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City of San José Federated City Employees' Retirement System

Actuarial Valuation Report as of June 30, 2017

Produced by Cheiron

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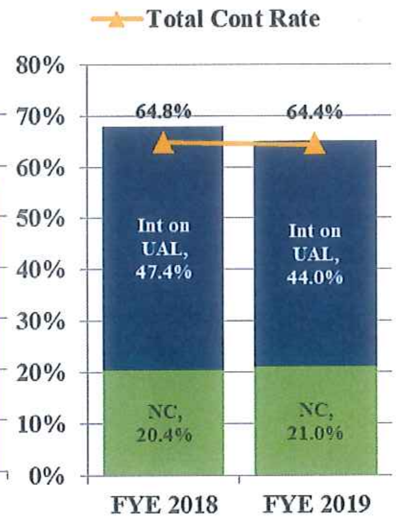
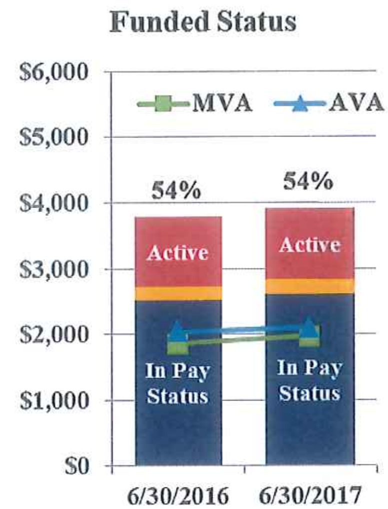
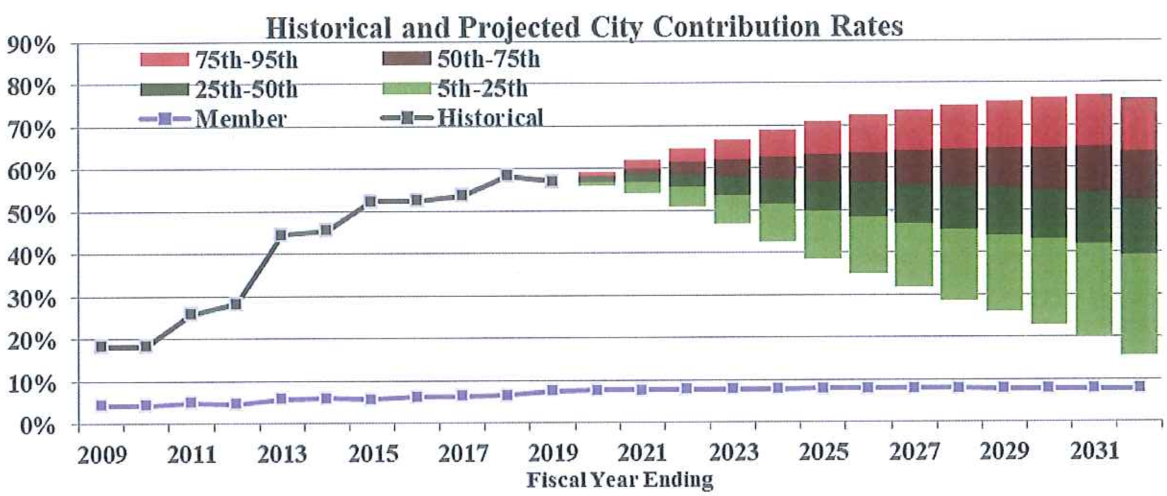
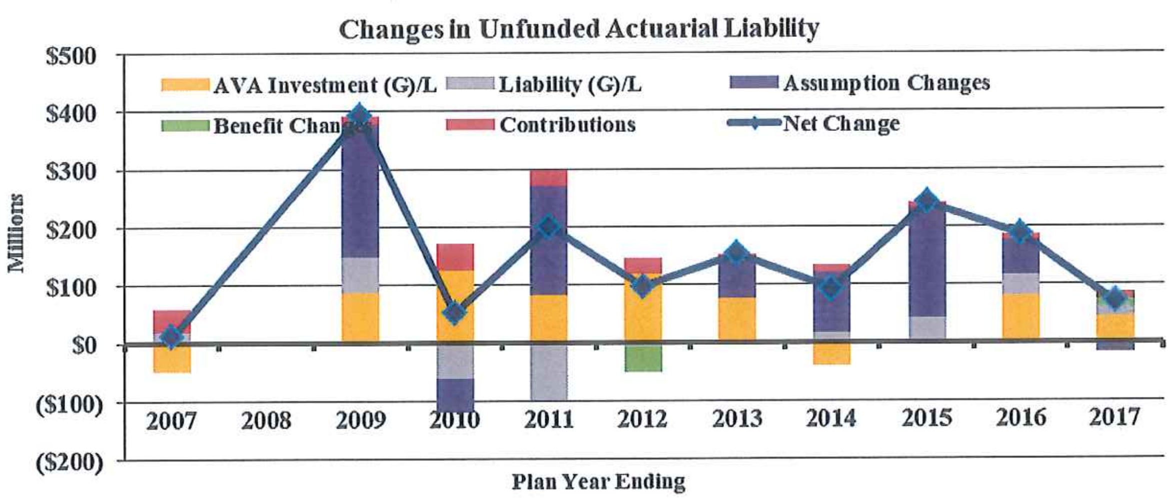








Membership

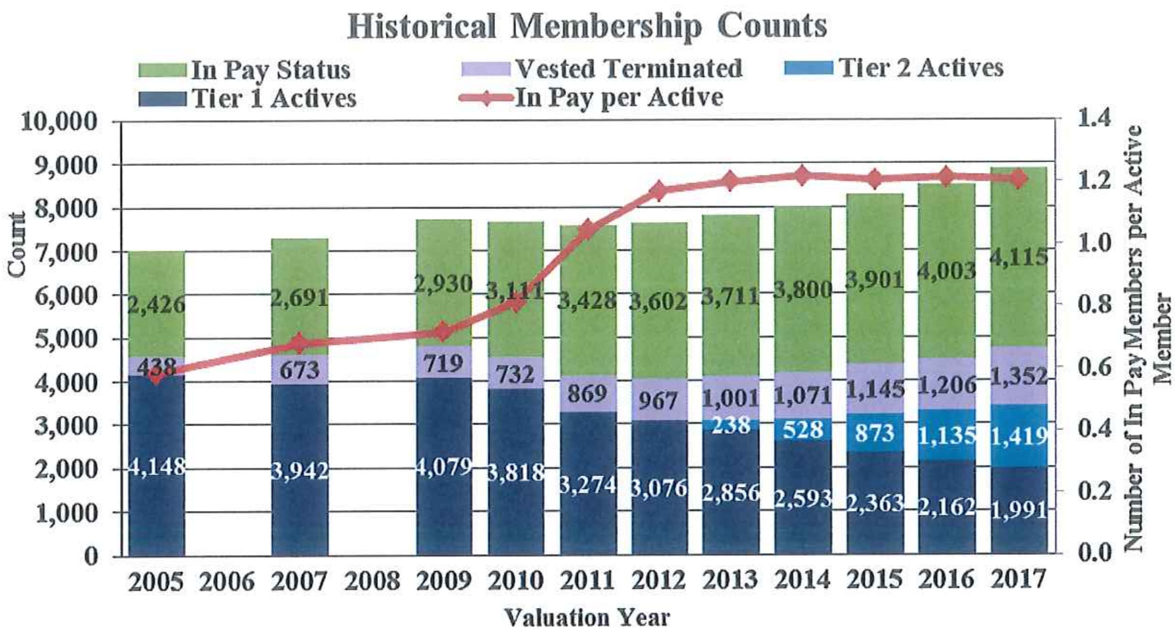
Underlying the changes in the actuarial valuation from one year to the next are changes in the membership of the System. These changes affect the liability of the System as well as contributions to the System. As shown in Table I-1 below, total membership grew 4.4% from 2016 to 2017. In particular, active membership increased 3.4% and total payroll increased by 7.7%. Approximately 40% of active members are now Tier 2 members.

Table I-1
Total Membership

	June 30, 2017	June 30, 2016	% Change
Active Members			
Tier 1	1,991	2,162	-7.9%
Tier 2	1,419	1,135	25.0%
Total Actives	3,410	3,297	3.4%
Terminated Vested Members			
Tier 1	1,037	1,038	-0.1%
Tier 2	315	168	87.5%
Total Terminated Vesteds	1,352	1,206	12.1%
Members In Pay Status			
Tier 1	4,114	4,002	2.8%
Tier 2	1	1	0.0%
Total In Pay Status	4,115	4,003	2.8%
Total Membership	8,877	8,506	4.4%
Active Member Payroll			
Tier 1	$ 181,691	$ 186,249	-2.4%
Tier 2	105,649	80,574	31.1%
Total	$ 287,339	$ 266,823	7.7%
Average Pay per Active Member	$ 84.3	$ 80.9	4.1%

Dollar amounts in thousands

As shown in the chart on the following page, the number of active members declined about 25% from 4,148 in 2005 to 3,076 in 2012. Most of this decline occurred between the 2010 and 2011 valuations. Since then, there has been a gradual increase in the number of active members to 3,410 in 2017. At the same time, the number of members in pay status has increased about 70% from 2,426 in 2005 to 4,115 in 2017. As a result, the ratio of the members in pay status to the active members increased from approximately 0.6 in 2005 to 1.2 in 2012 and has remained relatively stable since. As there are fewer actives to support each retiree, contributions tend to become more volatile and sensitive to gains and losses. This type of progression is to be expected for a maturing plan over a long period of time, but the impact of the recession accelerated the trend significantly. Following the recession, the ratio appears to have stabilized, but there is no indication yet of a return to a lower ratio.



Assets and Liabilities

This report measures assets and liabilities for funding purposes only. There is a separate report for financial reporting. Table I-2 on the next page summarizes the Actuarial Liability, assets, and related ratios for the System as of June 30, 2017 compared to June 30, 2016. The Actuarial Liability grew 3.6%, reflecting the continued accrual of benefits, unexpected salary increases, and the changes in assumptions adopted this year.

Table I-2
Summary of Funded Status and Related Ratios

		June 30, 2017		June 30, 2016	% Change
Actuarial Liability					
Actives	$	1,091,571	$	1,063,526	2.6%
Deferred Vested		222,400		208,080	6.9%
In Pay Status		2,609,995		2,515,124	3.8%
Total	$	3,923,966	$	3,786,730	3.6%
Market Value of Assets (MVA)	$	1,972,791	$	1,858,880	6.1%
Unfunded Actuarial Liability - MVA Basis	$	1,951,175	$	1,927,850	1.2%
Funding Ratio - MVA Basis		50.3%		49.1%	2.4%
Actuarial Value of Assets (AVA)	$	2,101,435	$	2,034,741	3.3%
Unfunded Actuarial Liability - AVA Basis	$	1,822,531	$	1,751,989	4.0%
Funding Ratio - AVA Basis		53.6%		53.7%	-0.3%
FYE 2018 Expected Payroll	$	287,339	$	266,823	7.7%
Asset Leverage Ratio		6.9		7.0	-1.4%
Actuarial Liability Leverage Ratio		13.7		14.2	-3.8%

Dollar amounts in thousands

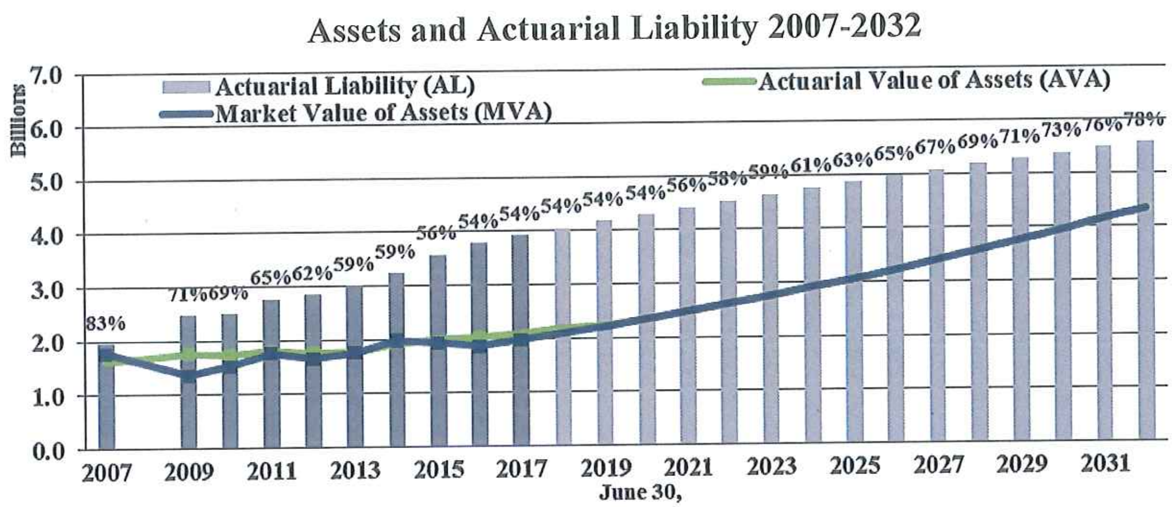
The Market Value of Assets is less than the actuarial value, so if assumptions are met in the future, we expect an increase in contribution rates as the deferred asset losses are recognized in the Actuarial Value of Assets.

The asset leverage ratio (market value of assets divided by payroll) of 6.9 means that if the System experiences a 10% loss on assets compared to the discount rate of 6.875%, the loss would be equivalent to 69% of payroll. Interest payments on such a loss would be approximately 4.7% of payroll. Interest payments on the current UAL are approximately 45% of payroll. As the System becomes better funded, the asset leverage ratio will increase, and if it was 100% funded, the leverage ratio would be 13.7 (Actuarial Liability divided by payroll). Higher asset leverage ratios indicate that a system is more sensitive to investment gains and losses. That is, the same level of investment gain or loss will have a greater impact on contribution rates for a system with a higher ratio than for a system with a lower ratio.

By comparison, the median asset leverage ratio in our survey of California retirement systems was 6.7, indicating that the System is slightly more sensitive to investment returns than the median California plan. The decline in asset leverage ratio reflects the increase in payroll in relation to the increase in Market Value of Assets.

Despite the tendency to focus on the most recent valuation results, it is important to remember that each valuation is merely a snapshot of the long-term progress of the System. The results of the current year's valuation should be evaluated in the context of historical trends, as well as trends expected into the future.

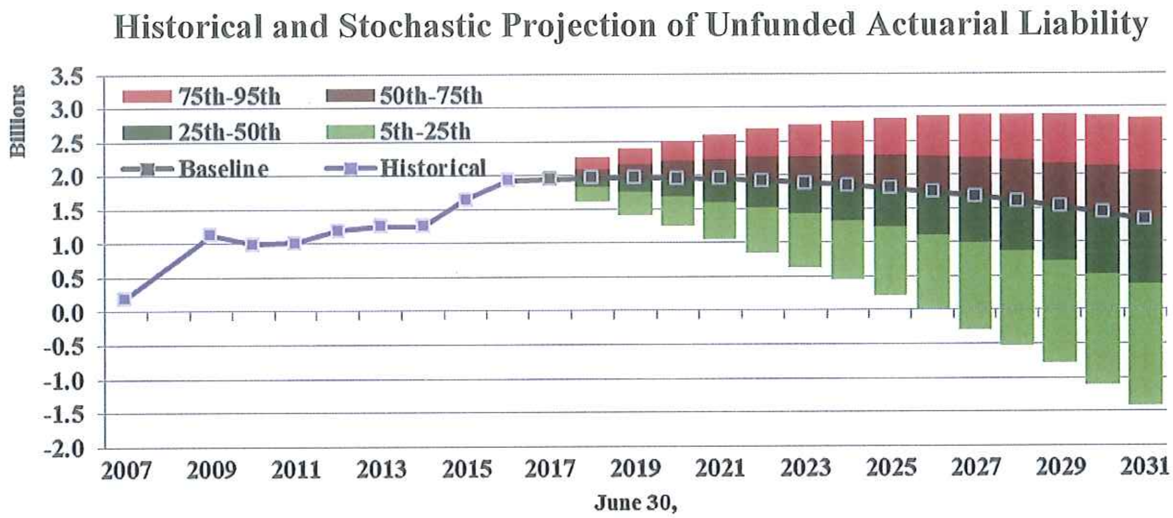
The chart below shows the historical and projected trends for assets (both market and smoothed actuarial) versus the Actuarial Liability, and also shows the progress of the funded ratios (based on the Actuarial Value of Assets) since 2007. The historical Actuarial Liability is shown in dark gray while the projected Actuarial Liability is shown in a lighter gray. From 2007 to 2017, the funding ratio has declined primarily because the System experienced lower than expected investment returns on the Actuarial Value of Assets and reduced its assumption of future investment returns. If all assumptions are met in the future including an expected return of 6.875% each year, the funded status is expected to reach about 79% by 2032.



If experience has taught us anything, it is that there is a significant level of uncertainty in projections of the future. The largest source of uncertainty is the projection of investment returns. In order to better understand the potential impact of investment returns on the System, we have included stochastic projections throughout this report based on an assumed rate of return of 6.875% and estimated standard deviation of 10.2%. Each projection contains 10,000 trials that are 15 years in length.

The chart on the next page shows the historic and stochastically projected Unfunded Actuarial Liability based on the Market Value of Assets. The black line shows the projected UAL for each year if all valuation assumptions are met, including a 6.875% investment return each and every year. The colored ranges represent different percentiles of the 10,000 results. For example, the green range represents the 5th through 25th percentile of the UAL for each year seen among the

10,000 trials. Based on the assumed distribution of investment returns, there is a 5% chance the result will be worse than the red range and a 5% chance that the result will be better than the green range.



While the amortization methods are designed to pay off the entirety of the current UAL in 25 years, the stochastic projection shows that there is a 5% chance that it will be paid off in as early as nine years. It also shows, however, that the UAL could approach $3.0 billion over a similar timeframe, but decrease after that.

The chart at the bottom of the dashboard and Table I-3 summarize the historical changes in the Unfunded Actuarial Liability over the last 10 years. Five categories of changes are shown: investment gains or losses on the Actuarial Value of Assets, liability gains or losses, assumption changes, benefit changes, and contributions.

Investment losses have contributed significantly to the growth in the UAL with 2014 as the only year in the last ten in which there was an investment gain on the Actuarial Value of Assets. In sum, investment losses have increased the UAL by about $580 million over the last ten years.

There have been significant assumption changes as shown by the purple bars in the chart on the dashboard, including reductions in the discount rate in steps from 8.25% in 2007 to 6.875% in 2016 that have increased the measure of the UAL by a sum total of $760 million over the last ten years.

Actual contributions have consistently been less than the normal cost plus interest on the UAL, resulting in an annual increase in the amount of the UAL as shown by the red bars on the dashboard. In sum, this has added $170 million to the UAL over the last ten years. This pattern is a result of the prior policy of a 30-year rolling amortization that is being phased out. Contribution rates in the future are expected to exceed normal cost plus interest on the UAL and begin paying down the UAL.

SECTION I – BOARD SUMMARY

This year is the fourth year in a row in which there was an actuarial loss on the Actuarial Liability, and five of the last nine actuarial valuations have reported an actuarial loss on the Actuarial Liability. However, in sum, the gains and losses on the Actuarial Liability have added less than $5 million to the UAL over the last ten years. The only benefit changes in the last ten years that affected the UAL were the elimination of the SRBR in 2012 and the changes under Measure F in 2017.

In aggregate, the UAL has increased in every year of the ten-year period for a total increase of approximately $1.5 billion as shown in Table I-3.

Table I-3
Changes in Unfunded Actuarial Liability

	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Discount Rate	7.75%	7.95%	7.50%	7.50%	7.25%	7.00%	7.00%	6.875%	6.875%	
Source										
AVA (G)/L	$ 86.5	$ 124.1	$ 82.2	$ 119.3	$ 76.5	$ (39.7)	$ 3.6	$ 81.5	$ 44.6	$ 578.7
Liability (G)/L	62.2	(60.4)	(98.0)	(6.5)	(0.1)	16.9	38.2	36.0	16.6	4.8
Assumption Changes	228.8	(59.4)	187.5	0.0	63.7	103.4	191.5	60.2	(15.6)	760.2
Benefit Changes	0.0	0.0	0.0	(43.1)	0.0	0.0	0.0	0.0	13.8	(29.3)
Contributions	14.0	47.0	28.9	26.8	12.4	12.2	8.8	8.8	11.1	170.0
Total UAL Change	$391.5	$ 51.4	$200.6	$ 96.5	$152.5	$ 92.8	$242.1	$186.6	$ 70.5	$1,484.4

Dollar amounts in millions

Table I-4 below breaks out the sources of the changes in UAL for the fiscal year ending June 30, 2017. The UAL increased about $71 million since the prior year. About $45 million was due to investment losses on the Actuarial Value of Assets and approximately $14 million was due to plan changes under Measure F. Technical assumption changes were made as a result of the actuarial audit to better reflect the timing of when COLAs are effective and to more accurately annualize partial year pay reported in the data. In addition, the Board adopted an increase in the wage inflation assumption and an update to the most recent mortality improvement projection scale (MP-2017 for this valuation). These assumption changes decreased the UAL by approximately $16 million. Of the $14 million in liability losses for 2017, $16 million is due to higher than expected salary increases, which was partially offset by other experience. Finally, contributions less than normal cost plus interest on the UAL added about $14 million to the UAL during the year.

Table I-4
Changes in Unfunded Actuarial Liability

		Amount
Unfunded Actuarial Liability, June 30, 2017	$	1,822,531
Unfunded Actuarial Liability, June 30, 2016		1,751,989
Change in Unfunded Actuarial Liability	**$**	**70,542**
Sources of Changes		
Plan Changes	$	13,769
Assumption Changes		(15,582)
Normal Cost and Interest on UAL less Contributions		14,031
Investment (gain) or loss on Actuarial Value of Assets		44,650
Liability (gain) or loss		
Salary experience	$	16,382
Retirement experience		5,941
Mortality experience		(6,604)
Other experience		(2,045)
Total Liability (gain) or loss	$	13,674
Total Changes	**$**	**70,542**

Dollar amounts in thousands

Contribution Rates

The System's contribution policy sets City contributions for Tier 1 equal to:

- The Normal Cost Rate attributable to reciprocity, plus
- 8/11th of the remaining Normal Cost Rate including administrative expenses, plus
- The UAL rate.

For Tier 2, City contributions equal 50% of the total contribution rate for Tier 2.

Member contributions equal 3/11th of the Normal Cost Rate (excluding reciprocity) for Tier 1 and 50% of the total contribution rate for Tier 2. Tier 1 members who were rehired into Tier 2 and then returned to Tier 1 under Measure F also pay half of the increased cost attributable to their Tier 2 service.

Table I-5 on the following page summarizes the member and City contribution rates and amounts for the fiscal years ending in 2018 and 2019. Tier 1 rates were expected to increase significantly from 2018 to 2019, reflecting the expected decline in Tier 1 payroll and the recognition of prior investment losses. However, the rate increase was mitigated by the assumption and amortization changes as well as a higher than expected payroll. The rates shown for Tier 2 in FYE 2018 are prior to the implementation of Measure F. The actual rate implemented for Tier 2 for FYE 2018 of 7.72% for members and the City reflected Measure F. In addition to Measure F, Tier 2 rates also increased due to the assumption changes and reduction of the amortization period to 10 years.

Table I-5
Components of Contribution Rates

	Fiscal Year Ending 2019			Fiscal Year Ending 2018		
	NC	UAL	Total	NC	UAL	Total
Tier 1						
Member Rate	6.81%	0.04%	6.85%	6.60%	0.00%	6.60%
City Rate	18.61%	80.55%	99.16%	18.00%	76.04%	94.04%
Total Rate	**25.42%**	**80.59%**	**106.01%**	**24.60%**	**76.04%**	**100.64%**
Projected Payroll			$ 158,776			$ 162,812
City Contribution Amounts						
Beginning of Year	$ 29,101	$ 125,447	$ 154,548	$ 28,863	$ 121,430	$ 150,293
Throughout the Year	$ 29,548	$ 127,894	$ 157,442	$ 29,306	$ 123,803	$ 153,109
Tier 2						
Member Rate	7.93%	0.35%	8.28%	6.23%	0.02%	6.25%
City Rate	7.93%	0.35%	8.28%	6.23%	0.02%	6.25%
Total Rate	**15.86%**	**0.70%**	**16.56%**	**12.46%**	**0.04%**	**12.50%**
Projected Payroll			$ 137,902			$ 111,616
City Contribution Amounts						
Throughout the Year	$ 10,936	$ 482	$ 11,418	$ 6,954	$ 22	$ 6,976
Total						
Member Rate	7.33%	0.18%	7.51%	6.45%	0.01%	6.46%
City Rate	13.65%	43.27%	56.92%	13.21%	45.12%	58.33%
Total Rate	**20.98%**	**43.45%**	**64.43%**	**19.66%**	**45.13%**	**64.79%**
Projected Payroll			$ 296,678			$ 274,428
City Contribution Amounts						
Throughout the Year	$ 40,484	$ 128,376	$ 168,860	$ 36,260	$ 123,825	$ 160,085

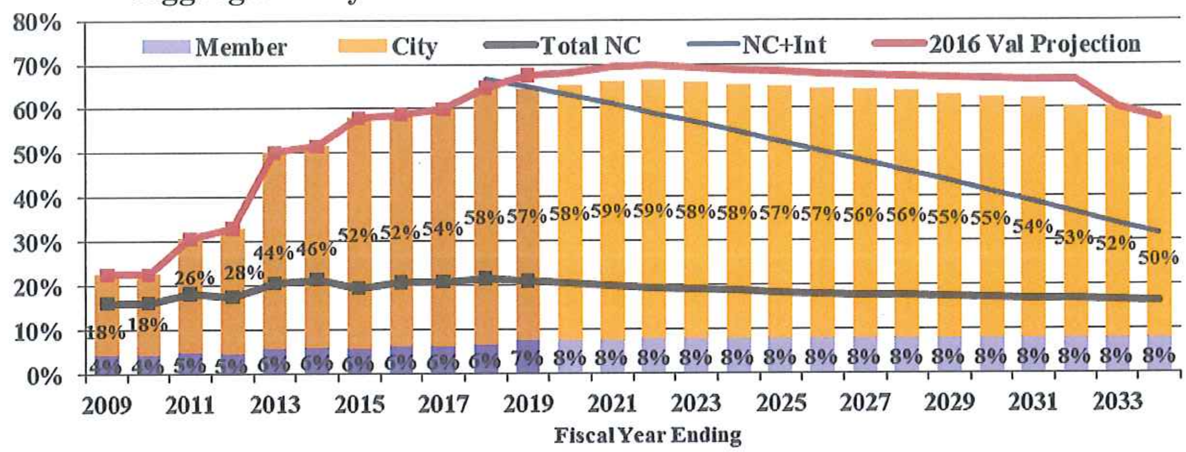
Dollar amounts in thousands

The plan changes under Measure F increased the aggregate City contribution rate by 1.1% of payroll while the changes in assumptions combined with the change in amortization periods decreased the aggregate City contribution rate by 3.7% of payroll to 56.9% of Tier 1 and Tier 2 payroll.

SECTION I – BOARD SUMMARY

The chart below shows the historical and projected aggregate member contribution rates (purple bars) and City contribution rates (gold bars) compared to the projection of member plus City contributions from the prior valuation, indicated by the red line. These contribution rates assume that all assumptions are met. The black line shows the historical and projected total normal cost rate. Historical rates and rates calculated through the fiscal year ending June 30, 2019 are shown in a darker shade than the projected future contribution rates.

Aggregate City and Member Contribution Rates FYE 2009-2034

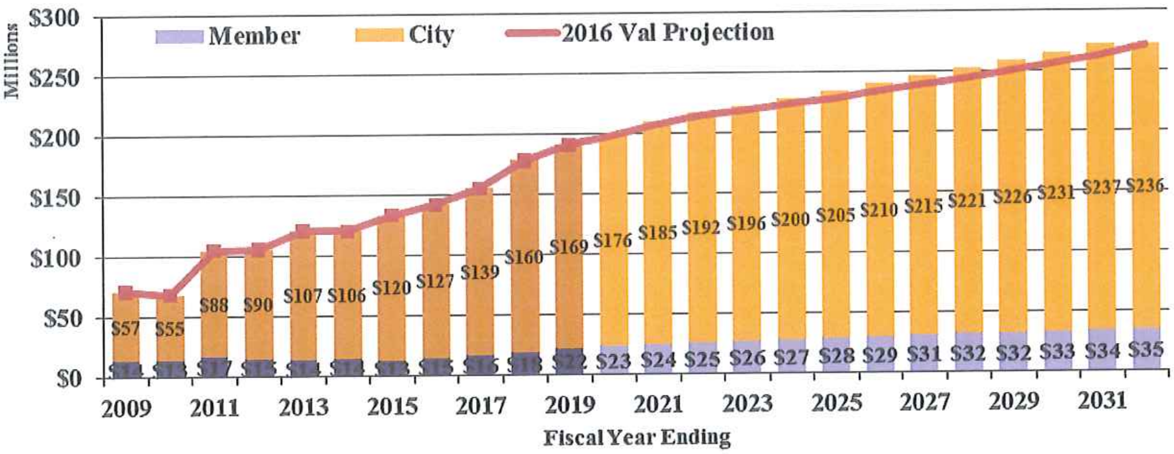


The aggregate City contribution rate has increased dramatically since FYE 2010 primarily due to investment losses, assumption changes, and reductions in payroll that increased the UAL rate. In aggregate, the discount rate over this period has been reduced from 8.25% to 6.875%. Future aggregate City contribution rates are expected to increase slightly in the next few years due to the recognition of recent investment losses, and then gradually decrease over time after that. The gradual decrease in the total rate is driven by the projected gradual decrease in total normal cost rate as Tier 2 becomes a greater proportion of the active membership and the gradual decrease in UAL rate as payroll is expected to grow slightly faster than amortization payments (3.25% vs. 3.00%). After the projection period shown, contribution rates are expected to drop more rapidly as some amortization bases are fully paid off.

The chart on the following page shows historical and projected member (purple bars) and City (gold bars) contribution amounts (assuming contributions throughout the year) compared to the projected amounts shown in the prior valuation. If all actuarial assumptions are exactly met, City contributions are expected to increase at a rate slower than payroll growth from $169 million in FYE 2019 to a peak of approximately $259 million in FYE 2037, before declining as portions of the UAL are paid off.

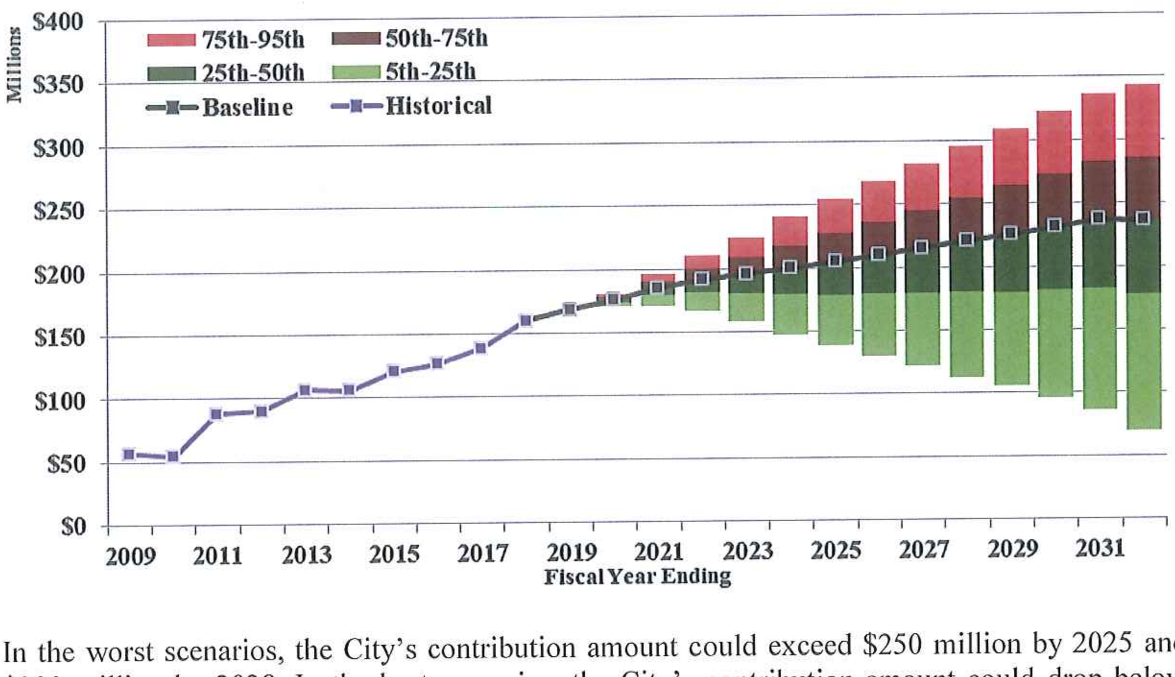
SECTION I – BOARD SUMMARY

Historical and Deterministic Projection of Contribution Amounts



The chart below shows the historical and stochastic projection of City contribution amounts. The purple line shows the historical amounts, and the black line shows the projected contribution amount for each year if all assumptions are met. The colored ranges represent different percentiles of the 10,000 trials. There is significant uncertainty in the level of City contributions depending on investment returns.

Historical and Stochastic Projection of City Contribution Amounts



In the worst scenarios, the City's contribution amount could exceed $250 million by 2025 and $300 million by 2028. In the best scenarios, the City's contribution amount could drop below $100 million by 2030. The chart on the dashboard (page 1) shows similar information based on City contribution rates as a percentage of payroll instead of contribution amounts.

SECTION II – CERTIFICATION

The purpose of this report is to present the June 30, 2017 Actuarial Valuation of the City of San José Federated City Employees' Retirement System ("System"). This report is for the use of the System and the City of San José.

In preparing our report, we relied on information, some oral and some written, supplied by the Plan. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The wage inflation assumption, amortization payment growth rate, and mortality improvement scale were adopted by the Board of Administration with our input at the December 21, 2017 Board meeting. The discount rate assumption was adopted by the Board of Administration with our input at the November 16, 2017 Board meeting. The Tier 2 retirement rates were adopted at the May 4, 2017 Board meeting based on a special analysis presented at that meeting. All other assumptions in this report were adopted at the November 19, 2015 Board meeting based on recommendations from our Experience Study covering plan experience during the period from July 1, 2010 through June 30, 2015. Please refer to the Experience Study Report for an explanation of the rationale for each assumption.

The liability measures and funding ratios in this report are for the purpose of establishing contribution rates. These measures are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the System's benefit obligations.

Future actuarial measurements may differ significantly from the current measurements 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; and, changes in plan provisions or applicable law.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This report was prepared for the City of San José Federated City Employees' Retirement System for the purposes described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

William R. Hallmark

William R. Hallmark, ASA, EA, FCA, MAAA
Consulting Actuary

Steven M. Hastings

Steven M. Hastings, FSA, EA, MAAA
Consulting Actuary

SECTION III – ASSETS

The System uses two different asset measurements: the Market Value and Actuarial Value of Assets. The market value represents the value of the assets if they were liquidated on the valuation date. The actuarial value smooths annual investment returns over five years to reduce the impact of short-term investment volatility on employer contribution rates. The Market Value of Assets is used primarily for reporting and disclosure, and the Actuarial Value of Assets is used primarily to determine contribution rates.

This section shows the changes in the Market Value of Assets and develops the Actuarial Value of Assets.

Statement of Change in Market Value of Assets

Table III-1 shows the changes in the Market Value of Assets for the current and prior fiscal years for each tier.

Table III-1
Change in Market Value of Assets

	Fiscal Year Ending 2017			Fiscal Year Ending 2016		
	Tier 1	Tier 2	Total	Tier 1	Tier 2	Total
Beginning Market Value	$1,843,157	$ 15,723	$1,858,880	$1,917,339	$ 8,435	$1,925,774
Contributions						
Member	11,493	5,735	17,228	11,952	3,968	15,920
City	132,749	5,735	138,484	125,488	3,968	129,456
Total	$ 144,242	$ 11,470	$ 155,712	$ 137,440	$ 7,936	$ 145,376
Net Investment Earnings	144,325	1,684	146,009	(34,786)	(225)	(35,011)
Benefit Payments	(183,060)	(371)	(183,431)	(172,983)	(335)	(173,318)
Administrative Expenses	(4,345)	(34)	(4,379)	(3,853)	(88)	(3,941)
Measure F Transfer	1,404	(1,404)	0			
Market Value, End of Year	**$1,945,723**	**$ 27,068**	**$1,972,791**	**$1,843,157**	**$ 15,723**	**$1,858,880**
Estimated Rate of Return	7.6%	7.9%	7.7%	-1.8%	-1.8%	-1.8%

Dollar amounts in thousands

The net investment earnings for the year ended June 30, 2017 represent approximately a 7.7% return on the Market Value of Assets compared to an assumed return of 6.875%. This return produced an investment gain of $14.7 million for the year ending June 30, 2017. For the year ended June 30, 2016, the net investment return was approximately -1.8% (7.00% was assumed), which produced an investment loss of $173.1 million.

SECTION III – ASSETS

Actuarial Value of Assets

To determine on-going contributions, most pension systems utilize an Actuarial Value of Assets that smooths year-to-year market value returns in order to reduce the volatility of contributions.

The Actuarial Value of Assets is calculated by recognizing the deviation of actual investment returns compared to the expected return (6.875% for FYE 2017, 7.00% for FYE 2016 and 2015, and 7.25% for FYE 2014) over a five-year period. The dollar amount of the expected return on the Market Value of Assets is determined using actual contributions, benefit payments, and administrative expenses during the year. Any difference between this amount and the actual net investment earnings is considered a gain or loss. Table III-2 on the next page shows the calculation of the Actuarial Value of Assets separately for Tier 1 and Tier 2. For each of the last four years, it shows the actual earnings, the expected earnings, the gain or loss, and the portion of the gain or loss that is not recognized in the current Actuarial Value of Assets. These deferred amounts will be recognized in future years.

SECTION III – ASSETS

Table III-2
Development of Actuarial Value of Assets

	Tier 1			Tier 2		
	Basic	COLA	Total	Basic	COLA	Total
Market Value of Assets	$1,326,908	$ 618,815	$1,945,723	$ 24,266	$ 2,803	$ 27,068
FYE 2017						
Actual Earnings	$ 99,441	$ 44,886	$ 144,327	$ 1,513	$ 171	$ 1,684
Expected Earnings	88,844	41,053	129,897	1,307	148	1,455
Investment Gain or (Loss)	10,597	3,833	14,430	206	23	229
Deferred (80%)	$ 8,478	$ 3,066	$ 11,544	$ 165	$ 19	$ 183
FYE 2016						
Actual Earnings	$ (24,477)	$ (10,310)	$ (34,787)	$ (203)	$ (21)	$ (224)
Expected Earnings	95,959	41,366	137,325	771	78	849
Investment Gain or (Loss)	(120,436)	(51,676)	(172,112)	(974)	(99)	(1,073)
Deferred (60%)	$ (72,262)	$ (31,005)	$ (103,267)	$ (584)	$ (59)	$ (644)
FYE 2015						
Actual Earnings	$ (11,897)	$ (4,691)	$ (16,588)	$ (49)	$ (5)	$ (54)
Expected Earnings	100,386	40,564	140,949	403	37	440
Investment Gain or (Loss)	(112,283)	(45,255)	(157,537)	(452)	(42)	(494)
Deferred (40%)	$ (44,913)	$ (18,102)	$ (63,015)	$ (181)	$ (17)	$ (197)
FYE 2014						
Actual Earnings	$ 193,556	$ 69,725	$ 263,281	$ 374	$ 32	$ 406
Expected Earnings	93,765	36,000	129,765	150	13	163
Investment Gain or (Loss)	99,791	33,725	133,516	224	19	243
Deferred (20%)	$ 19,958	$ 6,745	$ 26,703	$ 45	$ 4	$ 49
Total Deferred Gain or (Loss)	$ (88,739)	$ (39,296)	$ (128,035)	$ (556)	$ (53)	$ (609)
Actuarial Value of Assets	**$ 1,415,646**	**$ 658,111**	**$ 2,073,758**	**$ 24,821**	**$ 2,856**	**$ 27,677**
Ratio of Actuarial to Market	106.7%	106.4%	106.6%	102.3%	101.9%	102.3%
Estimated Rate of Return	4.8%	4.6%	4.7%	5.5%	5.7%	5.5%

Dollar amounts in thousands

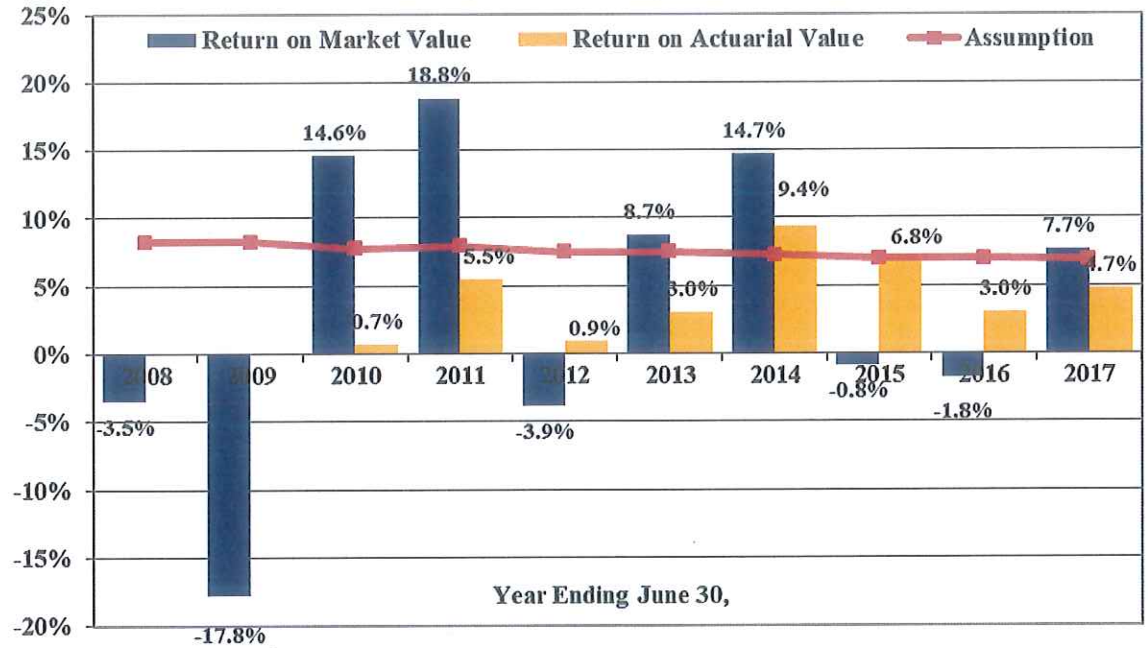
On an Actuarial Value of Assets basis, the aggregate return for the year ending June 30, 2017 was 4.7% for Tier 1 and 5.5% for Tier 2, both less than the assumed return of 6.875% and the return on the Market Value of Assets. This return on the Actuarial Value of Assets produced an investment loss of $44.6 million for the year ending June 30, 2017.

As shown in the chart on the following page, over the last ten years the investment return on the Market Value of Assets has varied significantly from negative 17.8% in 2009 to 18.8% in 2011. The geometric average return was 5.5% and 3.1% over the last five and 10 years, respectively.

SECTION III – ASSETS

The return on the Actuarial Value of Assets is more stable than on the market value with a geometric average of 5.4% over the last five years. The return on the Actuarial Value of Assets was not reported prior to 2010 when valuations were performed every two years.

Historical Rates of Return



SECTION IV – MEASURES OF LIABILITY

This section presents detailed information on liability measures for the System for funding purposes, including:

- Present value of future benefits,
- Normal cost,
- Actuarial Liability, and
- An analysis of changes in the Unfunded Actuarial Liability during the year.

Present Value of Future Benefits: The present value of future benefits represents the expected amount of money needed today if all assumptions are met to pay for all benefits both earned as of the valuation date and expected to be earned in the future by current plan members under the current plan provisions. Table IV-1 below shows the present value of future benefits as of June 30, 2017 and June 30, 2016 separately by Tier.

Table IV-1
Present Value of Future Benefits

	June 30, 2017			June 30, 2016	
	Basic	COLA	Total	Total	% Change
Tier 1					
Actives	$ 931,901	$ 379,483	$ 1,311,384	$ 1,296,783	1.1%
Deferred Vested	155,274	64,881	220,155	207,110	6.3%
In Pay Status	1,486,401	1,123,587	2,609,988	2,515,114	3.8%
Tier 1 Total	**$ 2,573,576**	**$ 1,567,951**	**$ 4,141,527**	**$ 4,019,007**	**3.0%**
Tier 2					
Actives	$ 146,489	$ 27,516	$ 174,005	$ 94,887	83.4%
Deferred Vested	2,175	70	2,245	970	131.4%
In Pay Status	6	1	7	10	-30.0%
Tier 2 Total	**$ 148,670**	**$ 27,587**	**$ 176,257**	**$ 95,867**	**83.9%**
Total	**$ 2,722,246**	**$ 1,595,538**	**$ 4,317,784**	**$ 4,114,874**	**4.9%**

Dollar amounts in thousands

SECTION IV – MEASURES OF LIABILITY

Normal Cost

Under the Entry Age (EA) actuarial cost method, the present value of future benefits for each individual is spread over the individual's expected working career under the System as a level percentage of the individual's expected pay. The normal cost rate is determined by taking the value, as of entry age into the System, of each member's projected future benefits divided by the value, also at entry age, of the each member's expected future salary. The normal cost rate is multiplied by current salary to determine each member's normal cost. The normal cost of the System is the sum of the normal costs for each individual. The normal cost represents the expected amount of money needed to fund the benefits attributed to the next year of service under the Entry Age actuarial cost method. In addition, administrative expenses are added to the EA normal cost rate to get the total normal cost rate. Table IV-2 below shows the EA normal cost and Total normal cost rates as of June 30, 2017 and June 30, 2016 separately by Tier.

Table IV-2
Normal Cost

	June 30, 2017			June 30, 2016	
	Basic	COLA	Total	Total	% Change
Tier 1					
Retirement	$ 19,900	$ 8,062	$ 27,962	$ 27,726	0.9%
Termination	7,281	2,177	9,458	9,531	-0.8%
Death	567	230	797	768	3.8%
Disability	936	408	1,344	1,368	-1.8%
Reciprocity	553	236	789	678	16.4%
Total	**$ 29,237**	**$ 11,113**	**$ 40,350**	**$ 40,071**	**0.7%**
PV of Annual Payroll	$ 165,215	$ 165,215	$ 165,215	$ 169,790	-2.7%
Normal Cost Rate	17.70%	6.72%	24.42%	23.60%	3.5%
Admin Expense	0.68%	0.32%	1.00%	1.00%	0.0%
Total Rate	**18.38%**	**7.04%**	**25.42%**	**24.60%**	**3.3%**
Tier 2					
Retirement	$ 8,777	$ 1,703	$ 10,480	$ 6,304	66.2%
Termination	2,441	322	2,763	1,538	79.6%
Death	366	63	429	104	312.5%
Disability	451	86	537	415	29.4%
Total	**$ 12,035**	**$ 2,174**	**$ 14,209**	**$ 8,361**	**69.9%**
PV of Annual Payroll	$ 95,615	$ 95,615	$ 95,615	$ 72,923	31.1%
Normal Cost Rate	12.59%	2.27%	14.86%	11.46%	29.7%
Admin Expense	0.90%	0.10%	1.00%	1.00%	0.0%
Total Rate	**13.49%**	**2.37%**	**15.86%**	**12.46%**	**27.3%**

Dollar amounts in thousands

Actuarial Liability

The Actuarial Liability represents the expected amount of money needed today if all assumptions are met to pay for benefits attributed to service prior to the valuation date under the Entry Age actuarial cost method. As such, it is the amount of assets targeted by the actuarial cost method for the System to hold as of the valuation date. It is not the amount necessary to settle the obligation. Table IV-3 below shows the Actuarial Liability as of June 30, 2017 and June 30, 2016 separately by Tier.

Table IV-3
Actuarial Liability

	June 30, 2017			June 30, 2016	
	Basic	COLA	Total	Total	% Change
Tier 1					
Actives					
Retirement	$ 698,348	$ 282,425	$ 980,773	$ 967,754	1.3%
Termination	37,094	21,717	58,811	60,695	-3.1%
Death	6,172	2,321	8,493	7,637	11.2%
Disability	7,559	2,988	10,547	10,851	-2.8%
Total Actives	$ 749,173	$ 309,451	$ 1,058,624	$ 1,046,937	1.1%
Deferred Vested	$ 155,274	$ 64,881	$ 220,155	$ 207,110	6.3%
In Pay Status					
Retirees	$ 1,366,230	$ 1,004,027	$ 2,370,257	$ 2,283,590	3.8%
Beneficiaries	75,825	77,416	153,241	146,625	4.5%
Disabled	44,346	42,144	86,490	84,899	1.9%
Total In Pay Status	$ 1,486,401	$ 1,123,587	$ 2,609,988	$ 2,515,114	3.8%
Tier 1 Total	**$ 2,390,848**	**$ 1,497,919**	**$ 3,888,767**	**$ 3,769,161**	**3.2%**
Tier 2					
Actives					
Retirement	$ 22,855	$ 4,456	$ 27,311	$ 13,517	102.0%
Termination	2,806	860	3,666	2,266	61.8%
Death	894	162	1,056	214	393.5%
Disability	762	150	912	591	54.3%
Total Actives	$ 27,317	$ 5,628	$ 32,945	$ 16,588	98.6%
Deferred Vested	2,175	70	2,245	970	131.4%
In Pay Status					
Retirees	$ 6	$ 1	$ 7	$ 10	-30.0%
Beneficiaries	0	0	0	0	
Disabled	0	0	0	0	
Total In Pay Status	$ 6	$ 1	$ 7	$ 10	-30.0%
Tier 2 Total	**$ 29,498**	**$ 5,699**	**$ 35,197**	**$ 17,568**	**100.3%**
System Total	**$ 2,420,346**	**$ 1,503,618**	**$ 3,923,964**	**$ 3,786,729**	**3.6%**

Dollar amounts in thousands

SECTION V – CONTRIBUTIONS

Amortization of the Unfunded Actuarial Liability

Under the contribution allocation procedure employed by the System, there are two components to the contribution: the normal cost (including administrative expenses) and an amortization payment on the Unfunded Actuarial Liability (UAL). The normal cost rate was developed in Section IV. This section develops the UAL contribution rate.

The difference between the Actuarial Liability and the Actuarial Value of Assets is the Unfunded Actuarial Liability. The UAL is made up of the unamortized UAL as of June 30, 2016 plus the impact of the 2017 experience, the 2017 assumption and plan changes, and the 2016 UAL payment that is made by the City on July 1, 2017.

Table V-1 provides the payment schedule to amortize the Tier 1 UAL as of June 30, 2009 originally over 30 years, and any additional actuarial gains/(losses) or method changes after June 30, 2009 over 20 years and assumption changes over 25 years from the valuation in which they are first recognized. Table V-2 provides the payment schedule to amortize the Tier 2 UAL as of June 30, 2017 over 10 years. The amortization payment for the 2015 assumption changes was phased in over a 3-year period such that the payment in the first year was one third of the regular amortization payment. With this valuation, the phase-in period is complete. The amortization payments increase 3.00% each year while payroll is expected to increase 3.25% each year. As a result, payments are expected to become a slightly smaller percentage of combined Tier 1 and Tier 2 payroll each year.

SECTION V – CONTRIBUTIONS

Table V-1
UAL Amortization - Tier 1

	Outstanding Balance			Remaining	Payment		
	Basic	COLA	Total	Period	Basic	COLA	Total
Golden Handshake	$ 17,075	$ 4,152	$ 21,227	22	$ 1,190	$ 289	$ 1,479
2009 UAL	611,814	149,825	761,639	22	42,621	10,437	53,059
2010 (Gain) or Loss	43,227	3,150	46,377	13	4,393	320	4,713
2010 Assumption Change	(34,725)	(19,277)	(54,001)	18	(2,771)	(1,538)	(4,309)
2011 (Gain) or Loss	8,683	(11,463)	(2,780)	14	833	(1,100)	(267)
2011 Assumption Changes	108,412	65,343	173,755	19	8,331	5,021	13,352
2012 (Gain) or Loss	(181,690)	292,431	110,741	15	(16,553)	26,642	10,089
SRBR Elimination	(40,696)		(40,696)	15	(3,708)		(3,708)
2013 (Gain) or Loss	49,680	20,766	70,446	16	4,315	1,804	6,118
2013 Assumption Changes	30,791	30,189	60,980	21	2,211	2,168	4,380
2014 (Gain) or Loss	(22,484)	(2,297)	(24,781)	17	(1,869)	(191)	(2,060)
2014 Assumption Changes	57,818	42,769	100,587	22	4,028	2,979	7,007
2015 (Gain) or Loss	28,097	19,923	48,020	18	2,242	1,590	3,832
2015 Assumption Changes	96,260	106,787	203,046	23	6,517	7,230	13,747
2016 (Gain) or Loss	77,124	34,273	111,397	19	5,927	2,634	8,560
2016 Assumption Changes	32,041	27,340	59,380	24	2,112	1,802	3,914
2017 (Gain) or Loss	41,519	17,707	59,226	20	3,081	1,314	4,395
Measure F	4,593	3,398	7,991	20	341	252	593
2017 Assumption Changes	(12,591)	(4,692)	(17,283)	25	(809)	(302)	(1,111)
7/1/2017 Payment	60,254	59,486	119,740				
Total	**$ 975,201**	**$ 839,810**	**$1,815,011**		**$ 62,433**	**$ 61,352**	**$123,785**

Dollar amounts in thousands

Table V-2
UAL Amortization - Tier 2

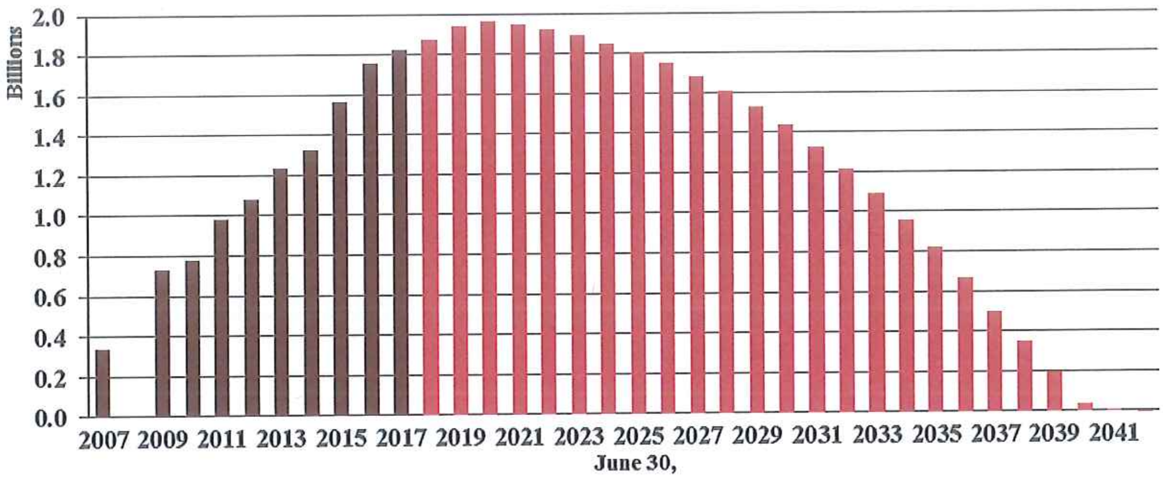
	Outstanding Balance			Remaining	Payment		
	Basic	COLA	Total	Period	Basic	COLA	Total
2013 (Gain) or Loss	$ 39	$ 9	$ 49	10	$ 5	$ 1	$ 6
2013 Assumption Changes	1	(1)	0	10	0	(0)	0
2014 (Gain) or Loss	(613)	1	(612)	10	(77)	0	(77)
2014 Assumption Changes	93	19	112	10	12	2	14
2015 (Gain) or Loss	711	172	883	10	89	22	111
2015 Assumption Changes	336	92	428	10	42	12	54
2016 (Gain) or Loss	(736)	159	(577)	10	(92)	20	(72)
2016 Assumption Changes	386	84	470	10	48	11	59
2017 (Gain) or Loss	(732)	(25)	(758)	10	(92)	(3)	(95)
Measure F	3,845	1,932	5,778	10	483	242	725
2017 Assumption Changes	1,340	362	1,701	10	168	45	214
7/1/2017 Payment	7	39	46				
Total	**$ 4,677**	**$ 2,843**	**$ 7,520**		**$ 586**	**$ 352**	**$ 938**

Dollar amounts in thousands

SECTION V – CONTRIBUTIONS

The chart below shows the historical UAL and its projected decline if all assumptions are met as unrecognized investment gains and losses from the asset smoothing method are recognized over the next four years and as payments are made on the amortization schedules over the next 25 years.

Historical and Deterministic Projected Unfunded Actuarial Liability



This amortization structure results in a total UAL rate of 43.5% of payroll for FYE 2019, which is less than the amount needed to pay the interest on the UAL based on the Market Value of Assets (45.2% of payroll). As a result, the dollar amount of the UAL is expected to increase in the short term as shown in the chart above. As the recent investment losses are recognized in the Actuarial Value of Assets and as the remaining periods shorten, the UAL rate will exceed the interest cost on the UAL and pay off the principal and interest in 25 years.

Contribution Rates and Amounts

Tier 1 members pay 3/11ths of the EA normal cost (including administrative expenses, but excluding reciprocity normal cost). Tier 1 members who were rehired into Tier 2 and then returned to Tier 1 under Measure F also pay half of the increased cost attributable to their Tier 2 service. For Tier 1, the City pays 8/11ths of the EA normal cost (including administrative expenses, but excluding reciprocity normal cost) plus the reciprocity normal cost and the UAL payments shown above. The total contribution cannot be less than the normal cost.

For Tier 2, members and the City each pay half of the EA normal cost, half of administrative expenses, and half of the UAL payments. However, the member's UAL contribution rate cannot increase by more than 0.33% of pay each year. The City contributes any amounts in excess of this cap that would otherwise be contributed by the member. The member and City contribution rates each cannot be less than 50% of the normal cost rate.

SECTION V – CONTRIBUTIONS

Table V-3 shows the components of the contribution rates for FYE 2019 and 2018. The FYE 2018 rates for Tier 2 are prior to the implementation of Measure F. After implementation, the Tier 2 rates were 7.72% each for the City and members. The UAL rate is calculated as the payment shown in Tables V-1 and V-2 increased with one-half year of interest and divided by the projected payroll for the fiscal year. For FYE 2019, the projected payroll is $158.8 million for Tier 1 and $137.9 million for Tier 2.

Table V-3
Contribution Rates

	Fiscal Year Ending 2019			Fiscal Year Ending 2018		
	Basic	COLA	Total	Basic	COLA	Total
Tier 1						
Regular Member Rate	4.93%	1.88%	6.81%	4.80%	1.80%	6.60%
Average Rehire Rate	0.03%	0.01%	0.04%	0.00%	0.00%	0.00%
Total Member Rate	**4.96%**	**1.89%**	**6.85%**	**4.80%**	**1.80%**	**6.60%**
City Service Normal Rate	13.12%	5.01%	18.13%	12.79%	4.81%	17.60%
City Reciprocity Normal Rate	0.33%	0.15%	0.48%	0.28%	0.12%	0.40%
City Normal Cost Rate	**13.45%**	**5.16%**	**18.61%**	**13.07%**	**4.93%**	**18.00%**
City Deficiency Rate	39.85%	39.74%	79.59%	37.52%	37.59%	75.11%
City Golden Handshake Rate	0.77%	0.19%	0.96%	0.74%	0.19%	0.93%
City UAL Rate	**40.62%**	**39.93%**	**80.55%**	**38.26%**	**37.78%**	**76.04%**
City Rate	**54.07%**	**45.09%**	**99.16%**	**51.33%**	**42.71%**	**94.04%**
Tier 2						
Member Normal Rate	6.75%	1.18%	7.93%	5.49%	0.74%	6.23%
Member UAL Rate	0.22%	0.13%	0.35%	0.00%	0.02%	0.02%
Member Rate	**6.97%**	**1.31%**	**8.28%**	**5.49%**	**0.76%**	**6.25%**
City Normal Cost Rate	6.75%	1.18%	7.93%	5.49%	0.74%	6.23%
City UAL Rate	0.22%	0.13%	0.35%	0.00%	0.02%	0.02%
City Rate	**6.97%**	**1.31%**	**8.28%**	**5.49%**	**0.76%**	**6.25%**

SECTION V – CONTRIBUTIONS

Table V-4 shows the City's contribution dollar amounts for FYE 2019 assuming contributions are made at the beginning of the fiscal year. In accordance with the Board's policy, contributions made at the beginning of FYE 2019 are discounted for one-half year of interest at 55% of the valuation discount rate. To the extent contributions are made after the beginning of the fiscal year, the amounts should be adjusted for interest.

Table V-4
City Contribution Amounts (BOY)

	July 1, 2018			July 1, 2017		
	Basic	COLA	Total	Basic	COLA	Total
Tier 1						
City Service Normal Cost	$ 20,448	$ 7,809	$ 28,257	$ 20,441	$ 7,687	$ 28,128
City Reciprocity Normal Cost	514	234	748	447	192	639
City Normal Cost	**$ 20,963**	**$ 8,042**	**$ 29,005**	**$ 20,888**	**$ 7,879**	**$ 28,767**
City Deficiency Cost	$ 62,109	$ 61,937	$124,046	$ 59,964	$ 60,076	$120,040
City Golden Handshake Cost	1,200	296	1,496	1,183	303	1,486
City UAL Cost	**$ 63,309**	**$ 62,234**	**$125,543**	**$ 61,147**	**$ 60,379**	**$121,526**
City Contribution	**$ 84,272**	**$ 70,276**	**$154,548**	**$ 82,035**	**$ 68,258**	**$150,293**
Tier 2						
City Normal Cost	$ 9,137	$ 1,597	$ 10,735	$ 6,015	$ 811	$ 6,826
City UAL Cost	298	176	474	0	22	22
City Contribution	**$ 9,435**	**$ 1,773**	**$ 11,208**	**$ 6,015**	**$ 833**	**$ 6,848**

Dollar amounts in thousands

Table V-5 reconciles the change in the Tier 1 contribution rates and the City's Tier 1 contribution amount from the rates and amount calculated in the prior report. The decrease in the City's Tier 1 contribution rate is due to the assumption and plan changes, investment and payroll experience. Payroll for Tier 1 is expected to decrease over time as members leave the system and new entrants join Tier 2. However, Tier 1 payroll is larger than was projected in the last valuation, further decreasing the UAL rate.

SECTION V – CONTRIBUTIONS

Table V-5
Reconciliation of Changes in Tier 1 Contribution Rates and Amounts

	Member Rate	City Normal Cost	City UAL Rate	City Total Rate	Projected Payroll	City Amount
FYE 2018 Contribution	6.60%	18.00%	76.04%	94.04%	$162,812	$ 153,109
Expected FYE 2019 Contribution	6.60%	18.00%	91.16%	109.16%	150,328	164,098
Changes Due to:						
Asset experience	0.00%	0.00%	-0.14%	-0.14%	150,328	(210)
Demographic experience	-0.06%	-0.19%	0.76%	0.57%	150,328	857
Payroll Change	0.00%	0.00%	-1.41%	-1.41%	152,547	295
Measure F	0.06%	0.03%	-2.02%	-1.99%	156,647	1,318
Assumption and Method Change	0.25%	0.77%	-7.80%	-7.03%	158,776	(8,901)
Subtotal	0.25%	0.61%	-10.61%	-10.00%	158,776	$ (6,641)
FYE 2019 Contribution	**6.85%**	**18.61%**	**80.55%**	**99.16%**	**$158,776**	**$ 157,442**

Dollar amounts in thousands

Table V-6 reconciles the change in the Tier 2 contribution rates and the City's Tier 2 contribution amount from the rates and amount calculated in the prior report. The increase in the City's Tier 2 contribution rate is primarily due to the plan and assumption changes.

Table V-6
Reconciliation of Changes in Tier 2 Member + City Contribution Rates and Amounts

	Normal Cost	UAL Rate	Total Rate	Projected Payroll	Amount
FYE 2018 Contribution	12.46%	0.04%	12.50%	$111,616	$ 13,952
Expected FYE 2019 Contribution	12.46%	0.12%	12.58%	131,921	16,596
Changes Due to:					
Asset experience	0.00%	-0.17%	-0.17%	131,921	(224)
Demographic experience	0.14%	0.11%	0.25%	131,921	330
Payroll Change	0.00%	-0.06%	-0.06%	139,440	868
Measure F	2.76%	0.34%	3.10%	135,340	3,679
Assumption and Method Change	0.50%	0.36%	0.86%	137,902	1,588
Subtotal	3.40%	0.58%	3.98%	137,902	$ 6,241
FYE 2019 Contribution	**15.86%**	**0.70%**	**16.56%**	**$137,902**	**$ 22,837**

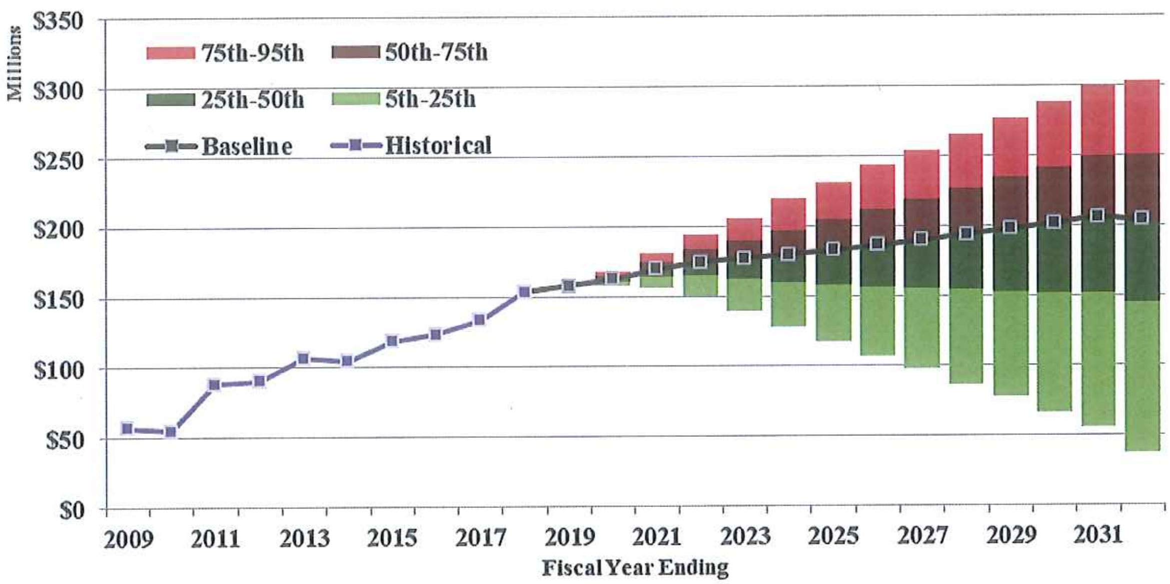
Dollar amounts in thousands

SECTION V – CONTRIBUTIONS

With declining payroll for the closed Tier 1, projections of contribution rates are not meaningful. As a result, the projections shown below show the projected range of City contribution amounts for Tier 1. The black line shows the projected City contribution amount for each year if all valuation assumptions are met, including a 6.875% investment return each and every year. The colored ranges represent different percentiles of the 10,000 results. For example, the green range represents the 5th through 25th percentile of the UAL for each year seen among the 10,000 trials.

For the fiscal year ending 2025 (based on the 2023 valuation), the range from the 5th to 95th percentile for City's Tier 1 contribution is from $118 million to $231 million. By the end of the projection period, the range extends above $300 million.

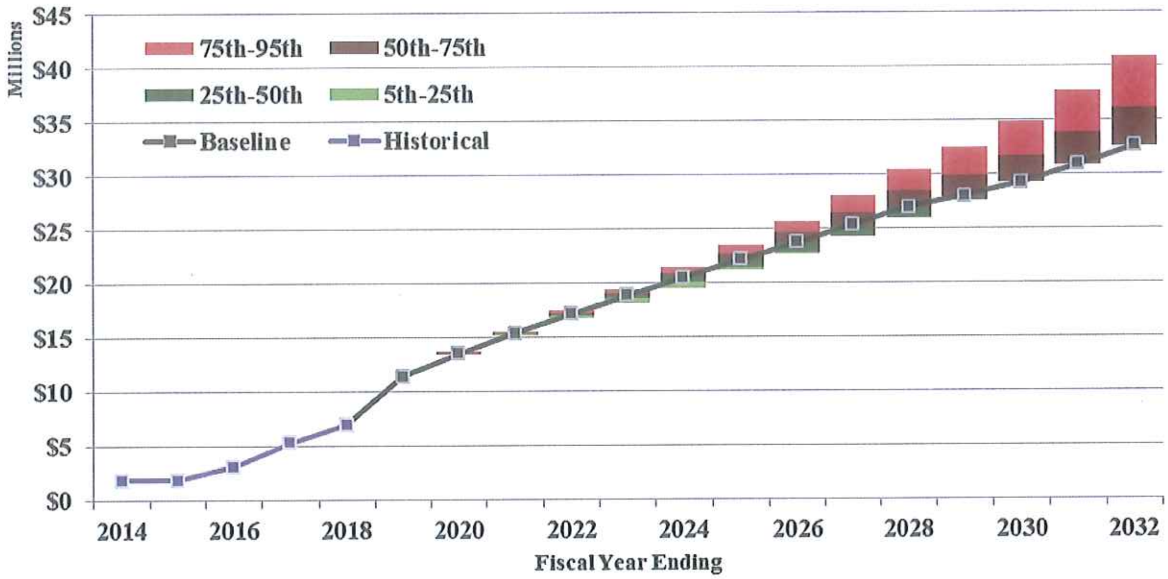
Historical and Stochastic Projection of Tier 1 City Contribution Amounts



Because Tier 2 is relatively young and growing rapidly, the contribution amounts are much less sensitive to investment returns. By the end of the projection period, the range from the 5th to 95th percentile for City's Tier 2 contribution is only from $33 million to $41 million. Tier 2 member contributions are identical to the City's contributions.

SECTION V – CONTRIBUTIONS

Historical and Stochastic Projection of Tier 2 City Contribution Amounts



SECTION VI – ACTUARIAL SECTION OF THE CAFR

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in the System's Comprehensive Annual Financial Report (CAFR) in order to receive recognition for excellence in financial reporting. The schedules in this section are listed by the GFOA for inclusion in the Actuarial Section of the System's CAFR. All amounts prior to June 30, 2010 were calculated by the prior actuary.

Table VI-1
Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Liability (AL)	Unfunded AL	Funded Ratio	Covered Payroll	Unfunded AL as a % of Covered Payroll
6/30/2017 [9]	$ 2,101,435	$ 3,923,966	$ 1,822,531	54%	$ 287,339	634%
6/30/2016 [8]	2,034,741	3,786,730	1,751,989	54%	266,823	657%
6/30/2015 [7]	2,004,481	3,569,898	1,565,417	56%	251,430	623%
6/30/2014 [6]	1,911,773	3,235,065	1,323,292	59%	234,677	564%
6/30/2013 [5]	1,783,270	3,013,763	1,230,493	59%	225,779	545%
6/30/2012 [4]	1,762,973	2,841,000	1,078,027	62%	225,859	477%
6/30/2011 [3]	1,788,660	2,770,227	981,567	65%	228,936	429%
6/30/2010 [2]	1,729,413	2,510,358	780,945	69%	300,811	260%
6/30/2009 [1]	1,756,558	2,486,155	729,597	71%	323,020	226%
6/30/2007	1,622,851	1,960,943	338,092	83%	291,405	116%

Dollar amounts in thousands

1 *Demographic and economic assumption changes, including reducing the discount rate from 8.25% to 7.75% increased the AL by $229 million*
2 *Increasing the discount rate from 7.75% to 7.95% decreased the AL by $59 million.*
3 *Demographic and economic assumption changes, including reducing the discount rate from 7.95% to 7.5% increased the AL by $188 million*
4 *Elimination of the Supplemental Retirement Benefit Reserve reduced the AL by $43 million*
5 *Reducing the discount rate from 7.5% to 7.25% and wage inflation to 2% for five years and 2.85% thereafter increased the AL by $64 million*
6 *Reducing the discount rate from 7.25% to 7.0% and eliminating the temporary 2% wage inflation increased the AL by $103 million*
7 *Demographic and economic assumption changes decreased the AL by $192 million.*
8 *Reducing the discount rate from 7.00% to 6.875% increased the AL by $60 million.*
9 *Measure F implimentation increased the AL by $16 and assumption changes decreased the AL by $16 million*

SECTION VI – ACTUARIAL SECTION OF THE CAFR

Table VI-2
Solvency Test

	Actuarial Liability For				Portion of Actuarial Liability Covered by Reported Assets		
Valuation Date	(A) Active Member Contributions	(B) Retirees, Beneficiaries and Other Inactives	(C) Remaining Active Members' Liabilities	Reported Assets*	(A)	(B)	(C)
6/30/2017	$ 236,819	$ 2,830,143	$ 857,004	$ 2,101,435	100%	66%	0%
6/30/2016	240,872	2,722,224	823,634	2,034,741	100%	66%	0%
6/30/2015	243,828	2,553,892	772,178	2,004,481	100%	69%	0%
6/30/2014	233,289	2,331,656	670,120	1,911,773	100%	72%	0%
6/30/2013	234,217	2,164,153	615,393	1,783,270	100%	72%	0%
6/30/2012	234,619	2,001,498	604,883	1,762,973	100%	76%	0%
6/30/2011	234,574	1,848,254	687,400	1,788,660	100%	84%	0%
6/30/2010	242,944	1,504,698	762,716	1,729,413	100%	99%	0%
6/30/2009	228,967	1,393,114	864,074	1,756,558	100%	100%	16%
6/30/2007	214,527	1,003,001	743,415	1,622,851	100%	100%	55%

** Actuarial Value of Assets*

Dollar amounts in thousands

The Government Finance Officers Association has named this exhibit the Solvency Test. It should be noted, however, that it doesn't test the solvency of the plan in the sense understood by financial economists that a 100 percent ratio would mean that there were sufficient assets to settle the obligation on the valuation date (e.g., by purchasing annuities). Instead, a 100 percent ratio only means that assets are expected to be sufficient if all assumptions are met in the future, including the expected rate of return on investments.

Table VI-3
Analysis of Financial Experience

	Gain or (Loss) for Year Ending on Valuation Date Due To:				
Actuarial Valuation Date	Investment Income	Combined Liability Experience	Total Financial Experience	Non-Recurring Items	Total Experience
6/30/2017	$ (44,650)	$ (13,819)	$ (58,468)	$ 1,813	$ (56,655)
6/30/2016	(81,539)	(29,989)	(111,528)	(60,233)	(171,761)
6/30/2015	(3,641)	(45,998)	(49,639)	(191,527)	(241,167)
6/30/2014	39,675	(13,600)	26,075	(103,404)	(77,329)
6/30/2013	(76,502)	2,899	(73,603)	(63,668)	(137,271)
6/30/2012	(119,331)	2,023	(117,308)	43,109	(74,199)
6/30/2011	(82,166)	83,403	1,237	(187,548)	(186,311)
6/30/2010	(124,137)	45,785	(78,352)	(18,467)	(96,819)

Dollar amounts in thousands

SECTION VI – ACTUARIAL SECTION OF THE CAFR

Table VI-4
Schedule of Active Member Data

Valuation Date	Active Count	Annual Payroll	Average Annual Pay	Percent Change in Average Pay*
2017	3,410	$ 287,339,000	$ 84,264	4.1%
2016	3,297	266,823,000	80,929	4.2%
2015	3,236	251,430,000	77,698	3.3%
2014	3,121	234,677,000	75,193	3.0%
2013	3,094	225,779,000	72,973	-0.6%
2012	3,076	225,859,000	73,426	5.0%
2011	3,274	228,936,000	69,925	-11.2%
2010	3,818	300,811,000	78,788	-0.5%
2009	4,079	323,020,000	79,191	7.1%
2007	3,942	291,405,000	73,923	7.0%

** Years prior to 2009 are increases over a two-year period, not an annual increase*

Table VI-5
Schedule Of Retirees And Beneficiaries Added To And Removed From Rolls

	Beginning of Period		Added to Rolls		Removed from Rolls		End of Period			
Period	Count	Annual Allowances	Count	Annual Allowances	Count	Annual Allowances	Count	Annual Allowances	% Increase in Annual Allowances*	Average Annual Allowances
2016-2017	4,003	$177,751,000	225	$ 8,843,000	113	$ 3,894,000	4,115	$ 187,714,000	5.6%	$ 45,617
2015-2016	3,901	168,917,000	212	7,907,000	110	3,904,000	4,003	177,751,000	5.2%	44,404
2014-2015	3,800	159,124,000	200	8,266,000	99	3,122,000	3,901	168,917,000	6.2%	43,301
2013-2014	3,711	150,934,000	194	7,274,000	105	3,405,000	3,800	159,124,000	5.4%	41,875
2012-2013	3,602	142,063,000	198	7,036,000	89	2,360,000	3,711	150,934,000	6.2%	40,672
2011-2012	3,428	129,869,000	250	14,158,000	76	1,964,000	3,602	142,063,000	9.4%	39,440
2010-2011	3,111	112,660,000	398	19,615,000	81	2,406,000	3,428	129,869,000	15.3%	37,885
2009-2010	2,930	101,194,000	206	10,700,373	79	2,203,960	3,111	112,660,000	11.3%	36,213
2007-2009	2,691	84,723,000	376	14,890,021	137	3,450,015	2,930	101,194,000	19.4%	34,537
2005-2007	2,426	69,466,000	389	13,818,131	124	2,721,303	2,691	84,723,000	22.0%	31,484

** Years prior to 2009-2010 are increases over a two-year period, not an annual increase*

SECTION VI – ACTUARIAL SECTION OF THE CAFR

Table VI-6
Alternate Analysis Of Financial Experience
For Plan Year Ended June 30, 2015

TIER 1

Type of Activity	Change in Employee Rate %	Change in Employer Rate %	Total Change in Contribution Rate %
Investment Performance	0.00%	-0.14%	-0.14%
Liability Experience	-0.06%	-0.84%	-0.90%
Change in Assumptions	0.25%	-7.03%	-6.78%
Change in Benefit Provisions	0.06%	-1.99%	-1.93%
TOTAL	**0.25%**	**-10.00%**	**-9.75%**

TIER 2

Type of Activity	Change in Employee Rate %	Change in Employer Rate %	Total Change in Contribution Rate %
Investment Performance	-0.09%	-0.09%	-0.17%
Liability Experience	0.10%	0.10%	0.19%
Change in Assumptions	0.43%	0.43%	0.86%
Change in Benefit Provisions	1.55%	1.55%	3.10%
TOTAL	**1.99%**	**1.99%**	**3.98%**

APPENDIX A – MEMBERSHIP INFORMATION

Data Assumptions and Methods

In preparing our data, we relied on information supplied by the San José Department of Retirement Services. This information includes, but is not limited to, plan provisions, employee data, and financial information. Our methodology for obtaining the data used for the valuation is based upon the following assumptions and practices:

- Records on the "Active" data file are considered to be Active if they do not have a reason for termination.
- Records on any of the data files are considered to be Inactive if they have a reason for termination of deferred vested or leave of absence/inactive.
- Records on the "Retiree" and "Beneficiary/QDRO" files are considered in pay status if they do not have a date of death, are not inactive, and have not withdrawn from the plan.
- All active employees are assumed to accrue a full year of service in all future years.
- Service for inactives that have no service amount is calculated to be the time from date of hire to date of termination.
- The most recent annual salary for full-time actives that accrued one year of service is set to be "earnable income." If "earnable income" was not provided, then the most recent annual salary is calculated to be "compensation rate 2" multiplied by 26.
- The annual salary for full-time actives that accrued less than one year of service is calculated to be "compensation rate 2" multiplied by 26.
- The annual salary for part-time actives is set to be "pensionable compensation" divided by the increase in service. If "pensionable compensation" was not provided, then the annual salary is calculated to be "compensation rate 2" multiplied by 26.
- The Tier 1 annual benefit for inactives is set to be the accrued benefit provided. If an accrued benefit is not provided, then the annual benefit is calculated to be 2.5% of final compensation per year of service in Tier 1, up to a maximum of 75% of final compensation. Members who terminated prior to June 30, 2001 have their final compensation adjusted for a three-year average rather than a 12-month average.
- The Tier 2 annual benefit for inactives is set to be the accrued benefit provided. If an accrued benefit is not provided, then the annual benefit is calculated to be 2.0% of final compensation per year of service in Tier 2, up to a maximum of 65% of final compensation. The final compensation is adjusted for a three-year average.
- We assume any member found in last year's "Retiree" file and not in this year's file is deceased without a beneficiary and should be removed from the valuation data.
- We assume all deceased members with payments continuing to a beneficiary have already been accounted for in the "Retiree" file.

APPENDIX A – MEMBERSHIP INFORMATION

Table A-1
Active Member Data

	June 30, 2017	June 30, 2016	% Change
Tier 1			
Count	1,991 *	2,162	-7.9%
Average Current Age	49.4	49.0	0.8%
Average Eligibility Service	16.1	15.6	3.2%
Average Benefit Service	15.9	15.3	3.9%
Annual Expected Pensionable Earnings	$ 181,690,635	$ 186,249,410	-2.4%
Average Expected Pensionable Earnings	$ 91,256	$ 86,147	5.9%
Tier 2			
Count	1,419	1,135	25.0%
Average Current Age	37.6	37.2	1.1%
Average Eligibility Service	2.0	2.0	0.0%
Average Benefit Service	1.9	1.6 **	18.8%
Annual Expected Pensionable Earnings	$ 105,648,788	$ 80,573,965	31.1%
Average Expected Pensionable Earnings	$ 74,453	$ 70,990	4.9%
Total			
Count	3,410	3,297	3.4%
Average Current Age	44.5	44.9	-0.9%
Average Eligibility Service	10.3	10.9	-5.5%
Average Benefit Service	10.0	10.6	-5.7%
Annual Expected Pensionable Earnings	$ 287,339,423	$ 266,823,375	7.7%
Average Expected Pensionable Earnings	$ 84,264	$ 80,929	4.1%

* *Tier 2 rehires that were transferred back to Tier 1 under Measure F*

** *Includes service attributable to Tier 1 benefits*

APPENDIX A – MEMBERSHIP INFORMATION

Table A-2
Payee Member Data

	June 30, 2017	June 30, 2016	% Change
Retired & Disabled			
Count	3,605	3,492	3.2%
Average Age	69.0	68.8	0.3%
Total Annual Benefit	$ 174,543,180	$ 165,313,149	5.6%
Average Annual Benefit	$ 48,417	$ 47,341	2.3%
Beneficiaries & SADROs			
Count	510	511	- 0.2%
Average Age	74.3	74.4	- 0.1%
Total Annual Benefit	$ 13,170,699	$ 12,437,426	5.9%
Average Annual Benefit	$ 25,825	$ 24,339	6.1%
Total			
Count	4,115	4,003	2.8%
Average Age	69.7	69.5	0.3%
Total Annual Benefit	$ 187,713,879	$ 177,750,575	5.6%
Average Annual Benefit	$ 45,617	$ 44,404	2.7%

Benefits provided in June 30 valuation data

APPENDIX A – MEMBERSHIP INFORMATION

Table A-3
Inactive Member Data

	Count		
	June 30, 2017	June 30, 2016	%Change
Tier 1			
Vested			
Count	780	775	0.6%
Average Age	47.7	47.4	0.6%
Total Annual Benefit	$ 16,457,049	$ 15,980,725	3.0%
Average Annual Benefit	$ 21,099	$ 20,620	2.3%
Total Contribution Balance with Interest	$ 56,644,199	$ 54,279,017	4.4%
Average Contribution Balance with Interest	$ 72,621	$ 70,037	3.7%
Non-Vested			
Count	257	263	-2.3%
Average Age	45.1	44.5	1.3%
Total Annual Benefit	$ 1,041,482	$ 1,082,754	-3.8%
Average Annual Benefit	$ 4,052	$ 4,117	-1.6%
Total Contribution Balance with Interest	$ 4,216,294	$ 4,273,552	-1.3%
Average Contribution Balance with Interest	$ 16,406	$ 16,249	1.0%
Total			
Count	1,037	1,038	-0.1%
Average Age	47.0	46.7	0.6%
Total Annual Benefit	$ 17,498,532	$ 17,063,479	2.5%
Average Annual Benefit	$ 16,874	$ 16,439	2.6%
Total Contribution Balance with Interest	$ 60,860,493	$ 58,552,569	3.9%
Average Contribution Balance with Interest	$ 58,689	$ 56,409	4.0%

APPENDIX A – MEMBERSHIP INFORMATION

Table A-3 (continued)
Inactive Member Data

	Count June 30, 2017	Count June 30, 2016		%Change
Tier 2				
Vested				
Count	5	8		-37.5%
Average Age	40.2	43.0		-6.5%
Total Annual Benefit	$ 19,985	43,846	*	-54.4%
Average Annual Benefit	$ 3,997	5,481	*	-27.1%
Total Contribution Balance with Interest	$ 75,866	224,063	**	-66.1%
Average Contribution Balance with Interest	$ 15,173	28,008	**	-45.8%
Non-Vested				
Count	310	160		93.8%
Average Age	37.9	37.5		1.1%
Total Annual Benefit	$ 528,843	$ 214,829	*	146.2%
Average Annual Benefit	$ 1,706	$ 1,343	*	27.0%
Total Contribution Balance with Interest	$ 2,025,560	$ 888,500	**	128.0%
Average Contribution Balance with Interest	$ 6,534	$ 5,553	**	17.7%
Total				
Count	315	168		87.5%
Average Age	37.9	37.7		0.6%
Total Annual Benefit	$ 548,828	$ 258,675	*	112.2%
Average Annual Benefit	$ 1,742	$ 1,540	*	13.1%
Total Contribution Balance with Interest	$ 2,101,426	$ 1,112,563	**	88.9%
Average Contribution Balance with Interest	$ 6,671	$ 6,622	**	0.7%
Total				
Count	1,352	1,206		12.1%
Average Age	44.9	45.4		-1.1%
Total Annual Benefit	$ 18,047,360	$ 17,322,154		4.2%
Average Annual Benefit	$ 13,349	$ 14,363		-7.1%
Total Contribution Balance with Interest	$ 62,961,919	$ 59,665,132		5.5%
Average Contribution Balance with Interest	$ 46,569	$ 49,474		-5.9%

APPENDIX A – MEMBERSHIP INFORMATION

Table A-4
Distribution of Active Members as of June 30, 2017

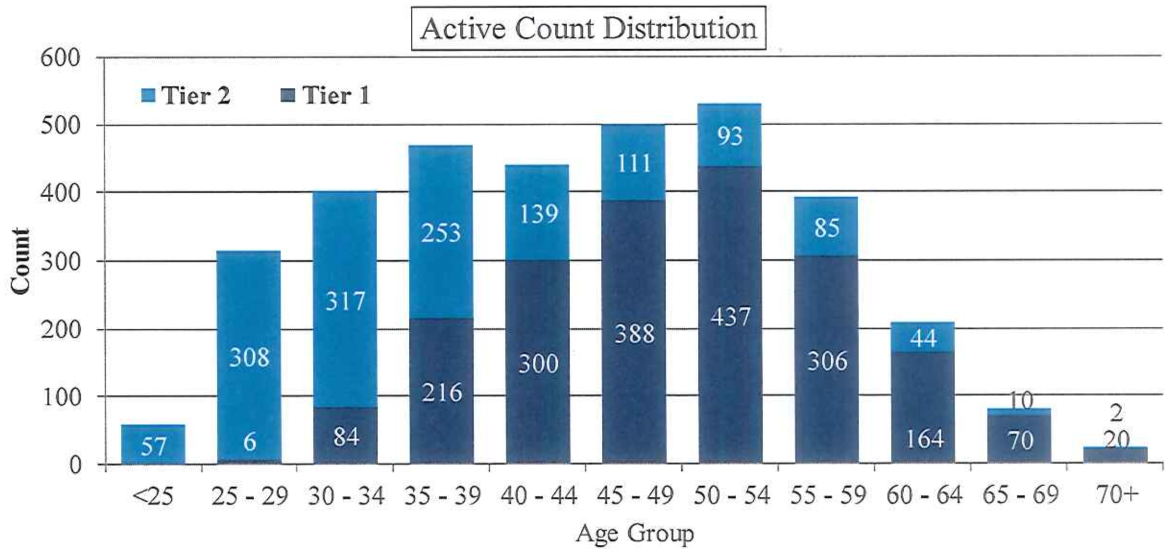
	Years of Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 and up	Total
Under 25	30	27	0	0	0	0	0	0	0	0	57
25 to 29	129	179	6	0	0	0	0	0	0	0	314
30 to 34	105	218	59	19	0	0	0	0	0	0	401
35 to 39	71	189	95	66	48	0	0	0	0	0	469
40 to 44	45	98	69	76	142	9	0	0	0	0	439
45 to 49	24	89	51	76	169	54	36	0	0	0	499
50 to 54	35	60	46	55	153	70	108	3	0	0	530
55 to 59	22	64	54	44	102	31	70	3	1	0	391
60 to 64	12	35	22	41	60	22	14	1	1	0	208
65 to 69	2	9	10	16	23	12	6	1	0	1	80
70 and up	0	2	5	2	9	3	0	0	0	1	22
Total Count	475	970	417	395	706	201	234	8	2	2	3,410

Table A-5
Distribution of Active Members as of June 30, 2017

	Average Expected Salary Years of Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 and up	Total
Under 25	$ 60,548	$ 55,564	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 58,187
25 to 29	61,447	65,793	72,871	0	0	0	0	0	0	0	64,143
30 to 34	67,462	74,463	81,560	81,493	0	0	0	0	0	0	74,007
35 to 39	72,986	78,185	85,413	85,421	81,325	0	0	0	0	0	80,201
40 to 44	80,876	81,104	88,471	87,065	87,919	107,943	0	0	0	0	86,025
45 to 49	81,870	84,399	92,106	89,158	89,590	92,432	96,404	0	0	0	89,283
50 to 54	73,563	86,093	85,465	97,747	94,089	87,140	98,567	78,566	0	0	91,366
55 to 59	78,915	85,756	92,170	92,446	95,536	100,602	97,214	72,362	174,362	0	92,913
60 to 64	105,202	81,702	101,717	92,896	94,223	100,348	112,734	73,024	63,187	0	94,923
65 to 69	70,753	93,919	82,319	95,894	100,848	102,408	88,073	114,475	0	52,448	94,851
70 and up	0	113,616	99,675	82,441	95,826	99,162	0	0	0	137,541	99,452
Avg. Salary	$ 70,163	$ 76,632	$ 87,850	$ 89,951	$ 91,366	$ 94,106	$ 98,408	$ 80,035	$ 118,775	$ 94,995	$ 84,264

APPENDIX A – MEMBERSHIP INFORMATION

Chart A-1



APPENDIX A – MEMBERSHIP INFORMATION

Table A-6
Retirees and Disabled by Attained Age and Benefit Effective Date as of June 30, 2017

Benefit Effective					Age						
Fiscal Year End	Under 50	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 and up	Total
Prior to 1995	0	2	2	6	9	13	99	132	132	102	497
1996	0	2	0	1	1	1	17	8	4	0	34
1997	0	1	0	0	1	6	38	10	3	2	61
1998	0	0	1	2	1	11	22	11	3	0	51
1999	0	0	0	2	4	33	20	9	6	0	74
2000	0	0	0	1	5	52	18	6	3	0	85
2001	0	0	1	2	2	40	27	5	2	0	79
2002	0	0	2	1	13	77	27	11	1	0	132
2003	0	1	0	4	37	42	22	6	2	1	115
2004	1	1	2	7	57	39	16	5	0	0	128
2005	0	0	1	11	74	43	26	8	2	0	165
2006	2	2	3	13	68	38	21	2	0	0	149
2007	0	1	1	17	79	33	14	3	3	0	151
2008	1	0	4	29	74	38	11	3	0	0	160
2009	1	3	4	63	35	31	5	0	0	0	142
2010	0	0	12	99	56	38	3	3	0	0	211
2011	2	0	25	148	105	47	14	1	1	0	343
2012	0	1	19	108	49	28	10	0	0	0	215
2013	0	1	40	63	29	9	1	1	0	0	144
2014	2	6	87	27	21	9	0	0	0	0	152
2015	0	10	96	31	20	7	1	1	0	0	166
2016	0	18	98	17	32	6	0	0	1	0	172
2017	1	14	99	43	16	5	1	0	0	0	179
Total	10	63	497	695	788	646	413	225	163	105	3,605

Average Age at Retirement/Disability	57.5
Average Current Age	69.0
Average Annual Pension	$ 48,417

APPENDIX A – MEMBERSHIP INFORMATION

Table A-7
Distribution of Retirees, Disabled Members, and Beneficiaries as of June 30, 2017

Age	Count	Annual Benefit
Under 50	25	$ 697,193
50 to 54	72	3,786,564
55 to 59	526	25,156,005
60 to 64	755	37,107,566
65 to 69	851	43,372,262
70 to 74	723	34,033,804
75 to 79	473	20,653,867
80 to 84	302	11,153,780
85 to 89	222	7,438,987
90 and up	166	4,313,850
Total	4,115	$ **187,713,879**

APPENDIX A – MEMBERSHIP INFORMATION

Chart A-2

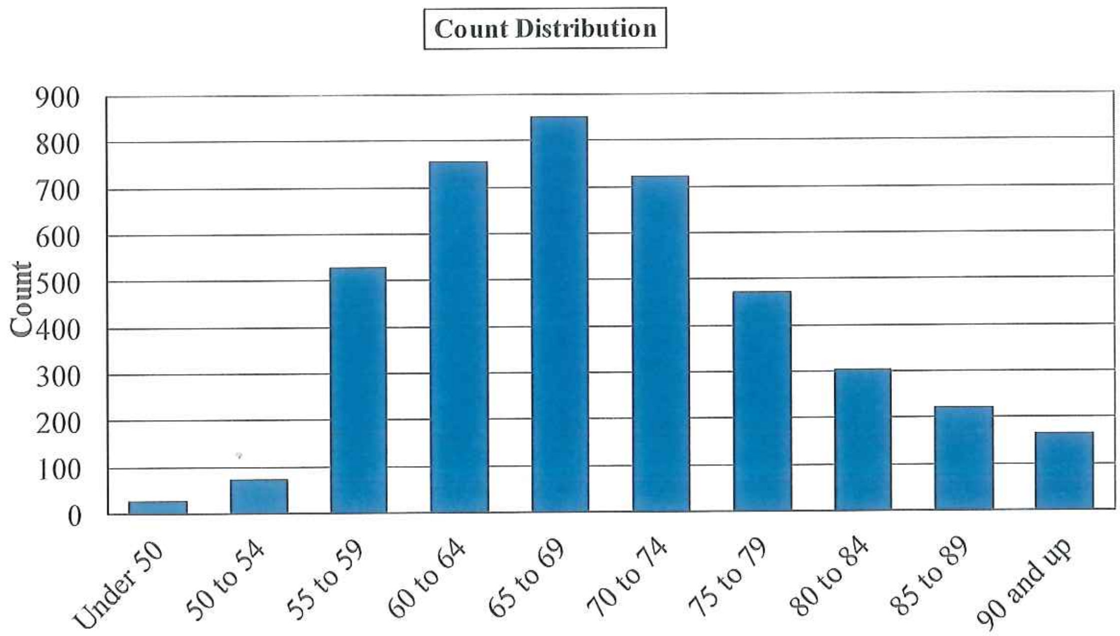
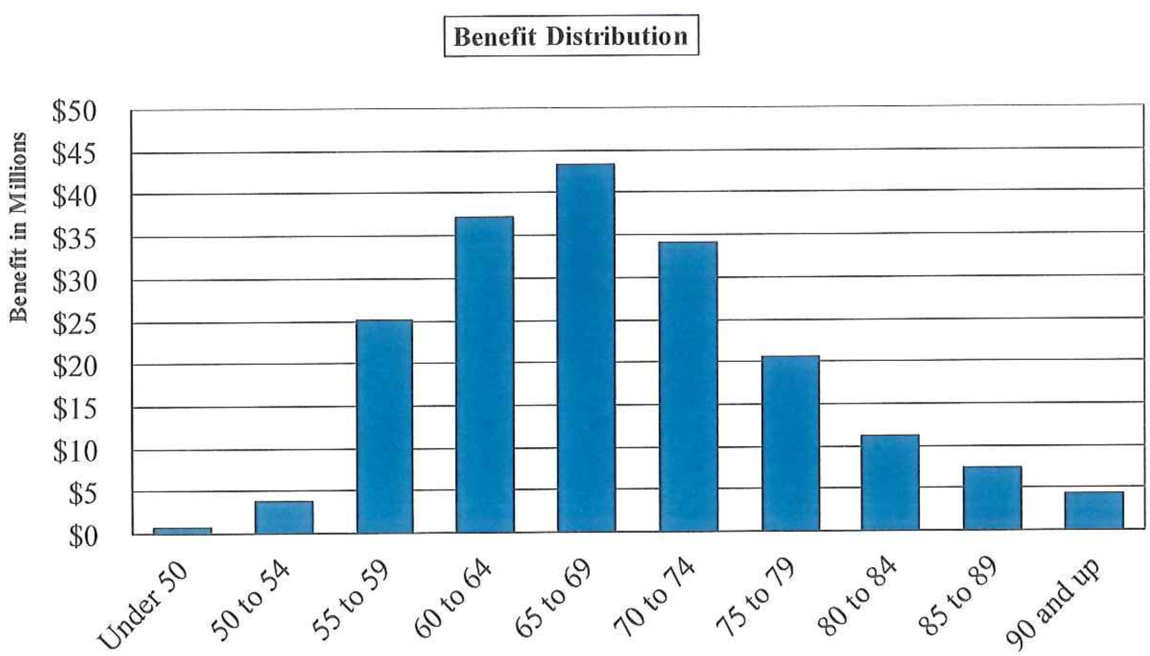


Chart A-3



APPENDIX A – MEMBERSHIP INFORMATION

Table A-8
Change in Plan Membership

TIER 1	Actives	Vested Terminations*	Service Disabilities	Non-Service Disabilities	Retirees	Beneficiaries/ SADRO	Total
June 30, 2016	**2,162**	**1,038**	**122**	**74**	**3,295**	**511**	**7,202**
New Entrants	0	0	0	0	0	0	0
Rehires	12	(11)	0	0	(1)	0	0
Vested Terminations	(69)	69	0	0	0	0	0
Return of Contributions	(5)	(8)	0	0	0	0	(13)
Service Disabilities	(2)	(2)	4	0	0	0	0
Non-Service Disabilities	(1)	(2)	0	3	0	0	0
Retirements	(132)	(49)	0	0	181	0	0
Deaths	(9)	(1)	(4)	(3)	(68)	33	(52)
Beneficiary Deaths	0	0	0	0	0	(36)	(36)
Benefit Ceased	0	0	0	0	0	(1)	(1)
Tier Adjustment **	35	3	0	0	1	0	39
Miscellaneous Adjustments	0	0	1	0	(1)	3	3
June 30, 2017	**1,991**	**1,037**	**123**	**74**	**3,407**	**510**	**7,142**

TIER 2	Actives	Vested Terminations*	Service Disabilities	Non-Service Disabilities	Retirees	Beneficiaries/ SADRO	Total
June 30, 2016	**1,135**	**168**	**0**	**0**	**1**	**0**	**1,304**
New Entrants	468	45	0	0	0	0	513
Rehires	3	(2)	0	0	0	0	1
Vested Terminations	(117)	117	0	0	0	0	0
Return of Contributions	(35)	(9)	0	0	0	0	(44)
Service Disabilities	0	0	0	0	0	0	0
Non-Service Disabilities	0	0	0	0	0	0	0
Retirements	0	(1)	0	0	1	0	0
Deaths	0	0	0	0	0	0	0
Beneficiary Deaths	0	0	0	0	0	0	0
Benefit Ceased	0	0	0	0	0	0	0
Tier Adjustment **	(35)	(3)	0	0	(1)	0	(39)
Miscellaneous Adjustments	0	0	0	0	0	0	0
June 30, 2017	**1,419**	**315**	**0**	**0**	**1**	**0**	**1,735**

TOTAL	Actives	Vested Terminations*	Service Disabilities	Non-Service Disabilities	Retirees	Beneficiaries/ SADRO	Total
June 30, 2016	**3,297**	**1,206**	**122**	**74**	**3,296**	**511**	**8,506**
New Entrants	468	45	0	0	0	0	513
Rehires	15	(13)	0	0	(1)	0	1
Vested Terminations	(186)	186	0	0	0	0	0
Return of Contributions	(40)	(17)	0	0	0	0	(57)
Service Disabilities	(2)	(2)	4	0	0	0	0
Non-Service Disabilities	(1)	(2)	0	3	0	0	0
Retirements	(132)	(50)	0	0	182	0	0
Deaths	(9)	(1)	(4)	(3)	(68)	33	(52)
Beneficiary Deaths	0	0	0	0	0	(36)	(36)
Benefit Ceased	0	0	0	0	0	(1)	(1)
Tier Adjustment **	0	0	0	0	0	0	0
Miscellaneous Adjustments	0	0	1	0	(1)	3	3
June 30, 2017	**3,410**	**1,352**	**123**	**74**	**3,408**	**510**	**8,877**

** Vested terminations includes non-vested and reciprocal terms that are still due a refund or benefit.*
*** Tier 2 rehires that were transferred back to Tier 1 under Measure F*

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Assumptions

The wage inflation assumption, amortization payment growth rate, and mortality improvement scale were adopted by the Board of Administration with our input at the December 21, 2017 Board meeting. The discount rate assumption was adopted by the Board of Administration with our input at the November 16, 2017 Board meeting. The Tier 2 retirement rates were adopted at the May 4, 2017 Board meeting based on a special analysis presented at that meeting. All other assumptions were adopted at the November 19, 2015 Board meeting based on recommendations from our Experience Study covering plan experience during the period from July 1, 2010 through June 30, 2015. Please refer to the full Experience Study Report for details, including the rationale for each assumption.

1. **Discount Rate**

   6.875%. The Board expects a long-term rate of return of 7.1% based on Meketa's 20-year capital market assumptions and the System's current investment policy. A margin for adverse deviation was used to improve the probability of achieving the discount rate.

2. **Wage Inflation and Payroll Growth**

   3.25%, compounded annually.

3. **Amortization Payment Growth**

   3.00%, compounded annually.

4. **Price Inflation**

   2.50%, compounded annually.

5. **Administrative Expenses**

   1.0% of payroll is added to the normal cost of the system for expected administrative expenses.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

6. Salary Increase Rate

In addition to the wage inflation component of 3.25% shown above, the following merit component is added based on an individual member's years of service:

Table B-1
Salary Merit Increases

Years of Service	Merit/ Longevity
0	4.50%
1	3.50
2	2.50
3	1.85
4	1.40
5	1.15
6	0.95
7	0.75
8	0.60
9	0.50
10	0.45
11	0.40
12	0.35
13	0.30
14	0.25
15+	0.25

7. Family Composition

Percentage married is shown in the following Table B-2. Male retirees are assumed to be three years older than their partner, and female retirees are assumed to be two years younger than their partner.

Table B-2
Percentage Married

Gender	Percentage
Males	80%
Females	60%

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Termination

Sample rates of termination are shown in the following Table B-3.

Table B-3
Rates of Termination

Age	0 Years of Service	1-4 Years of Service	5 or more Years of Service
20	18.00%	17.50%	9.00%
25	18.00	15.50	9.00
30	18.00	13.50	7.00
35	18.00	11.50	5.50
40	18.00	9.50	4.50
45	18.00	8.00	3.50
50	18.00	7.00	3.00
55	18.00	6.00	3.00
60	18.00	5.00	0.00
65	0.00	0.00	0.00

*Withdrawal/termination rates do not apply once a member is eligible for retirement

9. Rate of Reciprocity

25% of terminating employees are assumed to subsequently work for a reciprocal employer and receive 3.25% pay increases per year.

10. Rates of Refund

Tier 1:
Sample rates of vested terminated and reciprocal employees electing a refund of contributions are shown in the following Table B-4.

Table B-4
Rates of Refund

Age	Refund
20	40.00%
25	40.00
30	27.50
35	17.00
40	8.00
45	3.00
50	1.00
55	0.00

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Tier 2:
Vested terminated and reciprocal employees are expected to take a refund if it exceeds the actuarial present value of their deferred benefit payment.

11. Rates of Disability

Sample disability rates of active members are provided in Table B-5.

Table B-5
Rates of Disability at Selected Ages

Age	Disability
20	0.014%
25	0.014
30	0.021
35	0.063
40	0.136
45	0.201
50	0.218
55	0.200
60	0.181
65	0.167
70	0.149

40% of disabilities are assumed to be duty related, and 60% are assumed to be non-duty.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

12. Rates of Mortality

Mortality rates for actives, retirees, beneficiaries, terminated vested, and reciprocals are based on the sex-distinct employee and annuitant CalPERS mortality tables as described below. The CalPERS tables are from their 2014 experience study with a central experience year of 2009 and prior to the 20-year projection of those rates using Scale BB. Future mortality improvements are reflected by applying the most recent projection scale issued by the Society of Actuaries on a generational basis from the base year of 2009. The projection scale used for this valuation is MP-2017.

Base Mortality Tables

Category	Male	Female
Healthy Annuitant	0.952 times the CalPERS 2009 Healthy Annuitant Mortality Table (Male)	0.921 times the CalPERS 2009 Healthy Annuitant Mortality Table (Female)
Healthy Non-Annuitant	0.919 times the CalPERS 2009 Employee Mortality Table (Male)	0.918 times the CalPERS 2009 Employee Mortality Table (Female)
Disabled Annuitant	1.051 times the CalPERS 2009 Ordinary Disability Mortality Table (Male)	1.002 times the CalPERS 2009 Ordinary Disability Mortality Table (Female)

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

13. Rates of Retirement for Tier 1 Members

Rates of retirement for Tier 1 members are based on age according to the following Table B-6 – Tier 1.

Table B-6 – Tier 1
Rates of Retirement by Age and Service

Age	Less than 15 Years of Service	15 or more Years of Service and less than 30 Years of Service	30 or more Years of Service
50	0.0%	0.0%	70.0%
51	0.0	0.0	70.0
52	0.0	0.0	70.0
53	0.0	0.0	70.0
54	0.0	0.0	70.0
55	8.0	35.0	50.0
56	8.0	22.5	50.0
57	8.0	22.5	50.0
58	8.0	22.5	50.0
59	8.0	22.5	50.0
60	8.0	22.5	45.0
61	8.0	30.0	45.0
62	9.0	30.0	45.0
63	10.0	30.0	45.0
64	15.0	35.0	45.0
65	20.0	40.0	45.0
66	20.0	40.0	45.0
67	20.0	40.0	45.0
68	20.0	40.0	45.0
69	20.0	40.0	45.0
70 & over	100.0	100.0	100.0

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

14. Rates of Retirement for Tier 2 Members

Rates of retirement for Tier 2 members are based on age and service according to the following Table B-6 – Tier 2.

Table B-6 – Tier 2
Tier 2 Rates of Retirement by Age and Service

	Years of Service				
Age	5 – 10	11 – 20	21 – 25	26 – 34	35 +
55	3.0%	5.0%	7.0%	10.0%	15.0%
56	2.0%	3.5%	4.0%	7.0%	10.5%
57	2.5%	4.5%	5.0%	8.5%	12.75%
58	3.0%	5.5%	7.0%	11.0%	16.5%
59	3.5%	7.0%	9.0%	13.5%	20.25%
60 – 61	4.0%	8.5%	10.0%	14.5%	21.75%
62	7.5%	12.5%	17.5%	25.0%	100.0%
63 – 69	5.0%	10.0%	15.0%	25.0%	100.0%
70 & over	100.0%	100.0%	100.0%	100.0%	100.0%

15. Deferred Member Benefit

The benefit was estimated based on information provided by the Department of Retirement Services. The data used to value the estimated deferred benefit were credited service, date of termination, and last pay rate. Based on the data provided, the highest average salary was estimated.

Tier 1 terminated vested members are assumed to retire at age 57 and Tier 2 terminated vested members are assumed to retire at age 62.

16. Changes Since the Last Valuation

The retirement rates for Tier 2 members were changed due to the Measure F changes to retirement eligibility and benefit amounts.

The retirement age for Tier 2 terminated vested members was decreased from 65 to 62.

The wage inflation and payroll growth was increased from 2.85% to 3.25%, and the amortization payment growth rate was increased from 2.85% to 3.00%.

The mortality improvement table was updated from MP-2015 to MP-2017.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Contribution Allocation Procedure

The contribution allocation procedure primarily consists of an actuarial cost method, an asset smoothing method, and an amortization method as described below. All components of the contribution allocation procedure were established prior to the June 30, 2010 actuarial valuation except as specifically noted below.

1. Actuarial Cost Method

The Entry Age actuarial cost method was used for active employees, whereby the normal cost is computed as the level annual percentage of pay required to fund all benefits between each member's date of hire and last assumed date of employment. The Actuarial Liability is the difference between the present value of future benefits and the present value of future normal costs. Or, equivalently, it is the accumulation of normal costs for all periods prior to the valuation date. The normal cost and actuarial liability are calculated on an individual basis. The sum of the individual amounts is the normal cost and Actuarial Liability for the System. The Actuarial Liability for the System represents the target amount of assets the System should have as of the valuation date according to the actuarial cost method.

2. Asset Valuation Method

For the purpose of determining contribution rates and amounts, an Actuarial Value of Assets is used that dampens the volatility in the Market Value of Assets, resulting in a smoother pattern of contribution rates.

The Actuarial Value of Assets is calculated by recognizing 20% of the difference in each of the prior four years of actual investment returns compared to the expected return on the Market Value of Assets.

3. Amortization Method

The Unfunded Actuarial Liability is the difference between the Actuarial Liability and the Actuarial Value of Assets.

The Tier 1 Unfunded Actuarial Liability as of June 30, 2009 is amortized as a level percentage of Tier 1 pay over a closed 30-year period commencing June 30, 2009. Tier 1 actuarial gains and losses and plan changes are amortized over 20-year periods and Tier 1 assumption changes are amortized over 25-year periods beginning with the valuation date in which they first arise. Effective June 30, 2017, all prior assumption amortization base periods were increased by 5 years so they have the same remaining period as if they had originally been amortized over 25 years. Amortization payments are scheduled to increase 3.00% each year while aggregate payroll is expected to grow 3.25% each year.

The Tier 2 Unfunded Actuarial Liability as of June 30, 2017 is amortized over a closed 10-year period. Future Tier 2 actuarial gains and losses, assumption changes, and plan changes will be amortized over 10-year periods beginning with the valuation date in which they first arise. Amortization payments are scheduled to increase 3.00% each year while aggregate payroll is expected to grow 3.25% each year.

The amortization payment for the 2015 assumption changes was phased in over a 3-year period. The phase-in was calculated by multiplying the first year amortization payment by one third. For the second year, the amortization schedule is recalculated reflecting the one-third payment in the first year and the remaining 19-year period, and the calculated amortization payment is then multiplied by two-thirds. For the third year, the amortization schedule is again recalculated reflecting the prior payments and the remaining 18-year period. With this valuation, the phase-in period is complete.

4. Contributions

The Board adopted a policy in 2010 and modified it in 2015 setting the City's contribution to be the UAL contribution amount reported in the actuarial valuation plus the greater of the normal cost dollar amount reported in the actuarial valuation (adjusted for interest based on the time of the contribution) and the dollar amount determined by applying the normal cost as a percent of payroll reported in the actuarial valuation to the actual payroll for the fiscal year. The City and Member contributions determined by a valuation become effective for the fiscal year commencing one year after the valuation date. For Tier 1, City contributions are normally made on the first day of the fiscal year. All other contributions are made on a payroll-by-payroll basis.

The total contribution rate is the sum of the normal cost rate, assumed administrative expenses, and the UAL rate. Under Measure F, the total contribution rate cannot be less than the normal cost rate. The normal cost rate is determined by dividing the total normal cost determined under the actuarial cost method by the payroll expected for members active on the valuation date. The UAL payments are adjusted for interest from the valuation date to the date of expected payment in the following fiscal year. The UAL rate is determined by dividing the UAL payments by the total expected payroll for the year (including members active on the valuation date and new entrants expected to replace active members who are expected to leave employment).

For Tier 1, members contribute 3/11ths of the normal cost rate (including administrative expenses, but excluding reciprocity), and the City pays the remainder of the total contribution rate. Tier 1 members who were rehired into Tier 2 and then returned to Tier 1 under Measure F also pay half of the increased cost attributable to their Tier 2 service.

For Tier 2, the members and the City each pay half of the total contribution rate. However, the member's UAL contribution rate cannot increase by more than 0.33% of pay each year. The City contributes any amounts in excess of this cap that would otherwise be contributed by the member.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

5. Changes Since the Last Valuation

Tier 1 members who were rehired into Tier 2 and then returned to Tier 1 under Measure F also pay half of the increased cost attributable to their Tier 2 service.

All Tier 1 assumption amortization base periods were increased by 5 years and all future assumption amortization bases will be amortized over 25-year periods beginning with the valuation date in which they first arise.

All Tier 2 amortization base periods were reset to 10 years as of June 30, 2017. All future amortization bases will be amortized over 10-year periods beginning with the valuation date in which they first arise.

The annual amortization payment increase assumption was increased from 2.85% to 3.00%.

The minimum contribution rate was set equal to the normal cost rate, and the Tier 2 member UAL rate cannot increase by more than 0.33% of pay.

APPENDIX C – SUMMARY OF PLAN PROVISIONS
TIER 1

1. Membership Requirement

Participation in the Plan is immediate upon the first day of full-time employment for members hired before September 30, 2012, including members that are rehired after September 30, 2012 and had prior service under Tier 1 and did not take a return of contributions. In addition, any person accepting employment on or after September 30, 2012 who is otherwise eligible for this plan and who was a "classic" member in another California public retirement system with which this plan has reciprocity, and who has a break in service of less than six months from that covered employment and employment with the City, shall be a Tier 1 member of this plan.

2. Final Compensation

Members who separated from city service prior to June 30, 2001

The highest average annual compensation earnable during any period of three consecutive years.

Members who separated from city service on or after June 30, 2001

The highest average annual compensation earnable during any period of twelve consecutive months.

3. Credited Service

One year of service credit is given for 1,739 or more hours of Federated city service rendered in any calendar year. A partial year (fraction with the numerator equal to the hours worked, and the denominator equal to 1,739) is given for each calendar year with less than 1,739 hours worked.

4. Member Contributions

Member

The amount needed to fund 3/11ths of benefits accruing for the current year. These contributions are credited with interest at 3.0% per year, compounded annually.

Employer

The Employer contributes the remaining amounts necessary to maintain the soundness of the Retirement System.

APPENDIX C – SUMMARY OF PLAN PROVISIONS
TIER 1

5. **Service Retirement**

   Eligibility

   Age 55 with five years of service, or any age with 30 years of service.

   Benefit – Member

   2.5% of Final Compensation for each year of credited service, subject to a maximum of 75% of Final Compensation.

   Benefit – Survivor

   50% of the service retirement benefit paid to a qualified survivor.

6. **Service-Connected Disability Retirement**

   Eligibility

   No age or service requirement.

   Benefit – Member

   2.5% of Final Compensation for each year of credited service, subject to a minimum of 40% and a maximum of 75% of Final Compensation. Workers' Compensation benefits are generally offset from the service-connected benefits under this system.

   Benefit – Survivor

   50% of the disability retirement benefit paid to a qualified survivor.

7. **Non-Service Connected Disability Retirement**

   Eligibility

   Five years of service.

   Benefit – Member

   Members who were hired prior to September 1, 1998:
   The amount of the service-connected benefit reduced by 0.5% for each year that the disability age preceded 55.

APPENDIX C – SUMMARY OF PLAN PROVISIONS
TIER 1

Members who were hired on or after September 1, 1998:
20% of Final Compensation, plus 2% of Final Compensation for each year of credited service between six and 16 years, plus 2.5% of Final Compensation for each year of credited service in excess of 16 years, subject to a maximum of 75% of Final Compensation.

Benefit – Survivor

50% of the disability retirement benefit paid to a qualified survivor.

8. Death While an Active Employee

Less than five Years of Service, or No Qualified Survivor

Lump sum benefit equal to the accumulated refund of all employee contributions with interest, plus one month of salary for each year of service, up to a maximum of six years.

Five or more Years of Service

2.5% of Final Compensation for each year of credited service, subject to a minimum of 40% and a maximum of 75% of Final Compensation. The benefit is payable until the spouse or registered domestic partner marries or establishes a domestic partnership. If the member was age 55 with 20 years of service at death, the benefit is payable for the lifetime of the member's spouse or registered domestic partner.

9. Withdrawal Benefits

Less than five Years of Service

Lump sum benefit equal to the accumulated employee contributions with interest.

Five or more years of credited service

The amount of the service retirement benefit, payable at age 55.

10. Additional Post-retirement Death Benefit

A death benefit payable as a lump sum equal to $500 will be paid to a qualified survivor upon the member's death.

11. Post-retirement Cost-of-Living Benefit

Benefits are increased every April 1 by 3.0%, regardless of actual inflation.

APPENDIX C – SUMMARY OF PLAN PROVISIONS
TIER 1

12. Changes Since the Last Valuation

Membership requirements were changed by Measure F to allow former members of Tier 1 that are rehired to re-enter Tier 1.

APPENDIX C – SUMMARY OF PLAN PROVISIONS
TIER 2

1. **Membership Requirement**

   Any person who is hired, rehired or reinstated by the City on or after September 30, 2012 except those who elect to participate in a defined contribution plan, had prior service under Tier 1 and did not take a return of contributions, or had prior service as a "classic" member in a reciprocal system with less than a six month break in service.

2. **Final Compensation**

   The average annual compensation earnable during the highest three consecutive years of service. Final compensation only includes base pay, excluding premium pay and any other additional compensation.

3. **Credited Service**

   One year of service credit is given for 2,080 or more hours of Federated city service rendered in any calendar year. A partial year (fraction with the numerator equal to the hours worked, and the denominator equal to 2,080) is given for each calendar year with less than 2,080 hours worked.

4. **Member Contributions**

   50% of total Tier 2 contributions to the pension plan, including, but not limited to administrative expenses, normal cost, and Unfunded Actuarial Liability. However, the member's UAL contribution rate cannot increase by more than 0.33% of pay each year. The City contributes any amounts in excess of this cap that would otherwise be contributed by the member.

   The member contribution rate cannot be less than 50% of the normal cost rate.

5. **City Contributions**

   50% of total Tier 2 contributions to the pension plan, including, but not limited to administrative expenses, normal cost, and Unfunded Actuarial Liability. In addition, the City contributes any UAL amounts in excess of the member UAL cap until the member rate covers 50% of the UAL rate.

   The City contribution rate cannot be less than 50% of the normal cost rate.

6. Unreduced Service Retirement

Eligibility

Age 62 with five years of service.

Benefit – Member

2.0% of Final Compensation for each year of credited service attributable to Tier 2, subject to a maximum of 70% of Final Compensation.

Benefit – Survivor

50% of the service retirement benefit paid to a qualified survivor.

7. Early Service Retirement

Eligibility

Age 55 with five years of service.

Benefit – Member

Benefit reduced by a factor of 5% for each year the member retires before age 62.

The early retirement reduction is applied to the benefit after the application of the maximum of 70% of final compensation.

8. Service-Connected Disability Retirement

Eligibility

No age or service requirement.

Benefit – Member

2.0% of Final Compensation for each year of credited service, subject to a minimum of 40% of Final Compensation and a maximum of 70% of Final compensation, less the amounts specified in Section 3.28.1330 and Section 3.28.1340.

APPENDIX C – SUMMARY OF PLAN PROVISIONS
TIER 2

9. Non-Service Connected Disability Retirement

Eligibility

Five years of service.

Benefit – Member

2.0% of Final Compensation for each year of credited service attributable to Tier 2, subject to a minimum of 20% of Final Compensation and a maximum of 70% of Final Compensation less the amounts specified in Section 3.28.1330 and Section 3.28.1340.

10. Death Before Retirement

Less than five Years of Service, or No Qualified Survivor

Lump sum benefit equal to the accumulated refund of all employee contributions with interest, plus one month of salary for each year of service, up to a maximum of six years.

Five or more Years of Service

2.5% of Final Compensation for each year of credited service, subject to a minimum of 40% and a maximum of 70% of Final Compensation. The benefit is payable until the spouse or registered domestic partner marries or establishes a domestic partnership. If the member was age 55 with 20 years of service at death, the benefit is payable for the lifetime of the member's spouse or registered domestic partner.

11. Withdrawal Benefits

Less than five years of credited service

Lump sum benefit equal to the accumulated employee contributions with interest.

Five or more years of credited service

The amount of the service retirement benefit reduced for early retirement, and payable when retirement eligibility is reached.

12. Benefit Forms

Annuity benefits are paid in the form of a 50% joint and survivor annuity or an actuarially equivalent annuity with 75% or 100% continuance to a survivor.

APPENDIX C – SUMMARY OF PLAN PROVISIONS
TIER 2

13. Post-retirement Cost-of-Living Benefit

Benefits are increased every April 1 by the change in the December CPI-U for San José-San Francisco-Oakland, subject to a cap based on years of service as shown in the table below.

Years of Service	Maximum COLA
At least 1, but less than 11	1.25%*
At least 11, but less than 21	1.50%
At least 21, but less than 26	1.75%
At least 26	2.00%

*1.5% for members hired before Measure F effective date

The first COLA after retirement shall be prorated based on the number of months retired.

14. Changes Since the Last Valuation

Membership requirements were changed by Measure F to allow former members of Tier 1 that are rehired to re-enter Tier 1. This change moved 35 current Tier 2 members to Tier 1.

Measure F changed many of the terms of Tier 2, including:

- Eligibility requirements for service retirement,
- Maximum multiplier for calculating benefits,
- Early retirement reduction factors,
- Disability and death benefits, and
- Post-retirement COLAs.

Note: The summary of major plan provisions is designed to outline principal plan benefits. If the Department of Retirement Services should find the plan summary not in accordance with the actual provisions, the actuary should immediately be alerted so the proper provisions are valued.

APPENDIX D – GLOSSARY OF TERMS

1. **Actuarial Liability**

   The Actuarial Liability is the difference between the present value of future benefits and the present value of total future normal costs. This is also referred to as the "accrued liability" or "actuarial accrued liability." The Actuarial Liability represents the targeted amount of assets a plan should have as of a valuation date according to the actuarial cost method.

2. **Actuarial Assumptions**

   Estimates of future experience with respect to rates of mortality, disability, turnover, retirement rate or rates of investment income, and salary increases. Demographic actuarial assumptions (rates of mortality, disability, turnover, and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (price inflation, wage inflation, and investment income) are generally based on expectations for the future that may differ from the Plan's past experience.

3. **Actuarial Cost Method**

   A mathematical budgeting procedure for allocating the dollar amount of the present value of future benefits between future normal cost and Actuarial Liability.

4. **Actuarial Gain (Loss)**

   The difference between actual experience and the anticipated experience based on the actuarial assumptions during the period between two actuarial valuation dates.

5. **Actuarial Present Value**

   The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at the discount rate and by probabilities of payment.

6. **Actuarially Determined Contribution**

   The payment to the System as determined by the actuary using a contribution allocation procedure. It may or may not be the actual amount contributed to the System.

7. **Amortization Method**

   A method for determining the amount, timing, and pattern of payments of the Unfunded Actuarial Liability.

APPENDIX D – GLOSSARY OF TERMS

8. Asset Valuation Method

The method used to develop the Actuarial Value of Assets from the Market Value of Assets typically by smoothing investment returns above or below the assumed rate of return over a period of time.

9. Contribution Allocation Procedure

A procedure typically using an actuarial cost method, an asset valuation method, and an amortization method to develop the Actuarially Determined Contribution.

10. Discount Rate

The rate of interest used to discount future benefit payments to determine the actuarial present value. For purposes of determining an Actuarially Determined Contribution, the discount rate is typically based on the long-term expected return on assets.

11. Funded Status or Funding Ratio

The Market or Actuarial Value of assets divided by the Actuarial Liability. For purposes of this report, the Funded Status represents the proportion of the actual assets compared to the target established by the actuarial cost method as of the valuation date. These measures are for contribution budgeting purposes and are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

12. Normal Cost

The portion of the present value of future benefits allocated to the current year by the actuarial cost method.

13. Present Value of Future Benefits

The actuarial present value of all benefits both earned as of the valuation date and expected to be earned in the future by current plan members based on current plan provisions and actuarial assumptions.

14. Unfunded Actuarial Liability (UAL)

The Unfunded Actuarial Liability is the difference between Actuarial Liability and either the Market or the Actuarial Value of Assets. This value is sometimes referred to as "unfunded actuarial accrued liability." It represents the difference between the actual assets and the amount of assets expected by the actuarial cost method as of the valuation date.

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