	--	--	--	--	--	--
	86,188	--	67,297	89,094	--	--	--	--	--	--
40 - 44	11	--	8	3	--	--	--	--	--	--
	72,143	--	69,707	78,642	--	--	--	--	--	--
45 - 49	3	--	2	1	--	--	--	--	--	--
	81,229	--	74,802	94,083	--	--	--	--	--	--
50 - 54	2	--	--	2	--	--	--	--	--	--
	79,541	--	--	79,541	--	--	--	--	--	--
55 - 59	2	--	--	2	--	--	--	--	--	--
	96,309	--	--	96,309	--	--	--	--	--	--
60 - 64	2	--	--	2	--	--	--	--	--	--
	89,436	--	--	89,436	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	59	--	29	30	--	--	--	--	--	--
	\$78,734	--	\$69,323	\$87,831	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

viii. Safety Tier 4

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	10	3	7	--	--	--	--	--	--	--
	\$67,416	\$62,287	\$69,614	--	--	--	--	--	--	--
30 - 34	24	6	18	--	--	--	--	--	--	--
	68,781	78,232	65,631	--	--	--	--	--	--	--
35 - 39	17	6	11	--	--	--	--	--	--	--
	75,756	79,324	73,810	--	--	--	--	--	--	--
40 - 44	3	1	2	--	--	--	--	--	--	--
	66,471	69,327	65,043	--	--	--	--	--	--	--
45 - 49	4	--	4	--	--	--	--	--	--	--
	71,453	--	71,453	--	--	--	--	--	--	--
50 - 54	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
55 - 59	1	1	--	--	--	--	--	--	--	--
	78,182	78,182	--	--	--	--	--	--	--	--
60 - 64	1	--	1	--	--	--	--	--	--	--
	116,861	--	116,861	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	60	17	43	--	--	--	--	--	--	--
	\$71,550	\$75,277	\$70,077	--	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Average Compensation
By Age, Years of Service as of June 30, 2018**

ix. Safety Tier 5

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	51	51	--	--	--	--	--	--	--	--
	\$58,381	\$58,381	--	--	--	--	--	--	--	--
25 - 29	149	145	4	--	--	--	--	--	--	--
	58,012	57,920	\$61,366	--	--	--	--	--	--	--
30 - 34	87	72	15	--	--	--	--	--	--	--
	57,692	56,397	63,909	--	--	--	--	--	--	--
35 - 39	29	27	2	--	--	--	--	--	--	--
	59,246	59,202	59,838	--	--	--	--	--	--	--
40 - 44	12	10	2	--	--	--	--	--	--	--
	65,649	65,787	64,962	--	--	--	--	--	--	--
45 - 49	7	6	1	--	--	--	--	--	--	--
	76,169	78,324	63,239	--	--	--	--	--	--	--
50 - 54	3	3	--	--	--	--	--	--	--	--
	58,712	58,712	--	--	--	--	--	--	--	--
55 - 59	4	3	1	--	--	--	--	--	--	--
	100,441	110,957	68,893	--	--	--	--	--	--	--
60 - 64	1	--	1	--	--	--	--	--	--	--
	69,056	--	69,056	--	--	--	--	--	--	--
65 - 69	1	1	--	--	--	--	--	--	--	--
	68,459	68,459	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	344	318	26	--	--	--	--	--	--	--
	\$59,288	\$58,931	\$63,649	--	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT C

Reconciliation of Member Data – June 30, 2017 to June 30, 2018

	Active Members	Vested Terminated Members	Pensioners	Disableds	Beneficiaries	Total
Number as of June 30, 2017	7,353	3,411	5,902	377	921	17,964
New members	817	84	0	0	0	901
Terminations – with vested rights	-349	349	0	0	0	0
Contributions refunds	-160	-84	0	0	0	-244
Retirements	-216	-80	296	0	0	0
New disabilities	-19	-4	-8	31	0	0
Return to work	38	-37	-1	0	0	0
Died with or without beneficiary	-5	-8	-114	-7	52 ⁽¹⁾	-82
Data adjustments	-1	-4	-1	0	-3	-9
Number as of June 30, 2018	7,458	3,627	6,074	401	970	18,530

⁽¹⁾ This is the net increase of beneficiaries after subtracting the number of beneficiaries who died during the year.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT D

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended June 30	
	2018	2017
Net Contribution income:		
Employer contributions	\$210,534,894	\$198,472,119
Employee contributions	38,467,001	36,259,132
Less administrative fees	<u>(5,676,721)</u>	<u>(4,762,253)</u>
Contribution income	\$243,325,174	\$229,968,998
Investment income:		
Interest, dividends and other income	\$145,500,998	\$123,092,805
Adjustment toward market value	174,277,006	172,740,991
Less investment fees	<u>(26,421,765)</u>	<u>(24,608,102)</u>
Net investment income	<u>293,356,239</u>	<u>271,225,694</u>
Total income available for benefits	\$536,681,413	\$501,194,692
Less benefit payments:		
Service retirement	\$(254,737,024)	\$(240,682,559)
Death payments	(1,405,467)	(1,825,296)
Supplemental cost of living	0	(50,589)
Members refunds	(2,408,213)	(2,697,597)
Health benefit subsidies	<u>(4,680,842)</u>	<u>(4,590,854)</u>
Benefit payments	\$(263,231,547)	\$(249,846,894)
Change in reserve for future benefits	\$273,449,867	\$251,347,798

Note: Results may not total properly due to rounding.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT E

Summary Statement of Assets

	Year Ended June 30,	
	2018	2017
Cash equivalents	\$281,392,007	\$316,810,768
Accounts receivable:		
Investment trades	\$20,456,648	\$13,015,679
Interest and dividends	16,622,822	14,001,270
Contributions and others	9,074,025	7,955,833
Securities lending	<u>61,843</u>	<u>62,429</u>
Total accounts receivable	46,215,339	35,035,210
Investments:		
Equities	\$1,626,170,409	\$1,617,057,383
Fixed income	1,551,351,371	1,431,909,981
Real estate	22,904,393	18,007,552
Securities lending collateral	31,214,977	37,941,129
Capital assets	11,512,614	10,792,330
Others	<u>1,192,669,627</u>	<u>993,014,722</u>
Total investments at market value	<u>4,435,823,391</u>	<u>4,108,723,098</u>
Total assets	\$4,763,430,737	\$4,460,569,076
Less accounts payable:		
Investment trades	\$(29,492,230)	\$(12,248,753)
Cash collateral payable for securities lending	(31,214,977)	(37,941,129)
Securities lending bank and broker fees	(28,021)	(19,117)
Others	<u>(2,824,104)</u>	<u>(3,138,311)</u>
Total accounts payable	\$(63,559,331)	\$(53,347,310)
Net assets at market value	<u>\$4,699,871,406</u>	<u>\$4,407,221,766</u>
Net assets at actuarial value	<u>\$4,802,958,346</u>	<u>\$4,529,508,479</u>
Net assets at valuation value	<u>\$4,802,958,346</u>	<u>\$4,529,508,479</u>

Note: Results may not total properly due to rounding.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT G

Summary of Reported Asset Information as of June 30, 2018

Reserves	
Used in Development of Valuation Value of Assets	
<i>Regular Valuation Reserves</i>	
Members' Accumulated Contributions	\$408,051,498
Current Service Reserve	1,260,910,811
Annuity Pension Reserve	144,840,018
Current Service Pension Reserve	1,419,033,030
Cost of Living Reserve	1,353,526,603
Subtotal	<u>\$4,586,361,959</u>
<i>Settlement Reserves (Section 6)</i>	
Supplemental Annuity Reserve	\$705,413,056
Members' Accumulated Contributions	52,332,679
Current Service Reserve	285,253,053
Annuity Pension Reserve	42,820,454
Subtotal	<u>\$1,085,819,242</u>
<i>Settlement Benefit Reserve (Section 8)</i>	\$112,496,209
<i>Retiree Health Benefit Reserve (Section 9)</i>	\$30,661,530
<i>Contra Tracking Account</i>	<u>\$(1,012,380,594)</u>
<i>Valuation Value of Assets</i>	<u>\$4,802,958,346</u>
Not Used in Development of Valuation Value of Assets	
<i>Supplemental COLA</i>	\$0
<i>Retiree Health Benefit Reserve (BOR)</i>	0
<i>Contingency Reserve</i>	0
<i>Board Contingency Reserve/Undistributed Earnings ("Available Earnings")</i>	0
<i>Market Stabilization Reserve</i>	<u>(103,086,939)</u>
Total	<u>\$(103,086,939)</u>
<i>Market Value of Assets</i>	<u>\$4,699,871,406</u>

Note: Results may not total properly due to rounding.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT H

Development of Unfunded Actuarial Accrued Liability as of June 30, 2018

	(Dollar amounts in Thousands)
1 Unfunded actuarial accrued liability at beginning of year	\$1,113,936
2 Total normal cost payable at middle of year ⁽¹⁾	111,958
3 Expected administrative expenses	4,550
4 Expected employer and member contributions ⁽²⁾	(270,584)
5 Interest (full year on (1) plus half year on (2) + (3) + (4))	<u>74,352</u>
6 Expected unfunded actuarial accrued liability at end of year	\$1,034,212
7 Actuarial (gain)/loss due to all changes:	
<u>Experience (gain)/loss</u>	
a. Loss from investment return on valuation value of assets (6.49%) less than assumed	\$23,013
b. Loss from actual contributions less than expected ⁽³⁾	22,325
c. Gain from lower than expected salary increases	(3,346)
d. Other experience losses	<u>14,747</u>
e. Subtotal	\$56,739
8 Actual unfunded actuarial accrued liability at end of year (6) + (7e)	\$1,090,951

⁽¹⁾ Excludes administrative expense load.

⁽²⁾ Includes contributions toward administrative expenses.

⁽³⁾ Primarily as a result of the first year of the three-year phase-in of the contribution rate impact of the assumption changes determined in the June 30, 2016 valuation, as paid in 2017-2018.

Notes: The "Net loss from other experience" of \$11,401,000 shown in Section 2, Chart 9 is equal to the sum of items 7(c) and 7(d).

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT I

Section 415 Limitations

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 indexed for inflation. That limit is \$220,000 for 2018 and \$225,000 for 2019. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must generally be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions.

For non-PEPRA members, 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.

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

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

EXHIBIT J

Definitions of Pension Terms

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

**Assumptions or Actuarial
Assumptions:**

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age; and
- (d) Turnover rates — the rates at which members of various ages and years of service are expected to leave employment for reasons other than death, disability, or retirement.

Normal Cost:

The amount of contributions required to fund the determined cost allocated to the current year of service, as a level % of payroll over the members' career.

**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:**

The single sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

**Unfunded (Overfunded) Actuarial
Accrued Liability:**

The extent to which the actuarial accrued liability of the Plan exceeds (or is exceeded by) the assets of the Plan. There are many approaches to paying off the unfunded or overfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

SECTION 3: Supplemental Information for the Fresno County Employees' Retirement Association

**Amortization of the Unfunded
(Overfunded) Actuarial
Accrued Liability:**

Payments made over a period of years equal in value to the Plan's unfunded or overfunded actuarial accrued liability.

Rate of 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 market gains and losses to avoid significant swings in the value of assets from one year to the next.

Payroll or Compensation:

Compensation Earnable and Pensionable Compensation expected to be paid to active members during the twelve months following the valuation date. Only Compensation Earnable and Pensionable Compensation that would possibly go into the determination of retirement benefits are included.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Retired members as of the valuation date (including 970 beneficiaries in pay status)	7,445
2. Members inactive during year ended June 30, 2018 with vested rights	3,627
3. Members active during the year ended June 30, 2018	7,458

The actuarial factors as of the valuation date are as follows (amounts in 000s):

1. Normal cost ⁽¹⁾		\$113,193
2. Present value of future benefits		6,769,454
3. Present value of future normal costs (employer and member)		875,545
4. Actuarial accrued liability ⁽²⁾		5,893,909
Retired members and beneficiaries	\$3,677,223	
Inactive members with vested rights	315,035	
Active members	1,901,651	
5. Valuation value of assets ⁽²⁾ (\$4,699,871 at market value as reported by FCERA)		4,802,958
6. Unfunded actuarial accrued liability		\$1,090,951

⁽¹⁾ Includes administrative expense load.

⁽²⁾ Excludes non-valuation reserves and designations.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

The determination of the recommended average employer contribution is as follows:	Dollar Amount (in 000s)	% of Payroll
1. Total Normal Cost	\$113,193	26.22%
2. Expected member contributions	<u>(40,192)</u>	<u>(9.31%)</u>
3. Employer normal cost: (1) + (2)	\$73,001	16.91%
4. Amortization of Unfunded Actuarial Accrued Liability	<u>167,921</u>	<u>38.90%</u>
5. Total recommended average employer contribution: (3) + (4)	\$240,922	55.81%
6. Projected compensation	\$431,678	

Note: Both total normal cost and total UAAL rates include an explicit administrative expense load.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

EXHIBIT II

Actuarial Assumptions and Actuarial Cost Method

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 July 1, 2012 through June 30, 2015 Actuarial Experience Study and June 30, 2016 Economic Actuarial Assumptions Report both dated March 10, 2016. Unless otherwise noted, all actuarial assumptions and methods shown below apply to members for all tiers.
<u>Economic Assumptions</u>	
Net Investment Return:	7.00%, net of investment expenses.
Administrative Expenses:	1.10% of payroll, 0.94% allocated to the employers and 0.16% allocated to the members based on the components of the total average contribution rate (before expenses) for the employer and member
Employee Contribution Crediting Rate:	3.00%, compounded semi-annually. (The difference between the 7.00% net investment return assumption and 3.00% is credited to the other valuation reserves.)
Consumer Price Index:	Increase of 3.00% per year, retiree COLA increases due to CPI subject to a 3.00% maximum change per year for General Tiers 1, 2 and 3, and Safety Tiers 1 and 2. General and Safety Tiers 4 and 5 receive no COLA increases.
Payroll Growth:	Inflation of 3.00% per year plus “across the board” real salary increases of 0.50% per year.
Increase in Section 7522.10 Compensation Limit:	Increase of 3.00% per year from the valuation date.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Individual Salary Increases:

<u>Annual Rate of Compensation Increase</u>		
Inflation: 3.00%; plus “across the board” real salary increases of 0.50% per year; plus the following merit and promotional increases.		
Service	General	Safety
0	8.00%	8.00%
1	7.00%	7.00%
2	6.00%	5.50%
3	5.00%	5.50%
4	4.00%	5.00%
5	2.75%	3.75%
6	2.25%	3.25%
7	1.25%	2.75%
8 or more	1.00%	1.40%

Demographic Assumptions

Post – Retirement Mortality Rates:

Healthy:

For General Members and all Beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward one year for females.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set back two years.

Disabled:

For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward eight years.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward seven years.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

The above mortality tables contain about a 20% margin, based on actual to expected deaths, to reflect future mortality improvement, based on a review of mortality experience as of the measurement date.

*Member Contribution Rates
and Optional Benefits:*

For General Members and Beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward one year for females, weighted 35% male and 65% female for members and weighted 65% male and 35% female for beneficiaries.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set back two years weighted, 80% male and 20% female.

For Safety Beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward one year for females, weighted 20% male and 80% female.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Termination Rates Before Retirement:

Pre – Retirement Mortality Rates: For General and Safety Members: Headcount-Weighted RP-2014 Healthy Employee Mortality Table projected 20 years with the two-dimensional scale MP2015D times 75%. All pre-retirement deaths are assumed to be non-service connected deaths.

Age	Rate (%) Mortality			
	General ⁽¹⁾		Safety ⁽¹⁾	
	Male	Female	Male	Female
25	0.03	0.01	0.03	0.01
30	0.03	0.02	0.03	0.02
35	0.04	0.02	0.04	0.02
40	0.04	0.03	0.04	0.03
45	0.07	0.05	0.07	0.05
50	0.11	0.08	0.11	0.08
55	0.20	0.13	0.20	0.13
60	0.35	0.19	0.35	0.19
65	0.60	0.27	0.60	0.27

⁽¹⁾ All pre-retirement deaths are assumed to be non-service connected.

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Termination Rates Before Retirement (Continued):

Age	Rate (%) Disability		
	General ⁽¹⁾		Safety ⁽²⁾
	Male	Female	Male and Female
20	0.01	0.01	0.05
25	0.01	0.02	0.11
30	0.02	0.02	0.24
35	0.04	0.06	0.42
40	0.12	0.10	0.56
45	0.21	0.14	0.66
50	0.25	0.17	0.76
55	0.31	0.24	1.52
60	0.68	0.33	3.20
65	0.96	0.59	4.00
70	1.00	0.90	4.00

⁽¹⁾ 50% of General disabilities are assumed to be duty disabilities. The other 50% are assumed to be ordinary disabilities.

⁽²⁾ 100% of Safety disabilities are assumed to be duty disabilities.

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Termination Rates Before Retirement (Continued):

Rate (%)		
Total Termination (< 5 Years of Service)		
Years of Service	General	Safety
0	17.00	14.00
1	9.50	7.50
2	8.00	6.00
3	7.00	5.00
4	6.75	4.75

Rate (%)		
Total Termination (5+ Years of Service)		
Age	General	Safety
20	5.75	3.50
25	5.75	3.50
30	5.30	2.90
35	4.55	2.20
40	3.92	1.85
45	3.58	1.60
50	3.44	1.50
55	3.31	1.50
60	3.10	0.60
65	3.00	0.00
70	1.20	0.00

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Termination Rates Before Retirement (Continued):

Proportion of Total Termination Assumed to Receive Refunds and Deferred Vested Benefits (%)		
Years of Service	Refunds	Deferred Vested Benefits
0-4	60.00	40.00
5-9	30.00	70.00
10-14	25.00	75.00
15-19	15.00	85.00
20 or more	10.00	90.00

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Retirement Rates:

Rate (%)						
General						
Age	Tier 1		Tier 2	Tier 3	Tier 4	Tier 5
	Male	Female	Male & Female	Male & Female	Male & Female	Male & Female
50	5.00	4.00	3.00	2.40	2.00	0.00
51	3.50	4.00	3.00	2.40	2.00	0.00
52	3.00	4.00	3.60	2.80	2.50	4.50
53	4.00	4.00	3.60	2.80	2.50	2.00
54	4.00	6.00	4.20	3.40	3.00	2.50
55	8.00	9.00	8.40	6.70	4.00	3.50
56	9.00	11.00	10.00	8.00	5.00	4.50
57	14.00	14.00	10.00	8.00	6.00	5.50
58	15.00	15.00	10.00	8.00	7.00	6.50
59	16.00	16.00	10.00	12.00	8.00	7.50
60	25.00	20.00	15.00	15.40	9.00	8.50
61	20.00	22.00	15.00	15.40	10.00	9.50
62	25.00	28.00	25.00	27.40	16.00	15.00
63	25.00	22.00	24.00	19.00	16.00	15.00
64	25.00	25.00	24.00	19.00	19.00	18.00
65	45.00	35.00	35.00	34.60	23.00	22.00
66	40.00	35.00	34.00	26.60	20.00	20.00
67	40.00	35.00	34.00	26.60	20.00	20.00
68	40.00	45.00	35.00	32.00	25.00	25.00
69	50.00	45.00	35.00	37.00	30.00	30.00
70	50.00	50.00	70.00	60.00	60.00	60.00
71	50.00	50.00	70.00	60.00	60.00	60.00
72	50.00	50.00	70.00	60.00	60.00	60.00
73	50.00	50.00	70.00	60.00	60.00	60.00
74	50.00	50.00	70.00	60.00	60.00	60.00
75	100.00	100.00	100.00	100.00	100.00	100.00

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Retirement Rates (Continued):

Rate (%)			
Safety			
Age	Tier 1 & Tier 2	Tier 4	Tier 5
	Male & Female	Male & Female	Male & Female
45	1.00	1.00	0.00
46	1.00	1.00	0.00
47	1.00	1.00	0.00
48	1.00	1.00	0.00
49	3.00	2.00	0.00
50	5.00	4.00	4.00
51	7.00	4.00	4.00
52	8.00	5.00	5.00
53	14.00	6.00	6.00
54	27.00	11.00	11.00
55	40.00	20.00	20.00
56	25.00	20.00	20.00
57	25.00	20.00	25.00
58	20.00	20.00	20.00
59	20.00	23.00	23.00
60	40.00	45.00	45.00
61	40.00	45.00	45.00
62	50.00	45.00	45.00
63	50.00	45.00	45.00
64	50.00	45.00	45.00
65	100.00	100.00	100.00

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

**Retirement Age and Benefit for
Deferred Vested Members:**

For current and future deferred vested members, retirement assumptions are as follows:

General: Age 58
Safety: Age 54

We assume that 20% of future General and 30% of future Safety deferred vested members terminated with less than five years of service will continue to work for a reciprocal employer. For those future deferred vested members terminated with five or more years of service, we assume that 35% of General and 55% of Safety will continue to work for a reciprocal employer. In addition, we assume 4.50% and 4.90% compensation increases per annum for General and Safety members, respectively.

Future Benefit Accruals:

1.0 year of service per year of employment.

Annual Leave Conversion:

Eligibility for annual leave plans is determined based on hire date along with other factors. The number of members in each plan used to set the assumptions below can be found on page 59 of our July 1, 2012 through June 30, 2015 Actuarial Experience Study. The following assumptions for the amount of service converted from unused annual leave at retirement are used:

New Annual Leave Plan: 35 hours per year of service.

Annual Leave Plan II: 25 hours per year of service.

Vacation/Sick Leave Plans: 35 hours per year of service for General and 40 hours per year of service for Safety.

Annual Leave IV Plan or
the Old Annual Leave Plan: Based on actual hours in a member's frozen time-off bank.

Unknown Data for Members:

Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

**Inclusion of Deferred Vested
Members:**

All deferred vested members are included in the valuation.

Percent Married:

75% of male members; 50% of female members.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Age of Spouse: Male retirees are 3 years older than their spouses, and Female retirees are 2 years younger than their spouses.

Actuarial Methods

Actuarial Value of Assets: The actuarial value of assets is determined by recognizing any difference between actual and expected market return over 10 six-month interest crediting periods. The actuarial value of assets is further adjusted, if necessary, to be within 30% of the market value of assets.

Valuation Value of Assets: The actuarial value of assets, reduced by the value of the non-valuation reserves.

Actuarial Cost Method: Entry Age Cost Method. Entry Age is the age at the member's hire date. 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 formulas have always been in effect (i.e., "replacement life within each tier").

Amortization Policy: Unfunded Actuarial Accrued Liability established as of June 30, 2003 is amortized over a declining period with 15-years remaining. Unfunded Actuarial Accrued Liability established as a result of the Tier 3 benefit improvement is amortized over a declining period with 18-years remaining. The amortization period for UAAL established on each subsequent valuation as a result of actuarial gains or losses, changes in actuarial assumptions or plan amendments is a declining 15-year period.

Changes in Actuarial Assumptions and Methods: There have been no changes in actuarial assumptions or methods since the previous actuarial valuation.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

EXHIBIT III

Summary of Plan Provisions

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

Membership Eligibility:

	Membership with FCERA usually begins with the first day of the pay period following the date of appointment to a permanent position of at least 50% full-time.
<i>General and Safety Tier 1</i>	All General and Safety members hired on or before February 26, 2006 and General and Safety members of certain bargaining units hired after February 26, 2006.
<i>General and Safety Tier 2</i>	General and Safety members of certain bargaining units hired after February 26, 2006 and former Tier 1 members hired on or before February 26, 2006 who have elected to transfer to Tier 2.
<i>General Tier 3</i>	General members of certain bargaining units hired after December 17, 2007 and those eligible Tier 2 members hired on or before December 17, 2007.
<i>General and Safety Tier 4</i>	General and Safety County members hired on or after June 11, 2012 and prior to January 1, 2013.
<i>General and Safety Tier 5</i>	All General and Safety members hired on or after January 1, 2013.

Final Compensation for Benefit Determination:

<i>General and Safety Tiers 1 & 2</i>	Highest one-year average final compensation (§31462.1) (FAS1).
<i>General Tiers 3 & 4 and Safety Tier 4</i>	Highest three-year average final compensation (§31462) (FAS3).
<i>General and Safety Tier 5</i>	Highest consecutive three years of pensionable compensation (§7522.10(c), §7522.32 and §7522.34) (FAS3)

Service:	Years of service (Yrs).
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Service Retirement Eligibility:

General

General Tiers 1, 2, 3 &4

Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years of service, regardless of age (§31672).

General Tier 5

Age 52 with 5 years of service (§7522.20(a)) or age 70 regardless of service (§31672.3).

Safety

Safety Tiers 1, 2 &4

Age 50 with 10 years of service, or after 30 years of service, regardless of age (§31663.25).

Safety Tier 5

Age 50 with 5 years of service (§7522.25(d)) or age 70 regardless of service (§31672.3).

Benefit Formula:

	Retirement Age	Benefit Formula
<i>General Tier 1</i>	50	$(1.86\% \times \text{FAS1} - 1/3 \times 1.86\% \times \$350 \times 12) \times \text{Yrs}$
<i>Regular plus Settlement benefit pursuant to Ventura Settlement Agreement*</i>	55	$(2.50\% \times \text{FAS1} - 1/3 \times 2.50\% \times \$350 \times 12) \times \text{Yrs}$
	60 or later	$(3.27\% \times \text{FAS1} - 1/3 \times 3.27\% \times \$350 \times 12) \times \text{Yrs}$
<i>General Tier 2 (§31676.16)</i>	50	$(1.43\% \times \text{FAS1} - 1/3 \times 1.43\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(2.00\% \times \text{FAS1} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
	60	$(2.26\% \times \text{FAS1} - 1/3 \times 2.26\% \times \$350 \times 12) \times \text{Yrs}$
	62	$(2.37\% \times \text{FAS1} - 1/3 \times 2.37\% \times \$350 \times 12) \times \text{Yrs}$
	63 or later	$(2.42\% \times \text{FAS1} - 1/3 \times 2.42\% \times \$350 \times 12) \times \text{Yrs}$
<i>General Tier 3 (§31676.15)</i>	50	$(1.49\% \times \text{FAS3} - 1/3 \times 1.49\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(2.00\% \times \text{FAS3} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
	60	$(2.62\% \times \text{FAS3} - 1/3 \times 2.62\% \times \$350 \times 12) \times \text{Yrs}$
	62	$(2.82\% \times \text{FAS3} - 1/3 \times 2.82\% \times \$350 \times 12) \times \text{Yrs}$
	65 or later	$(3.13\% \times \text{FAS3} - 1/3 \times 3.13\% \times \$350 \times 12) \times \text{Yrs}$

* Please refer to the discussion on page iv of this report for breakdown between Regular and Settlement benefits we use for determining contribution rate requirements for funding purposes.

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	Retirement Age	Benefit Formula
<i>General Tier 4 (§31676.1)</i>	50	$(1.18\% \times \text{FAS3} - 1/3 \times 1.18\% \times \$350 \times 12) \times \text{Yrs}$
	55	$(1.49\% \times \text{FAS3} - 1/3 \times 1.49\% \times \$350 \times 12) \times \text{Yrs}$
	60	$(1.92\% \times \text{FAS3} - 1/3 \times 1.92\% \times \$350 \times 12) \times \text{Yrs}$
	62	$(2.09\% \times \text{FAS3} - 1/3 \times 2.09\% \times \$350 \times 12) \times \text{Yrs}$
	65 or later	$(2.43\% \times \text{FAS3} - 1/3 \times 2.43\% \times \$350 \times 12) \times \text{Yrs}$
<i>General Tier 5 (§7522.20(a))</i>	52	$1.00\% \times \text{FAS3} \times \text{Yrs}$
	55	$1.30\% \times \text{FAS3} \times \text{Yrs}$
	60	$1.80\% \times \text{FAS3} \times \text{Yrs}$
	62	$2.00\% \times \text{FAS3} \times \text{Yrs}$
	65	$2.30\% \times \text{FAS3} \times \text{Yrs}$
	67 or later	$2.50\% \times \text{FAS3} \times \text{Yrs}$
<i>Safety Tier 1</i>	50	$(2.50\% \times \text{FAS1} - 1/3 \times 2.50\% \times \$350 \times 12) \times \text{Yrs}$
<i>Regular plus Settlement benefit pursuant to Ventura Settlement Agreement*</i>	55 or later	$(3.27\% \times \text{FAS1} - 1/3 \times 3.27\% \times \$350 \times 12) \times \text{Yrs}$
<i>Safety Tier 2 (§31664.2)</i>	50	$(2.29\% \times \text{FAS1} - 1/3 \times 2.29\% \times \$350 \times 12) \times \text{Yrs}$
	55 or later	$(3.00\% \times \text{FAS1} - 1/3 \times 3.00\% \times \$350 \times 12) \times \text{Yrs}$
<i>Safety Tier 4 (§31664)</i>	50	$(2.00\% \times \text{FAS3} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
	55 or later	$(2.62\% \times \text{FAS3} - 1/3 \times 2.62\% \times \$350 \times 12) \times \text{Yrs}$
<i>Safety Tier 5 (§7522.25(d))</i>	50	$2.00\% \times \text{FAS3} \times \text{Yrs}$
	55	$2.50\% \times \text{FAS3} \times \text{Yrs}$
	57 or later	$2.70\% \times \text{FAS3} \times \text{Yrs}$

* For funding purposes, contribution rate for Regular benefit is calculated pursuant under Section §31664 and the contribution rate for Settlement benefit is the difference between the benefit described above and the benefit under Section §31664.

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Maximum Benefit:

<i>General Tiers 1, 2, 3 & 4 and Safety Tiers 1, 2 & 4</i>	100% of Final Compensation (§31676.14, §31676.16, §31676.15, §31676.1, §31664 and §31664.2).
<i>General Tier 5 and Safety Tier 5</i>	None.

Ordinary Disability:*

General Tiers 1, 2, 4 & 5

<i>Eligibility</i>	Five years of service (§31720).
<i>Benefit Formula</i>	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. The service retirement benefit is paid, if greater.

General Tier 3

<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 65, but the total benefit cannot be more than one-third of Final Compensation. The service retirement benefit is paid, if greater.

Safety Tiers 1, 2, 4 & 5

<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. The service retirement benefit is paid, if greater.

* For General and Safety Tier 1 members who retire because of disability, there is an allocation of the value of their disability benefits made by the Association's Pension Administration System between the "Regular" and "Settlement" benefits assuming those members would have been eligible to retire and collect a service retirement benefit. While it does not change the total contribution rates paid by each of the employer and the employee, consistent with the prior valuations we have continued in this valuation to adjust the allocation of the rates between "Regular" and "Settlement" benefits so as to be consistent with the allocation made by the Association's Pension Administration System.

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Line-of-Duty Disability:*

All Members

Eligibility

No age or service requirements (§31720).

Benefit Formula

50% of the Final Compensation or 100% of Service Retirement benefit, if greater (§31727.4).

Pre-Retirement Death:

All Members

Eligibility

None.

Basic lump sum benefit

Refund of employee contributions with interest, plus one month's compensation for each year of service, to a maximum of six months' compensation (§31781).

Death in line of duty

50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor children (§31787).

OR

Vested Members

Eligibility

Five years of service.

Basic benefit

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.

Death in line of duty

50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor children (§31787).

** For General and Safety Tier 1 members who retire because of disability, there is an allocation of the value of their disability benefits made by the Association's Pension Administration System between the "Regular" and "Settlement" benefits assuming those members would have been eligible to retire and collect a service retirement benefit. While it does not change the total contribution rates paid by each of the employer and the employee, consistent with the prior valuations we have continued in this valuation to adjust the allocation of the rates between "Regular" and "Settlement" benefits so as to be consistent with the allocation made by the Association's Pension Administration System.*

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Death After Retirement:

All Members

Service or

Ordinary Disability Retirement

60% of member's unmodified allowance continued to eligible spouse (§31760.1). 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) or at least two years prior to the date of death and has attained age 55 on or prior to the date of death (§31786.1).

Line-of-Duty Disability

100% of member's allowance continued to eligible spouse (§31786).

Withdrawal Benefits:

Less than Five Years of Service

Refund of accumulated employee contributions with interest, or earned 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).

Five or More Years of Service

If contributions left on deposit, entitled to earned benefits commencing at any time after eligible to retire (§31700).

Post-retirement

Cost-of-Living Benefits:

General Tiers 1, 2 & 3 and Safety Tiers 1 & 2

Future changes based on Consumer Price Index to a maximum of 3% per year; excess "banked" (§31870.1).

General Tiers 4 & 5 and Safety Tiers 4 & 5

None.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Conversion of Annual Leave

General members

New Annual Leave Plan (5Y)	Members who entered the plan on or before October 10, 1983 and in bargaining groups who have agreed to this plan may convert hours in excess of 1,100 hours to service at retirement.
Annual Leave Plan II (5Y)	Members who entered the plan after October 10, 1983 with accruals in the 5Y leave plan and in bargaining groups who have agreed to this plan may convert hours in excess of 400 hours to service at retirement.
Vacation/Sick Leave Plans (5Q, 5S and 5W)	Members who entered the plan on or after December 14, 1998 and in bargaining groups who have agreed to these plans may convert all accrued sick leave hours to service at retirement.
Annual Leave IV Plan or the Old Annual Leave Plan (5O)	Members hired on or after October 10, 1983 or prior to that date, respectively, and who are in bargaining groups who have agreed to these plans, management or are unrepresented will convert any frozen hours balance to service at retirement.

Safety members

New Annual Leave Plan (5Y)	Members who entered the plan on or before October 10, 1983 and in bargaining groups who have agreed to this plan may convert hours in excess of 1,100 hours to service at retirement.
Annual Leave Plan II (5Y)	Members who entered the plan after October 10, 1983 with accruals in the 5Y leave plan and in bargaining groups who have agreed to this plan may convert hours in excess of 400 hours to service at retirement.
Vacation/Sick Leave Plans (5Q, 5S and 5W)	Members who entered the plan on or after December 14, 1998 and in bargaining groups who have agreed to these plans may convert all accrued sick leave hours to service at retirement.
Annual Leave IV Plan or the Old Annual Leave Plan (5O)	Members hired on or after October 10, 1983 or prior to that date, respectively, and who are in bargaining groups who have agreed to these plans, management or are unrepresented will convert any frozen hours balance to service at retirement.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Ventura Settlement Benefits:

Section 6	For Tier 1 members retiring on or after January 1, 2001 –The difference between the regular plus settlement benefits, and the regular benefit (i.e., Section 31676.12 for General Tier 1 and Section 31664 for Safety Tier 1)
Section 8	For Tier 1 members who retired prior to January 1, 2001 - \$15 per month per year of service, up to a maximum monthly benefit of \$450.
Section 9	All retired members (excluding General Tiers 4 & 5 and Safety Tier 5 members) are entitled to a \$3 per month per year of service benefit. Future increase in this benefit will depend on the amount of future undistributed earnings. For the purpose of this valuation, it is assumed that there will be no future increase in the amount of benefit.

Member Contributions:

Please refer to Appendix A for specific rates.

General Tier 1

Regular Basic

Provide for an average annuity at age 60 equal to 1/200 of FAS1 (§31621.5).

Regular Plus Settlement Basic

Provide for an average annuity at age 55 equal to 1/160 of FAS1 (§31627).

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

General Tier 2

Basic

Provide for an average annuity at age 60 equal to 1/240 of FAS1 (§31621.4).

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

General Tier 3

Basic

Provide for an average annuity at age 55 equal to 1/200 of FAS3 (§31621.6 and §31630).

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

General Tier 4

Basic

Provide for an average annuity at age 60 equal to 1/120 of FAS3 (§31621).

Cost-of-Living

Not applicable.

General Tier 5

50% of the total Normal Cost rate.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Safety Tier 1

Regular Basic

Provide for an average annuity at age 50 equal to 1/200 of FAS1 (§31639.5).

Regular Plus Settlement Basic

Provide for an average annuity at age 50 equal to 1/160 of FAS1 (§31627).

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

Safety Tier 2

Basic

Provide for an average annuity at age 50 equal to 1/200 of FAS1 (§31639.5).

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

Safety Tier 4

Basic

Provide for an average annuity at age 50 equal to 1/100 of FAS3 (§31639.25).

Cost-of-Living

Not applicable.

Safety Tier 5

50% of the total Normal Cost rate.

Other Information:

Non-Tier 5 Safety members with 30 or more years of service are exempt from paying member contributions. The same applies for General members hired on or before March 7, 1973.

Plan Changes:

There have been no changes in plan provisions since the previous 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 Association should find the plan summary not in accordance with the actual provisions, the Association should alert Segal, to ensure the proper provisions are valued.*

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A

Member Contribution Rates

Comparison of Total Member Rate from June 30, 2018 (New) and June 30, 2017 (Current) Valuations

General Tier 1 ⁽¹⁾				General Tier 2 ⁽¹⁾			
Entry Age	Current ⁽²⁾	New ⁽²⁾	Change	Entry Age	Current ⁽²⁾	New ⁽²⁾	Change
25	9.20%	9.17%	-0.03%	25	6.17%	6.18%	0.01%
35	10.56%	10.53%	-0.03%	35	7.07%	7.08%	0.01%
45	12.41%	12.37%	-0.04%	45	8.17%	8.18%	0.01%
General Tier 3 ⁽¹⁾				General Tier 4 ⁽¹⁾			
Entry Age	Current ⁽²⁾	New ⁽²⁾	Change	Entry Age	Current ⁽²⁾	New ⁽²⁾	Change
25	7.24%	7.24%	0.00%	25	6.16%	6.16%	0.00%
35	8.33%	8.33%	0.00%	35	7.06%	7.06%	0.00%
45	9.76%	9.76%	0.00%	45	8.16%	8.16%	0.00%
General Tier 5							
Entry Age	Current ⁽²⁾	New ⁽²⁾	Change				
Any ⁽³⁾	7.23%	7.17%	-0.06%				

⁽¹⁾ For non-CalPEPRA members, contributions for the first \$350 of monthly payroll are based on 2/3 (no adjustment for the administrative expense load) of the above rates.

⁽²⁾ Includes an explicit administrative expense load of 0.16% of payroll that has been allocated to the Current and New member contribution rates.

⁽³⁾ CalPEPRA member rates are independent of entry age.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A

Member Contribution Rates (Continued)

Comparison of Total Member Rate from June 30, 2018 (New) and June 30, 2017 (Current) Valuations

Safety Tier 1 ⁽¹⁾				Safety Tier 2 ⁽¹⁾			
Entry Age	Current ⁽²⁾	New ⁽²⁾	Change	Entry Age	Current ⁽²⁾	New ⁽²⁾	Change
25	13.25%	13.27%	0.02%	25	11.25%	11.24%	-0.01%
30	14.08%	14.10%	0.02%	30	11.96%	11.94%	-0.02%
35	15.03%	15.07%	0.04%	35	12.78%	12.77%	-0.01%
Safety Tier 4 ⁽¹⁾				Safety Tier 5			
Entry Age	Current ⁽²⁾	New ⁽²⁾	Change	Entry Age	Current ⁽²⁾	New ⁽²⁾	Change
25	9.83%	9.83%	0.00%	Any ⁽³⁾	12.07%	11.92%	-0.15%
30	10.45%	10.45%	0.00%				
35	11.16%	11.16%	0.00%				

⁽¹⁾ For non-CalPEPRA members, contributions for the first \$350 of monthly payroll are based on 2/3 (no adjustment for the administrative expense load) of the above rates.

⁽²⁾ Includes an explicit administrative expense load of 0.16% of payroll that has been allocated to the Current and New member contribution rates.

⁽³⁾ CalPEPRA member rates are independent of entry age.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A

Member Contribution Rates (Continued)

General Tier 1 Members' Contribution Rates based on the June 30, 2018 Actuarial Valuation as a percentage of payroll										
Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Basic Settlement First \$350 per month	Basic Settlement Over \$350 per month	COLA Settlement First \$350 per month	COLA Settlement Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
15	2.37%	3.47%	1.64%	2.46%	0.93%	1.39%	0.53%	0.79%	5.47%	8.11%
16	2.37%	3.47%	1.64%	2.46%	0.93%	1.39%	0.53%	0.79%	5.47%	8.11%
17	2.40%	3.52%	1.67%	2.50%	0.94%	1.41%	0.53%	0.80%	5.54%	8.23%
18	2.43%	3.57%	1.69%	2.53%	0.95%	1.42%	0.53%	0.80%	5.60%	8.32%
19	2.46%	3.62%	1.71%	2.57%	0.96%	1.44%	0.54%	0.81%	5.67%	8.44%
20	2.50%	3.67%	1.73%	2.60%	0.97%	1.46%	0.55%	0.83%	5.75%	8.56%
21	2.53%	3.71%	1.76%	2.64%	0.99%	1.49%	0.56%	0.84%	5.84%	8.68%
22	2.56%	3.77%	1.79%	2.68%	1.00%	1.50%	0.57%	0.85%	5.92%	8.80%
23	2.60%	3.82%	1.81%	2.72%	1.01%	1.52%	0.57%	0.86%	5.99%	8.92%
24	2.63%	3.87%	1.84%	2.76%	1.03%	1.55%	0.59%	0.88%	6.09%	9.06%
25	2.67%	3.92%	1.86%	2.79%	1.05%	1.57%	0.59%	0.89%	6.17%	9.17%
26	2.70%	3.97%	1.89%	2.83%	1.07%	1.60%	0.61%	0.91%	6.27%	9.31%
27	2.74%	4.03%	1.91%	2.87%	1.07%	1.61%	0.61%	0.91%	6.33%	9.42%
28	2.77%	4.08%	1.94%	2.91%	1.09%	1.64%	0.62%	0.93%	6.42%	9.56%
29	2.81%	4.14%	1.97%	2.96%	1.11%	1.66%	0.63%	0.94%	6.52%	9.70%
30	2.85%	4.19%	2.00%	3.00%	1.13%	1.69%	0.64%	0.96%	6.62%	9.84%
31	2.89%	4.25%	2.03%	3.04%	1.14%	1.71%	0.65%	0.97%	6.71%	9.97%
32	2.92%	4.31%	2.05%	3.08%	1.15%	1.73%	0.65%	0.98%	6.77%	10.10%
33	2.96%	4.37%	2.09%	3.13%	1.17%	1.76%	0.67%	1.00%	6.89%	10.26%
34	3.00%	4.42%	2.11%	3.17%	1.19%	1.79%	0.67%	1.01%	6.97%	10.39%
35	3.04%	4.49%	2.14%	3.21%	1.21%	1.81%	0.68%	1.02%	7.07%	10.53%
36	3.08%	4.55%	2.17%	3.26%	1.23%	1.84%	0.69%	1.04%	7.17%	10.69%

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Basic Settlement First \$350 per month	Basic Settlement Over \$350 per month	COLA Settlement First \$350 per month	COLA Settlement Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
37	3.13%	4.61%	2.21%	3.31%	1.25%	1.88%	0.71%	1.06%	7.30%	10.86%
38	3.17%	4.67%	2.23%	3.35%	1.27%	1.91%	0.72%	1.08%	7.39%	11.01%
39	3.21%	4.74%	2.27%	3.40%	1.29%	1.94%	0.73%	1.10%	7.50%	11.18%
40	3.26%	4.81%	2.30%	3.45%	1.31%	1.97%	0.74%	1.11%	7.61%	11.34%
41	3.30%	4.87%	2.33%	3.50%	1.35%	2.02%	0.76%	1.14%	7.74%	11.53%
42	3.35%	4.94%	2.37%	3.56%	1.37%	2.06%	0.78%	1.17%	7.87%	11.73%
43	3.40%	5.02%	2.41%	3.61%	1.40%	2.10%	0.79%	1.19%	8.00%	11.92%
44	3.45%	5.09%	2.45%	3.67%	1.44%	2.16%	0.81%	1.22%	8.15%	12.14%
45	3.50%	5.17%	2.48%	3.72%	1.48%	2.22%	0.84%	1.26%	8.30%	12.37%
46	3.55%	5.25%	2.52%	3.78%	1.53%	2.29%	0.87%	1.30%	8.47%	12.62%
47	3.61%	5.34%	2.57%	3.85%	1.57%	2.35%	0.89%	1.33%	8.64%	12.87%
48	3.67%	5.43%	2.61%	3.91%	1.58%	2.37%	0.89%	1.34%	8.75%	13.05%
49	3.73%	5.52%	2.65%	3.98%	1.58%	2.37%	0.89%	1.34%	8.85%	13.21%
50	3.80%	5.63%	2.71%	4.06%	1.53%	2.29%	0.87%	1.30%	8.91%	13.28%
51	3.88%	5.74%	2.77%	4.15%	1.44%	2.16%	0.81%	1.22%	8.90%	13.27%
52	3.96%	5.86%	2.82%	4.23%	1.32%	1.98%	0.75%	1.12%	8.85%	13.19%
53	4.01%	5.94%	2.86%	4.29%	1.19%	1.79%	0.67%	1.01%	8.73%	13.03%
54	4.06%	6.01%	2.90%	4.35%	1.05%	1.57%	0.59%	0.89%	8.60%	12.82%
55	4.07%	6.03%	2.91%	4.36%	1.05%	1.57%	0.59%	0.89%	8.62%	12.85%
56	4.06%	6.02%	2.90%	4.35%	1.05%	1.57%	0.59%	0.89%	8.60%	12.83%
57	4.03%	5.97%	2.88%	4.32%	1.05%	1.57%	0.59%	0.89%	8.55%	12.75%
58	3.98%	5.89%	2.83%	4.25%	1.05%	1.57%	0.59%	0.89%	8.45%	12.60%
59+	3.90%	5.77%	2.78%	4.17%	1.05%	1.57%	0.59%	0.89%	8.32%	12.40%

Interest: 7.00% per annum

COLA: 3.00%

Administrative Expenses: 0.16% of payroll added to Basic Regular rates

Mortality: See Exhibit II, page 55

Salary Increase: See Exhibit II, page 54

COLA Loading Factor: 74.32% for Regular Benefits, applied to Basic rates prior to adjustment for administrative expenses, and 56.58% for Settlement Benefits

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association**Appendix A****Member Contribution Rates (Continued)**

General Tier 2 Members' Contribution Rates based on the June 30, 2018 Actuarial Valuation as a percentage of payroll						
Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
15	2.00%	2.92%	1.70%	2.55%	3.70%	5.47%
16	2.00%	2.92%	1.70%	2.55%	3.70%	5.47%
17	2.03%	2.96%	1.72%	2.58%	3.75%	5.54%
18	2.05%	3.00%	1.75%	2.62%	3.80%	5.62%
19	2.08%	3.04%	1.77%	2.66%	3.85%	5.70%
20	2.11%	3.08%	1.79%	2.69%	3.90%	5.77%
21	2.13%	3.12%	1.82%	2.73%	3.95%	5.85%
22	2.16%	3.16%	1.85%	2.77%	4.01%	5.93%
23	2.19%	3.21%	1.87%	2.81%	4.06%	6.02%
24	2.22%	3.25%	1.90%	2.85%	4.12%	6.10%
25	2.25%	3.29%	1.93%	2.89%	4.18%	6.18%
26	2.28%	3.34%	1.95%	2.93%	4.23%	6.27%
27	2.31%	3.38%	1.98%	2.97%	4.29%	6.35%
28	2.34%	3.43%	2.01%	3.01%	4.35%	6.44%
29	2.37%	3.47%	2.04%	3.06%	4.41%	6.53%
30	2.40%	3.52%	2.07%	3.10%	4.47%	6.62%
31	2.43%	3.57%	2.09%	3.14%	4.52%	6.71%
32	2.46%	3.62%	2.13%	3.19%	4.59%	6.81%
33	2.50%	3.66%	2.15%	3.23%	4.65%	6.89%
34	2.53%	3.71%	2.19%	3.28%	4.72%	6.99%
35	2.56%	3.76%	2.21%	3.32%	4.77%	7.08%
36	2.60%	3.82%	2.25%	3.37%	4.85%	7.19%
37	2.63%	3.87%	2.28%	3.42%	4.91%	7.29%

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
38	2.67%	3.92%	2.31%	3.47%	4.98%	7.39%
39	2.70%	3.98%	2.35%	3.52%	5.05%	7.50%
40	2.74%	4.03%	2.38%	3.57%	5.12%	7.60%
41	2.78%	4.09%	2.41%	3.62%	5.19%	7.71%
42	2.82%	4.15%	2.45%	3.68%	5.27%	7.83%
43	2.86%	4.21%	2.49%	3.73%	5.35%	7.94%
44	2.90%	4.27%	2.53%	3.79%	5.43%	8.06%
45	2.94%	4.33%	2.57%	3.85%	5.51%	8.18%
46	2.99%	4.40%	2.61%	3.91%	5.60%	8.31%
47	3.04%	4.47%	2.65%	3.98%	5.69%	8.45%
48	3.09%	4.55%	2.70%	4.05%	5.79%	8.60%
49	3.14%	4.63%	2.75%	4.12%	5.89%	8.75%
50	3.20%	4.71%	2.80%	4.20%	6.00%	8.91%
51	3.26%	4.81%	2.86%	4.29%	6.12%	9.10%
52	3.33%	4.91%	2.92%	4.38%	6.25%	9.29%
53	3.37%	4.97%	2.96%	4.44%	6.33%	9.41%
54	3.41%	5.03%	2.99%	4.49%	6.40%	9.52%
55	3.42%	5.05%	3.01%	4.51%	6.43%	9.56%
56	3.41%	5.04%	3.00%	4.50%	6.41%	9.54%
57	3.39%	5.00%	2.97%	4.46%	6.36%	9.46%
58	3.34%	4.93%	2.93%	4.40%	6.27%	9.33%
59+	3.28%	4.83%	2.87%	4.31%	6.15%	9.14%

Interest: 7.00% per annum
COLA: 3.00%
Administrative Expenses: 0.16% of payroll added to Basic Regular rates
Mortality: See Exhibit II, page 55
Salary Increase: See Exhibit II, page 54
COLA Loading Factor: 92.24% for Regular Benefits, applied to Basic rates prior to adjustment for administrative expenses

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association**Appendix A****Member Contribution Rates (Continued)**

General Tier 3 Members' Contribution Rates based on the June 30, 2018 Actuarial Valuation as a percentage of payroll						
Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
15	2.56%	3.76%	1.77%	2.65%	4.33%	6.41%
16	2.56%	3.76%	1.77%	2.65%	4.33%	6.41%
17	2.59%	3.81%	1.79%	2.68%	4.38%	6.49%
18	2.63%	3.86%	1.81%	2.72%	4.44%	6.58%
19	2.66%	3.91%	1.84%	2.76%	4.50%	6.67%
20	2.70%	3.97%	1.87%	2.80%	4.57%	6.77%
21	2.73%	4.02%	1.89%	2.84%	4.62%	6.86%
22	2.77%	4.08%	1.92%	2.88%	4.69%	6.96%
23	2.81%	4.13%	1.95%	2.92%	4.76%	7.05%
24	2.84%	4.19%	1.97%	2.96%	4.81%	7.15%
25	2.88%	4.24%	2.00%	3.00%	4.88%	7.24%
26	2.92%	4.30%	2.03%	3.04%	4.95%	7.34%
27	2.96%	4.36%	2.06%	3.09%	5.02%	7.45%
28	3.00%	4.42%	2.09%	3.13%	5.09%	7.55%
29	3.04%	4.48%	2.11%	3.17%	5.15%	7.65%
30	3.08%	4.54%	2.15%	3.22%	5.23%	7.76%
31	3.12%	4.60%	2.18%	3.27%	5.30%	7.87%
32	3.16%	4.67%	2.21%	3.31%	5.37%	7.98%
33	3.21%	4.73%	2.24%	3.36%	5.45%	8.09%
34	3.25%	4.80%	2.27%	3.41%	5.52%	8.21%
35	3.30%	4.87%	2.31%	3.46%	5.61%	8.33%

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Entry Age	Basic Regular	Basic Regular	COLA Regular	COLA Regular	Combined	Combined
	First \$350 per month	Over \$350 per month	First \$350 per month	Over \$350 per month	First \$350 per month	Over \$350 per month
36	3.34%	4.93%	2.34%	3.51%	5.68%	8.44%
37	3.39%	5.01%	2.37%	3.56%	5.76%	8.57%
38	3.44%	5.08%	2.41%	3.62%	5.85%	8.70%
39	3.49%	5.15%	2.45%	3.67%	5.94%	8.82%
40	3.54%	5.23%	2.49%	3.73%	6.03%	8.96%
41	3.60%	5.32%	2.53%	3.79%	6.13%	9.11%
42	3.65%	5.40%	2.57%	3.85%	6.22%	9.25%
43	3.72%	5.49%	2.61%	3.92%	6.33%	9.41%
44	3.78%	5.59%	2.66%	3.99%	6.44%	9.58%
45	3.85%	5.69%	2.71%	4.07%	6.56%	9.76%
46	3.91%	5.78%	2.75%	4.13%	6.66%	9.91%
47	3.96%	5.86%	2.79%	4.19%	6.75%	10.05%
48	3.98%	5.90%	2.81%	4.22%	6.79%	10.12%
49	3.99%	5.91%	2.81%	4.22%	6.80%	10.13%
50	3.97%	5.88%	2.80%	4.20%	6.77%	10.08%
51	3.93%	5.82%	2.77%	4.16%	6.70%	9.98%
52	3.87%	5.72%	2.73%	4.09%	6.60%	9.81%
53	3.99%	5.90%	2.81%	4.22%	6.80%	10.12%
54+	4.12%	6.09%	2.91%	4.36%	7.03%	10.45%

Interest:	7.00% per annum
COLA:	3.00%
Administrative Expenses:	0.16% of payroll added to Basic Regular rates
Mortality:	See Exhibit II, page 55
Salary Increase:	See Exhibit II, page 54
COLA Loading Factor:	73.51% for Regular Benefits, applied to Basic rates prior to adjustment for administrative expenses

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A

Member Contribution Rates (Continued)

General Tier 4 Members' Contribution Rates based on the June 30, 2018 Actuarial Valuation as a percentage of payroll								
Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month
15	3.68%	5.45%	30	4.45%	6.59%	45	5.49%	8.16%
16	3.68%	5.45%	31	4.51%	6.69%	46	5.58%	8.28%
17	3.73%	5.52%	32	4.57%	6.78%	47	5.67%	8.42%
18	3.79%	5.60%	33	4.63%	6.87%	48	5.76%	8.56%
19	3.84%	5.68%	34	4.70%	6.97%	49	5.86%	8.72%
20	3.89%	5.75%	35	4.76%	7.06%	50	5.97%	8.88%
21	3.94%	5.83%	36	4.83%	7.16%	51	6.07%	9.02%
22	4.00%	5.91%	37	4.89%	7.26%	52	6.14%	9.13%
23	4.05%	5.99%	38	4.96%	7.36%	53	6.19%	9.20%
24	4.10%	6.08%	39	5.03%	7.47%	54	6.20%	9.22%
25	4.16%	6.16%	40	5.10%	7.57%	55	6.17%	9.17%
26	4.22%	6.24%	41	5.18%	7.68%	56	6.10%	9.07%
27	4.27%	6.33%	42	5.25%	7.80%	57	6.00%	8.93%
28	4.33%	6.42%	43	5.33%	7.91%	58	6.19%	9.21%
29	4.39%	6.51%	44	5.41%	8.03%	59+	6.39%	9.51%

Interest:

7.00% per annum

COLA:

0.00%

Administrative Expenses:

0.16% of payroll added to Basic Regular rates

Mortality:

See Exhibit II, page 55

Salary Increase:

See Exhibit II, page 54

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A

Member Contribution Rates (Continued)

**General Tier 5 Members' Contribution Rates based on the June 30, 2018
Actuarial Valuation as a percentage of payroll**

	<u>All Eligible Pay⁽¹⁾</u>
All members	7.17%
Administrative Expenses:	0.16% of payroll added to the rate

⁽¹⁾ *It is our understanding that in the determination of pension benefits under the CalPEPRA formulas, the compensation that can be taken into account for 2018 is \$121,388. For an employer that is not enrolled in Social Security, the maximum amount is \$145,666 (reference Section 7522.10). These amounts are adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018 (reference Section 7522.10(d)).*

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A

Member Contribution Rates (Continued)

Safety Tier 1 Members' Contribution Rates based on the June 30, 2018 Actuarial Valuation as a percentage of payroll										
Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Basic Settlement First \$350 per month	Basic Settlement Over \$350 per month	COLA Settlement First \$350 per month	COLA Settlement Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
15	3.20%	4.71%	3.30%	4.95%	0.76%	1.14%	0.75%	1.13%	8.01%	11.93%
16	3.20%	4.71%	3.30%	4.95%	0.76%	1.14%	0.75%	1.13%	8.01%	11.93%
17	3.23%	4.77%	3.34%	5.01%	0.77%	1.15%	0.76%	1.14%	8.10%	12.07%
18	3.27%	4.82%	3.38%	5.07%	0.78%	1.17%	0.77%	1.16%	8.20%	12.22%
19	3.31%	4.88%	3.42%	5.13%	0.79%	1.18%	0.78%	1.17%	8.30%	12.36%
20	3.34%	4.93%	3.46%	5.19%	0.80%	1.20%	0.79%	1.19%	8.39%	12.51%
21	3.38%	4.99%	3.50%	5.25%	0.81%	1.21%	0.80%	1.20%	8.49%	12.65%
22	3.42%	5.05%	3.54%	5.31%	0.81%	1.22%	0.81%	1.21%	8.58%	12.79%
23	3.46%	5.11%	3.59%	5.38%	0.82%	1.23%	0.81%	1.22%	8.68%	12.94%
24	3.50%	5.17%	3.63%	5.44%	0.83%	1.25%	0.83%	1.24%	8.79%	13.10%
25	3.54%	5.23%	3.67%	5.51%	0.85%	1.27%	0.84%	1.26%	8.90%	13.27%
26	3.58%	5.29%	3.72%	5.58%	0.85%	1.28%	0.85%	1.27%	9.00%	13.42%
27	3.62%	5.35%	3.77%	5.65%	0.87%	1.30%	0.86%	1.29%	9.12%	13.59%
28	3.67%	5.42%	3.81%	5.72%	0.87%	1.31%	0.87%	1.30%	9.22%	13.75%
29	3.71%	5.48%	3.86%	5.79%	0.89%	1.33%	0.88%	1.32%	9.34%	13.92%
30	3.75%	5.55%	3.91%	5.86%	0.90%	1.35%	0.89%	1.34%	9.45%	14.10%
31	3.80%	5.62%	3.96%	5.94%	0.91%	1.37%	0.91%	1.36%	9.58%	14.29%
32	3.85%	5.69%	4.01%	6.02%	0.93%	1.39%	0.92%	1.38%	9.71%	14.48%
33	3.90%	5.77%	4.07%	6.10%	0.93%	1.40%	0.93%	1.39%	9.83%	14.66%
34	3.95%	5.84%	4.12%	6.18%	0.95%	1.43%	0.95%	1.42%	9.97%	14.87%
35	4.00%	5.93%	4.18%	6.27%	0.96%	1.44%	0.95%	1.43%	10.09%	15.07%

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Basic Settlement First \$350 per month	Basic Settlement Over \$350 per month	COLA Settlement First \$350 per month	COLA Settlement Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
36	4.06%	6.01%	4.24%	6.36%	0.97%	1.46%	0.97%	1.45%	10.24%	15.28%
37	4.12%	6.10%	4.31%	6.46%	0.99%	1.49%	0.99%	1.48%	10.41%	15.53%
38	4.18%	6.20%	4.37%	6.56%	1.01%	1.51%	1.00%	1.50%	10.56%	15.77%
39	4.25%	6.30%	4.45%	6.68%	1.03%	1.54%	1.01%	1.52%	10.74%	16.04%
40	4.33%	6.42%	4.53%	6.80%	1.04%	1.56%	1.03%	1.54%	10.93%	16.32%
41	4.42%	6.55%	4.63%	6.94%	1.06%	1.59%	1.05%	1.57%	11.16%	16.65%
42	4.46%	6.61%	4.67%	7.01%	1.08%	1.62%	1.07%	1.60%	11.28%	16.84%
43	4.50%	6.66%	4.71%	7.07%	1.09%	1.63%	1.07%	1.61%	11.37%	16.97%
44	4.52%	6.70%	4.74%	7.11%	1.09%	1.63%	1.07%	1.61%	11.42%	17.05%
45	4.50%	6.67%	4.72%	7.08%	1.09%	1.63%	1.07%	1.61%	11.38%	16.99%
46	4.47%	6.63%	4.69%	7.03%	1.08%	1.62%	1.07%	1.60%	11.31%	16.88%
47	4.45%	6.60%	4.67%	7.00%	1.07%	1.61%	1.06%	1.59%	11.25%	16.80%
48	4.39%	6.51%	4.60%	6.90%	1.05%	1.58%	1.04%	1.56%	11.08%	16.55%
49+	4.31%	6.38%	4.51%	6.76%	1.03%	1.55%	1.02%	1.53%	10.87%	16.22%

Interest:	7.00% per annum
COLA:	3.00%
Administrative Expenses:	0.16% of payroll added to Basic Regular rates
Mortality:	See Exhibit II, page 55
Salary Increase:	See Exhibit II, page 54
COLA Loading Factor:	108.71% for Regular Benefits, applied to Basic rates prior to adjustment for administrative expenses, and 99.01% for Settlement Benefits

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association**Appendix A****Member Contribution Rates (Continued)**

Safety Tier 2 Members' Contribution Rates based on the June 30, 2018 Actuarial Valuation as a percentage of payroll						
Entry Age	Basic Regular	Basic Regular	COLA	COLA	Combined	Combined
	First \$350 per month	Over \$350 per month	Regular First \$350 per month	Regular Over \$350 per month	First \$350 per month	Over \$350 per month
15	3.20%	4.71%	3.60%	5.40%	6.80%	10.11%
16	3.20%	4.71%	3.60%	5.40%	6.80%	10.11%
17	3.23%	4.77%	3.65%	5.47%	6.88%	10.24%
18	3.27%	4.82%	3.69%	5.53%	6.96%	10.35%
19	3.31%	4.88%	3.73%	5.60%	7.04%	10.48%
20	3.34%	4.93%	3.77%	5.66%	7.11%	10.59%
21	3.38%	4.99%	3.82%	5.73%	7.20%	10.72%
22	3.42%	5.05%	3.87%	5.80%	7.29%	10.85%
23	3.46%	5.11%	3.91%	5.87%	7.37%	10.98%
24	3.50%	5.17%	3.96%	5.94%	7.46%	11.11%
25	3.54%	5.23%	4.01%	6.01%	7.55%	11.24%
26	3.58%	5.29%	4.05%	6.08%	7.63%	11.37%
27	3.62%	5.35%	4.11%	6.16%	7.73%	11.51%
28	3.67%	5.42%	4.16%	6.24%	7.83%	11.66%
29	3.71%	5.48%	4.21%	6.31%	7.92%	11.79%
30	3.75%	5.55%	4.26%	6.39%	8.01%	11.94%
31	3.80%	5.62%	4.32%	6.48%	8.12%	12.10%
32	3.85%	5.69%	4.37%	6.56%	8.22%	12.25%
33	3.90%	5.77%	4.43%	6.65%	8.33%	12.42%
34	3.95%	5.84%	4.49%	6.74%	8.44%	12.58%
35	4.00%	5.93%	4.56%	6.84%	8.56%	12.77%

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	COLA Regular First \$350 per month	COLA Regular Over \$350 per month	Combined First \$350 per month	Combined Over \$350 per month
36	4.06%	6.01%	4.63%	6.94%	8.69%	12.95%
37	4.12%	6.10%	4.70%	7.05%	8.82%	13.15%
38	4.18%	6.20%	4.77%	7.16%	8.95%	13.36%
39	4.25%	6.30%	4.85%	7.28%	9.10%	13.58%
40	4.33%	6.42%	4.95%	7.42%	9.28%	13.84%
41	4.42%	6.55%	5.05%	7.57%	9.47%	14.12%
42	4.46%	6.61%	5.10%	7.65%	9.56%	14.26%
43	4.50%	6.66%	5.14%	7.71%	9.64%	14.37%
44	4.52%	6.70%	5.17%	7.75%	9.69%	14.45%
45	4.50%	6.67%	5.15%	7.73%	9.65%	14.40%
46	4.47%	6.63%	5.12%	7.68%	9.59%	14.31%
47	4.45%	6.60%	5.09%	7.64%	9.54%	14.24%
48	4.39%	6.51%	5.02%	7.53%	9.41%	14.04%
49+	4.31%	6.38%	4.92%	7.38%	9.23%	13.76%

Interest:	7.00% per annum
COLA:	3.00%
Administrative Expenses:	0.16% of payroll added to Basic Regular rates
Mortality:	See Exhibit II, page 55
Salary Increase:	See Exhibit II, page 54
COLA Loading Factor:	118.61% for Regular Benefits, applied to Basic rates prior to adjustment for administrative expenses

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A

Member Contribution Rates (Continued)

Safety Tier 4 Members' Contribution Rates based on the June 30, 2018 Actuarial Valuation as a percentage of payroll					
Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month	Entry Age	Basic Regular First \$350 per month	Basic Regular Over \$350 per month
15	5.95%	8.85%	33	7.13%	10.86%
16	5.79%	8.85%	34	7.23%	11.01%
17	5.86%	8.95%	35	7.33%	11.16%
18	5.93%	9.06%	36	7.44%	11.32%
19	6.00%	9.16%	37	7.56%	11.49%
20	6.07%	9.27%	38	7.68%	11.68%
21	6.15%	9.38%	39	7.81%	11.88%
22	6.22%	9.49%	40	7.93%	12.05%
23	6.29%	9.60%	41	8.01%	12.18%
24	6.37%	9.71%	42	8.06%	12.25%
25	6.45%	9.83%	43	8.07%	12.26%
26	6.53%	9.95%	44	8.04%	12.22%
27	6.61%	10.07%	45	7.99%	12.14%
28	6.69%	10.19%	46	7.90%	12.01%
29	6.77%	10.32%	47	7.77%	11.82%
30	6.86%	10.45%	48	8.03%	12.20%
31	6.95%	10.58%	49+	8.29%	12.60%
32	7.04%	10.72%			
Interest: 7.00% per annum					
COLA: 0.00%					
Administrative Expenses: 0.16% of payroll added to Basic Regular rates					
Mortality: See Exhibit II, page 55					
Salary Increase: See Exhibit II, page 54					

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix A
Member Contribution Rates (Continued)

Safety Tier 5 Members' Contribution Rates based on the June 30, 2018
Actuarial Valuation as a percentage of payroll

	All Eligible Pay ⁽¹⁾
All members	11.92%
Administrative Expenses:	0.16% of payroll added to the rate

⁽¹⁾ It is our understanding that in the determination of pension benefits under the CalPEPRA formulas, the compensation that can be taken into account for 2018 is \$121,388. For an employer that is not enrolled in Social Security, the maximum amount is \$145,666 (reference Section 7522.10). These amounts are adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018 (reference Section 7522.10(d)).

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix B

Amortization Schedule for UAAL

General – Regular Benefits	Source	Initial Amount	Outstanding Balance	Years Remaining	Payment
June 30, 2003	Restart Amortization	N/A ⁽¹⁾	\$60,010,164	15	\$5,183,978
June 30, 2004	Actuarial Loss/POB Proceeds ⁽²⁾	N/A ⁽¹⁾	(6,923,635)	1	(7,181,755)
June 30, 2005	Actuarial Loss	\$165,807,070	44,889,006	2	23,668,357
June 30, 2006	Actuarial Loss	74,355,835	28,494,197	3	10,181,575
June 30, 2006	Plan Provision Change	333,000	376,407	18	28,353
June 30, 2007	Actuarial Loss	9,736,697	4,713,494	4	1,283,941
June 30, 2007	Assumption Change	48,705,000	23,577,883	4	6,422,544
June 30, 2008	Actuarial Loss	37,435,443	21,389,640	5	4,737,356
June 30, 2009	Actuarial Loss	99,661,060	64,529,416	6	12,103,524
June 30, 2010	Actuarial Loss	40,450,188	28,859,001	7	4,714,638
June 30, 2010	Assumption Change	180,478,000	128,761,202	7	21,035,460
June 30, 2011	Actuarial Loss	33,654,586	25,944,124	8	3,768,228
June 30, 2012	Actuarial Gain	(37,654,021)	(30,877,762)	9	(4,050,175)
June 30, 2013	Actuarial Gain	(55,328,951)	(47,673,461)	10	(5,717,287)
June 30, 2013	Assumption Change	152,395,000	131,309,143	10	15,747,381
June 30, 2014	Actuarial Gain	(35,957,667)	(32,339,463)	11	(3,581,434)
June 30, 2015	Actuarial Loss	1,049,334	977,029	12	100,741
June 30, 2016	Actuarial Loss	26,665,072	25,527,143	13	2,467,531
June 30, 2016	Assumption Change	146,934,000	140,663,609	13	13,596,967
June 30, 2017	Actuarial Gain	(1,695,678)	(1,663,275)	14	(151,608)
June 30, 2018	Actuarial Loss	40,262,138	40,262,138	15	3,478,045
	Total		\$650,806,000		\$107,836,360

⁽¹⁾ The initial amounts are only available for periods based on prior audit and valuation results reviewed or prepared by Segal.

⁽²⁾ It appears that the proceeds from the Pension Obligation Bonds issued by the County were used to offset the actuarial loss in the June 30, 2004 valuation.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix B (continued)

Amortization Schedule for UAAL

General – Settlement Benefits	Source	Initial Amount	Outstanding Balance	Years Remaining	Payment
June 30, 2003	Restart Amortization ⁽¹⁾	N/A ⁽²⁾	\$140,515,625	15	\$12,138,442
June 30, 2004	Actuarial Loss/POB Proceeds ⁽³⁾	N/A ⁽²⁾	(7,708,787)	1	(7,996,178)
June 30, 2005	Actuarial Loss	\$10,771,055	2,916,052	2	1,537,529
June 30, 2006	Actuarial Loss	8,282,685	3,174,041	3	1,134,152
June 30, 2007	Actuarial Gain	(162,430)	(78,631)	4	(21,419)
June 30, 2007	Assumption Change	37,063,000	17,942,042	4	4,887,358
June 30, 2008	Actuarial Loss	11,510,769	6,576,955	5	1,456,657
June 30, 2009	Actuarial Loss	17,637,452	11,420,052	6	2,142,013
June 30, 2010	Actuarial Loss	4,210,394	3,003,887	7	490,739
June 30, 2010	Assumption Change	38,322,000	27,340,656	7	4,466,588
June 30, 2011	Actuarial Loss	208,522	160,749	8	23,348
June 30, 2012	Actuarial Gain	(18,843,015)	(15,452,006)	9	(2,026,809)
June 30, 2013	Actuarial Gain	(20,059,381)	(17,283,901)	10	(2,072,789)
June 30, 2013	Assumption Change	41,809,000	36,024,174	10	4,320,235
June 30, 2014	Actuarial Gain	(16,375,093)	(14,727,367)	11	(1,630,982)
June 30, 2015	Actuarial Gain	(16,849,948)	(15,688,898)	12	(1,617,667)
June 30, 2016	Actuarial Gain	(2,623,929)	(2,511,953)	13	(242,813)
June 30, 2016	Assumption Change	25,697,000	24,600,384	13	2,377,947
June 30, 2017	Actuarial Gain	(8,885,007)	(8,717,183)	14	(794,571)
June 30, 2018	Actuarial Gain	(305,215)	(305,215)	15	(26,366)
	Total		\$191,200,676		\$18,545,414

⁽¹⁾ The outstanding balance includes the full General Section 8 UAAL and General Section 9 UAAL.

⁽²⁾ The initial amounts are only available for periods based on prior audit and valuation results reviewed or prepared by Segal.

⁽³⁾ It appears that the proceeds from the Pension Obligation Bonds issued by the County were used to offset the actuarial losses in the June 30, 2004 valuation.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix B (continued)

Amortization Schedule for UAAL

Safety – Regular Benefits	Source	Initial Amount	Outstanding Balance	Years Remaining	Payment
June 30, 2003	Restart Amortization	N/A ⁽¹⁾	\$20,530,687	15	\$1,773,543
June 30, 2004	Actuarial Loss/POB Proceeds ⁽²⁾	N/A ⁽¹⁾	(1,496,168)	1	(1,551,947)
June 30, 2005	Actuarial Loss	\$28,456,160	7,703,945	2	4,062,013
June 30, 2006	Actuarial Loss	36,122,657	13,842,708	3	4,946,290
June 30, 2007	Actuarial Loss	11,440,206	5,538,154	4	1,508,577
June 30, 2007	Assumption Change	18,663,000	9,034,679	4	2,461,019
June 30, 2008	Actuarial Loss	25,279,442	14,444,017	5	3,199,047
June 30, 2009	Actuarial Loss	33,290,245	21,555,059	6	4,042,997
June 30, 2010	Actuarial Loss	7,016,461	5,005,860	7	817,797
June 30, 2010	Assumption Change	44,211,000	31,542,135	7	5,152,976
June 30, 2011	Actuarial Gain	(3,902,219)	(3,008,196)	8	(436,923)
June 30, 2012	Actuarial Gain	(4,727,978)	(3,877,126)	9	(508,554)
June 30, 2013	Actuarial Gain	(17,551,239)	(15,122,793)	10	(1,813,616)
June 30, 2013	Assumption Change	47,490,000	40,919,132	10	4,907,267
June 30, 2014	Actuarial Gain	(11,045,503)	(9,934,061)	11	(1,100,148)
June 30, 2015	Actuarial Gain	(375,371)	(349,507)	12	(36,038)
June 30, 2016	Actuarial Gain	(3,837,802)	(3,674,025)	13	(355,142)
June 30, 2016	Assumption Change	51,927,000	49,711,023	13	4,805,217
June 30, 2017	Actuarial Loss	1,282,333	1,257,829	14	114,651
June 30, 2018	Actuarial Loss	15,871,648	<u>15,871,648</u>	15	<u>1,371,072</u>
	Total		\$199,495,000		\$33,360,098

⁽¹⁾ The initial amounts are only available for periods based on prior audit and valuation results reviewed or prepared by Segal.

⁽²⁾ It appears that the proceeds from the Pension Obligation Bonds issued by the County were used to offset the actuarial loss in the June 30, 2004 valuation.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix B (continued)

Amortization Schedule for UAAL

Safety – Settlement Benefits	Source	Initial Amount	Outstanding Balance	Years Remaining	Payment
June 30, 2003	Restart Amortization ⁽¹⁾	N/A ⁽²⁾	\$23,898,807	15	\$2,064,498
June 30, 2004	Actuarial Loss/POB Proceeds ⁽³⁾	N/A ⁽²⁾	(1,225,266)	1	(1,270,945)
June 30, 2005	Actuarial Gain	\$(8,133,004)	(2,201,850)	2	(1,160,956)
June 30, 2006	Actuarial Loss	6,885,605	2,638,662	3	942,849
June 30, 2007	Actuarial Loss	810,988	392,596	4	106,942
June 30, 2007	Assumption Change	4,474,000	2,165,844	4	589,969
June 30, 2008	Actuarial Loss	4,845,166	2,768,402	5	613,143
June 30, 2009	Actuarial Loss	7,849,312	5,082,342	6	953,275
June 30, 2010	Actuarial Loss	1,272,629	907,952	7	148,330
June 30, 2010	Assumption Change	6,935,000	4,947,744	7	808,303
June 30, 2011	Actuarial Gain	(433,930)	(334,514)	8	(48,586)
June 30, 2012	Actuarial Gain	(1,098,338)	(900,680)	9	(118,140)
June 30, 2013	Actuarial Gain	(3,609,401)	(3,109,991)	10	(372,969)
June 30, 2013	Assumption Change	10,467,000	9,018,752	10	1,081,583
June 30, 2014	Actuarial Gain	(2,617,021)	(2,353,686)	11	(260,659)
June 30, 2015	Actuarial Gain	(7,407,553)	(6,897,133)	12	(711,156)
June 30, 2016	Actuarial Loss	5,491,129	5,256,796	13	508,138
June 30, 2016	Assumption Change	9,148,000	8,757,610	13	846,537
June 30, 2017	Actuarial Gain	(278,477)	(273,156)	14	(24,898)
June 30, 2018	Actuarial Loss	910,093	<u>910,093</u>	15	<u>78,618</u>
	Total		\$49,449,324		\$4,773,876

⁽¹⁾ The outstanding balance includes the full Safety Section 8 UAAL and Safety Section 9 UAAL.

⁽²⁾ The initial amounts are only available for periods based on prior audit and valuation results reviewed or prepared by Segal.

⁽³⁾ It appears that the proceeds from the Pension Obligation Bonds issued by the County were used to offset the actuarial losses in the June 30, 2004 valuation.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix B (continued)

Amortization Schedule for UAAL

Total	Source	Initial Amount	Outstanding Balance	Years Remaining	Payment
June 30, 2003	Restart Amortization ⁽¹⁾	N/A ⁽²⁾	\$244,955,283	15	\$21,160,460
June 30, 2004	Actuarial Loss/POB Proceeds ⁽³⁾	N/A ⁽²⁾	(17,353,856)	1	(18,000,825)
June 30, 2005	Actuarial Loss	\$196,901,281	53,307,153	2	28,106,943
June 30, 2006	Actuarial Loss	125,646,782	48,149,608	3	17,204,866
June 30, 2006	Plan Provision Change	333,000	376,407	18	28,353
June 30, 2007	Actuarial Loss	21,825,461	10,565,613	4	2,878,041
June 30, 2007	Assumption Change	108,905,000	52,720,448	4	14,360,890
June 30, 2008	Actuarial Loss	79,070,820	45,179,014	5	10,006,203
June 30, 2009	Actuarial Loss	158,438,069	102,586,869	6	19,241,809
June 30, 2010	Actuarial Loss	52,949,672	37,776,700	7	6,171,504
June 30, 2010	Assumption Change	269,946,000	192,591,737	7	31,463,327
June 30, 2011	Actuarial Loss	29,526,959	22,762,163	8	3,306,067
June 30, 2012	Actuarial Gain	(62,323,352)	(51,107,574)	9	(6,703,678)
June 30, 2013	Actuarial Gain	(96,548,872)	(83,190,146)	10	(9,976,661)
June 30, 2013	Assumption Change	252,161,000	217,271,201	10	26,056,466
June 30, 2014	Actuarial Gain	(65,995,284)	(59,354,577)	11	(6,573,223)
June 30, 2015	Actuarial Gain	(23,583,538)	(21,958,509)	12	(2,264,120)
June 30, 2016	Actuarial Loss	25,694,470	24,597,961	13	2,377,714
June 30, 2016	Assumption Change	233,706,000	223,732,626	13	21,626,668
June 30, 2017	Actuarial Gain	(9,578,829)	(9,395,785)	14	(856,426)
June 30, 2018	Actuarial Loss	56,738,664	<u>56,738,664</u>	15	<u>4,901,369</u>
	Total		\$1,090,951,000		\$164,515,747

⁽¹⁾ The outstanding balance includes the full Section 8 UAAL and Section 9 UAAL.

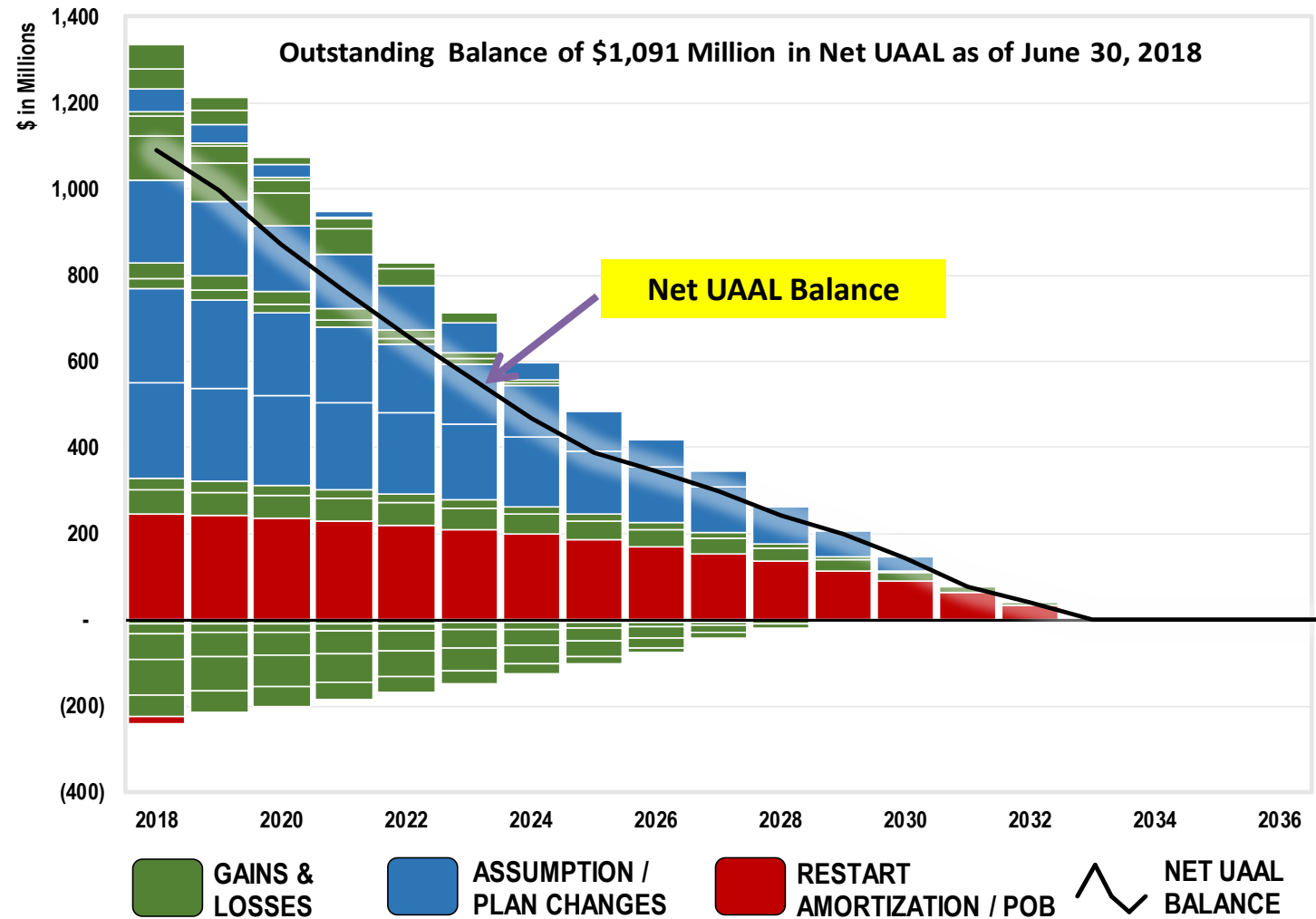
⁽²⁾ The initial amounts are only available for periods based on prior audit and valuation results reviewed or prepared by Segal.

⁽³⁾ It appears that the proceeds from the Pension Obligation Bonds issued by the County were used to offset the actuarial losses in the June 30, 2004 valuation.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix C

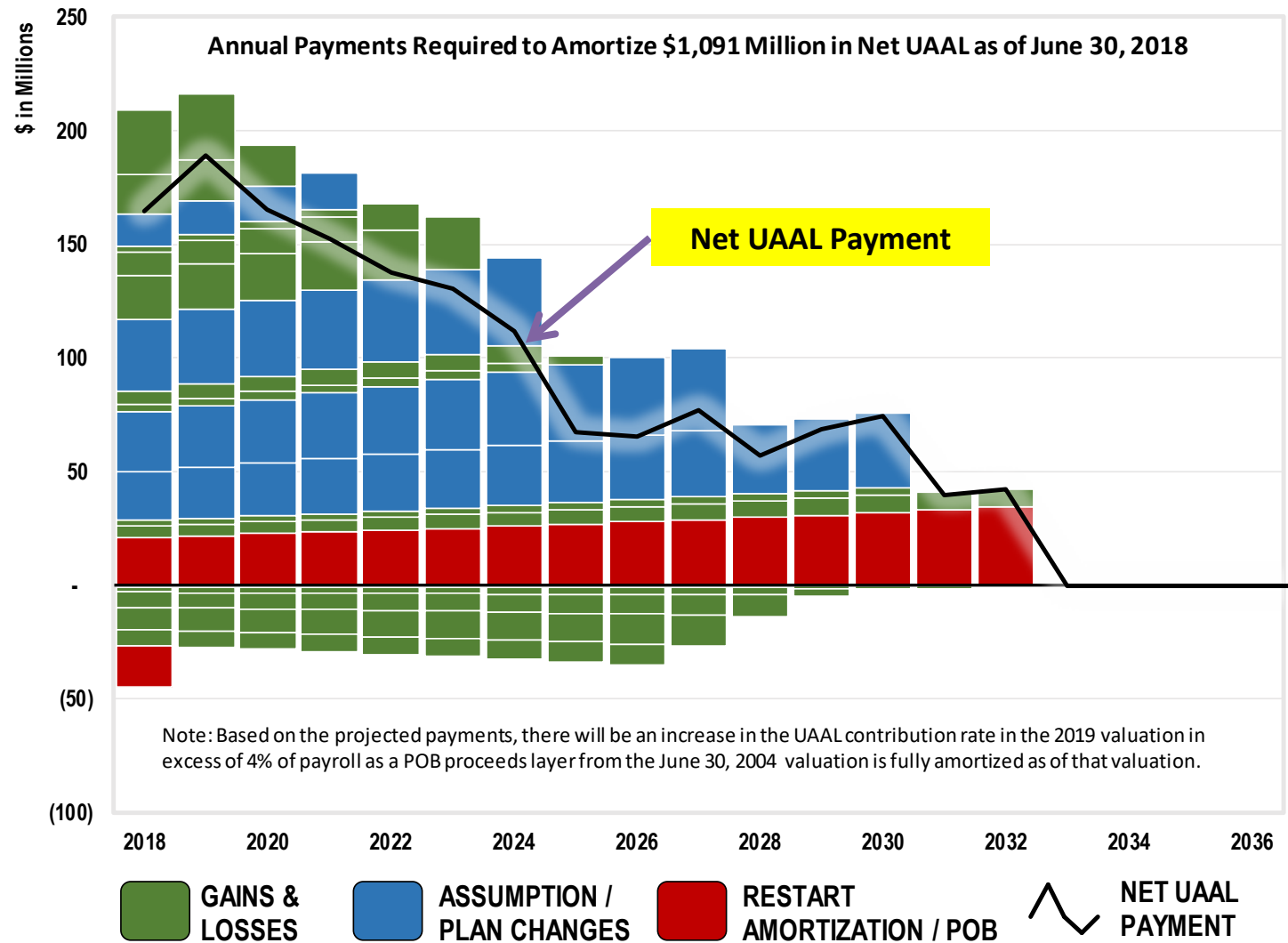
Projection of UAAL Balances and Payments



SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix C (continued)

Projection of UAAL Balances and Payments



SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix D

Schedule of UAAL and Associated Funded Ratios (Dollar Amounts in Thousands)

	Regular Benefit	Settlement Benefit	Total
A. AAL	\$4,646,256	\$1,247,653	\$5,893,909
B. Valuation Value of Assets	\$3,795,955	\$1,007,003	\$4,802,958
C. UAAL (A - B)	\$850,301	\$240,650	\$1,090,951
D. Funded Ratio (B / A)	81.70%	80.71%	81.49%

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix E

Recommended Employer Contribution Rates with Three-Year Phase-in⁽¹⁾ of Cost Impact of 2016 Changes in Actuarial Assumptions (Dollar Amounts in Thousands)

	June 30, 2018 ⁽²⁾						June 30, 2017 ⁽²⁾	
	REGULAR		SETTLEMENT		TOTAL		REGULAR & SETTLEMENT	
	Rate	Estimated Annual Amount ⁽³⁾	Rate	Estimated Annual Amount ⁽³⁾	Rate	Estimated Annual Amount ⁽³⁾	Rate	Estimated Annual Amount ⁽³⁾
General Tier 1 Members								
Normal Cost	15.85%	\$29,825	4.96%	\$9,332	20.81%	\$39,157	21.13%	\$39,759
UAAL	<u>30.72%</u>	<u>57,804</u>	<u>5.16%</u>	<u>9,709</u>	<u>35.88%</u>	<u>67,513</u>	<u>33.52%</u>	<u>63,072</u>
Total Contribution	46.57%	\$87,629	10.12%	\$19,041	56.69%	\$106,670	54.65%	\$102,831
General Tier 2 Members								
Normal Cost	17.80%	\$1,580	0.23%	\$20	18.03%	\$1,600	18.33%	\$1,627
UAAL	<u>30.72%</u>	<u>2,727</u>	<u>5.16%</u>	<u>458</u>	<u>35.88%</u>	<u>3,185</u>	<u>33.46%</u>	<u>2,970</u>
Total Contribution	48.52%	\$4,307	5.39%	\$478	53.91%	\$4,785	51.79%	\$4,597
General Tier 3 Members								
Normal Cost	17.67%	\$5,702	0.32%	\$103	17.99%	\$5,805	17.92%	\$5,782
UAAL	<u>30.72%</u>	<u>9,913</u>	<u>5.16%</u>	<u>1,665</u>	<u>35.88%</u>	<u>11,578</u>	<u>33.51%</u>	<u>10,813</u>
Total Contribution	48.39%	\$15,615	5.48%	\$1,768	53.87%	\$17,383	51.43%	\$16,595
General Tier 4 Members								
Normal Cost	9.04%	\$1,279	0.00%	\$0	9.04%	\$1,279	8.84%	\$1,251
UAAL	<u>30.72%</u>	<u>4,346</u>	<u>5.16%</u>	<u>730</u>	<u>35.88%</u>	<u>5,076</u>	<u>33.59%</u>	<u>4,752</u>
Total Contribution	39.76%	\$5,625	5.16%	\$730	44.92%	\$6,355	42.43%	\$6,003
General Tier 5 Members								
Normal Cost	7.17%	\$8,367	0.00%	\$0	7.17%	\$8,367	7.23%	\$8,437
UAAL	<u>30.72%</u>	<u>35,847</u>	<u>5.16%</u>	<u>6,021</u>	<u>35.88%</u>	<u>41,868</u>	<u>33.58%</u>	<u>39,185</u>
Total Contribution	37.89%	\$44,214	5.16%	\$6,021	43.05%	\$50,235	40.81%	\$47,622

⁽¹⁾ The phase-in rates are only with respect to the results for the June 30, 2017 valuation.

⁽²⁾ The Regular Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense of 0.16% and 0.78% of payroll, respectively.

⁽³⁾ Amounts are in thousands and are based on June 30, 2018 projected annual compensation shown on the following page.

SECTION 4: Reporting Information for the Fresno County Employees' Retirement Association

Appendix E (continued)

Recommended Employer Contribution Rates with Three-Year Phase-in⁽¹⁾ of Cost Impact of 2016 Changes in Actuarial Assumptions (Dollar Amounts in Thousands)

	June 30, 2018 ⁽²⁾						June 30, 2017 ⁽²⁾	
	REGULAR		SETTLEMENT		TOTAL		REGULAR & SETTLEMENT	
	Rate	Estimated Annual Amount ⁽³⁾	Rate	Estimated Annual Amount ⁽³⁾	Rate	Estimated Annual Amount ⁽³⁾	Rate	Estimated Annual Amount ⁽³⁾
Safety Tier 1 Members								
Normal Cost	23.55%	\$9,939	5.72%	\$2,414	29.27%	\$12,353	29.59%	\$12,488
UAAL	<u>47.42%</u>	<u>20,012</u>	<u>6.68%</u>	<u>2,819</u>	<u>54.10%</u>	<u>22,831</u>	<u>49.36%</u>	<u>20,831</u>
Total Contribution	70.97%	\$29,951	12.40%	\$5,233	83.37%	\$35,184	78.95%	\$33,319
Safety Tier 2 Members								
Normal Cost	29.46%	\$1,368	0.25%	\$12	29.71%	\$1,380	29.70%	\$1,380
UAAL	<u>47.42%</u>	<u>2,202</u>	<u>6.68%</u>	<u>311</u>	<u>54.10%</u>	<u>2,513</u>	<u>49.38%</u>	<u>2,294</u>
Total Contribution	76.88%	\$3,570	6.93%	\$323	83.81%	\$3,893	79.08%	\$3,674
Safety Tier 4 Members								
Normal Cost	14.45%	\$620	0.20%	\$9	14.65%	\$629	14.43%	\$619
UAAL	<u>47.42%</u>	<u>2,036</u>	<u>6.68%</u>	<u>287</u>	<u>54.10%</u>	<u>2,323</u>	<u>49.51%</u>	<u>2,125</u>
Total Contribution	61.87%	\$2,656	6.88%	\$296	68.75%	\$2,952	63.94%	\$2,744
Safety Tier 5 Members								
Normal Cost	11.92%	\$2,431	0.00%	\$0	11.92%	\$2,431	12.07%	\$2,462
UAAL	<u>47.42%</u>	<u>9,671</u>	<u>6.68%</u>	<u>1,363</u>	<u>54.10%</u>	<u>11,034</u>	<u>49.41%</u>	<u>10,077</u>
Total Contribution	59.34%	\$12,102	6.68%	\$1,363	66.02%	\$13,465	61.48%	\$12,539
All Categories Combined								
Normal Cost	14.16%	\$61,111	2.75%	\$11,890	16.91%	\$73,001	17.10%	\$73,805
UAAL	<u>33.49%</u>	<u>144,558</u>	<u>5.41%</u>	<u>23,363</u>	<u>38.90%</u>	<u>167,921</u>	<u>36.17%</u>	<u>156,119</u>
Total Contribution	47.65%	\$205,669	8.16%	\$35,253	55.81%	\$240,922	53.27%	\$229,924

⁽¹⁾ The phase-in rates are only with respect to the results for the June 30, 2017 valuation.

⁽²⁾ The Regular Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense of 0.16% and 0.78% of payroll, respectively.

⁽³⁾ Amounts are in thousands and are based on June 30, 2018 projected annual compensation (also in thousands):

General Tier 1	\$188,162	Safety Tier 1	42,202
General Tier 2	8,876	Safety Tier 2	4,645
General Tier 3	32,268		
General Tier 4	14,147	Safety Tier 4	4,293
General Tier 5	116,690	Safety Tier 5	20,395
Total Compensation		\$431,678	