

# **Contra Costa County Employees' Retirement Association**

**Actuarial Valuation and Review  
As of December 31, 2017**



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

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*August 16, 2018*

*Board of Retirement  
Contra Costa County Employees' Retirement Association  
1335 Willow Way, Suite 221  
Concord, CA 94520*

*Dear Board Members:*

*We are pleased to submit this Actuarial Valuation and Review as of December 31, 2017. It summarizes the actuarial data used in the valuation, establishes the funding requirements for the fiscal year beginning July 1, 2019 and analyzes the preceding year's experience.*

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

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

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

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

*Sincerely,*

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

By:

*Paul Angelo, FSA, EA, MAAA, FCA  
Senior Vice President & Actuary*

*John Monroe, ASA, EA, MAAA  
Vice President & Actuary*

*EK/bbf*

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## **SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association**

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### **PURPOSE AND SCOPE**

This report has been prepared by Segal Consulting to present a valuation of the Contra Costa County Employees' Retirement Association (CCCERA) as of December 31, 2017. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution rate requirements presented in this report are based on:

- The benefit provisions of the Retirement Association, as administered by the Board;
- The characteristics of covered active members, terminated members, and retired members and beneficiaries as of December 31, 2017, provided by CCCERA;
- The assets of the Plan as of December 31, 2017, provided by CCCERA;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board for the December 31, 2017 valuation; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc. adopted by the Board for the December 31, 2017 valuation.

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

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Association's assets, liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the Association's staff. This information has not been audited by us, but it has been reviewed and found to be reasonably consistent, both internally and with prior years' information.

## SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

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*Ref: Pgs. 71 - 84*

The contribution requirements are determined as a percentage of payroll. The Association's employer rates provide for both normal cost and a contribution to amortize any unfunded or overfunded actuarial accrued liabilities. In 2008, the Board elected to amortize the remaining balance of the Association's unfunded actuarial accrued liability (UAAL) through December 31, 2007 over a decreasing 15-year period with 5 years remaining as of December 31, 2017. Any change in the UAAL that arises at each valuation after December 31, 2007 is amortized over its own separate declining 18-year period.

*Ref: Pgs. 85 - 86*

Effective with the December 31, 2013 valuation, any change in UAAL that arises due to plan amendments is amortized over its own declining 10-year period (with the exception of a change due to retirement incentives, which is to be funded in full upon adoption of the incentive). Note that a graphical projection of the UAAL amortization bases and payments has been included as a new Exhibit K.

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

### SIGNIFICANT ISSUES IN VALUATION YEAR

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

*Ref: Pg. 36  
Ref: Pg. 70*

➤ The ratio of the valuation value of assets to the actuarial accrued liability increased from 86.5% to 88.5% while the ratio of the market value of assets to the actuarial accrued liability also increased from 84.6% to 90.8%. The Association's UAAL (which is based on the valuation value of assets) has decreased from \$1.2 billion to \$1.1 billion. This decrease is due to an investment return on actuarial value (i.e. after smoothing) greater than the 7.00% assumed rate, actual contributions greater than expected, and a retirement gain on actives all offset to some degree by higher than expected individual salary increases, higher than expected COLA increases for retirees and beneficiaries, and a mortality loss on retirees and beneficiaries. A reconciliation of the Association's UAAL is provided in Section 3, Exhibit I.

*Ref: Pg. 33*

➤ The average employer rate calculated in this valuation (excluding any employer subvention of member rates or member subvention of employer rates) has decreased from 38.08% of payroll to 36.07% of payroll. This decrease is due to an investment return on actuarial value (i.e. after smoothing) greater than the 7.00% assumed rate, actual contributions greater than expected, amortizing the prior year's UAAL over a greater than expected projected total payroll and a retirement gain on actives all offset to some degree by higher than expected individual salary increases, a higher than expected COLA increases for retirees and beneficiaries and a mortality loss on retirees and beneficiaries. A complete reconciliation of the Association's aggregate employer rate is provided in Section 2, Subsection D (see Chart 15).

## SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

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*Ref: Pgs. 21 - 32*

- Separate employer contribution rates are shown in Chart 14 for members with membership dates before January 1, 2013 (non-PEPRA members) and on or after January 1, 2013 (PEPRA members). However, the average employer contribution rates shown on page v are based on all members regardless of their membership date. A detailed schedule of the employer contribution rates is provided in Section 2, Subsection D, Chart 14.

*Ref: Pg. 34*

- The average member rate calculated in this valuation has decreased from 12.08% of payroll to 12.03% of payroll. A complete reconciliation of the Association's aggregate member rate is provided in Section 2, Subsection D (see Chart 16). The detailed member rates are provided in Appendix A and B of this report. They are shown by cost group.

*Ref: Pg. 5*

- The total unrecognized net investment gain as of December 31, 2017 is about \$195 million as compared to an unrecognized net investment loss of \$184 million in the previous valuation. The net investment gain of \$195 million will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years as shown in the footnote in Chart 7.
- The net deferred gains of \$195 million represent about 2.3% of the market value of assets. Unless offset by future investment losses or other unfavorable experience, the recognition of the \$195 million market gains is expected to have an impact on the Association's future funded ratio and contribution rate requirements. This potential impact may be illustrated as follows:
  - If the net deferred gains were recognized immediately in the valuation value of assets, the funded percentage would increase from 88.5% to 90.6%.

For comparison purposes, if all the deferred losses in the December 31, 2016 valuation had been recognized immediately in the December 31, 2016 valuation, the funded percentage would have decreased from 86.5% to 84.4%.
  - If the net deferred gains were recognized immediately in the valuation value of assets, the average employer contribution rate would decrease from 36.1% to about 34.3% of payroll.

For comparison purposes, if all the deferred losses in the December 31, 2016 valuation had been recognized immediately in the December 31, 2016 valuation, the average employer contribution rate would have increased from 38.1% to 39.9% of payroll.
- The actuarial valuation report as of December 31, 2017 is based on financial information as of that date. Changes in the assets subsequent to that date, to the extent that they exist, are not reflected. Declines in asset values will increase the actuarial cost of the plan, while increases will decrease the actuarial cost of the plan.

## SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

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- This valuation reflects the \$30,000 and \$294,000 additional contributions made by Local Agency Formation Commission (LAFCO) and San Ramon Valley Fire Department, respectively, towards their UAAL. Based on CCCERA's funding policy, these amounts will be amortized as a level percent of pay (credit) over a period of eighteen years beginning with the December 31, 2017 valuation to reduce their associated employer UAAL contributions.

### Impact of Future Experience on Contribution Rates

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

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

## SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

### Summary of Key Valuation Results

	December 31, 2017		December 31, 2016	
		Estimated		Estimated
Average Employer Contribution Rates <sup>(1)</sup> :	Total Rate	Annual Amount	Total Rate	Annual Amount
<b>General</b>				
Cost Group #1 – County and Small Districts (Tier 1 and 4)	31.10%	\$7,606,008	32.24%	\$7,255,727
Cost Group #2 – County and Small Districts (Tier 3 and 5)	26.36%	165,290,829	27.79%	158,011,177
Cost Group #3 – Central Contra Costa Sanitary District	49.57%	17,028,036	51.06%	16,647,933
Cost Group #4 – Contra Costa Housing Authority	41.91%	2,339,998	41.39%	2,292,585
Cost Group #5 – Contra Costa County Fire Protection District	31.82%	1,637,209	32.30%	1,373,964
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	16.59%	141,096	28.88%	231,953
<b>Safety</b>				
Cost Group #7 – County (Tier A and D)	71.94%	43,932,485	75.62%	45,850,943
Cost Group #8 – Contra Costa and East Fire Protection Districts	75.59%	26,986,544	77.06%	26,794,496
Cost Group #9 – County (Tier C and E)	62.56%	22,115,804	67.42%	17,836,505
Cost Group #10 – Moraga-Orinda Fire District	69.74%	5,127,677	70.26%	4,947,214
Cost Group #11 – San Ramon Valley Fire District	75.25%	16,211,133	80.73%	15,490,933
Cost Group #12 – Rodeo-Hercules Fire Protection District	92.28%	2,022,595	96.93%	2,012,833
<b>All Employers combined</b>	36.07%	\$310,439,414	38.08%	\$298,746,263
<b>Average Member Contribution Rates<sup>(1)</sup>:</b>		Estimated		Estimated
<b>General</b>	Total Rate	Annual Amount	Total Rate	Annual Amount
Cost Group #1 – County and Small Districts (Tier 1 and 4)	10.89%	\$2,663,749	10.78%	\$2,425,734
Cost Group #2 – County and Small Districts (Tier 3 and 5)	10.76%	67,468,539	10.84%	61,630,010
Cost Group #3 – Central Contra Costa Sanitary District	11.45%	3,932,967	11.56%	3,769,197
Cost Group #4 – Contra Costa Housing Authority	11.70%	653,190	11.57%	640,888
Cost Group #5 – Contra Costa County Fire Protection District	11.08%	570,022	10.99%	467,521
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	13.31%	113,227	13.55%	108,839
<b>Safety</b>				
Cost Group #7 – County (Tier A and D)	17.92%	10,943,567	17.83%	10,810,732
Cost Group #8 – Contra Costa and East Fire Protection Districts	17.54%	6,261,431	17.12%	5,953,027
Cost Group #9 – County (Tier C and E)	16.20%	5,727,117	16.08%	4,253,979
Cost Group #10 – Moraga-Orinda Fire District	17.26%	1,269,068	17.14%	1,206,917
Cost Group #11 – San Ramon Valley Fire District	16.75%	3,608,279	16.63%	3,190,924
Cost Group #12 – Rodeo-Hercules Fire Protection District	15.52%	340,150	15.44%	320,617
<b>All Categories Combined</b>	12.03%	\$103,551,307	12.08%	\$94,778,385

<sup>(1)</sup> Based on projected payroll as of each valuation date shown. These rates do not include any employer subvention of member contributions or any member subvention of employer contributions. The rates shown are averages based on all members regardless of their membership date.

Note: Pages 19 and 20 contain a summary that shows which employers are in each cost group.



**SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association**

**Summary of Key Valuation Results (continued)**

	December 31, 2017	December 31, 2016
<b>Funded Status:</b>		
Actuarial accrued liability (AAL)	\$9,239,246,920	\$8,794,434,139
Valuation value of assets (VVA)	\$8,179,891,191	\$7,606,997,530
Market value of assets (MVA)	\$8,390,581,049	\$7,438,519,504
Funded percentage on VVA basis (VVA/AAL)	88.5%	86.5%
Funded percentage on MVA basis (MVA/AAL)	90.8%	84.6%
Unfunded Actuarial Accrued Liability (UAAL) on VVA basis	\$1,059,355,729	\$1,187,436,609
Unfunded Actuarial Accrued Liability (UAAL) on MVA basis	\$848,665,871	\$1,355,914,635
<b>Summary of Financial Data:</b>		
Market value of assets	\$8,390,581,049	\$7,438,519,504
Return on market value of assets	13.31%	7.10%
Actuarial value of assets	\$8,195,516,541	\$7,622,351,103
Return on actuarial value of assets	8.00%	7.04%
Valuation value of assets	\$8,179,891,191	\$7,606,997,530
Return on valuation value of assets	8.00%	7.04%
<b>Key Assumptions:</b>		
Interest rate	7.00%	7.00%
Inflation rate	2.75%	2.75%
Across the board salary increase	0.50%	0.50%

**SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association**

**Summary of Key Valuation Demographic Data**

	December 31, 2017	December 31, 2016	Change from Prior Year
<b>Active Members:</b>			
Number of members	10,038	9,848	1.9%
Average age	46.0	45.9	0.1
Average service	9.8	9.9	-0.1
Projected total payroll (compensation)	\$860,624,613	\$784,412,260	9.7%
Average projected payroll	\$85,737	\$79,652	7.6%
<b>Retired Member and Beneficiaries:</b>			
Number of members:			
Service retired	6,973	6,825	2.2%
Disability retired	896	905	-1.0%
Beneficiaries	1,398	1,370	2.0%
Total	9,267	9,100	1.8%
Average age	70.3	70.0	0.3
Average Monthly Benefit	\$3,892	\$3,799	2.4%
<b>Vested Terminated Members:</b>			
Number of terminated vested members <sup>(1)</sup>	3,327	3,089	7.7%
Average age	46.5	46.6	-0.1

<sup>(1)</sup> Includes 1,696 terminated members with member contributions on deposit as of December 31, 2017 and 1,543 as of December 31, 2016.

## SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

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### Important Information about Actuarial Valuations

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

In order to prepare an actuarial valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

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

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

- The valuation is prepared at the request of the CCCERA. Segal is not responsible for the use or misuse of its report, particularly by any other party.

## SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

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- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- If CCCERA is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.

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

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**A. MEMBER DATA**

The Actuarial Valuation and Review considers the number and demographics of covered members, including active members, vested terminated members, retired members and beneficiaries.

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

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

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

**CHART 1**  
**Member Population: 2008 – 2017**

<b>Year Ended December 31</b>	<b>Active Members</b>	<b>Vested Terminated Members<sup>(1)</sup></b>	<b>Retired Members and Beneficiaries</b>	<b>Ratio of Non-Actives to Actives</b>
2008	9,385	2,153	7,012	0.98
2009	8,938	2,209	7,292	1.06
2010	8,811	2,231	7,559	1.11
2011	8,629	2,214	8,085	1.19
2012	8,640	2,288	8,517	1.25
2013	9,124	2,345	8,625	1.20
2014	9,159	2,647	8,871	1.26
2015	9,642	2,790	9,068	1.23
2016	9,848	3,089	9,100	1.24
2017	10,038	3,327	9,267	1.25

<sup>(1)</sup> Includes members who terminate and leave accumulated contributions on deposit.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**Active Members**

Plan costs are affected by the age, years of service and payroll of active members. In this year's valuation, there are 10,038 active members with an average age of 46.0, average years of service of 9.8 years and average payroll of \$85,737. The 9,848 active members in the prior valuation had an average age of 45.9, average service of 9.9 years and average payroll of \$79,652.

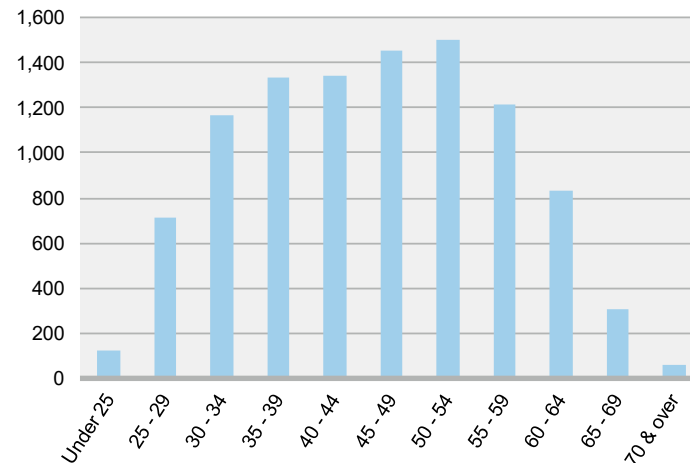
Among the active members, there were none with unknown age or service information.

**Inactive Members**

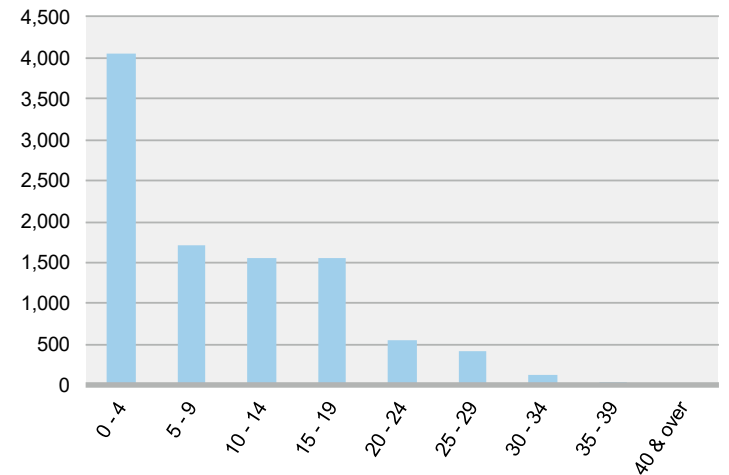
In this year's valuation, there were 3,327 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their employee contributions versus 3,089 in the prior valuation.

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

**CHART 2**  
**Distribution of Active Members by Age as of December 31, 2017**



**CHART 3**  
**Distribution of Active Members by Years of Service as of December 31, 2017**



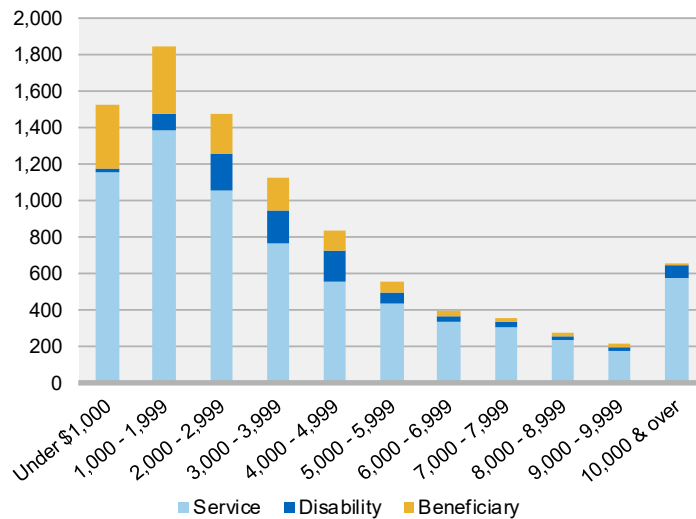
**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**Retired Members and Beneficiaries**

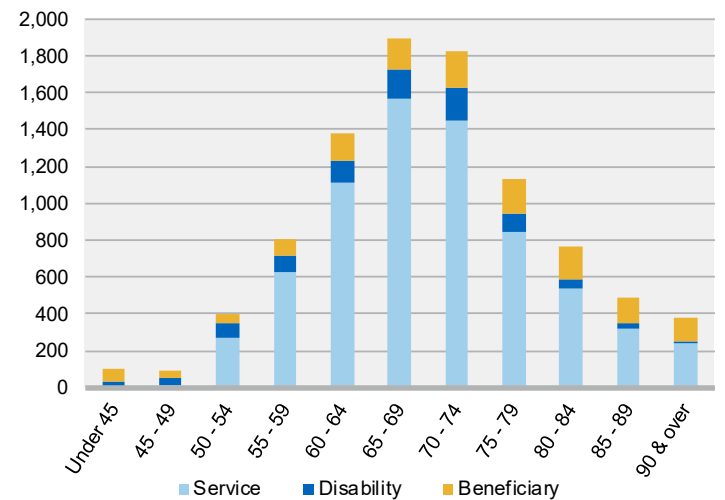
As of December 31, 2017, 7,869 retired members and 1,398 beneficiaries were receiving total monthly benefits of \$36,067,626. For comparison, in the previous valuation, there were 7,730 retired members and 1,370 beneficiaries receiving monthly benefits of \$34,574,919.

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

**CHART 4**  
**Distribution of Retired Members and Beneficiaries by Type and by Monthly Amount as of December 31, 2017**



**CHART 5**  
**Distribution of Retired Members and Beneficiaries by Type and by Age as of December 31, 2017**



## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

### B. FINANCIAL INFORMATION

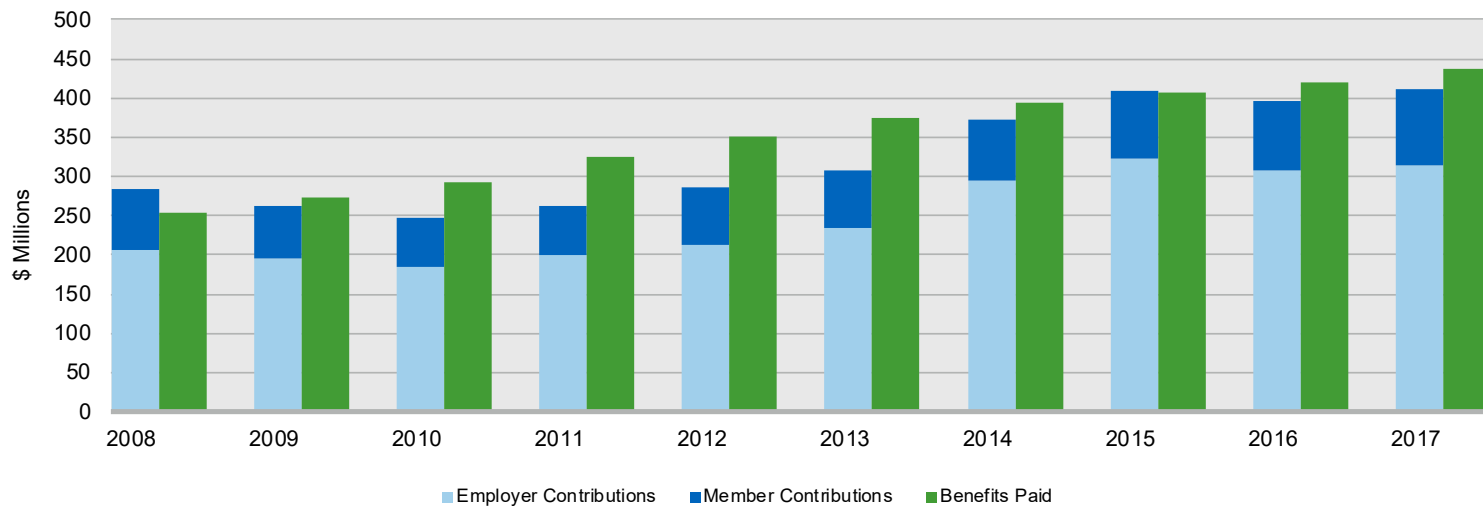
Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

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

*The chart depicts two components of changes in the actuarial value of assets over the last ten years. The first bar represents increases in assets due to contributions during each year while the second bar details the decreases due to benefit payments. UAAL prepayments of \$7.0 million are included for 2013, \$5.0 million for 2014, \$2.5 million for 2015 and \$0.3 million for 2017.*

**CHART 6**

**Comparison of Contributions with Benefits for Years Ended December 31, 2008 - 2017**





## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

### CHART 7

#### Determination of Actuarial and Valuation Value of Assets for Year Ended December 31, 2017

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

Six Month Period		Total Actual Market	Expected Market	Investment	Deferred Factor	Deferred
From	To	Return (net)	Return (net)	Gain (Loss)		Return
7/2012	12/2012	371,057,645	205,350,894	165,706,751	0.0	\$0
1/2013	6/2013	281,608,945	218,386,047	63,222,898	0.0	0
7/2013	12/2013	588,758,958	227,909,702	360,849,256	0.1	36,084,926
1/2014	6/2014	347,257,106	249,636,410	97,620,696	0.2	19,524,139
7/2014	12/2014	125,727,585	241,361,743	(115,634,158)	0.3	(34,690,247)
1/2015	6/2015	207,439,920	246,283,585	(38,843,665)	0.4	(15,537,466)
7/2015	12/2015	(142,612,600)	253,672,471	(396,285,071)	0.5	(198,142,535)
1/2016	6/2016	297,615,324	239,907,822	57,707,502	0.6	34,624,501
7/2016	12/2016	196,258,919	249,584,567	(53,325,648)	0.7	(37,327,954)
1/2017	6/2017	488,764,245	255,728,819	233,035,426	0.8	186,428,341
7/2017	12/2017	498,651,736	271,873,066	226,778,670	0.9	<u>204,100,803</u>
1. Total Deferred Return <sup>(1)</sup>						\$195,064,508
2. Market Value of Assets						8,390,581,049
3. Actuarial Value of Assets (Item 2 – Item 1)						8,195,516,541
4. Actuarial Value as Percentage of Market Value (Item 3 / Item 2)						97.7%
5. Non-valuation Reserves and Designations:						
a. Post Retirement Death Benefit						\$15,625,350
b. Statutory Contingency						0
c. Additional One Percent Contingency						0
d. Unrestricted Designation						<u>0</u>
e. Total						\$15,625,350
6. Valuation Value of Assets (Item 3 – Item 5e)						<u>\$8,179,891,191</u>

<sup>(1)</sup> Deferred return recognized in each of the next 5 years:

(a) Amount recognized during 2018	\$38,295,677
(b) Amount recognized during 2019	(5,749,973)
(c) Amount recognized during 2020	53,210,683
(d) Amount recognized during 2021	86,630,254
(e) Amount recognized during 2022	<u>22,677,867</u>
(f) Subtotal	\$195,064,508

Note: Results may not add due to rounding.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 8**

**Allocation of Valuation Value of Assets as of December 31, 2017**

The calculation of the valuation value of assets from December 31, 2016 to December 31, 2017 by cost groups is provided below.

		General					
		Cost Groups #1 and #2 General County and Small Districts	Cost Group #3 Central Contra Costa Sanitary District	Cost Group #4 Contra Costa Housing Authority	Cost Group #5 Contra Costa County Fire Protection District	Cost Group #6 Small Districts (General Non-Enhanced)	Terminated Employers
1	Allocated Valuation Value of Assets As of Beginning of Plan Year	\$4,254,074,626	\$291,526,301	\$49,792,725	\$45,956,528	\$6,316,233	\$56,628,197
2	Contributions: <sup>(1)</sup>						
a.	Total Member Contributions	64,742,096	3,888,695	561,028	504,943	101,870	1,114
b.	Employer Contributions - Excludes POB and other Special Contributions	172,954,953	17,880,152	2,150,337	1,415,239	205,766	0
c.	Employer Contributions - Special (POB, Termination, etc.)	30,000	0	0	0	0	1,089,680
d.	Total Contributions	237,727,049	21,768,847	2,711,365	1,920,182	307,636	1,090,794
3	Total Payments Excluding Post- Retirement Death	241,313,683	19,149,964	2,986,805	2,976,578	337,884	5,519,623
4	Administrative Expenses <sup>(2)</sup>	6,891,481	380,175	64,586	49,602	9,366	0
5	Subtotal (Item 1 + 2d - 3 - 4)	4,243,596,511	293,765,009	49,452,699	44,850,530	6,276,619	52,199,368
6	Weighted Average Fund Balance	4,248,835,566	292,645,655	49,622,712	45,403,529	6,296,426	54,255,704
7	Earnings Allocated in Proportion to Item 6	340,082,517	23,423,752	3,971,869	3,634,160	503,974	4,342,700
8	Allocated Valuation Value of Assets As of End of Plan Year (Item 5 + 7)	\$4,583,679,028	\$317,188,761	\$53,424,568	\$48,484,690	\$6,780,593	\$56,542,068

<sup>(1)</sup> Employer contributions include "member subvention of employer contributions" and exclude "employer subvention of member contributions".

<sup>(2)</sup> Allocated based on expected administrative expenses from the prior valuation.

Note: Results may not add due to rounding.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 8 (continued)**

**Allocation of Valuation Value of Assets as of December 31, 2017**

		Safety					
		Cost Groups #7 & 9 Safety County	Cost Group #8 Contra Costa & East Fire Protection Districts	Cost Group #10 Moraga-Orinda Fire District	Cost Group #11 San Ramon Valley Fire District	Cost Group #12 Rodeo-Hercules Fire Protection District	<b>Total</b>
1	Allocated Valuation Value of Assets As of Beginning of Plan Year	\$1,555,112,518	\$835,842,053	\$151,638,626	\$330,679,992	\$29,429,731	\$7,606,997,530
2	Contributions: <sup>(1)</sup>						
a.	Total Member Contributions	15,980,753	6,039,791	1,248,975	3,081,669	315,972	96,466,906
b.	Employer Contributions - Excludes POB and other Special Contributions	67,344,168	27,412,834	5,058,510	16,915,097	2,085,825	313,422,881
c.	Employer Contributions – Special (POB, Termination, etc.)	0	0	0	294,000	0	1,413,680
d.	Total Contributions	83,324,921	33,452,625	6,307,485	20,290,766	2,401,797	411,303,467
3	Total Payments Excluding Post- Retirement Death	83,095,375	55,078,932	9,616,657	14,827,305	1,838,482	436,741,288
4	Administrative Expenses <sup>(2)</sup>	1,015,424	405,440	82,103	223,726	24,212	9,146,115
5	Subtotal (Item 1 + 2d – 3 – 4)	1,554,326,640	813,810,306	148,247,351	335,919,727	29,968,834	7,572,413,594
6	Weighted Average Fund Balance	1,554,719,579	824,826,180	149,942,989	333,299,860	29,699,283	7,589,547,483
7	Earnings Allocated in Proportion to Item 6	124,441,848	66,020,198	12,001,639	26,677,769	2,377,171	607,477,597
8	Allocated Valuation Value of Assets As of End of Plan Year (Item 5 + 7)	\$1,678,768,488	\$879,830,504	\$160,248,990	\$362,597,496	\$32,346,005	\$8,179,891,191

<sup>(1)</sup> Employer contributions include "member subvention of employer contributions" and exclude "employer subvention of member contributions".

<sup>(2)</sup> Allocated based on expected administrative expenses from the prior valuation.

Note: Results may not add due to rounding.

## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

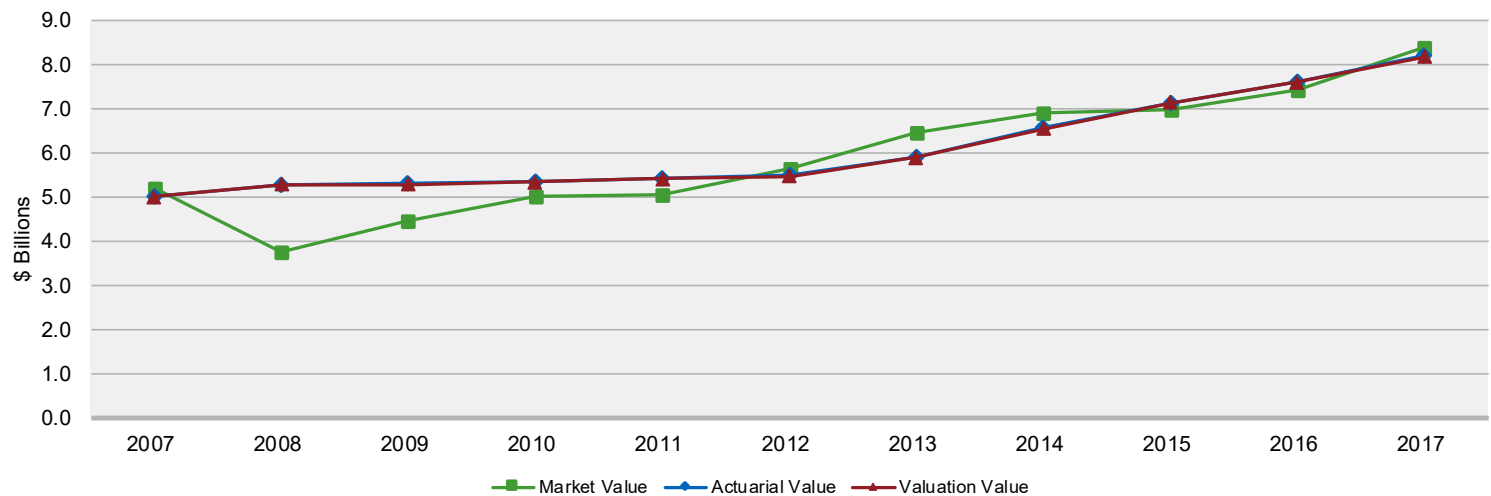
The market value, actuarial value and valuation value of assets are representations of the Plan's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets, but with less volatility. The valuation value of assets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

The valuation value of assets is significant because CCCERA's liabilities are compared to this measure of its assets to determine what portion, if any, remains unfunded. Amortization of the unfunded liability is an important element in determining the contribution requirement.

*This chart shows the change in the relative values of market value, actuarial value and valuation value of assets over the past ten years.*

**CHART 9**

**Relative Values of Market Value, Actuarial Value and Valuation Value of Assets for Years Ended December 31, 2007 – 2017**



**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

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**C. ACTUARIAL EXPERIENCE**

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will

return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total experience gain was \$40.6 million, a gain of \$76.2 million from investments, a gain of \$17.9 million from contribution experience and a loss of \$53.6 million from all other sources. A discussion of the major components of the actuarial experience is on the following pages.

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

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**CHART 10**  
**Actuarial Experience for Year Ended December 31, 2017**

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1. Net gain/(loss) from investments <sup>(1)</sup>	\$76,209,273
2. Net gain/(loss) from contribution experience	17,933,150
3. Net gain/(loss) from other experience <sup>(2)</sup>	<u>(53,561,701)</u>
4. Net experience gain/(loss): (1) + (2) + (3)	<u>\$40,580,722</u>

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<sup>(1)</sup> Details in Chart 11

<sup>(2)</sup> See Section 3, Exhibit I. Does not include the effect of plan or assumption changes, if any.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**Investment Rate of Return**

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on CCCERA's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets during 2017 was 7.00% (based on the December 31, 2016 actuarial valuation). The actual rate of return on the actuarial value for the 2017 Plan Year was 8.00%.

The market value return reflects the entire impact of the investment performance during the current year and ignores returns from prior years.

The actuarial and valuation value returns reflect the fact that investment gains and losses are gradually taken into account. This is because these returns reflect only a portion of the investment gain or loss from the current year as well as portions of the gains and losses from prior years in accordance with the Board's asset valuation method.

Since the actual return for the year was greater than the assumed return, the Plan experienced an actuarial gain on the actuarial and valuation value of assets during the year ended December 31, 2017.

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

**CHART 11**

**Investment Experience for Year Ended December 31, 2017 – Market Value, Actuarial Value and Valuation Value of Assets**

	<b>Market Value</b>	<b>Actuarial Value</b>	<b>Valuation Value</b>
1. Actual return	\$987,415,981	\$608,519,874	\$607,477,597
2. Average value of assets	7,420,684,208	7,604,515,807	7,589,547,483
3. Actual rate of return: (1) ÷ (2)	13.31%	8.00%	8.00%
4. Assumed rate of return	7.00%	7.00%	7.00%
5. Expected return: (2) x (4)	519,447,895	532,316,106	531,268,324
6. Actuarial gain/(loss): (1) – (5)	<u>\$467,968,086</u>	<u>\$76,203,768</u>	<u>\$76,209,273</u>

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

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

**CHART 12**

**Investment Return – Valuation Value, Actuarial Value and Market Value: 2008 – 2017**

Year Ended December 31	Market Value Investment Return		Actuarial Value Investment Return		Valuation Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent
2008	\$(1,477,705,765)	(28.35%)	\$238,397,117	4.73%	\$237,402,129	4.72%
2009	736,956,891	19.68%	18,226,933	0.34%	17,021,116	0.32%
2010	594,637,090	13.35%	95,918,913	1.82%	94,835,030	1.80%
2011	88,042,268	1.76%	148,058,548	2.78%	146,988,614	2.77%
2012	668,138,997	13.31%	121,921,302	2.25%	120,826,177	2.24%
2013	870,984,744	15.50%	492,503,802	9.01%	491,324,308	9.02%
2014	473,522,261	7.35%	673,040,867	11.39%	671,957,212	11.40%
2015	65,495,657	0.95%	577,199,123	8.78%	576,151,245	8.79%
2016	493,874,242	7.10%	502,352,173	7.04%	501,328,149	7.04%
2017	987,415,981	13.31%	608,519,874	8.00%	607,477,597	8.00%
Five-Year Average Return		8.67%		8.73%		8.73%
Ten-Year Average Return		6.17%		5.88%		5.88%

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

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

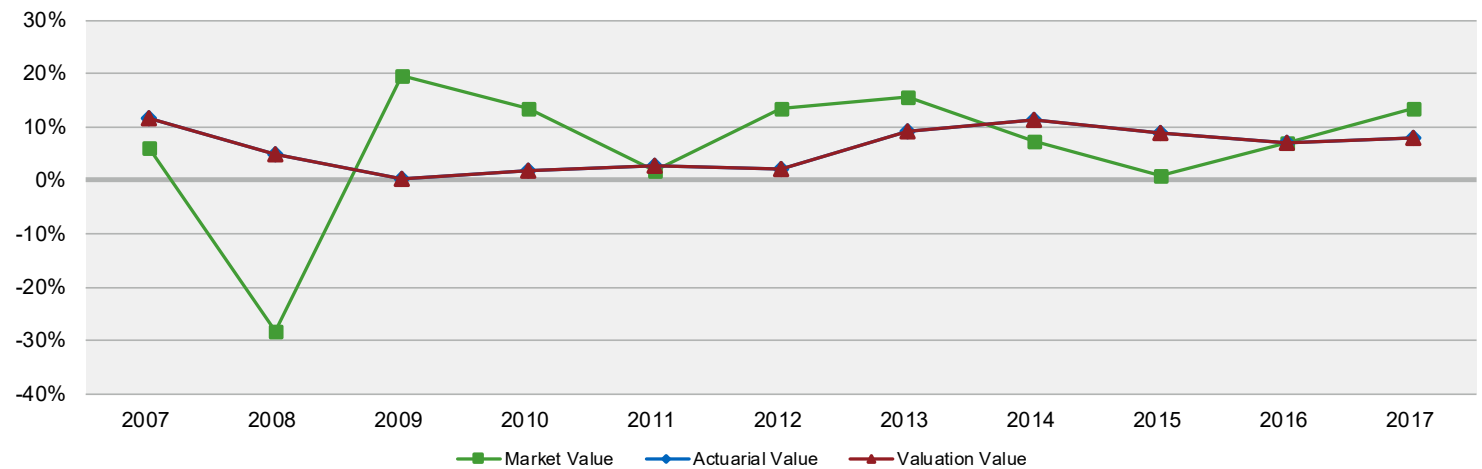
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Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan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

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**CHART 13**  
**Market, Actuarial and Valuation Value Rates of Return for Years Ended December 31, 2007 - 2017**

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## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

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### Other Experience

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

These include:

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

The net loss from this other experience for the year ended December 31, 2017 amounted to \$53.6 million, which was 0.6% of the actuarial accrued liability. This loss is mainly the result of higher than expected individual salary increases and higher than expected COLA increases. See Exhibit I for a detailed development of the Unfunded Actuarial Accrued Liability.

## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

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### D. RECOMMENDED CONTRIBUTION

Employer contributions consist of two components:

#### *Normal Cost*

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

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

The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL ) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the Association) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase at the combined annual inflation and "across the board" salary increase rate of 3.25% along with expected payroll. The remaining balance of the December 31, 2007 UAAL is being amortized over a 5-year declining period as of December 31, 2017. Any change in the UAAL that arises at each valuation after December 31, 2007 is amortized over its own separate declining 18-year period. Effective with the December 31, 2013 valuation, any change in the UAAL that arises due to plan amendments is amortized over its own declining 10-year period (with the exception of a change due to retirement incentives, which is to be funded in full upon adoption of the incentive).

#### *Employer Contribution Rates*

The current and recommended employer contribution rates are shown in Chart 14. County contribution rates also include the Superior Court.

The PEPRA Tier 4 (2% COLA) in Cost Group #1 continues to not have any actual members as of December 31, 2017. The contribution rates for this cost group have been developed based on generally the same methodology used to estimate contribution rates for all of the PEPRA tiers in the December 31, 2012 valuation. We have assumed in this valuation that the demographic profiles (e.g., entry age, composition of male versus female, etc.) for this cost group can be approximated by the data profiles of current active members with membership dates on and after January 1, 2011.

## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

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The amortization cost for the UAAL has been expressed as a percentage of total future payroll, including members with membership dates on or after January 1, 2013. This has been done in order to continue the open group level percent of payroll amortization methodology for the UAAL associated with members with membership dates before January 1, 2013. It is also consistent with the methodology applied when Safety Tier C was implemented.

The employer contribution rates shown in Chart 14 are the aggregate rates before reflecting the under and over \$350 of monthly compensation contribution provisions for members integrated with Social Security. The detailed contribution rates reflecting these provisions will be provided in the contribution rate packet that goes to the Board of Supervisors.

### *Member Contributions Non-PEPRA Members*

Articles 6 and 6.8 of the 1937 Act define the methodology to be used in the calculation of member basic contribution rates for non-PEPRA General and Safety members, respectively. The basic contribution rate is determined as that percentage of compensation which if paid annually from a member's first year of membership through the prescribed retirement age would accumulate to the amount necessary to fund a prescribed annuity.

The annuity is equal to:

- 1/120 of one year Final Average Salary per year of service at age 55 for General Tier 1 and Tier 3 Non-enhanced members
- 1/100 of one year Final Average Salary per year of service at age 50 for Safety Tier A Non-enhanced members
- 1/120 of one year Final Average Salary per year of service at age 60 for General Tier 1 and Tier 3 Enhanced members
- 1/100 of one year Final Average Salary per year of service at age 50 for Safety Tier A Enhanced
- 1/100 of three year Final Average Salary per year of service at age 50 for Safety Tier C Enhanced members

Member contributions are accumulated at an annual interest rate adopted annually by the Board. Note that recently negotiated MOU's for County General members no longer include the 50% employer subvention of the members' basic contributions. Districts pay varying portions, of the members' basic contributions on a

## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

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nonrefundable basis. Members also pay 50% of the cost-of-living benefit. For most Safety Tier A employers, Safety members also subvent a portion of the employer rate, currently up to 9% of compensation (depending on their MOU). Chart 14 does not include any employer subvention of member contributions or any member subvention of employer contributions.

Effective with the December 31, 2014 valuation, for determining the cost of the total benefit (i.e., basic and COLA components), the leave cashout assumptions are recognized in the valuation as an employer and member cost. Prior to the December 31, 2014 valuation, for determining the cost of the basic benefit (i.e., non-COLA component), the leave cashout assumptions were recognized in the valuation only as an employer cost and did not affect member contribution rates. In other words, the leave cashout assumptions were only used in establishing COLA member contribution rates.

As a result of including the leave cashout assumptions in the basic member rates for the members of each specific cost group, the COLA member rates are no longer pooled across all members of the same tier. This results in twelve different sets of member contribution rates for each specific cost group.

The age specific contribution rates are provided in Appendix A.

### *PEPRA Members*

Pursuant to Section 7522.30(a) of the Government Code, PEPRA members are required to contribute at least 50% of the Normal Cost rate. We have assumed that exactly 50% of the Normal Cost would be paid by PEPRA members. In addition, we have calculated the total Normal Cost rate for the PEPRA tiers to the nearest one-fiftieth of one percent (i.e., the nearest even one-hundredth) as that will allow the Normal Cost rate to be shared exactly 50:50 without going beyond two decimal places.

Member contribution rates are provided in Appendix B.

### *Administrative Expense*

The Board adopted an explicit administrative expense assumption effective with the December 31, 2015 actuarial valuation. The explicit administrative expense assumption is based on the prior year actual administration expenses, expressed as a percent of actual payroll for that year. For the 2017 calendar year the actual administrative expenses were \$9,146,115 and actual payroll was \$809,960,088. This results in an administrative expense load of 1.13% of payroll for the December 31,

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

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2017 valuation. This is an increase from the 1.12% assumption determined in the prior valuation.

The explicit assumption is allocated to both the employers and members based on the portions of the total Normal Cost rate (before expenses) for the employers and members. This results in an administrative expense load allocation as shown in the table below.

	<b>Average Normal Cost Rates</b>		
	<b><u>Before Administrative Expense</u></b>	<b><u>Weighting</u></b>	<b><u>Total Loading</u></b>
Employer	16.09%	58.19%	0.66%
Member	11.56%	<u>41.81%</u>	<u>0.47%</u>
		100.00%	1.13%

Under this approach, the employer Normal Cost rate is then increased by the same percent of payroll as the member rate with the remaining employer loading allocated to the employer UAAL rate. This is done to maintain a 50/50 sharing of Normal Cost for those in the PEPRA tiers. The table below shows this allocation.

**Allocation of Administrative Expense Load as % of Payroll**

Addition to Employer Basic Normal Cost Rate	0.47%
Addition to Employer Basic UAAL Rate	0.19%
Addition to Member Basic Rate	<u>0.47%</u>
Total Addition to Contribution Rates	1.13%

The administrative expense load is added to the Basic rates for employers and members.

*Cost Sharing Adjustments*

Starting with the December 31, 2009 Actuarial Valuation, the Board took action to depool CCCERA's assets, liabilities and normal cost by employer when determining employer contribution rates. The Board action included a review of experience back to December 31, 2002. This did not involve recalculation of any employer rates prior to December 31, 2009. However, it did involve reflecting the separate experience of the employers in each individual cost group back from December 31, 2002 through December 31, 2009. The cost groups are detailed on pages 19 and 20. In addition, the Board action called for a discontinuation of certain cost sharing adjustments for both member and employer contribution rates for General Tier 1 and Safety Tier A. Even under the depooling structure, there are a few remaining cost sharing arrangements.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

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Here is a summary of the cost sharing arrangements that were implemented in the December 31, 2009 Actuarial Valuation:

- Smaller employers (less than 50 active members as of December 31, 2009) were pooled with the applicable County tier. Safety members from the East Contra Costa Fire Protection District were pooled with Safety members of the Contra Costa County Fire Protection District.
- Due to a statutory requirement, the Superior Court was pooled with the County regardless of how many members the Court has.
- UAAL costs are pooled between Cost Group #1 and Cost Group #2 which represent General County and Small Districts. UAAL costs are also pooled for Cost Groups #7 and #9 which are Safety County tiers.

*Other Adjustments*

Other adjustments made in the determination of rates are as follows:

- Adjustments are made to some UAAL amounts for the County, the Contra Costa County Fire Protection District (CCCFPD), the Moraga-Orinda Fire District (Moraga), First 5 – Children & Families Commission (First Five) and Local Agency Formation Commission (LAFCO) to account for Pension Obligation Bonds (POBs) and any other special contributions that they previously made. These adjustments serve to reduce the UAAL contribution rate for these employers. The outstanding balances of these adjustments as of December 31, 2017 are as follows:

	<u>County General</u>	<u>Moraga General</u>	<u>First Five General</u>	<u>LAFCO General</u>	<u>CCCFPD Safety</u>
Basic	\$144,963,375	\$255,285	\$561,613	\$22,405	\$41,609,731
COL	\$116,160,609	\$148,165	\$424,815	\$8,412	\$31,733,443

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

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**Summary of Cost Groups and Employers**

**GENERAL**

<b>Cost Group</b>	<b>Employer Name</b>	<b>Benefit Structure</b>	<b>Special Adjustment</b>
(1)	County General	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Local Agency Formation Commission	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Contra Costa Mosquito and Vector Control District	Tier 1 Enhanced/PEPRA Tier 4	
	Bethel Island Municipal District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
	First 5-Children & Families Commission	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Contra Costa County Employees' Retirement Association	Tier 1 Enhanced/PEPRA Tier 4	
	Superior Court	Tier 1 Enhanced/PEPRA Tier 4	Yes
	East Contra Costa Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
	Moraga-Orinda Fire District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Rodeo-Hercules Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
San Ramon Valley Fire District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4		
(2)	County General	Tier 3 Enhanced/PEPRA Tier 5	Yes
	In-Home Supportive Services Authority	Tier 3 Enhanced/PEPRA Tier 5	
	Contra Costa Mosquito and Vector Control District	Tier 3 Enhanced/PEPRA Tier 5	
	Superior Court	Tier 3 Enhanced/PEPRA Tier 5	Yes
(3)	Central Contra Costa Sanitary District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
(4)	Contra Costa Housing Authority	Tier 1 Enhanced/PEPRA Tier 4	
(5)	Contra Costa County Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
(6)	Rodeo Sanitary District	Tier 1 Non-Enhanced/PEPRA Tier 4	
	Byron Brentwood Cemetery	Tier 1 Non-Enhanced/PEPRA Tier 4	

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

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**Summary of Cost Groups and Employers (continued)**

**SAFETY**

<b>Cost Group</b>	<b>Employer Name</b>	<b>Benefit Structure</b>	<b>Special Adjustment</b>
(7)	County Safety	Tier A Enhanced/PEPRA Tier D	
(8)	Contra Costa County Fire Protection District East Contra Costa Fire Protection District	Tier A Enhanced/PEPRA Tier D/E Tier A Enhanced/PEPRA Tier D	Yes
(9)	County Safety	Tier C Enhanced/PEPRA Tier E (Members hired on or after January 1, 2007)	
(10)	Moraga-Orinda Fire District	Tier A Enhanced/PEPRA Tier D	
(11)	San Ramon Valley Fire District	Tier A Enhanced/PEPRA Tier D	
(12)	Rodeo-Hercules Fire Protection District	Tier A Non-Enhanced/PEPRA Tier D	

A special adjustment is made for employers that have a remaining balance of a Pension Obligation Bond or any other special contributions as described on page 18.



**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #1	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>County General Tier 1 w/Courts</b>								
Normal Cost	12.35%	3.55%	15.90%	\$1,874,629	12.35%	3.55%	15.90%	\$1,856,159
UAAL	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>1,457,259</u>	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>1,567,813</u>
Total Contributions	23.06%	5.20%	28.26%	\$3,331,888	23.79%	5.54%	29.33%	\$3,423,972
	Payroll = \$11,790,121				Payroll = \$11,673,958			
<b>Cost Group #1</b>								
<b>District General Tier 1 w/o POB</b>								
Normal Cost	12.35%	3.55%	15.90%	\$1,082,621	12.35%	3.55%	15.90%	\$1,024,719
UAAL	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>1,464,602</u>	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>1,494,543</u>
Total Contributions	28.14%	9.27%	37.41%	\$2,547,223	29.21%	9.88%	39.09%	\$2,519,262
	Payroll = \$6,808,935				Payroll = \$6,444,772			
<b>Cost Group #1</b>								
<b>District General Tier 1 w/ POB (Moraga)</b>								
Normal Cost	12.35%	3.55%	15.90%	\$89,206	12.35%	3.55%	15.90%	\$84,808
UAAL	<u>8.47%</u>	<u>1.48%</u>	<u>9.95%</u>	<u>55,824</u>	<u>7.73%</u>	<u>1.04%</u>	<u>8.77%</u>	<u>46,778</u>
Total Contributions	20.82%	5.03%	25.85%	\$145,030	20.08%	4.59%	24.67%	\$131,586
	Payroll = \$561,043				Payroll = \$533,382			
<b>Cost Group #1</b>								
<b>District General Tier 1 w/ UAAL Prepayment (First Five)</b>								
Normal Cost	12.35%	3.55%	15.90%	\$238,733	12.35%	3.55%	15.90%	\$277,000
UAAL	<u>10.56%</u>	<u>1.76%</u>	<u>12.32%</u>	<u>184,980</u>	<u>10.91%</u>	<u>1.82%</u>	<u>12.73%</u>	<u>221,775</u>
Total Contributions	22.91%	5.31%	28.22%	\$423,713	23.26%	5.37%	28.63%	\$498,775
	Payroll = \$1,501,463				Payroll = \$1,742,141			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #1	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>District General Tier 1 w/ UAAL Prepayment (LAFCO)</b>								
Normal Cost	12.35%	3.55%	15.90%	\$36,570	12.35%	3.55%	15.90%	\$35,578
UAAL	<u>15.04%</u>	<u>5.44%</u>	<u>20.48%</u>	<u>47,104</u>	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>51,890</u>
Total Contributions	27.39%	8.99%	36.38%	\$83,674	29.21%	9.88%	39.09%	\$87,468
	Payroll = \$230,000				Payroll = \$223,762			
<b>Cost Group #1</b>								
<b>County General Tier 4 (3% COLA) w/ Courts</b>								
Normal Cost	8.95%	3.01%	11.96%	\$0	8.67%	2.94%	11.61%	\$0
UAAL	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>0</u>	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>0</u>
Total Contributions	19.66%	4.66%	24.32%	\$0	20.11%	4.93%	25.04%	\$0
	Payroll = \$0				Payroll = \$0			
<b>Cost Group #1</b>								
<b>District General Tier 4 (3% COLA) w/o POB</b>								
Normal Cost	8.95%	3.01%	11.96%	\$277,255	8.67%	2.94%	11.61%	\$154,073
UAAL	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>498,642</u>	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>307,749</u>
Total Contributions	24.74%	8.73%	33.47%	\$775,897	25.53%	9.27%	34.80%	\$461,822
	Payroll = \$2,318,188				Payroll = \$1,327,075			
<b>Cost Group #1</b>								
<b>District General Tier 4 (3% COLA) w/ POB (Moraga)</b>								
Normal Cost	8.95%	3.01%	11.96%	\$25,744	8.67%	2.94%	11.61%	\$8,062
UAAL	<u>8.47%</u>	<u>1.48%</u>	<u>9.95%</u>	<u>21,417</u>	<u>7.73%</u>	<u>1.04%</u>	<u>8.77%</u>	<u>6,090</u>
Total Contributions	17.42%	4.49%	21.91%	\$47,161	16.40%	3.98%	20.38%	\$14,152
	Payroll = \$215,247				Payroll = \$69,443			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #1	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>District General Tier 4 (3% COLA) with UAAL Prepayment (First Five)</b>								
Normal Cost	8.95%	3.01%	11.96%	\$123,847	8.67%	2.94%	11.61%	\$56,614
UAAL	<u>10.56%</u>	<u>1.76%</u>	<u>12.32%</u>	<u>127,575</u>	<u>10.91%</u>	<u>1.82%</u>	<u>12.73%</u>	<u>62,076</u>
Total Contributions	19.51%	4.77%	24.28%	\$251,422	19.58%	4.76%	24.34%	\$118,690
	Payroll = \$1,035,511				Payroll = \$487,635			
<b>Cost Group #1</b>								
<b>District General Tier 4 (3% COLA) with UAAL Prepayment (LAFCO)</b>								
Normal Cost	8.95%	3.01%	11.96%	\$0	8.67%	2.94%	11.61%	\$0
UAAL	<u>15.04%</u>	<u>5.44%</u>	<u>20.48%</u>	<u>0</u>	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>0</u>
Total Contributions	23.99%	8.45%	32.44%	\$0	25.53%	9.27%	34.80%	\$0
	Payroll = \$0				Payroll = \$0			
<b>Cost Group #1</b>								
<b>County General Tier 4 (2% COLA) w/ Courts</b>								
Normal Cost	8.80%	2.02%	10.82%	\$0	8.83%	2.04%	10.87%	\$0
UAAL	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>0</u>	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>0</u>
Total Contributions	19.51%	3.67%	23.18%	\$0	20.27%	4.03%	24.30%	\$0
	Payroll = \$0				Payroll = \$0			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #2	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>County General Tier 3 w/ Courts</b>								
Normal Cost	12.31%	3.43%	15.74%	\$65,050,705	12.28%	3.42%	15.70%	\$64,625,796
UAAL	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>51,081,748</u>	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>55,281,811</u>
Total Contributions	23.02%	5.08%	28.10%	\$116,132,453	23.72%	5.41%	29.13%	\$119,907,607
	Payroll = \$413,282,751				Payroll = \$411,629,272			
<b>District General Tier 3 w/o POB</b>								
Normal Cost	12.31%	3.43%	15.74%	\$508,194	12.28%	3.42%	15.70%	\$489,780
UAAL	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>694,489</u>	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>723,440</u>
Total Contributions	28.10%	9.15%	37.25%	\$1,202,683	29.14%	9.75%	38.89%	\$1,213,220
	Payroll = \$3,228,680				Payroll = \$3,119,619			
<b>County General Tier 5 (3%/4% COLA) w/ Courts</b>								
Normal Cost	8.42%	2.79%	11.21%	\$6,476,314	8.39%	2.78%	11.17%	\$6,430,765
UAAL	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>7,140,700</u>	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>7,731,887</u>
Total Contributions	19.13%	4.44%	23.57%	\$13,617,014	19.83%	4.77%	24.60%	\$14,162,652
	Payroll = \$57,772,653				Payroll = \$57,571,759			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #2	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>District General Tier 5 (3%/4% COLA) w/o POB</b>								
Normal Cost	8.42%	2.79%	11.21%	\$58,359	8.39%	2.78%	11.17%	\$27,371
UAAL	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>111,980</u>	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>56,826</u>
Total Contributions	24.21%	8.51%	32.72%	\$170,339	25.25%	9.11%	34.36%	\$84,197
	Payroll = \$520,596				Payroll = \$245,044			
<b>County General Tier 5 (2% COLA) w/ Courts</b>								
Normal Cost	8.20%	1.87%	10.07%	\$15,302,813	8.25%	1.89%	10.14%	\$9,709,443
UAAL	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>18,782,797</u>	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>12,859,746</u>
Total Contributions	18.91%	3.52%	22.43%	\$34,085,610	19.69%	3.88%	23.57%	\$22,569,189
	Payroll = \$151,964,380				Payroll = \$95,753,877			
<b>District General Tier 5 (2% COLA) w/o POB</b>								
Normal Cost	8.20%	1.87%	10.07%	\$26,380	8.25%	1.89%	10.14%	\$22,608
UAAL	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>56,350</u>	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>51,704</u>
Total Contributions	23.99%	7.59%	31.58%	\$82,730	25.11%	8.22%	33.33%	\$74,312
	Payroll = \$261,971				Payroll = \$222,957			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #3	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>CCCSD General Tier 1</b>								
Normal Cost	13.30%	3.88%	17.18%	\$4,947,250	13.45%	3.91%	17.36%	\$4,951,527
UAAL	<u>22.99%</u>	<u>10.43%</u>	<u>33.42%</u>	<u>9,623,812</u>	<u>23.91%</u>	<u>10.56%</u>	<u>34.47%</u>	<u>9,831,747</u>
Total Contributions	36.29%	14.31%	50.60%	\$14,571,062	37.36%	14.47%	51.83%	\$14,783,274
	Payroll = \$28,796,566				Payroll = \$28,522,620			
<b>Cost Group #3</b>								
<b>CCCSD General Tier 4 (3% COLA)</b>								
Normal Cost	8.03%	2.80%	10.83%	\$601,334	8.32%	2.88%	11.20%	\$457,284
UAAL	<u>22.99%</u>	<u>10.43%</u>	<u>33.42%</u>	<u>1,855,640</u>	<u>23.91%</u>	<u>10.56%</u>	<u>34.47%</u>	<u>1,407,375</u>
Total Contributions	31.02%	13.23%	44.25%	\$2,456,974	32.23%	13.44%	45.67%	\$1,864,659
	Payroll = \$5,552,483				Payroll = \$4,082,897			
<b>Cost Group #4</b>								
<b>Contra Costa Housing Authority General Tier 1</b>								
Normal Cost	13.24%	3.74%	16.98%	\$694,627	13.38%	3.76%	17.14%	\$723,575
UAAL	<u>16.36%</u>	<u>9.71%</u>	<u>26.07%</u>	<u>1,066,486</u>	<u>16.10%</u>	<u>9.29%</u>	<u>25.39%</u>	<u>1,071,854</u>
Total Contributions	29.60%	13.45%	43.05%	\$1,761,113	29.48%	13.05%	42.53%	\$1,795,429
	Payroll = \$4,090,854				Payroll = \$4,221,560			
<b>Cost Group #4</b>								
<b>Contra Costa Housing Authority General Tier 4 (3% COLA)</b>								
Normal Cost	9.49%	3.24%	12.73%	\$189,928	9.21%	3.13%	12.34%	\$162,600
UAAL	<u>16.36%</u>	<u>9.71%</u>	<u>26.07%</u>	<u>388,957</u>	<u>16.10%</u>	<u>9.29%</u>	<u>25.39%</u>	<u>334,556</u>
Total Contributions	25.85%	12.95%	38.80%	\$578,885	25.31%	12.42%	37.73%	\$497,156
	Payroll = \$1,491,972				Payroll = \$1,317,669			

(1) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

(2) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #5	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>CCCYPD General Tier 1</b>								
Normal Cost	12.27%	3.52%	15.79%	\$606,975	12.25%	3.53%	15.78%	\$543,052
UAAL	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>651,951</u>	<u>10.77%</u>	<u>6.49%</u>	<u>17.26%</u>	<u>593,984</u>
Total Contributions	22.39%	10.36%	32.75%	\$1,258,926	23.02%	10.02%	33.04%	\$1,137,036
	Payroll = \$3,844,050				Payroll = \$3,441,393			
<b>Cost Group #5</b>								
<b>CCCYPD General Tier 4 (3% COLA)</b>								
Normal Cost	11.44%	3.90%	15.34%	\$25,753	11.24%	3.86%	15.10%	\$16,406
UAAL	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>28,473</u>	<u>10.77%</u>	<u>6.49%</u>	<u>17.26%</u>	<u>18,753</u>
Total Contributions	21.56%	10.74%	32.30%	\$54,226	22.01%	10.35%	32.36%	\$35,159
	Payroll = \$167,881				Payroll = \$108,649			
<b>Cost Group #5</b>								
<b>CCCYPD General Tier 4 (2% COLA)</b>								
Normal Cost	9.46%	2.19%	11.65%	\$131,956	9.25%	2.15%	11.40%	\$80,257
UAAL	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>192,101</u>	<u>10.77%</u>	<u>6.49%</u>	<u>17.26%</u>	<u>121,512</u>
Total Contributions	19.58%	9.03%	28.61%	\$324,057	20.02%	8.64%	28.66%	\$201,769
	Payroll = \$1,132,669				Payroll = \$704,009			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #6	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>Non-Enhanced District General Tier 1</b>								
Normal Cost	13.27%	3.95%	17.22%	\$114,214	12.82%	3.84%	16.66%	\$109,747
UAAL	<u>0.19%</u>	<u>0.00%</u>	<u>0.19%</u>	<u>1,260</u>	<u>12.43%</u>	<u>(0.06%)</u>	<u>12.37%</u>	<u>81,487</u>
Total Contributions	13.46%	3.95%	17.41%	\$115,474	25.25%	3.78%	29.03%	\$191,234
	Payroll = \$663,261				Payroll = \$658,747			
<b>Cost Group #6</b>								
<b>Non-Enhanced District General Tier 4 (3% COLA)</b>								
Normal Cost	10.01%	3.47%	13.48%	\$25,266	11.96%	3.85%	15.81%	\$22,845
UAAL	<u>0.19%</u>	<u>0.00%</u>	<u>0.19%</u>	<u>356</u>	<u>12.43%</u>	<u>(0.06%)</u>	<u>12.37%</u>	<u>17,874</u>
Total Contributions	10.20%	3.47%	13.67%	\$25,622	24.39%	3.79%	28.18%	\$40,719
	Payroll = \$187,433				Payroll = \$144,494			
<b>Cost Group #7</b>								
<b>County Safety Tier A</b>								
Normal Cost	23.00%	7.35%	30.35%	\$17,463,315	22.91%	7.31%	30.22%	\$17,367,909
UAAL	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>24,241,498</u>	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>26,362,210</u>
Total Contributions	45.59%	26.89%	72.48%	\$41,704,813	48.35%	27.74%	76.09%	\$43,730,119
	Payroll = \$57,539,752				Payroll = \$57,471,572			
<b>Cost Group #7</b>								
<b>County Safety Tier D</b>								
Normal Cost	14.86%	6.13%	20.99%	\$740,793	15.04%	6.19%	21.23%	\$671,015
UAAL	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>1,486,879</u>	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>1,449,809</u>
Total Contributions	37.45%	25.67%	63.12%	\$2,227,672	40.48%	26.62%	67.10%	\$2,120,824
	Payroll = \$3,529,264				Payroll = \$3,160,691			

(1) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

(2) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.



**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #8	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>CCCFPD Safety Tier A</b>								
Normal Cost	22.60%	7.30%	29.90%	\$8,634,767	22.01%	7.12%	29.13%	\$8,289,271
UAAL	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>12,415,004</u>	<u>17.31%</u>	<u>27.22%</u>	<u>44.53%</u>	<u>12,671,515</u>
Total Contributions	37.23%	35.66%	72.89%	\$21,049,771	39.32%	34.34%	73.66%	\$20,960,786
	Payroll = \$28,878,819				Payroll = \$28,456,131			
<b>East CCCFPD Safety Tier A</b>								
Normal Cost	22.60%	7.30%	29.90%	\$767,350	22.01%	7.12%	29.13%	\$825,079
UAAL	<u>42.84%</u>	<u>49.87%</u>	<u>92.71%</u>	<u>2,379,297</u>	<u>45.64%</u>	<u>48.83%</u>	<u>94.47%</u>	<u>2,675,770</u>
Total Contributions	65.44%	57.17%	122.61%	\$3,146,647	67.65%	55.95%	123.60%	\$3,500,849
	Payroll = \$2,566,387				Payroll = \$2,832,402			
<b>CCCFPD Safety Tier D</b>								
Normal Cost	14.28%	6.00%	20.28%	\$359,801	13.67%	5.77%	19.44%	\$329,369
UAAL	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>762,715</u>	<u>17.31%</u>	<u>27.22%</u>	<u>44.53%</u>	<u>754,465</u>
Total Contributions	28.91%	34.36%	63.27%	\$1,122,516	30.98%	32.99%	63.97%	\$1,083,834
	Payroll = \$1,774,169				Payroll = \$1,694,284			
<b>East CCCFPD Safety Tier D</b>								
Normal Cost	14.28%	6.00%	20.28%	\$62,491	13.67%	5.77%	19.44%	\$56,679
UAAL	<u>42.84%</u>	<u>49.87%</u>	<u>92.71%</u>	<u>285,676</u>	<u>45.64%</u>	<u>48.83%</u>	<u>94.47%</u>	<u>275,438</u>
Total Contributions	57.12%	55.87%	112.99%	\$348,167	59.31%	54.60%	113.91%	\$332,117
	Payroll = \$308,139				Payroll = \$291,561			

(1) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

(2) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #8	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>CCCYPD Safety Tier E</b>								
Normal Cost	13.90%	3.90%	17.80%	\$386,348	13.01%	3.67%	16.68%	\$249,862
UAAL	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>933,095</u>	<u>17.31%</u>	<u>27.22%</u>	<u>44.53%</u>	<u>667,048</u>
Total Contributions	28.53%	32.26%	60.79%	\$1,319,443	30.32%	30.89%	61.21%	\$916,910
	Payroll = \$2,170,493				Payroll = \$1,497,974			
<b>Cost Group #9</b>								
<b>County Safety Tier C</b>								
Normal Cost	21.06%	4.51%	25.57%	\$3,445,978	21.29%	4.55%	25.84%	\$3,308,435
UAAL	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>5,677,710</u>	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>5,872,984</u>
Total Contributions	43.65%	24.05%	67.70%	\$9,123,688	46.73%	24.98%	71.71%	\$9,181,419
	Payroll = \$13,476,643				Payroll = \$12,803,541			
<b>Cost Group #9</b>								
<b>County Safety Tier E</b>								
Normal Cost	13.50%	3.76%	17.26%	\$3,775,786	13.72%	3.81%	17.53%	\$2,393,118
UAAL	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>9,216,330</u>	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>6,261,968</u>
Total Contributions	36.09%	23.30%	59.39%	\$12,992,116	39.16%	24.24%	63.40%	\$8,655,086
	Payroll = \$21,875,931				Payroll = \$13,651,555			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #10	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>Moraga-Orinda FD Safety Tier A</b>								
Normal Cost	21.38%	7.06%	28.44%	\$1,825,642	20.96%	6.96%	27.92%	\$1,725,213
UAAL	<u>13.83%</u>	<u>28.67%</u>	<u>42.50%</u>	<u>2,728,192</u>	<u>15.98%</u>	<u>27.46%</u>	<u>43.44%</u>	<u>2,684,215</u>
Total Contributions	35.21%	35.73%	70.94%	\$4,553,834	36.94%	34.42%	71.36%	\$4,409,428
	Payroll = \$6,419,275				Payroll = \$6,179,131			
<b>Moraga-Orinda FD Safety Tier D</b>								
Normal Cost	13.33%	5.65%	18.98%	\$177,156	13.29%	5.63%	18.92%	\$163,164
UAAL	<u>13.83%</u>	<u>28.67%</u>	<u>42.50%</u>	<u>396,687</u>	<u>15.98%</u>	<u>27.46%</u>	<u>43.44%</u>	<u>374,622</u>
Total Contributions	27.16%	34.32%	61.48%	\$573,843	29.27%	33.09%	62.36%	\$537,786
	Payroll = \$933,381				Payroll = \$862,390			
<b>San Ramon FD Safety Tier A</b>								
Normal Cost	22.22%	7.08%	29.30%	\$5,421,031	21.86%	7.01%	28.87%	\$5,179,535
UAAL	<u>28.83%</u>	<u>18.71%</u>	<u>47.54%</u>	<u>8,795,761</u>	<u>32.19%</u>	<u>20.32%</u>	<u>52.51%</u>	<u>9,420,761</u>
Total Contributions	51.05%	25.79%	76.84%	\$14,216,792	54.05%	27.33%	81.38%	\$14,600,296
	Payroll = \$18,501,811				Payroll = \$17,940,890			
<b>San Ramon FD Safety Tier D</b>								
Normal Cost	12.66%	5.40%	18.06%	\$549,052	13.28%	5.64%	18.92%	\$235,907
UAAL	<u>28.83%</u>	<u>18.71%</u>	<u>47.54%</u>	<u>1,445,289</u>	<u>32.19%</u>	<u>20.32%</u>	<u>52.51%</u>	<u>654,730</u>
Total Contributions	41.49%	24.11%	65.60%	\$1,994,341	45.47%	25.96%	71.43%	\$890,637
	Payroll = \$3,040,153				Payroll = \$1,246,868			

(1) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

(2) The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 14 (continued)**

**Components of Current and Recommended Employer Contribution Rates**

Cost Group #12	December 31, 2017 (Recommended Rates for FY 19-20) <sup>(1)</sup>				December 31, 2016 (Recommended Rates for FY 18-19) <sup>(2)</sup>			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
<b>Non-Enhanced Rodeo-Hercules FPD Safety Tier A</b>								
Normal Cost	14.89%	5.21%	20.10%	\$371,801	14.82%	5.20%	20.02%	\$363,887
UAAL	<u>42.63%</u>	<u>30.04%</u>	<u>72.67%</u> <sup>(3)</sup>	<u>1,344,216</u>	<u>46.06%</u>	<u>31.23%</u>	<u>77.29%</u> <sup>(4)</sup>	<u>1,404,835</u>
Total Contributions	57.52%	35.25%	92.77%	\$1,716,017	60.88%	36.43%	97.31%	\$1,768,722
	Payroll = \$1,849,754				Payroll = \$1,817,615			
<b>Cost Group #12</b>								
<b>Non-Enhanced Rodeo-Hercules FPD Safety Tier D</b>								
Normal Cost	11.92%	5.07%	16.99%	\$58,095	11.92%	5.07%	16.99%	\$43,991
UAAL	<u>42.63%</u>	<u>30.04%</u>	<u>72.67%</u> <sup>(3)</sup>	<u>248,483</u>	<u>46.06%</u>	<u>31.23%</u>	<u>77.29%</u> <sup>(4)</sup>	<u>200,120</u>
Total Contributions	54.55%	35.11%	89.66%	\$306,578	57.98%	36.30%	94.28%	\$244,111
	Payroll = \$341,934				Payroll = \$258,921			
<b>Total All Employers Combined (Aggregate)</b>								
Normal Cost	12.87%	3.69%	16.56%	\$142,548,079	13.16%	3.80%	16.96%	\$133,072,503
UAAL	<u>13.45%</u>	<u>6.06%</u>	<u>19.51%</u>	<u>167,891,335</u>	<u>14.63%</u>	<u>6.49%</u>	<u>21.12%</u>	<u>165,673,760</u>
Total Contributions	26.32%	9.75%	36.07%	\$310,439,414	27.79%	10.29%	38.08%	\$298,746,263
	Payroll = \$860,624,613				Payroll = \$784,412,260			

<sup>(1)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

<sup>(2)</sup> The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

<sup>(3)</sup> Total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,670,971 for FY 19-20. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 19-20. The estimated payroll for FY 19-20 was determined by increasing payroll amounts shown above for 2018 by 18-months of assumed wage inflation.

<sup>(4)</sup> Total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,683,829 for FY 18-19. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 18-19. The estimated payroll for FY 18-19 was determined by increasing payroll amounts shown above for 2017 by 18-months of assumed wage inflation.

## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

The employer contribution rates as of December 31, 2017 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

### Reconciliation of Recommended Employer Contribution Rate

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

#### CHART 15

#### Reconciliation of Recommended Average Employer Contribution from December 31, 2016 to December 31, 2017 Valuation

	Contribution Rate <sup>(1)</sup>	Estimated Annual Dollar Cost <sup>(2)</sup>
<b>Recommended Average Employer Contribution Rate in December 31, 2016 Valuation</b>	38.08%	\$298,746,263
Effect of investment gain <sup>(3)</sup>	(0.68%)	\$(5,852,247)
Effect of difference in actual versus expected contributions due to delay in implementation of contribution rates calculated in 12/31/2016 valuation	(0.16%)	(1,376,999)
Effect of additional UAAL contributions	0.00%	(25,672)
Effect of higher than expected individual salary increases	0.53%	4,561,310
Effect of amortizing prior year's UAAL over a greater than expected projected total payroll	(1.24%)	5,333,219 <sup>(4)</sup>
Effect of changes in member demographics on Normal Cost	(0.41%)	(3,528,561)
Effect of higher than expected COLA increases for retirees and beneficiaries	0.18%	1,549,124
Effect of mortality loss on retirees and beneficiaries (fewer deaths than expected)	0.07%	602,437
Effect of retirement experience gain on actives (later retirements than expected)	(0.23%)	(1,979,437)
Effect of net other experience gains <sup>(5)</sup>	(0.07%)	12,409,977
<b>Total change</b>	<b>(2.01%)</b>	<b>11,693,151</b>
<b>Recommended Average Employer Contribution Rate in December 31, 2017 Valuation</b>	<b>36.07%</b>	<b>\$310,439,414</b>

<sup>(1)</sup> These rates do not include any employer subvention of member contributions, or member subvention of employer contributions.

<sup>(2)</sup> Based on projected total payroll for each valuation date shown.

<sup>(3)</sup> Return on the valuation value of assets of 8.00% was greater than the 7.00% assumed in the December 31, 2016 valuation.

<sup>(4)</sup> Represents the dollar increase in UAAL amortization payments for amortization bases established prior to the December 31, 2017 valuation.

<sup>(5)</sup> Other differences in actual versus expected experience including (but not limited to) disability, withdrawal and leave cashout experience. Estimated annual dollar cost also reflects change in payroll from prior valuation.

**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

The member contribution rates as of December 31, 2017 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

**Reconciliation of Recommended Member Contribution Rate**

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

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

**CHART 16**

**Reconciliation of Recommended Average Member Contribution from December 31, 2016 to December 31, 2017 Valuation**

	Contribution Rate <sup>(1)</sup>	Estimated Annual Dollar Cost <sup>(2)</sup>
<b>Recommended Average Member Contribution Rate in December 31, 2016 Valuation</b>	12.08%	\$94,778,385
Effect of change in administrative expense load	0.01%	\$86,062
Effect of changes in member demographics <sup>(3)</sup>	<u>(0.06%)</u>	<u>8,686,859</u>
<b>Total change</b>	<u>(0.05%)</u>	<u>\$8,772,921</u>
<b>Recommended Average Member Contribution Rate in December 31, 2017 Valuation</b>	12.03%	\$103,551,307

<sup>(1)</sup> These rates do not include any employer subvention of member contributions, or member subvention of employer contributions.

<sup>(2)</sup> Based on projected total payroll for each valuation date shown.

<sup>(3)</sup> Includes changes in demographic profile of active membership. Estimated annual dollar cost also reflects change in payroll from prior valuation.

## SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

### E. FUNDED RATIO

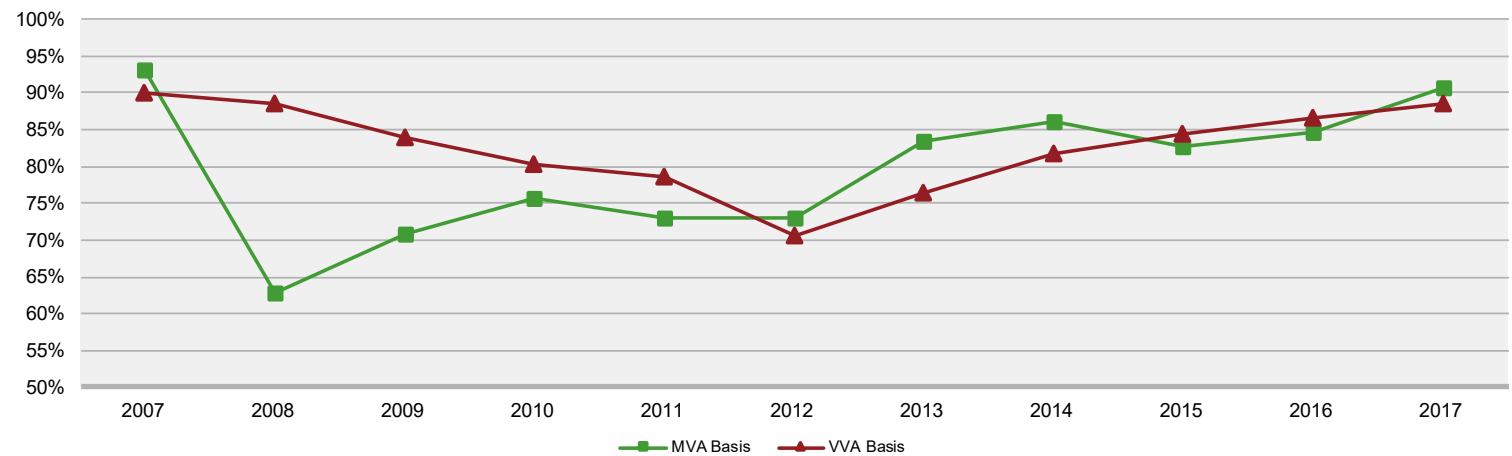
A critical piece of information regarding the Plan's financial status is the funded ratio. The ratios compare the valuation value of assets and market value of assets to the actuarial accrued liabilities of the Plan as calculated. High ratios indicate a well-funded plan with assets sufficient to cover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

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

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

### CHART 17

Funded Ratio for Plan Years Ending December 31, 2007 – 2017



**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**CHART 18**  
**Schedule of Funding Progress**

<b>Actuarial Valuation Date</b>	<b>Valuation Value of Assets<sup>(1)</sup> (a)</b>	<b>Actuarial Accrued Liability (AAL)<sup>(2)</sup> (b)</b>	<b>Unfunded/ (Overfunded) AAL (UAAL) (b) – (a)</b>	<b>Funded Ratio (a) / (b)</b>	<b>Projected Payroll (c)</b>	<b>UAAL as a Percentage of Projected Payroll [(b) – (a)] / (c)</b>
12/31/2008	\$5,282,505,159	\$5,972,471,074	\$689,965,915	88.45%	\$704,947,668	97.87%
12/31/2009	5,290,114,102	6,314,787,187	1,024,673,085	83.77%	694,443,999	147.55%
12/31/2010	5,341,821,711	6,654,036,801	1,312,215,090	80.28%	687,443,206	190.88%
12/31/2011	5,426,719,066	6,915,311,649	1,488,592,583	78.47%	666,394,146	223.38%
12/31/2012	5,482,257,062	7,761,315,535	2,279,058,473	70.64%	652,312,180	349.38%
12/31/2013	5,907,416,432	7,731,097,407	1,823,680,975	76.41%	679,428,911	268.41%
12/31/2014	6,557,496,101	8,027,438,213	1,469,942,112	81.69%	697,831,837	210.64%
12/31/2015	7,136,801,380	8,448,624,096	1,311,822,716	84.47%	746,352,663	175.76%
12/31/2016	7,606,997,530	8,794,434,139	1,187,436,609	86.50%	784,412,260	151.38%
12/31/2017	8,179,891,191	9,239,246,920	1,059,355,729	88.53%	860,624,613	123.09%

<sup>(1)</sup> Excludes assets for non-valuation reserves.

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



**SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association**

**F. VOLATILITY RATIOS**

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

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

For CCCERA, the current AVR is about 9.7. This means that a 1% asset gain/(loss) (relative to the assumed investment return) translates to about 9.7% of one-year's payroll. Since CCCERA amortizes actuarial gains and losses over a 18-year period, there would be a 0.7% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

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

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

For CCCERA, the current LVR is about 10.7. This is about 10% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long-term.

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

**CHART 19**  
**Volatility Ratios for Years Ended December 31, 2009 – 2017**

Year Ended December 31	Asset Volatility Ratios			Liability Volatility Ratios		
	General	Safety	Total	General	Safety	Total
2009	5.0	11.4	6.4	7.0	16.0	9.1
2010	5.6	13.1	7.3	7.5	17.2	9.7
2011	5.9	13.6	7.6	8.0	18.6	10.4
2012	6.7	16.2	8.7	9.0	22.5	11.9
2013	7.3	18.2	9.5	8.6	22.3	11.4
2014	7.5	19.7	9.9	8.6	23.5	11.5
2015	7.1	18.7	9.3	8.4	23.3	11.3
2016	7.2	19.0	9.5	8.3	23.1	11.1
2017	7.4	19.6	9.7	8.0	22.2	10.7

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A  
Table of Plan Coverage  
i. General Tier 1**

Category	Year Ended December 31		Change From Prior Year
	2017	2016	
<b>Active members in valuation</b>			
Number	529	559	-5.4%
Average age	50.5	49.9	0.6
Average service	16.5	15.8	0.7
Projected total payroll <sup>(1)</sup>	\$58,286,293	\$57,462,335	1.4%
Projected average payroll	\$110,182	\$102,795	7.2%
Account balances	\$66,823,081	\$61,775,547	8.2%
Total active members with at least five years of service	512	500	2.4%
<b>Vested terminated members<sup>(2)</sup></b>	233	234	-0.4%
<b>Retired members<sup>(2)</sup></b>			
Number in pay status	2,437	2,503	-2.6%
Average age	74.9	74.6	0.3
Average monthly benefit	\$4,247	\$4,087	3.9%
<b>Disabled members<sup>(2)</sup></b>			
Number in pay status <sup>(3)</sup>	255	265	-3.8%
Average age	71.7	71.6	0.1
Average monthly benefit	\$2,890	\$2,802	3.1%
<b>Beneficiaries<sup>(2)</sup></b>			
Number in pay status	686	682	0.6%
Average age	78.0	77.4	0.6
Average monthly benefit	\$2,336	\$2,243	4.1%

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale.

<sup>(2)</sup> Includes members from terminated employers.

<sup>(3)</sup> For 2017, includes 187 members receiving a service-connected disability and 68 members receiving an ordinary disability.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**

**Table of Plan Coverage**

**ii. General Tier 2**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2017</b>	<b>2016</b>	
<b>Active members in valuation</b>			
Number <sup>(1)</sup>	0	0	N/A
Average age	N/A	N/A	N/A
Average service	N/A	N/A	N/A
Projected total payroll	N/A	N/A	N/A
Projected average payroll	N/A	N/A	N/A
Account balances	N/A	N/A	N/A
Total active members with at least five years of service	0	0	N/A
<b>Vested terminated members<sup>(2)</sup></b>	201	214	-6.1%
<b>Retired members<sup>(2)</sup></b>			
Number in pay status	420	419	0.2%
Average age	75.2	74.6	0.6
Average monthly benefit	\$857	\$849	0.9%
<b>Disabled members<sup>(2)</sup></b>			
Number in pay status <sup>(3)</sup>	42	45	-6.7%
Average age	71.6	70.7	0.9
Average monthly benefit	\$2,323	\$2,309	0.6%
<b>Beneficiaries<sup>(2)</sup></b>			
Number in pay status	102	106	-3.8%
Average age	68.7	68.4	0.3
Average monthly benefit	\$891	\$836	6.6%

<sup>(1)</sup> As of the December 31, 2005 valuation, there are no longer any Tier 2 Active Members since they have all transferred to Tier 3.

<sup>(2)</sup> Includes members from terminated employers.

<sup>(3)</sup> For 2017, includes 22 members receiving a service-connected disability and 20 members receiving an ordinary disability.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**  
**Table of Plan Coverage**  
**iii. General Tier 3**

Category	Year Ended December 31		Change From Prior Year
	2017	2016	
<b>Active members in valuation</b>			
Number	4,738	5,053	-6.2%
Average age	50.7	50.0	0.7
Average service	13.9	13.3	0.6
Projected total payroll <sup>(1)</sup>	\$416,511,431	\$414,748,891	0.4%
Projected average payroll	\$87,909	\$82,080	7.1%
Account balances	\$523,594,120	\$487,288,911	7.5%
Total active members with at least five years of service	4,507	4,411	2.2%
<b>Vested terminated members</b>	1,743	1,687	3.3%
<b>Retired members</b>			
Number in pay status	2,878	2,695	6.8%
Average age	67.8	67.2	0.6
Average monthly benefit	\$2,778	\$2,716	2.3%
<b>Disabled members</b>			
Number in pay status <sup>(2)</sup>	83	84	-1.2%
Average age	62.6	62.0	0.6
Average monthly benefit	\$2,390	\$2,341	2.1%
<b>Beneficiaries</b>			
Number in pay status	204	187	9.1%
Average age	61.0	62.0	-1.0
Average monthly benefit	\$1,556	\$1,612	-3.5%

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale.

<sup>(2)</sup> For 2017, includes 26 members receiving a service-connected disability and 57 members receiving an ordinary disability.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**

**Table of Plan Coverage**

**iv. General Tier 4 – 2% COLA**

Category	Year Ended December 31		Change From Prior Year
	2017	2016	
<b>Active members in valuation</b>			
Number	18	14	28.6%
Average age	43.1	42.6	0.5
Average service	1.5	1.2	0.3
Projected total payroll <sup>(1)</sup>	\$1,132,669	\$704,009	60.9%
Projected average payroll	\$62,926	\$50,286	25.1%
Account balances	\$147,903	\$98,401	50.3%
Total active members with at least five years of service	0	0	N/A
<b>Vested terminated members</b>			
	4	1	300.0%
<b>Retired members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Disabled members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Beneficiaries</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2018 has been limited. It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2018 is equal to \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$121,388, or \$145,666). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**

**Table of Plan Coverage**

**v. General Tier 4 – 3% COLA**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2017</b>	<b>2016</b>	
<b>Active members in valuation</b>			
Number	129	103	25.2%
Average age	41.1	40.8	0.3
Average service	2.2	1.9	0.3
Projected total payroll <sup>(1)</sup>	\$10,968,716	\$7,537,862	45.5%
Projected average payroll	\$85,029	\$73,183	16.2%
Account balances	\$1,994,064	\$1,038,597	92.0%
Total active members with at least five years of service	2	1	100.0%
<b>Vested terminated members</b>			
	14	11	27.3%
<b>Retired members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Disabled members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Beneficiaries</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2018 has been limited. It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2018 is equal to \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$121,388, or \$145,666). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**

**Table of Plan Coverage**

**vi. General Tier 5 – 2% COLA**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2017</b>	<b>2016</b>	
<b>Active members in valuation</b>			
Number	2,350	1,784	31.7%
Average age	39.9	39.2	0.7
Average service	1.5	1.1	0.4
Projected total payroll <sup>(1)</sup>	\$152,226,351	\$95,976,834	58.6%
Projected average payroll	\$64,777	\$53,799	20.4%
Account balances	\$20,015,213	\$9,678,004	106.8%
Total active members with at least five years of service	12	17	-29.4%
<b>Vested terminated members</b>	417	256	62.9%
<b>Retired members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Disabled members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Beneficiaries</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2018 has been limited. It is our understanding that in the determination of pension benefits under the PEPRAs formulas, the compensation that can be taken into account for 2018 is equal to \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$121,388, or \$145,666). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**

**Table of Plan Coverage**

**vii. General Tier 5 – 3% COLA**

Category	Year Ended December 31		Change From Prior Year
	2017	2016	
<b>Active members in valuation</b>			
Number	801	865	-7.4%
Average age	43.1	42.0	1.1
Average service	3.6	2.8	0.8
Projected total payroll <sup>(1)</sup>	\$58,293,249	\$57,816,803	0.8%
Projected average payroll	\$72,776	\$66,840	8.9%
Account balances	\$20,237,024	\$14,800,751	36.7%
Total active members with at least five years of service	3	12	-75.0%
<b>Vested terminated members</b>	274	243	12.8%
<b>Retired members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Disabled members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Beneficiaries</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2018 has been limited. It is our understanding that in the determination of pension benefits under the PEPRAs formulas, the compensation that can be taken into account for 2018 is equal to \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$121,388, or \$145,666). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))



**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**  
**Table of Plan Coverage**  
**viii. Safety Tier A**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2017</b>	<b>2016</b>	
<b>Active members in valuation</b>			
Number	945	991	-4.6%
Average age	45.2	44.6	0.6
Average service	15.8	15.5	0.3
Projected total payroll <sup>(1)</sup>	\$115,755,798	\$114,697,741	0.9%
Projected average payroll	\$122,493	\$115,739	5.8%
Account balances	\$377,672,109	\$358,633,855	5.3%
Total active members with at least five years of service	935	953	-1.9%
<b>Vested terminated members<sup>(2)</sup></b>			
	314	331	-5.1%
<b>Retired members<sup>(2)</sup></b>			
Number in pay status	1,238	1,208	2.5%
Average age	66.2	65.9	0.3
Average monthly benefit	\$7,796	\$7,653	1.9%
<b>Disabled members<sup>(2)</sup></b>			
Number in pay status <sup>(3)</sup>	509	506	0.6%
Average age	63.9	63.5	0.4
Average monthly benefit	\$6,063	\$5,877	3.2%
<b>Beneficiaries<sup>(2)</sup></b>			
Number in pay status	406	395	2.8%
Average age	69.2	68.3	0.9
Average monthly benefit	\$3,833	\$3,723	3.0%

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale.

<sup>(2)</sup> Includes members from terminated employers.

<sup>(3)</sup> For 2017, includes 488 members receiving a service-connected disability and 21 members receiving an ordinary disability.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**  
**Table of Plan Coverage**  
**ix. Safety Tier C**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2017</b>	<b>2016</b>	
<b>Active members in valuation</b>			
Number	128	136	-5.9%
Average age	37.4	36.6	0.8
Average service	7.6	6.7	0.9
Projected total payroll <sup>(1)</sup>	\$13,476,643	\$12,803,541	5.3%
Projected average payroll	\$105,286	\$94,144	11.8%
Account balances	\$12,548,377	\$10,676,664	17.5%
Total active members with at least five years of service	118	88	34.1%
<b>Vested terminated members</b>			
	74	72	2.8%
<b>Retired members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Disabled members</b>			
Number in pay status <sup>(2)</sup>	7	5	40.0%
Average age	43.1	43.8	-0.7
Average monthly benefit	\$3,758	\$3,704	1.5%
<b>Beneficiaries</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale.

<sup>(2)</sup> For 2017, includes 7 members receiving a service-connected disability.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**

**Table of Plan Coverage**

**x. Safety Tier D**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2017</b>	<b>2016</b>	
<b>Active members in valuation</b>			
Number	115	106	8.5%
Average age	33.6	33.0	0.6
Average service	2.8	2.0	0.8
Projected total payroll <sup>(1)</sup>	\$9,927,039	\$7,514,715	32.1%
Projected average payroll	\$86,322	\$70,894	21.8%
Account balances	\$4,701,883	\$2,916,657	61.2%
Total active members with at least five years of service	0	0	N/A
<b>Vested terminated members</b>	21	17	23.5%
<b>Retired members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Disabled members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Beneficiaries</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2018 has been limited. It is our understanding that in the determination of pension benefits under the PEPPRA formulas, the compensation that can be taken into account for 2018 is equal to \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$121,388, or \$145,666). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT A (continued)**

**Table of Plan Coverage**

**xi. Safety Tier E**

<b>Category</b>	<b>Year Ended December 31</b>		<b>Change From Prior Year</b>
	<b>2017</b>	<b>2016</b>	
<b>Active members in valuation</b>			
Number	285	237	20.3%
Average age	31.9	31.4	0.5
Average service	2.2	1.6	0.6
Projected total payroll <sup>(1)</sup>	\$24,046,424	\$15,149,530	58.7%
Projected average payroll	\$84,373	\$63,922	32.0%
Account balances	\$7,288,339	\$3,886,353	87.5%
Total active members with at least five years of service	0	0	N/A
<b>Vested terminated members</b>	32	23	39.1%
<b>Retired members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Disabled members</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
<b>Beneficiaries</b>			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

<sup>(1)</sup> Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2018 has been limited. It is our understanding that in the determination of pension benefits under the PEPRAs formulas, the compensation that can be taken into account for 2018 is equal to \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$121,388, or \$145,666). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**i. General Tier 1 Non-Enhanced**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	1	1	--	--	--	--	--	--	--	--
40 - 44	\$11,256	\$11,256	--	--	--	--	--	--	--	--
45 - 49	3	--	--	2	1	--	--	--	--	--
50 - 54	115,253	--	--	\$133,769	\$78,222	--	--	--	--	--
55 - 59	4	--	3	1	--	--	--	--	--	--
60 - 64	76,561	--	\$71,055	93,081	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>8</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
	\$82,908	\$11,256	\$71,055	\$120,206	\$78,222	--	--	--	--	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017**

**By Age and Years of Service**

**ii. General Tier 1 Enhanced**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	8	--	8	--	--	--	--	--	--	--
30 - 34	20	3	15	2	--	--	--	--	--	--
35 - 39	52	7	26	13	6	--	--	--	--	--
40 - 44	65	8	17	17	19	4	--	--	--	--
45 - 49	79	4	18	13	31	11	2	--	--	--
50 - 54	120	3	12	31	41	12	17	4	--	--
55 - 59	92	5	17	12	25	11	14	4	3	1
60 - 64	60	3	12	7	13	9	10	1	4	1
65 - 69	23	--	4	4	10	1	2	--	--	2
70 & over	2	--	--	1	1	--	--	--	--	--
	85,624	--	--	79,669	91,579	--	--	--	--	--
Total	521	33	129	100	146	48	45	9	7	4
	\$110,601	\$118,797	\$111,975	\$106,498	\$113,713	\$98,765	\$111,863	\$139,115	\$79,516	\$105,691

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**iii. General Tier 3 Enhanced**

Age	Total	Years of Service									
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over	
Under 25	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--
25 - 29	31	--	31	--	--	--	--	--	--	--	--
	\$65,935	--	\$65,935	--	--	--	--	--	--	--	--
30 - 34	239	43	157	37	2	--	--	--	--	--	--
	77,211	\$79,786	76,374	\$77,472	\$82,693	--	--	--	--	--	--
35 - 39	504	49	223	190	42	--	--	--	--	--	--
	88,549	90,428	91,238	87,974	74,681	--	--	--	--	--	--
40 - 44	621	55	202	193	158	13	--	--	--	--	--
	89,995	82,792	90,710	94,287	86,980	\$82,268	--	--	--	--	--
45 - 49	749	45	196	192	223	72	20	1	--	--	--
	90,076	86,845	87,694	89,504	92,834	95,941	\$74,865	\$79,128	--	--	--
50 - 54	921	42	182	199	252	124	100	22	--	--	--
	89,252	92,136	82,048	83,948	89,043	93,137	105,647	97,314	--	--	--
55 - 59	805	32	151	166	192	97	104	48	15	--	--
	88,680	81,755	82,698	85,877	85,056	98,246	101,995	93,718	\$70,777	--	--
60 - 64	586	11	124	130	154	62	54	33	18	--	--
	86,002	91,863	80,611	83,833	81,134	93,926	94,554	108,084	83,451	--	--
65 - 69	233	11	57	61	43	34	21	4	2	--	--
	87,593	65,226	81,785	87,359	91,247	107,311	78,770	80,120	77,157	--	--
70 & over	49	3	13	14	11	2	4	1	1	--	--
	74,210	120,959	80,101	67,388	68,606	79,810	57,251	101,592	43,793	--	--
Total	4,738	291	1,336	1,182	1,077	404	303	109	36	--	--
	\$87,909	\$85,567	\$84,589	\$87,221	\$86,991	\$95,761	\$97,883	\$98,233	\$76,719	--	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**iv. General Tier 4 – 2% COLA**

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	1	1	--	--	--	--	--	--	--	--
	\$68,290	\$68,290	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	5	5	--	--	--	--	--	--	--	--
	60,257	60,257	--	--	--	--	--	--	--	--
35 - 39	1	1	--	--	--	--	--	--	--	--
	46,119	46,119	--	--	--	--	--	--	--	--
40 - 44	3	3	--	--	--	--	--	--	--	--
	63,425	63,425	--	--	--	--	--	--	--	--
45 - 49	2	2	--	--	--	--	--	--	--	--
	94,096	94,097	--	--	--	--	--	--	--	--
50 - 54	4	4	--	--	--	--	--	--	--	--
	62,712	62,712	--	--	--	--	--	--	--	--
55 - 59	2	2	--	--	--	--	--	--	--	--
	43,832	43,832	--	--	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	18	18	--	--	--	--	--	--	--	--
	\$62,926	\$62,926	--	--	--	--	--	--	--	--



**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**v. General Tier 4 – 3% COLA**

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	1	1	--	--	--	--	--	--	--	--
	\$71,937	\$71,937	--	--	--	--	--	--	--	--
25 - 29	19	19	--	--	--	--	--	--	--	--
	81,744	81,744	--	--	--	--	--	--	--	--
30 - 34	22	22	--	--	--	--	--	--	--	--
	83,901	83,901	--	--	--	--	--	--	--	--
35 - 39	22	22	--	--	--	--	--	--	--	--
	86,803	86,803	--	--	--	--	--	--	--	--
40 - 44	22	22	--	--	--	--	--	--	--	--
	84,811	84,811	--	--	--	--	--	--	--	--
45 - 49	12	12	--	--	--	--	--	--	--	--
	90,174	90,174	--	--	--	--	--	--	--	--
50 - 54	17	17	--	--	--	--	--	--	--	--
	89,977	89,977	--	--	--	--	--	--	--	--
55 - 59	11	11	--	--	--	--	--	--	--	--
	78,414	78,414	--	--	--	--	--	--	--	--
60 - 64	2	2	--	--	--	--	--	--	--	--
	85,943	85,943	--	--	--	--	--	--	--	--
65 - 69	1	1	--	--	--	--	--	--	--	--
	76,166	76,166	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	129	129	--	--	--	--	--	--	--	--
	\$85,029	\$85,029	--	--	--	--	--	--	--	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**vi. General Tier 5 – 2% COLA**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	87	87	--	--	--	--	--	--	--	--
	\$48,670	\$48,670	--	--	--	--	--	--	--	--
25 - 29	407	407	--	--	--	--	--	--	--	--
	57,851	57,851	--	--	--	--	--	--	--	--
30 - 34	498	497	1	--	--	--	--	--	--	--
	67,845	67,737	\$121,388	--	--	--	--	--	--	--
35 - 39	373	371	2	--	--	--	--	--	--	--
	68,306	68,234	81,589	--	--	--	--	--	--	--
40 - 44	258	258	--	--	--	--	--	--	--	--
	67,375	67,375	--	--	--	--	--	--	--	--
45 - 49	229	228	--	1	--	--	--	--	--	--
	66,784	66,673	--	\$92,135	--	--	--	--	--	--
50 - 54	198	198	--	--	--	--	--	--	--	--
	66,005	66,005	--	--	--	--	--	--	--	--
55 - 59	165	164	1	--	--	--	--	--	--	--
	64,640	64,716	52,180	--	--	--	--	--	--	--
60 - 64	102	98	4	--	--	--	--	--	--	--
	62,883	63,465	48,630	--	--	--	--	--	--	--
65 - 69	23	22	--	--	--	--	1	--	--	--
	76,863	74,839	--	--	--	--	\$121,388	--	--	--
70 & over	10	10	--	--	--	--	--	--	--	--
	58,891	58,891	--	--	--	--	--	--	--	--
Total	2,350	2,340	8	1	--	--	1	--	--	--
	\$64,777	\$64,736	\$66,408	\$92,135	--	--	\$121,388	--	--	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**vii. General Tier 5 – 3% COLA**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	5	5	--	--	--	--	--	--	--	--
	\$54,871	\$54,871	--	--	--	--	--	--	--	--
25 - 29	55	54	--	1	--	--	--	--	--	--
	60,396	60,562	--	\$51,458	--	--	--	--	--	--
30 - 34	157	156	1	--	--	--	--	--	--	--
	73,023	73,003	\$76,233	--	--	--	--	--	--	--
35 - 39	160	160	--	--	--	--	--	--	--	--
	74,752	74,752	--	--	--	--	--	--	--	--
40 - 44	115	115	--	--	--	--	--	--	--	--
	78,655	78,655	--	--	--	--	--	--	--	--
45 - 49	87	87	--	--	--	--	--	--	--	--
	74,028	74,028	--	--	--	--	--	--	--	--
50 - 54	76	74	2	--	--	--	--	--	--	--
	72,902	72,152	100,663	--	--	--	--	--	--	--
55 - 59	76	74	2	--	--	--	--	--	--	--
	68,691	68,887	61,422	--	--	--	--	--	--	--
60 - 64	51	49	2	--	--	--	--	--	--	--
	69,862	70,576	52,375	--	--	--	--	--	--	--
65 - 69	17	16	1	--	--	--	--	--	--	--
	77,533	78,998	54,092	--	--	--	--	--	--	--
70 & over	2	2	--	--	--	--	--	--	--	--
	72,188	72,189	--	--	--	--	--	--	--	--
<b>Total</b>	<b>801</b>	<b>792</b>	<b>8</b>	<b>1</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
	<b>\$72,776</b>	<b>\$72,832</b>	<b>\$69,906</b>	<b>\$51,458</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**viii. Safety Tier A Non-Enhanced**

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	2	2	--	--	--	--	--	--	--	--
40 - 44	\$129,562	\$129,562	--	--	--	--	--	--	--	--
45 - 49	3	--	--	--	3	--	--	--	--	--
50 - 54	140,255	--	--	--	\$140,255	--	--	--	--	--
55 - 59	2	--	--	--	1	--	1	--	--	--
60 - 64	131,156	--	--	--	136,890	--	\$125,421	--	--	--
65 - 69	4	1	--	--	--	--	3	--	--	--
70 & over	145,036	130,599	--	--	--	--	149,848	--	--	--
	2	--	--	--	--	--	1	--	1	--
	163,706	--	--	--	--	--	190,300	\$137,111	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	13	3	--	--	4	--	5	1	--	--
	\$142,289	\$129,908	--	--	\$139,414	--	\$153,053	\$137,111	--	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**ix. Safety Tier A Enhanced**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	9	5	4	--	--	--	--	--	--	--
30 - 34	\$98,198	\$93,610	\$103,933	--	--	--	--	--	--	--
35 - 39	75	14	44	17	--	--	--	--	--	--
40 - 44	114,533	97,466	114,138	\$129,609	--	--	--	--	--	--
45 - 49	148	13	41	78	16	--	--	--	--	--
50 - 54	116,246	93,871	113,386	118,929	\$128,680	--	--	--	--	--
55 - 59	213	6	14	80	108	5	--	--	--	--
60 - 64	117,939	124,372	117,635	119,426	115,652	\$136,680	--	--	--	--
65 - 69	267	2	16	51	128	48	22	--	--	--
70 & over	126,271	191,864	106,773	124,604	123,254	130,482	\$146,721	--	--	--
	145	1	4	18	56	26	32	8	--	--
	133,661	124,308	100,357	112,180	126,282	126,469	162,120	\$161,010	--	--
	45	--	5	9	16	9	4	1	1	--
	120,571	--	110,561	105,632	106,461	136,042	178,980	181,890	\$96,636	--
	24	--	3	7	8	4	1	1	--	--
	120,709	--	115,426	106,318	103,627	147,482	240,717	146,841	--	--
	6	--	1	3	2	--	--	--	--	--
	114,794	--	110,140	104,577	132,446	--	--	--	--	--
Total	932	41	132	263	334	92	59	10	1	--
	\$122,217	\$105,053	\$112,519	\$119,455	\$120,344	\$130,968	\$158,853	\$161,681	\$96,636	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**x. Safety Tier C**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	15	2	13	--	--	--	--	--	--	--
	\$103,751	\$98,467	\$104,564	--	--	--	--	--	--	--
30 - 34	48	6	40	2	--	--	--	--	--	--
	103,395	88,267	105,448	\$107,719	--	--	--	--	--	--
35 - 39	29	2	24	3	--	--	--	--	--	--
	101,831	62,108	104,601	106,158	--	--	--	--	--	--
40 - 44	17	--	11	5	1	--	--	--	--	--
	107,155	--	106,682	107,746	\$109,403	--	--	--	--	--
45 - 49	10	--	7	3	--	--	--	--	--	--
	110,652	--	110,636	110,689	--	--	--	--	--	--
50 - 54	5	--	5	--	--	--	--	--	--	--
	132,831	--	132,831	--	--	--	--	--	--	--
55 - 59	1	--	1	--	--	--	--	--	--	--
	101,709	--	101,709	--	--	--	--	--	--	--
60 - 64	3	1	2	--	--	--	--	--	--	--
	103,423	99,888	105,191	--	--	--	--	--	--	--
65 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	128	11	103	13	1	--	--	--	--	--
	\$105,286	\$86,422	\$106,912	\$108,055	\$109,403	--	--	--	--	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**xi. Safety Tier D**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	7	7	--	--	--	--	--	--	--	--
	\$73,730	\$73,730	--	--	--	--	--	--	--	--
25 - 29	31	31	--	--	--	--	--	--	--	--
	80,304	80,304	--	--	--	--	--	--	--	--
30 - 34	46	46	--	--	--	--	--	--	--	--
	86,891	86,891	--	--	--	--	--	--	--	--
35 - 39	14	14	--	--	--	--	--	--	--	--
	92,526	92,526	--	--	--	--	--	--	--	--
40 - 44	8	8	--	--	--	--	--	--	--	--
	85,530	85,530	--	--	--	--	--	--	--	--
45 - 49	3	3	--	--	--	--	--	--	--	--
	102,924	102,924	--	--	--	--	--	--	--	--
50 - 54	3	3	--	--	--	--	--	--	--	--
	131,451	131,451	--	--	--	--	--	--	--	--
55 - 59	3	3	--	--	--	--	--	--	--	--
	80,601	80,601	--	--	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
65 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	115	115	--	--	--	--	--	--	--	--
	\$86,322	\$86,322	--	--	--	--	--	--	--	--

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT B (continued)**

**Members in Active Service and Projected Payroll as of December 31, 2017  
By Age and Years of Service**

**xii. Safety Tier E**

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	24	24	--	--	--	--	--	--	--	--
	\$80,890	\$80,890	--	--	--	--	--	--	--	--
25 - 29	137	137	--	--	--	--	--	--	--	--
	82,055	82,055	--	--	--	--	--	--	--	--
30 - 34	58	58	--	--	--	--	--	--	--	--
	84,342	84,342	--	--	--	--	--	--	--	--
35 - 39	28	28	--	--	--	--	--	--	--	--
	85,562	85,562	--	--	--	--	--	--	--	--
40 - 44	14	14	--	--	--	--	--	--	--	--
	79,342	79,342	--	--	--	--	--	--	--	--
45 - 49	9	9	--	--	--	--	--	--	--	--
	91,524	91,524	--	--	--	--	--	--	--	--
50 - 54	7	7	--	--	--	--	--	--	--	--
	108,360	108,360	--	--	--	--	--	--	--	--
55 - 59	7	7	--	--	--	--	--	--	--	--
	109,073	109,073	--	--	--	--	--	--	--	--
60 - 64	1	1	--	--	--	--	--	--	--	--
	119,347	119,347	--	--	--	--	--	--	--	--
65 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	285	285	--	--	--	--	--	--	--	--
	\$84,373	\$84,373	--	--	--	--	--	--	--	--



**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT C**

**Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries**

**i. General Tier 1 as of December 31, 2017**

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	2	--	1	--	--	1	--	--	--	--
30 - 34	5	--	2	--	--	3	--	--	--	--
35 - 39	858	--	1,027	--	--	745	--	--	--	--
40 - 44	1	--	--	--	--	1	--	--	--	--
45 - 49	596	--	--	--	--	596	--	--	--	--
50 - 54	6	1	--	1	--	2	1	1	--	--
55 - 59	1,173	\$1,288	--	\$2,446	--	631	\$1,022	\$1,020	--	--
60 - 64	8	3	1	--	1	2	1	--	--	--
65 - 69	1,940	2,065	3,857	--	\$2,329	1,057	1,029	--	--	--
70 - 74	32	20	2	1	3	3	2	1	--	--
75 - 80	1,664	1,871	2,219	566	1,057	1,307	1,420	879	--	--
80 - 84	119	62	38	6	4	4	2	3	--	--
85 - 89	2,751	3,167	2,424	1,795	2,875	1,518	3,087	1,450	--	--
90 & over	351	79	175	53	15	11	8	6	1	3
Total	3,895	3,388	5,000	2,488	2,160	2,674	2,045	1,823	\$1,856	\$459
	585	51	218	184	82	19	19	3	6	3
	4,303	2,855	6,042	4,065	2,338	2,560	2,357	2,033	1,860	1,406
	658	10	89	277	158	71	24	14	7	8
	4,412	2,103	5,409	5,568	3,723	2,078	2,273	2,961	2,104	1,457
	494	--	11	76	180	117	72	20	12	6
	3,978	--	4,110	5,430	5,263	2,766	1,987	2,412	2,868	1,747
	449	1	1	14	99	133	109	69	13	10
	3,510	340	257	5,228	5,434	3,799	2,589	1,638	2,945	2,535
	348	--	--	3	17	67	112	95	40	14
	3,089	--	--	1,556	3,383	4,316	3,816	2,070	1,779	2,027
	320	--	--	1	4	13	64	89	103	46
	2,738	--	--	1,266	3,091	2,889	3,570	2,687	2,457	2,271
Total	3,378	227	538	616	563	447	414	301	182	90
	\$3,756	\$2,978	\$5,246	\$4,753	\$4,236	\$3,127	\$2,917	\$2,198	\$2,333	\$2,066

Note: Includes members from terminated employers.

Note: Total retired benefit \$12,688,893, average age 75.3 and average years retired 19.0.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT C (continued)**

**Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries**

**ii. General Tier 2 as of December 31, 2017**

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	2	--	--	--	2	--	--	--	--	--
35 - 39	\$827	--	--	--	\$827	--	--	--	--	--
40 - 44	8	--	--	--	3	3	2	--	--	--
45 - 49	859	--	--	--	900	\$628	\$1,145	--	--	--
50 - 54	10	--	--	--	2	5	3	--	--	--
55 - 59	1,031	--	--	--	434	1,427	768	--	--	--
60 - 64	7	3	--	1	--	2	1	--	--	--
65 - 69	946	\$198	--	\$644	--	1,698	1,986	--	--	--
70 - 74	27	14	9	1	2	1	--	--	--	--
75 - 80	447	324	\$254	180	2,068	932	--	--	--	--
80 - 84	53	9	9	17	9	8	1	--	--	--
85 - 89	967	514	764	578	1,986	1,152	2,854	--	--	--
90 & over	78	8	13	26	22	5	4	--	--	--
Total	867	574	834	792	705	1,916	1,624	--	--	--
	120	4	15	21	42	32	3	3	--	--
	915	746	829	661	953	970	1,835	\$1,293	--	--
	85	--	6	12	38	25	4	--	--	--
	1,090	--	479	1,065	1,350	939	566	--	--	--
	98	--	3	1	42	35	15	2	--	--
	1,103	--	1,341	747	1,178	1,084	910	1,109	--	--
	52	--	--	1	11	27	10	2	1	--
	1,100	--	--	60	911	1,302	1,065	451	\$405	--
	24	--	--	--	1	11	11	1	--	--
	1,016	--	--	--	1,032	853	1,218	577	--	--
Total	564	38	55	80	174	154	54	8	1	--
	\$973	\$456	\$715	\$734	\$1,118	\$1,098	\$1,137	\$947	\$405	--

Note: Includes members from terminated employers.

Note: Total retired benefit \$548,535, average age 73.7 and average years retired 17.3.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT C (continued)**

**Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries**

**iii. General Tier 3 as of December 31, 2017**

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	6	4	2	--	--	--	--	--	--	--
	\$561	\$160	\$1,363	--	--	--	--	--	--	--
25 - 29	3	2	1	--	--	--	--	--	--	--
	414	161	922	--	--	--	--	--	--	--
30 - 34	8	4	--	1	2	1	--	--	--	--
	1,088	607	--	\$1,656	\$1,923	\$777	--	--	--	--
35 - 39	6	1	1	4	--	--	--	--	--	--
	847	494	1,920	667	--	--	--	--	--	--
40 - 44	8	3	3	2	--	--	--	--	--	--
	2,019	2,503	1,800	1,620	--	--	--	--	--	--
45 - 49	15	6	2	3	4	--	--	--	--	--
	1,300	1,425	1,729	1,144	1,014	--	--	--	--	--
50 - 54	108	91	7	6	4	--	--	--	--	--
	1,767	1,723	2,428	2,122	1,084	--	--	--	--	--
55 - 59	331	217	106	5	3	--	--	--	--	--
	2,147	2,358	1,734	2,444	930	--	--	--	--	--
60 - 64	649	291	279	74	5	--	--	--	--	--
	2,913	2,819	3,307	1,793	2,930	--	--	--	--	--
65 - 69	889	300	411	153	25	--	--	--	--	--
	2,938	2,495	3,519	2,547	1,104	--	--	--	--	--
70 - 74	693	103	327	225	37	1	--	--	--	--
	2,950	1,949	3,430	2,958	1,470	2,117	--	--	--	--
75 - 80	330	17	100	155	57	--	1	--	--	--
	2,387	1,508	2,567	2,616	1,726	--	\$1,513	--	--	--
80 - 84	107	3	19	48	37	--	--	--	--	--
	1,820	2,112	2,235	1,753	1,668	--	--	--	--	--
85 - 89	9	1	1	6	1	--	--	--	--	--
	1,767	760	3,162	1,196	4,811	--	--	--	--	--
90 & over	3	--	2	1	--	--	--	--	--	--
	3,433	--	1,915	6,468	--	--	--	--	--	--
Total	3,165	1,043	1,261	683	175	2	1	--	--	--
	\$2,689	\$2,388	\$3,182	\$2,529	\$1,581	\$1,447	\$1,513	--	--	--

Note: Total retired benefit \$8,510,824, average age 67.2 and average years retired 7.2.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT C (continued)**

**Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries**

**iv. Safety Tier A and Tier C as of December 31, 2017**

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	6	--	--	3	--	--	2	--	1	--
	\$1,888	--	--	\$1,425	--	--	\$1,467	--	\$4,121	--
25 - 29	1	--	--	1	--	--	--	--	--	--
	891	--	--	891	--	--	--	--	--	--
30 - 34	2	2	--	--	--	--	--	--	--	--
	3,316	\$3,316	--	--	--	--	--	--	--	--
35 - 39	11	5	4	--	--	2	--	--	--	--
	3,750	4,476	\$4,102	--	--	\$1,233	--	--	--	--
40 - 44	22	8	7	6	--	--	1	--	--	--
	3,525	3,144	3,238	4,734	--	--	1,342	--	--	--
45 - 49	55	20	14	16	5	--	--	--	--	--
	4,138	4,312	3,773	4,403	\$3,620	--	--	--	--	--
50 - 54	254	162	50	18	15	6	3	--	--	--
	6,045	6,168	7,472	4,185	4,129	3,683	1,122	--	--	--
55 - 59	325	55	214	24	21	6	5	--	--	--
	7,002	6,229	7,946	4,000	4,480	4,299	3,356	--	--	--
60 - 64	330	20	122	134	26	12	8	6	1	1
	7,717	4,412	8,812	8,724	4,390	3,439	3,285	\$4,268	2,878	\$4,012
65 - 69	343	13	56	159	54	33	14	11	3	--
	7,283	4,009	8,138	9,204	5,609	3,668	3,816	3,445	3,829	--
70 - 74	356	6	17	84	149	39	19	26	13	3
	6,671	3,813	5,803	7,776	8,051	4,682	4,421	2,914	3,678	3,454
75 - 80	223	1	9	16	68	66	30	17	7	9
	6,531	1,376	2,920	5,027	8,281	7,542	5,552	3,347	3,994	4,000
80 - 84	116	--	2	--	7	30	45	17	12	3
	5,875	--	4,175	--	6,413	6,219	6,632	4,823	4,131	3,902
85 - 89	80	--	--	--	2	5	12	26	22	13
	4,867	--	--	--	5,188	5,936	5,162	5,262	4,506	3,955
90 & over	36	--	--	--	--	--	--	7	11	18
	5,454	--	--	--	--	--	--	6,429	6,889	4,198
Total	2,160	292	495	461	347	199	139	110	70	47
	\$6,629	\$5,640	\$7,737	\$7,899	\$6,943	\$5,574	\$5,144	\$4,182	\$4,553	\$4,023

*Note: Includes members from terminated employers.*

*Note: Total retired benefit \$14,319,373, average age 66.2 and average years retired 15.2.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT D**

**Reconciliation of Member Data – December 31, 2016 to December 31, 2017**

	<b>Active Participants</b>	<b>Vested Terminated Members</b>	<b>Pensioners</b>	<b>Disableds</b>	<b>Beneficiaries</b>	<b>Total</b>
Number as of December 31, 2016	9,848	3,089	6,825	905	1,370	22,037
New participants	977	67	0	0	83	1,127
Terminations – with vested rights	-396	396	0	0	0	0
Contribution refunds	-177	-124	0	0	0	-301
Retirements	-241	-54	295	0	0	0
New disabilities	-13	0	-5	18	0	0
Return to work	47	-43	-4	0	0	0
Died with or without beneficiary	-6	-1	-141	-25	-52	-225
Data adjustments	<u>-1</u>	<u>-3</u>	<u>3</u>	<u>-2</u>	<u>-3</u>	<u>-6</u>
Number as of December 31, 2017	10,038	3,327	6,973	896	1,398	22,632

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT E**

**Summary Statement of Income and Expenses on an Actuarial Value Basis**

	Year Ended December 31, 2017	Year Ended December 31, 2016
<b>Contribution income:</b>		
Employer contributions <sup>(1)</sup>	\$314,836,561	\$307,457,143
Employee contributions <sup>(1)</sup>	96,466,906	89,240,172
Administrative expenses	<u>(9,146,115)</u>	<u>(8,486,463)</u>
Net contribution income	\$402,157,352	\$388,210,852
<b>Investment income:</b>		
Interest, dividends and other income	\$216,736,117	\$163,255,934
Adjustment toward market value <sup>(2)</sup>	434,648,740	385,424,070
Less investment expenses	<u>(42,864,983)</u>	<u>(46,327,831)</u>
Net investment income	<u>608,519,874</u>	<u>502,352,173</u>
<b>Total income available for benefits</b>	<b>\$1,010,677,226</b>	<b>\$890,563,025</b>
<b>Less benefit payments:</b>		
Benefits paid	\$(429,574,195)	\$(411,779,400)
Refunds of contributions	(5,980,405)	(7,448,304)
Adjustments/transfers/other expenses	<u>(1,957,188)</u>	<u>(920,314)</u>
Net benefit payments	\$(437,511,788)	\$(420,148,018)
<b>Change in reserve for future benefits</b>	<b>\$573,165,438</b>	<b>\$470,415,007</b>

<sup>(1)</sup> For the year ended December 31, 2017, employer contributions include "member subvention of employer contributions" and exclude "employer subvention of member contributions".

<sup>(2)</sup> Equals the "non-cash" earnings on investments implicitly included in the Actuarial Value of Assets.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT F  
Summary Statement of Assets**

	Year Ended December 31, 2017	Year Ended December 31, 2016
<b>Cash equivalents</b>	\$690,793,803	\$644,324,488
<b>Other Assets</b>	516,754	266,092
<b>Accounts receivable:</b>		
Investment trades	\$22,462,322	\$232,983,556
Investment income	20,293,645	18,879,074
Employee and employer contributions	9,805,486	8,834,817
Additional contributions <sup>(1)</sup>	<u>14,367,397</u>	<u>15,965,773</u>
Total accounts receivable	66,928,850	276,663,220
<b>Investments:</b>		
Stocks	\$3,899,074,060	\$2,948,533,927
Bonds	2,385,460,866	2,563,716,770
Real estate	652,385,617	701,599,169
Alternative investments and real assets	<u>1,216,666,285</u>	<u>977,913,714</u>
Total investments at market value	<u>8,153,586,828</u>	<u>7,191,763,580</u>
<b>Total assets</b>	<u>\$8,911,826,235</u>	<u>\$8,113,017,380</u>
<b>Less accounts payable:</b>		
Investment trades	\$(25,352,546)	\$(302,095,514)
Security lending	(294,005,415)	(204,196,090)
Employer contributions unearned	(155,492,320)	(149,089,010)
Other	<u>(46,394,905)</u>	<u>(19,117,262)</u>
Total accounts payable	\$(521,245,186)	\$(674,497,876)
<b>Net assets at market value</b>	<u>\$8,390,581,049</u>	<u>\$7,438,519,504</u>
<b>Net assets at actuarial value</b>	<u>\$8,195,516,541</u>	<u>\$7,622,351,103</u>
<b>Net assets at valuation value</b>	<u>\$8,179,891,191</u>	<u>\$7,606,997,530</u>

<sup>(1)</sup> Equals the sum of additional contribution receivables for the final Paulson Settlement.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT G**

**Actuarial Balance Sheet**

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, we first determine the amount and timing of all future payments that are projected/anticipated to be made by the Plan for current participants. We then discount these payments at the valuation interest rate to the date of the valuation, thereby determining their present value. We refer to this present value as the "liability" of the Plan.

Second, we determine how this liability will be met. These actuarial "assets" include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments.

<b>Assets<sup>(1)</sup></b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
1. Total valuation value of assets	\$5,051,054,664	\$3,128,836,527	\$8,179,891,191
2. Present value of future contributions by members	528,135,237	229,557,863	757,693,100
3. Present value of future employer contributions for:			
(a) entry age normal cost	735,945,571	218,878,311	954,823,882
(b) unfunded actuarial accrued liability	763,637,018	295,718,711	1,059,355,729
4. Total actuarial assets	<u>\$7,078,772,490</u>	<u>\$3,872,991,412</u>	<u>\$10,951,763,902</u>
<b>Liabilities<sup>(1)</sup></b>			
5. Present value of benefits for retirees and beneficiaries	\$3,363,692,416	\$2,509,325,115	\$5,873,017,531
6. Present value of benefits for vested terminated members <sup>(2)</sup>	218,940,106	76,751,231	295,691,337
7. Present value of benefits for active members	3,496,139,968	1,286,915,066	4,783,055,034
8. Total present value of benefits	<u>\$7,078,772,490</u>	<u>\$3,872,991,412</u>	<u>\$10,951,763,902</u>

<sup>(1)</sup> *Assets and liabilities exclude administrative expenses.*

<sup>(2)</sup> *Includes nonvested terminated members.*



**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT H**

**Summary of Total Allocated Reserves**

<b>Reserves</b>	<b>December 31, 2017</b>	<b>December 31, 2016</b>
Member Deposits <sup>(1)</sup>	\$795,727,498	\$729,442,554
Member Cost of Living <sup>(1)</sup>	420,388,707	387,381,328
Employer Advance <sup>(1)(2)</sup>	2,063,002,259	1,834,547,821
Employer Cost of Living <sup>(1)(2)</sup>	928,964,628	824,863,184
Retired Members <sup>(1)(2)</sup>	3,363,343,722	3,292,924,578
Retired Cost of Living <sup>(1)(2)</sup>	2,444,582,495	2,333,427,992
Dollar Power Cost of Living Supplement Pre-Funding <sup>(1)</sup>	3,946,603	5,348,040
Post Retirement Death Benefit <sup>(3)</sup>	15,625,350	15,353,573
Statutory Contingency (one percent) <sup>(3)</sup>	0	0
Additional One Percent Contingency Designation <sup>(3)</sup>	0	0
Contra Tracking Account <sup>(1)</sup>	(1,840,064,721)	(1,800,937,967)
<b>Total Allocated Reserves</b>	<b>8,195,516,541</b>	<b>7,622,351,103</b>
<b>Total Deferred Return</b>	<b>195,064,508</b>	<b>(183,831,599)</b>
<b>Net Market Value</b>	<b>\$8,390,581,049</b>	<b>\$7,438,519,504</b>

*Note: Results may not add due to rounding.*

<sup>(1)</sup> *Included in valuation value of assets.*

<sup>(2)</sup> *Both December 31, 2017 and December 31, 2016 information reflect a "true-up" of retired reserves.*

<sup>(3)</sup> *Not included in valuation value of assets.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT I**

**Development of Unfunded Actuarial Accrued Liability**

	<b>Year Ended December 31, 2017</b>
1. Unfunded actuarial accrued liability at beginning of year	\$1,187,436,609
2. Total Normal Cost at middle of year <sup>(1)</sup>	220,685,740
3. Expected administrative expenses	8,785,414
4. Expected employer and member contributions	(394,614,328)
5. Interest (whole year on (1) plus half year on (2) + (3) + (4) )	<u>77,643,016</u>
6. Expected unfunded actuarial accrued liability at end of year	\$1,099,936,451
7. Actuarial (gain)/loss due to all changes:	
(a) Investment return more than expected	\$(76,209,273)
(b) Actual contributions greater than expected due to delay in implementation of rates	(17,598,527)
(c) Gain from additional UAAL contributions	(334,623)
(d) Higher than expected individual salary increases	59,574,068
(e) Higher than expected COLA increases for retirees and beneficiaries	19,930,011
(f) Mortality loss on retirees and beneficiaries (fewer deaths than expected)	8,816,238
(g) Retirement experience gain on actives (later retirements than expected)	(25,633,003)
(h) Other experience gain <sup>(2)</sup>	<u>(9,125,613)</u>
(i) Total changes	<u>\$(40,580,722)</u>
8. Unfunded actuarial accrued liability at end of year	\$1,059,355,729

*Note: The "net loss from other experience" of \$53,561,701 shown in Section 2, Chart 10 is equal to the sum of items 7(d) through 7(h).*

<sup>(1)</sup> *Excludes administrative expense load.*

<sup>(2)</sup> *Other differences in actual versus expected experience including (but not limited to) disability, withdrawal and leave cashout experience.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Groups #1 and #2</b>	December 31, 2007	Restart of Amortization	\$785,069,153	\$451,570,768	5	\$100,481,011
General County and	December 31, 2008	Actuarial Loss	80,033,199	65,014,920	9	8,605,931
Small Districts	December 31, 2009	Actuarial Loss	165,041,323	140,650,587	10	17,040,368
	December 31, 2009	Assumption Change <sup>(2)</sup>	39,563,826	33,716,861	10	4,084,929
	December 31, 2009	Depooling Implementation	(74,701,913)	(63,662,043)	10	(7,712,905)
	December 31, 2010	Actuarial Loss	153,070,543	135,519,666	11	15,177,890
	December 31, 2011	Actuarial Loss	94,750,078	86,434,514	12	9,022,488
	December 31, 2012	Actuarial Loss	117,029,116	109,247,412	13	10,701,907
	December 31, 2012	Assumption Change <sup>(2)</sup>	288,802,882	269,599,297	13	26,410,022
	December 31, 2013	Actuarial Gain	(134,810,112)	(128,453,911)	14	(11,877,911)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(107,553,289)	(102,482,228)	14	(9,476,355)
	December 31, 2014	Actuarial Gain	(171,898,812)	(166,348,135)	15	(14,592,489)
	December 31, 2015	Actuarial Gain	(105,003,533)	(102,746,884)	16	(8,587,918)
	December 31, 2015	Assumption Change <sup>(2)</sup>	39,814,884	38,959,215	16	3,256,338
	December 31, 2016	Actuarial Gain	(28,579,026)	(28,317,823)	17	(2,263,817)
	December 31, 2017	Actuarial Gain	(17,937,638)	<u>(17,937,638)</u>	18	<u>(1,376,161)</u>
<b>Total for Cost Groups #1 and #2</b>				\$720,764,577		\$138,893,328

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #3</b>	December 31, 2007	Restart of Amortization	\$36,185,000	\$20,813,566	5	\$4,631,319
Central Contra Costa	December 31, 2008	Actuarial Loss	3,709,835	3,013,682	9	398,917
Sanitary District	December 31, 2009	Actuarial Loss	10,118,261	8,622,927	10	1,044,701
	December 31, 2009	Assumption Change <sup>(2)</sup>	2,003,000	1,706,985	10	206,808
	December 31, 2009	Depooling Implementation	20,037,235	17,076,020	10	2,068,826
	December 31, 2010	Actuarial Loss	18,178,489	16,094,167	11	1,802,510
	December 31, 2010	Assumption Change <sup>(3)</sup>	11,479,648	10,163,406	11	1,138,278
	December 31, 2011	Actuarial Loss	10,514,535	9,591,747	12	1,001,237
	December 31, 2012	Actuarial Loss	12,564,241	11,728,798	13	1,148,956
	December 31, 2012	Assumption Change <sup>(2)</sup>	22,455,342	20,962,202	13	2,053,463
	December 31, 2012	UAAL Prepayment	(4,666,477)	(4,356,185)	13	(426,733)
	December 31, 2013	Actuarial Loss	582,962	555,476	14	51,364
	December 31, 2013	Assumption Change <sup>(3)</sup>	(14,950,866)	(14,245,943)	14	(1,317,298)
	December 31, 2013	UAAL Prepayment	(4,662,899)	(4,443,047)	14	(410,841)
	December 31, 2014	Actuarial Gain	(11,848,823)	(11,466,221)	15	(1,005,846)
	December 31, 2014	UAAL Prepayment	(2,331,896)	(2,256,598)	15	(197,955)
	December 31, 2015	Actuarial Gain	(6,504,510)	(6,364,720)	16	(531,984)
	December 31, 2015	Assumption Change <sup>(2)</sup>	44,220	43,270	16	3,617
	December 31, 2016	Actuarial Gain	(1,522,932)	(1,509,013)	17	(120,635)
	December 31, 2017	Actuarial Gain	(1,621,926)	<u>(1,621,926)</u>	18	<u>(124,433)</u>
<b>Total for Cost Group #3</b>				\$74,108,590		\$11,414,271

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #4</b>	December 31, 2007	Restart of Amortization	\$7,770,000	\$4,469,294	5	\$994,482
Contra Costa Housing Authority	December 31, 2008	Actuarial Loss	1,573,513	1,278,242	9	169,199
	December 31, 2009	Actuarial Loss	1,277,079	1,088,345	10	131,857
	December 31, 2009	Assumption Change <sup>(2)</sup>	425,000	362,191	10	43,881
	December 31, 2009	Depooling Implementation	(189,275)	(161,303)	10	(19,542)
	December 31, 2010	Actuarial Loss	619,697	548,643	11	61,447
	December 31, 2010	Assumption Change <sup>(3)</sup>	(920,656)	(815,095)	11	(91,289)
	December 31, 2011	Actuarial Loss	1,059,328	966,358	12	100,874
	December 31, 2012	Actuarial Loss	1,912,999	1,785,796	13	174,937
	December 31, 2012	Assumption Change <sup>(2)</sup>	3,722,862	3,475,315	13	340,443
	December 31, 2013	Actuarial Gain	(2,220,704)	(2,115,999)	14	(195,663)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(1,077,289)	(1,026,496)	14	(94,918)
	December 31, 2014	Actuarial Gain	(1,360,021)	(1,316,105)	15	(115,452)
	December 31, 2015	Actuarial Gain	(875,294)	(856,483)	16	(71,588)
	December 31, 2015	Assumption Change <sup>(2)</sup>	432,801	423,500	16	35,397
	December 31, 2016	Actuarial Gain	(297,092)	(294,376)	17	(23,533)
	December 31, 2017	Actuarial Loss	53,895	<u>53,895</u>	18	<u>4,135</u>
<b>Total for Cost Group #4</b>				\$7,865,723		\$1,444,667

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #5</b>	December 31, 2007	Restart of Amortization	\$(1,011,000)	\$(581,526)	5	\$(129,398)
Contra Costa County Fire Protection District	December 31, 2008	Actuarial Loss	45,963	37,338	9	4,942
	December 31, 2009	Actuarial Loss	1,614,180	1,375,627	10	166,663
	December 31, 2009	Assumption Change <sup>(2)</sup>	336,000	286,344	10	34,692
	December 31, 2009	Depooling Implementation	2,142,538	1,825,902	10	221,215
	December 31, 2010	Actuarial Loss	2,722,306	2,410,170	11	269,933
	December 31, 2011	Actuarial Loss	1,350,620	1,232,085	12	128,612
	December 31, 2012	Actuarial Loss	1,787,426	1,668,573	13	163,454
	December 31, 2012	Assumption Change <sup>(2)</sup>	3,184,172	2,972,444	13	291,181
	December 31, 2013	Actuarial Gain	(2,500,665)	(2,382,761)	14	(220,330)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(985,653)	(939,180)	14	(86,844)
	December 31, 2014	Actuarial Gain	(2,215,758)	(2,144,210)	15	(188,096)
	December 31, 2015	Actuarial Gain	(756,551)	(740,292)	16	(61,876)
	December 31, 2015	Assumption Change <sup>(2)</sup>	355,946	348,296	16	29,112
	December 31, 2016	Actuarial Loss	1,591,375	1,576,830	17	126,057
	December 31, 2017	Actuarial Loss	1,476,313	<u>1,476,313</u>	18	<u>113,262</u>
<b>Total for Cost Group #5</b>				\$8,421,955		\$862,579

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #6</b>						
Small Districts (General Non-enhanced)						
	December 31, 2017	Actuarial Surplus	\$(111,682)	<u>\$(111,682)</u>	N/A	<u>\$0<sup>(6)</sup></u>
<b>Total for Cost Group #6</b>				<b>\$(111,682)</b>		<b>\$0</b>

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Groups #7 and #9</b>	December 31, 2007	Restart of Amortization	\$127,662,439	\$73,431,271	5	\$16,339,517
County Safety	December 31, 2008	Actuarial Loss	25,619,265	20,811,794	9	2,754,827
	December 31, 2009	Actuarial Loss	55,134,940	46,986,788	10	5,692,633
	December 31, 2009	Assumption Change <sup>(2)</sup>	11,076,665	9,439,693	10	1,143,656
	December 31, 2009	Depooling Implementation	23,852,078	20,327,083	10	2,462,706
	December 31, 2010	Actuarial Loss	57,287,975	50,719,408	11	5,680,457
	December 31, 2011	Actuarial Loss	45,209,350	41,241,636	12	4,305,018
	December 31, 2012	Actuarial Loss	53,258,503	49,717,146	13	4,870,305
	December 31, 2012	Assumption Change <sup>(2)</sup>	138,353,562	129,153,916	13	12,651,954
	December 31, 2013	Actuarial Gain	(35,024,912)	(33,373,513)	14	(3,085,991)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(43,771,706)	(41,707,901)	14	(3,856,658)
	December 31, 2014	Actuarial Gain	(61,815,393)	(59,819,350)	15	(5,247,509)
	December 31, 2014	Assumption Change <sup>(4)</sup>	(51,701)	(50,031)	15	(4,389)
	December 31, 2015	Actuarial Gain	(58,489,966)	(57,232,948)	16	(4,783,715)
	December 31, 2015	Assumption Change <sup>(2)</sup>	39,291,409	38,446,990	16	3,213,524
	December 31, 2016	Actuarial Gain	(13,557,811)	(13,433,897)	17	(1,073,949)
	December 31, 2017	Actuarial Gain	(8,178,240)	<u>(8,178,240)</u>	18	<u>(627,428)</u>
<b>Total for Cost Groups #7 and #9</b>				\$266,479,844		\$40,434,958

*Note: Results may not add due to rounding.*



**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #8</b>	December 31, 2007	Restart of Amortization	\$124,138,710	\$71,404,427	5	\$15,888,515
Contra Costa and East Fire	December 31, 2008	Actuarial Loss	6,780,436	5,508,083	9	729,097
Protection Districts	December 31, 2009	Actuarial Loss	27,018,706	23,025,730	10	2,789,657
	December 31, 2009	Assumption Change <sup>(2)</sup>	4,945,000	4,214,200	10	510,567
	December 31, 2009	Depooling Implementation	47,818,666	40,751,754	10	4,937,234
	December 31, 2010	Actuarial Loss	38,165,445	33,789,443	11	3,784,340
	December 31, 2010	Assumption Change <sup>(3)</sup>	(1,599,051)	(1,415,706)	11	(158,556)
	December 31, 2011	Actuarial Loss	26,533,166	24,204,533	12	2,526,596
	December 31, 2012	Actuarial Loss	31,501,440	29,406,791	13	2,880,697
	December 31, 2012	Assumption Change <sup>(2)</sup>	68,193,356	63,658,924	13	6,236,046
	December 31, 2013	Actuarial Gain	(22,661,640)	(21,593,160)	14	(1,996,682)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(17,910,676)	(17,066,200)	14	(1,578,082)
	December 31, 2014	Actuarial Gain	(29,217,962)	(28,274,503)	15	(2,480,312)
	December 31, 2015	Actuarial Gain	(19,005,510)	(18,597,059)	16	(1,554,403)
	December 31, 2015	Assumption Change <sup>(2)</sup>	24,296,846	23,774,678	16	1,987,165
	December 31, 2016	Actuarial Gain	(8,297,685)	(8,221,847)	17	(657,281)
	December 31, 2017	Actuarial Gain	(10,658,502)	<u>(10,658,502)</u>	18	<u>(817,711)</u>
<b>Total for Cost Group #8</b>				\$213,911,585		\$33,026,887

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #10</b>	December 31, 2007	Restart of Amortization	\$(2,591,000)	\$(1,490,340)	5	\$(331,622)
Moraga-Orinda	December 31, 2008	Actuarial Loss	2,002,150	1,626,446	9	215,290
Fire District	December 31, 2009	Actuarial Loss	5,671,684	4,833,491	10	585,596
	December 31, 2009	Assumption Change <sup>(2)</sup>	1,012,000	862,441	10	104,488
	December 31, 2009	Depooling Implementation	4,873,631	4,153,378	10	503,198
	December 31, 2010	Actuarial Loss	5,334,964	4,723,264	11	528,995
	December 31, 2010	Assumption Change <sup>(3)</sup>	806,018	713,601	11	79,922
	December 31, 2011	Actuarial Loss	6,791,005	6,195,005	12	646,667
	December 31, 2012	Actuarial Loss	8,924,598	8,331,168	13	816,124
	December 31, 2012	Assumption Change <sup>(2)</sup>	12,149,892	11,342,000	13	1,111,065
	December 31, 2013	Actuarial Gain	(1,027,440)	(978,997)	14	(90,526)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(3,613,981)	(3,443,584)	14	(318,422)
	December 31, 2014	Actuarial Gain	(4,813,045)	(4,657,630)	15	(408,579)
	December 31, 2015	Actuarial Gain	(8,490,806)	(8,308,329)	16	(694,437)
	December 31, 2015	Assumption Change <sup>(2)</sup>	3,844,347	3,761,727	16	314,417
	December 31, 2016	Actuarial Loss	1,028,690	1,019,288	17	81,485
	December 31, 2017	Actuarial Gain	(422,995)	<u>(422,995)</u>	18	<u>(32,452)</u>
<b>Total for Cost Group #10</b>				\$28,259,935		\$3,111,209

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #11</b>	December 31, 2007	Restart of Amortization	\$58,766,000	\$33,802,128	5	\$7,521,461
San Ramon Valley	December 31, 2008	Actuarial Loss	10,216,694	8,299,526	9	1,098,596
Fire District	December 31, 2009	Actuarial Loss	9,262,105	7,893,299	10	956,304
	December 31, 2009	Assumption Change <sup>(2)</sup>	2,453,000	2,090,482	10	253,270
	December 31, 2009	Depooling Implementation	(20,174,500)	(17,192,999)	10	(2,082,999)
	December 31, 2010	Actuarial Loss	6,585,812	5,830,691	11	653,024
	December 31, 2010	Assumption Change <sup>(3)</sup>	5,093,420	4,509,415	11	505,044
	December 31, 2011	Actuarial Loss	5,513,071	5,029,227	12	524,977
	December 31, 2012	Actuarial Loss	14,600,741	13,629,883	13	1,335,187
	December 31, 2012	Assumption Change <sup>(2)</sup>	26,672,143	24,898,612	13	2,439,075
	December 31, 2013	Actuarial Gain	(4,492,900)	(4,281,063)	14	(395,862)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(12,984,002)	(12,371,816)	14	(1,144,000)
	December 31, 2014	Actuarial Gain	(13,850,852)	(13,403,603)	15	(1,175,799)
	December 31, 2015	Actuarial Gain	(9,008,582)	(8,814,977)	16	(736,784)
	December 31, 2015	Assumption Change <sup>(2)</sup>	5,533,144	5,414,230	16	452,539
	December 31, 2016	Actuarial Loss	2,020,042	2,001,580	17	160,013
	December 31, 2017	UAAL Prepayment	(303,806)	(303,806)	18	(23,308)
	December 31, 2017	Actuarial Gain	(1,837,378)	<u>(1,837,378)</u>	18	<u>(140,962)</u>
<b>Total for Cost Group #11</b>				\$55,193,431		\$10,199,776

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Cost Group #12</b>	December 31, 2007	Restart of Amortization	\$3,960,000	\$2,277,787	5	\$506,840
Rodeo-Hercules Fire	December 31, 2008	Actuarial Loss	957,150	777,540	9	102,922
Protection District	December 31, 2009	Actuarial Loss	2,872,360	2,447,867	10	296,569
	December 31, 2009	Assumption Change <sup>(2)</sup>	1,154,000	983,455	10	119,149
	December 31, 2009	Depooling Implementation	(1,809,374)	(1,541,975)	10	(186,816)
	December 31, 2010	Actuarial Loss	1,502,503	1,330,228	11	148,982
	December 31, 2010	Assumption Change <sup>(3)</sup>	662,085	586,171	11	65,650
	December 31, 2011	Actuarial Loss	2,067,217	1,885,792	12	196,849
	December 31, 2012	Actuarial Loss	2,246,131	2,096,777	13	205,401
	December 31, 2012	Assumption Change <sup>(2)</sup>	3,018,796	2,818,065	13	276,058
	December 31, 2013	Actuarial Loss	413,088	393,611	14	36,397
	December 31, 2013	Assumption Change <sup>(3)</sup>	(1,169,821)	(1,114,665)	14	(103,071)
	December 31, 2014	Actuarial Loss	315,937	305,735	15	26,820
	December 31, 2015	Actuarial Gain	(990,379)	(969,095)	16	(81,000)
	December 31, 2015	Assumption Change <sup>(2)</sup>	775,874	759,200	16	63,456
	December 31, 2016	Actuarial Gain	(270,731)	(268,257)	17	(21,445)
	December 31, 2017	Actuarial Gain	(836,969)	<u>(836,969)</u>	18	<u>(64,212)</u>
<b>Total for Cost Group #12</b>				\$11,931,268		\$1,588,549

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>Special Adjustments<sup>(5)</sup></b>	December 31, 2007	County General POBs	\$(453,973,319)	\$(261,123,984)	5	\$(58,103,854)
	December 31, 2007	Moraga General POBs	(701,412)	(403,450)	5	(89,773)
	December 31, 2007	CCCFPD Safety POBs	(127,509,711)	(73,343,174)	5	(16,319,914)
	December 31, 2011	First Five UAAL Prepayment	(1,794,205)	(986,428)	5	(233,191)
	December 31, 2017	LAFCO UAAL Prepayment	(30,817)	<u>(30,817)</u>	18	<u>(2,364)</u>
<b>Total for Special Adjustments</b>				\$(335,887,854)		\$(74,749,096)
<b>Terminated Employers<sup>(7)</sup></b>				\$8,418,356		

*Note: Results may not add due to rounding.*

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>All Cost Groups Combined</b>	December 31, 2007	Restart of Amortization	\$1,139,949,302	\$655,697,374	5	\$145,902,125
	December 31, 2007	County General POBs <sup>(5)</sup>	(453,973,319)	(261,123,984)	5	(58,103,854)
	December 31, 2007	Moraga General POBs <sup>(5)</sup>	(701,412)	(403,450)	5	(89,773)
	December 31, 2007	CCCFPD Safety POBs <sup>(5)</sup>	(127,509,711)	(73,343,174)	5	(16,319,914)
	December 31, 2008	Actuarial Loss	130,938,206	106,367,571	9	14,079,721
	December 31, 2009	Actuarial Loss	278,010,637	236,924,660	10	28,704,348
	December 31, 2009	Assumption Change <sup>(2)</sup>	62,968,491	53,662,653	10	6,501,440
	December 31, 2009	Depooling Implementation	1,849,086	1,575,817	10	190,917
	December 31, 2010	Actuarial Loss	283,467,735	250,965,679	11	28,107,578
	December 31, 2010	Assumption Change <sup>(3)</sup>	15,521,464	13,741,792	11	1,539,049
	December 31, 2011	Actuarial Loss	193,788,371	176,780,896	12	18,453,318
	December 31, 2011	First Five UAAL Prepayment <sup>(5)</sup>	(1,794,205)	(986,428)	5	(233,191)
	December 31, 2012	Actuarial Loss	243,825,195	227,612,345	13	22,296,968
	December 31, 2012	Assumption Change <sup>(2)</sup>	566,553,007	528,880,776	13	51,809,307
	December 31, 2012	Sanitary UAAL Prepayment	(4,666,477)	(4,356,185)	13	(426,733)
	December 31, 2013	Actuarial Gain	(201,742,323)	(192,230,317)	14	(17,775,204)
	December 31, 2013	Assumption Change <sup>(3)</sup>	(204,017,283)	(194,398,013)	14	(17,975,648)
	December 31, 2013	Sanitary UAAL Prepayment	(4,662,899)	(4,443,047)	14	(410,841)
	December 31, 2014	Actuarial Gain	(296,704,729)	(287,124,022)	15	(25,187,262)
	December 31, 2014	Assumption Change <sup>(4)</sup>	(51,701)	(50,031)	15	(4,389)
	December 31, 2014	Sanitary UAAL Prepayment	(2,331,896)	(2,256,598)	15	(197,955)

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

**EXHIBIT J (continued)**

**Table of Amortization Bases**

	<b>Date Established</b>	<b>Source</b>	<b>Initial Amount</b>	<b>Outstanding Balance</b>	<b>Years Remaining</b>	<b>Annual Payment<sup>(1)</sup></b>
<b>All Cost Groups Combined</b>	December 31, 2015	Actuarial Gain	\$(209,125,132)	\$(204,630,787)	16	\$(17,103,705)
<b>(continued)</b>	December 31, 2015	Assumption Change <sup>(2)</sup>	114,389,471	111,931,107	16	9,355,565
	December 31, 2016	Actuarial Gain	(47,885,171)	(47,447,516)	17	(3,793,105)
	December 31, 2017	San Ramon UAAL Prepayment	(303,806)	(303,806)	18	(23,308)
	December 31, 2017	LAFCO UAAL Prepayment <sup>(5)</sup>	(30,817)	(30,817)	18	(2,364)
	December 31, 2017	Actuarial Gain	(39,963,440)	(39,963,440)	18	(3,065,962)
	December 31, 2017	CG #6 Actuarial Surplus	(111,682)	<u>(111,682)</u>	N/A	<u>0<sup>(6)</sup></u>
<b>Total for All Cost Groups</b>				\$1,050,937,373		\$166,227,128
<b>Terminated Employers<sup>(7)</sup></b>				<u>8,418,356</u>		
<b>Total CCCERA</b>				\$1,059,355,729		

### SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

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#### EXHIBIT J (continued)

#### Table of Amortization Bases

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*Note: Results may not add due to rounding.*

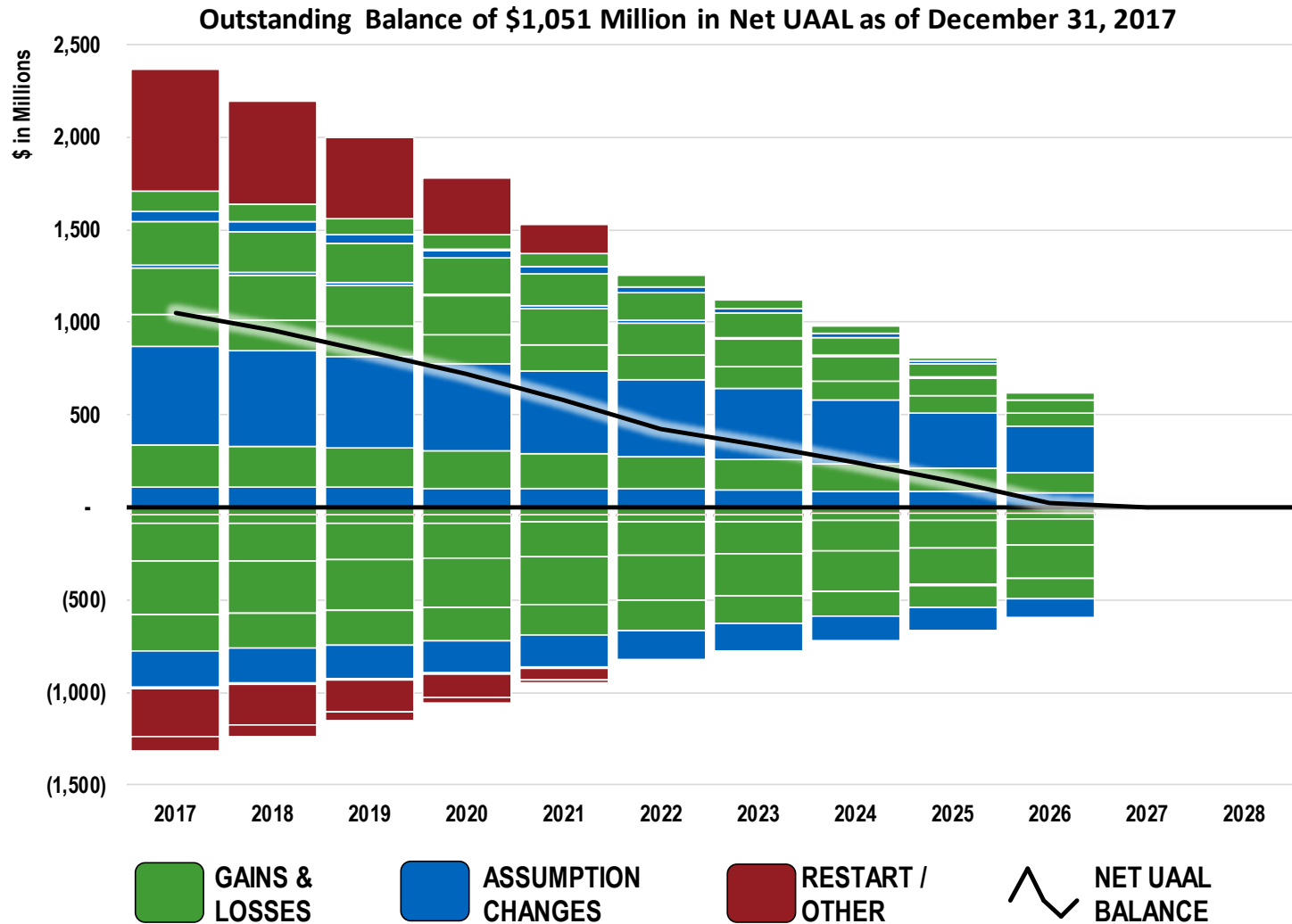
- (1) As of middle of year. The annual payment amounts shown for the Special Adjustments represent the credit allocated to the employer to reflect the receipt of the proceeds for Pension Obligation Bonds (POBs) or any other special contributions. These adjustments serve to reduce the UAAL contribution rate for these employers. The cost of debt service associated with the POBs is not reflected in this report.*
- (2) Changes in actuarial assumptions and methods from actuarial experience study.*
- (3) The Board approved changes in actuarial assumptions. Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.*
- (4) The Board approved changes in actuarial assumptions. Effective with the December 31, 2014 valuation, leave cashout (terminal pay) assumptions were eliminated for Cost Group #9.*
- (5) Includes remaining balance of POBs and any other special contributions made by the County (including Courts), First 5 – Children & Families Commission, Local Agency Formation Commission, or Moraga-Orinda Fire District that have been allocated to the County General cost groups or for Contra Costa Fire Protection District that have been allocated to their Safety cost group.*
- (6) Consistent with CCCERA's Actuarial Funding Policy, all prior UAAL layers are considered fully amortized due to surplus.*
- (7) Starting with the December 31, 2016 valuation, the three terminated employers (i.e., Diablo Water District, Delta Diablo Sanitation District and City of Pittsburg) have been moved from Cost Groups #1, #2 and #7 to their own Terminated Employers Cost Group.*



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

EXHIBIT K

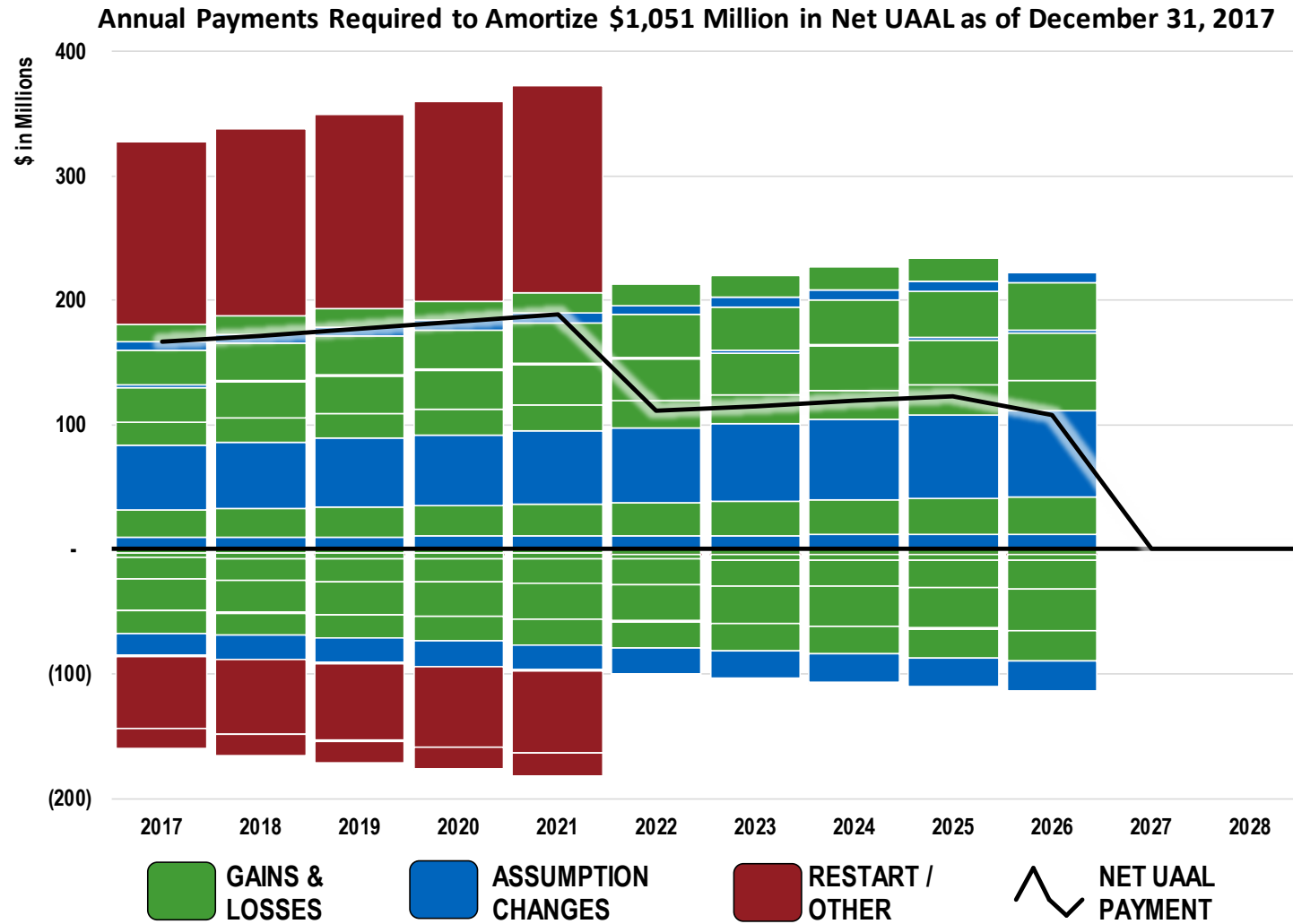
Projection of UAAL Outstanding Balances and Payments (Excludes Terminated Employers)



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

EXHIBIT K (continued)

Projection of UAAL Outstanding Balances and Payments (Excludes Terminated Employers)



### SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

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#### EXHIBIT L

#### Section 415 Limitations

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Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.

A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$220,000 for 2018. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must generally be adjusted based on each participant's circumstances, for such things as age at

retirement, form of benefits chosen and after tax contributions. Limits are also affected by the "grandfather" election under Section 415(b)(10).

For non-PEPRA members, benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

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

Contribution rates determined in this valuation have not been reduced for the Section 415 limitations. However, it is anticipated that PEPRA members will not be limited in the future due to the PEPRA compensation limit applied in the determination of their benefit. Actual limitations will result in actuarial gains as they occur.

**SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association**

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**EXHIBIT M**

**Definitions of Pension Terms**

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

**Assumptions or Actuarial Assumptions:**

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

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

**Normal Cost:**

The amount of contributions required to fund the level cost allocated to the current year of service.

**Actuarial Accrued Liability For Actives:**

The equivalent of the accumulated normal costs allocated to the years before the valuation date.

**Actuarial Accrued Liability For Pensioners:**

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

**Unfunded Actuarial Accrued Liability:**

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan.

**Amortization of the Unfunded Actuarial Accrued Liability:**

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

### SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

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<b>Investment Return:</b>	The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the market gains and losses to avoid significant swings in the value of assets from one year to the next.
<b>Payroll or Compensation:</b>	Payroll for pension purposes expected to be paid to active members during the twelve months following the valuation date. Only pay that would possibly go into the determination of retirement benefits is included.
<b>Asset Volatility Ratio:</b>	Equal to the market value of assets divided by total projected payroll. This provides an indication of the potential contribution volatility for any given level of investment volatility.
<b>Liability Volatility Ratio:</b>	Equal to the Actuarial Accrued Liability divided by total projected payroll. This provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. It also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions.

## SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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### EXHIBIT I

#### Summary of Actuarial Valuation Results

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

1. Retired members as of the valuation date (including 1,398 beneficiaries in pay status)	9,267
2. Members inactive during year ended December 31, 2017 with vested rights	3,327
3. Members active during the year ended December 31, 2017	10,038

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

1. Normal cost <sup>(1)</sup>	\$246,099
2. Present value of future benefits	10,951,764
3. Present value of future normal costs	1,712,517
4. Actuarial accrued liability <sup>(2)</sup>	9,239,247
Retired members and beneficiaries	\$5,873,018
Inactive members with vested rights	295,691
Active members	3,070,538
5. Valuation value of assets <sup>(3)</sup> (\$8,390,581 at market value as reported by CCCERA)	8,179,891
6. Unfunded actuarial accrued liability	\$1,059,356

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<sup>(1)</sup> *Includes administrative expense load*

<sup>(2)</sup> *Excludes liabilities for non-valuation reserves*

<sup>(3)</sup> *Excludes assets for non-valuation reserves*

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**EXHIBIT I (continued)**

**Summary of Actuarial Valuation Results**

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The determination of the recommended average employer contribution is as follows  
(amounts in 000s):

	<b>Dollar Amount</b>	<b>% of Payroll</b>
1. Total normal cost	\$246,099	28.59%
2. Expected employee contributions	<u>(103,551)</u>	<u>(12.03%)</u>
3. Employer normal cost: (1) + (2)	\$142,548	16.56%
4. Amortization of unfunded actuarial accrued liability	<u>167,891</u>	<u>19.51%</u>
5. Total recommended average employer contribution: (3) + (4)	\$310,439	36.07%
6. Projected payroll	\$860,625	

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## SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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### EXHIBIT II

#### Actuarial Assumptions and Methods

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<b><u>Rationale for Assumptions:</u></b>	The information and analysis used in selecting each demographic (non-economic) assumption that has a significant effect on this actuarial valuation is shown in the January 1, 2012 through December 31, 2014 Actuarial Experience Study dated June 1, 2016. The information and analysis used in selecting each economic assumption is shown in our Review of Economic Actuarial Assumptions dated April 19, 2016. Unless otherwise noted, all actuarial assumptions and methods shown below apply to both PEPRA and Non-PEPRA members.
<b><u>Economic Assumptions</u></b>	
<b>Net Investment Return:</b>	7.00%, net of investment expenses
<b>Administrative Expenses:</b>	1.13% of payroll allocated to both the employer and the member based on normal cost (before expenses) for the employer and member. This assumption changes each year based on the actual administrative expenses as a percent of actual compensation during the calendar year leading up to the valuation date.
<b>Employee Contribution Crediting Rate:</b>	7.00%, compounded semi-annually
<b>Consumer Price Index:</b>	Increase of 2.75% per year; retiree COLA increases due to CPI subject to a 3.00% maximum change per year (valued as a 2.75% increase) except for Tier 3 and PEPRA Tier 5 disability benefits and Tier 2 benefits which are subject to a 4.00% maximum change per year (valued as a 2.75% increase). Safety Tier C benefits, Safety PEPRA Tier E benefits and benefits for PEPRA Tier 4 and Tier 5 members covered under certain memoranda of understanding are subject to a 2.00% maximum change per year. For members that have COLA banks, they are reflected in projected future COLAs.  The actual COLA granted by CCCERA on April 1, 2018 has been reflected for nonactive members in the December 31, 2017 valuation.
<b>Payroll Growth:</b>	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year.



**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Increase in Internal Revenue**

**Code Section 401(a)(17)**

**Compensation Limit:**

Increase of 2.75% per year from the valuation date.

**Increase in Section 7522.10**

**Compensation Limit:**

Increase of 2.75% per year from the valuation date.

**Individual Salary Increases:**

**Annual Rate of Compensation Increase**

Inflation: 2.75% per year, plus “across the board” salary increases of 0.50% per year, plus the following merit and promotional increases:

Years of Service	General	Safety
Less than 1	10.00%	10.50%
1	7.25	7.25
2	5.25	5.75
3	3.75	4.50
4	2.75	3.00
5	2.25	1.75
6	1.75	1.25
7	1.50	1.20
8	1.25	1.15
9	1.20	1.10
10	1.15	1.05
11	1.10	1.00
12	1.00	0.95
13	0.90	0.85
14	0.80	0.80
15	0.75	0.75
16	0.75	0.75
17	0.75	0.75
18	0.75	0.75
19	0.75	0.75
20 or more	0.75	0.75

The average total assumed salary increase for active members in the December 31, 2017 actuarial valuation is 5.4%.

## SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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### Demographic Assumptions

#### **Post – Retirement Mortality Rates:**

- Healthy:* For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional MP-2015 projection scale.  
For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back three years, projected generationally with the two-dimensional MP-2015 projection scale.
- Disabled:* For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward eight years, projected generationally with the two-dimensional MP-2015 projection scale.  
For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward three years, projected generationally with the two-dimensional MP-2015 projection scale.
- Beneficiaries:* Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who has taken a service (non-disability) retirement.

The RP-2014 mortality tables and adjustments as shown above reflect the mortality experience as of the measurement date. The generational projection is a provision for future mortality improvement.

- Member Contribution Rates:* For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.  
For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

- Pre – Retirement Mortality Rates:** Headcount-Weighted RP-2014 Employee Mortality Table times 75%, projected generationally with the two-dimensional MP-2015 projection scale.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Termination Rates Before Retirement:**

<b>Age</b>	<b>Rate (%)</b>	
	<b>Mortality<sup>(1)</sup></b>	
	<b>Male</b>	<b>Female</b>
25	0.05	0.02
30	0.05	0.02
35	0.05	0.03
40	0.06	0.04
45	0.09	0.06
50	0.16	0.10
55	0.26	0.16
60	0.42	0.23
65	0.73	0.33

<sup>(1)</sup> All pre-retirement deaths are assumed to be non-service connected. Note that generational projections beyond the base year (2014) are not reflected in the above mortality rates.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Termination Rates Before Retirement (continued):**

Age	Rate (%) Disability		
	General Tier 1 and Tier 4 <sup>(1)</sup>	General Tier 3 and Tier 5 <sup>(2)</sup>	Safety <sup>(3)</sup>
20	0.01	0.01	0.02
25	0.02	0.02	0.22
30	0.04	0.03	0.42
35	0.08	0.05	0.56
40	0.22	0.08	0.66
45	0.36	0.13	1.00
50	0.52	0.16	2.88
55	0.60	0.20	4.60
60	0.60	0.28	5.00
65	0.60	0.32	5.00
70	0.60	0.32	5.00

<sup>(1)</sup> 65% of General Tier 1 and Tier 4 disabilities are assumed to be duty disabilities. The other 35% are assumed to be ordinary disabilities.  
<sup>(2)</sup> 30% of General Tier 3 and Tier 5 disabilities are assumed to be duty disabilities. The other 70% are assumed to be ordinary disabilities.  
<sup>(3)</sup> 100% of Safety disabilities are assumed to be duty disabilities.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Termination Rates Before Retirement (continued):**

Years of Service	Rate (%)	
	Withdrawal <sup>(1)</sup>	
	General	Safety
Less than 1	13.50	13.00
1	9.25	8.00
2	9.00	7.00
3	6.00	5.50
4	4.50	3.75
5	4.25	3.25
6	3.75	3.00
7	3.50	2.75
8	3.25	2.50
9	3.00	2.25
10	2.75	2.00
11	2.50	1.90
12	2.40	1.80
13	2.30	1.70
14	2.20	1.60
15	2.10	1.50
16	2.00	1.40
17	2.00	1.30
18	2.00	1.20
19	1.75	1.10
20 or more	1.50	1.00

<sup>(1)</sup> The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit. No withdrawal is assumed after a member is first assumed to retire.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Retirement Rates (General):**

Rates (%)				
Age	General Tier 1 (Enhanced)	General Tier 3 (Enhanced)	General Tier 1 (Non-enhanced)	PEPRA General Tiers 4 and 5
50	5.00	4.00	3.00	0.00
51	4.00	3.00	3.00	0.00
52	5.00	3.00	3.00	2.00
53	5.00	5.00	3.00	3.00
54	14.00	6.00	3.00	3.00
55	20.00	10.00	10.00	5.00
56	20.00	10.00	10.00	5.00
57	20.00	10.00	10.00	6.00
58	20.00	12.00	10.00	8.00
59	25.00	13.00	10.00	9.00
60	28.00	15.00	25.00	10.00
61	35.00	20.00	15.00	14.00
62	35.00	25.00	40.00	20.00
63	30.00	25.00	35.00	20.00
64	30.00	30.00	30.00	20.00
65	35.00	35.00	40.00	25.00
66	40.00	35.00	35.00	30.00
67	40.00	35.00	35.00	30.00
68	40.00	35.00	35.00	30.00
69	40.00	35.00	35.00	30.00
70	50.00	40.00	50.00	50.00
71	50.00	40.00	50.00	50.00
72	50.00	40.00	50.00	50.00
73	50.00	40.00	50.00	50.00
74	50.00	40.00	50.00	50.00
75	100.00	100.00	100.00	100.00

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Retirement Rates (Safety):**

Age	Rates (%)			
	Safety Tier A (Enhanced)	Safety Tier C (Enhanced)	Safety Tier A (Non-enhanced)	PEPRA Safety Tiers D and E
45	4.00	2.00	0.00	0.00
46	3.00	1.00	0.00	0.00
47	10.00	4.00	0.00	0.00
48	10.00	4.00	0.00	0.00
49	25.00	12.00	0.00	0.00
50	30.00	18.00	5.00	5.00
51	30.00	18.00	4.00	4.00
52	25.00	15.00	4.00	4.00
53	25.00	15.00	5.00	5.00
54	25.00	15.00	8.00	6.00
55	28.00	18.00	10.00	10.00
56	25.00	15.00	10.00	10.00
57	25.00	15.00	12.00	18.00
58	35.00	25.00	18.00	18.00
59	35.00	25.00	20.00	18.00
60	35.00	30.00	20.00	18.00
61	35.00	30.00	20.00	20.00
62	35.00	30.00	20.00	20.00
63	35.00	30.00	20.00	20.00
64	50.00	40.00	100.00	30.00
65	100.00	100.00	100.00	30.00
66	100.00	100.00	100.00	100.00

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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

For deferred vested benefits, we make the following retirement assumption:

General: Age 59

Safety: Age 54

We assume that 40% and 65% of future General and Safety deferred vested members, respectively, will continue to work for a reciprocal employer. For reciprocals, we assume 4.75% compensation increases per annum.

**Future Benefit Accruals:**

1.0 year of service per year for full-time employees. Continuation of current partial service accrual for part-time employees.

**Unknown Data for Members:**

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

**Percent Married:**

75% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement. There is no explicit assumption for children's benefits.

**Age of Spouse:**

Males are 3 years older than their spouses, and females are 2 years younger than their spouses.

**Offsets by Other Plans of the Employer for Disability Benefits:**

The Plan requires members who retire because of disability from General Tier 3 and PEPRA General Tier 5 to offset the Plan's disability benefits with other Plans of the employer. We have not assumed any offsets in this valuation.



**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Leave Cashout Assumptions:**

The following assumptions for leave cashouts as a percentage of final average pay are used:

*General Tiers 1, 2 and 3  
Safety Tiers A and C*

Cost Group 1:	1.25%
Cost Group 2:	0.50% for Tier 2 1.00% for Tier 3
Cost Group 3:	5.50%
Cost Group 4:	0.50%
Cost Group 5:	1.00%
Cost Group 6:	0.75%
Cost Group 7:	1.00%
Cost Group 8:	0.75%
Cost Group 9:	0.00%
Cost Group 10:	1.00%
Cost Group 11:	2.50%
Cost Group 12:	2.50%

The cost of this pay element is recognized in the valuation as an employer and member cost in both basic and COLA components.

*PEPRA General Tiers 4 and 5  
PEPRA Safety Tiers D and E*

None

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Service From Accumulated Sick Leave Conversion:**

The following assumptions for additional service converted from accumulated sick leave as a percentage of service at retirement are used:

Service Retirements:

General:	1.20%
Safety:	1.90%

Disability Retirements:

General:	0.08%
Safety:	1.30%

Pursuant to Section 31641.01, the cost of this benefit for the non-PEPRA tiers will be charged only to employers and will not affect member contribution rates.

**Actuarial Methods**

**Actuarial Cost Method:**

Entry Age Actuarial Cost Method. Entry Age is calculated as age on the valuation date minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percent of compensation, as if the current benefit formulas have always been in effect (i.e., “replacement life”).

**Actuarial Value of Assets:**

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

**Valuation Value of Assets:**

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

**Amortization Policy:**

The UAAL (i.e., the difference between the AAL and the Valuation Value of Assets) as of December 31, 2014 will continue to be amortized over separate amortization layers based on the valuations during which each separate layer was previously established.

Any new UAAL as a result of actuarial gains or losses identified in the annual valuation as of December 31 will be amortized over a period of 18 years.

#### SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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Any new UAAL as a result of change in actuarial assumptions or methods will be amortized over a period of 18 years.

Unless the Board adopts an alternative amortization period after receiving an actuarial analysis:

- i. With the exception noted in ii., below, the increase in UAAL as a result of any plan amendments will be amortized over a period of 10 years;
- ii. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive. If the increase in UAAL is due to the impact of benefits resulting from additional service permitted in Section 31641.04 of the 1937 CERL (Golden Handshake), the entire increase in UAAL will be funded in full upon adoption of the Golden Handshake.

The UAAL will be amortized over “closed” amortization periods so that the amortization period for each layer decreases by one year with each actuarial valuation.

The UAAL will be amortized as a level percentage of payroll so that the amortization amount in each year during the amortization period shall be expected to be a level percentage of covered payroll, taking into consideration the current assumption for general payroll increase (i.e., wage inflation).

If an overfunding or “surplus” exists (i.e., the Valuation Value of Assets exceeds the AAL, so that the total of all UAAL amortization layers become negative), any prior UAAL amortization layers will be considered fully amortized, and any subsequent UAAL will be amortized as the first of a new series of amortization layers, using the above amortization periods.

If the surplus exceeds 20% of the AAL per Section 7522.52 of the Government Code, then the amount of surplus in excess of 20% of the AAL (and any subsequent surpluses in excess of that amount) will be amortized over an “open” amortization period of 30 years, but only if the other conditions of Section 7522.52 have also been met. If those conditions are not met, then the surplus will not be amortized and the full Normal Cost will be contributed.

These amortization policy components will generally apply separately to each of CCCERA's UAAL cost groups with the exception that the conditions of Section 7522.52 apply to the total plan.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Changes in Actuarial Assumptions  
and Methods:**

The following assumption was changed. Previously, this assumption was as follows:

**Administrative Expenses:**

1.12% of payroll allocated to both the employer and the member based on normal cost (before expenses) for the employer and member. This assumption changes each year based on the actual administrative expenses as a percent of actual compensation during the calendar year leading up to the valuation date.

## SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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### EXHIBIT III

#### Summary of Plan Provisions

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

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#### Membership Eligibility:

<i>General Tier 1</i>	General members hired before July 1, 1980 and electing not to transfer to Tier 2 Plan. Certain General members with membership dates before January 1, 2013 hired by specific employers who did not adopt Tier 2 are placed in Tier 1.
<i>General Tier 2</i>	Most General members hired on or after August 1, 1980 and all General members hired before July 1, 1980 electing to transfer to the Tier 2 Plan. Effective October 1, 2002, for the County, Tier 2 was eliminated and all County employees (excluding CNA employees) in Tier 2 were placed in Tier 3. Effective January 1, 2005, all CNA employees in Tier 2 were placed in Tier 3.
<i>General Tier 3</i>	General members with membership dates before January 1, 2013 who are not placed in Tier 1 are placed in Tier 3.
<i>PEPRA General Tier 4</i>	General members with membership dates on or after January 1, 2013 hired by specific employers who did not adopt Tier 2 are placed in Tier 4.
<i>PEPRA General Tier 5</i>	General members with membership dates on or after January 1, 2013 who are not placed in Tier 4 are placed in Tier 5.
<i>Safety Tiers A and C</i>	Safety members with membership dates before January 1, 2013. County Sheriff's Department Safety members hired on or after January 1, 2007, but before January 1, 2013 are placed in Safety Tier C Enhanced.
<i>PEPRA Safety Tiers D and E</i>	Safety members with membership dates on or after January 1, 2013. Safety members from certain bargaining units are placed in Safety Tier E.

## SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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### Final Compensation for Benefit Determination:

<i>General Tier 1, Tier 3 (non-disability), and Safety Tier A</i>	Highest consecutive twelve months of compensation earnable. (FAS1) (§31462.1)
<i>General Tier 2, Tier 3 (disability), and Safety Tier C</i>	Highest consecutive thirty-six months of compensation earnable. (FAS3) (§31462)
<i>PEPRA General Tiers 4 and 5 PEPRA Safety Tiers D and E</i>	Highest consecutive thirty-six months of pensionable compensation. (FAS3) (§7522.10(c), §7522.32 and §7522.34)

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### Compensation Limit:

<i>Non-PEPRA Tiers</i>	For members with membership dates on or after January 1, 1996, Compensation Earnable is limited to Internal Revenue Code Section 401(a)(17). The limit is \$275,000 for calendar year 2018. The limit is indexed for inflation on an annual basis.
<i>PEPRA Tiers</i>	Pensionable Compensation is limited to \$121,388 for 2018 (\$145,666, if not enrolled in Social Security). The limit is indexed for inflation on an annual basis.

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### Social Security Primary Insurance Amount:

<i>General Tier 2</i>	Estimated Social Security award at age 62 assuming level future earnings. (PIA)
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### Service:

<i>All tiers</i>	Years of service*. (Yrs)
<i>General Tier 2</i>	Years of service up to a maximum of 30 years*. (Yrs30)

\* Includes accumulated sick leave as of the date of retirement (§31641.01).

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### Service Retirement Eligibility:

<i>General Tiers 1, 2 and 3</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years of service, regardless of age. (§31672)
<i>PEPRA General Tiers 4 and 5</i>	Age 52 with 5 years of service, or age 70 regardless of service. (§7522.20(a) and §31672.3)
<i>Safety Tiers A and C</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 20 years of service, regardless of age. (§31663.25)

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

*PEPRA Safety Tiers D and E* Age 50 with 5 years of service, or age 70 regardless of service. (§7522.25(a) and §31672.3)

**Benefit Formula:**

*General Tiers 1 and 3 (Non-enhanced) (§31676.11)*

Retirement Age	Benefit Formula
50	$(1.24\% \times \text{FAS1} - 1/3 \times 1.24\% \times \$350 \times 12) \times \text{Yrs}$
55	$(1.67\% \times \text{FAS1} - 1/3 \times 1.67\% \times \$350 \times 12) \times \text{Yrs}$
60	$(2.18\% \times \text{FAS1} - 1/3 \times 2.18\% \times \$350 \times 12) \times \text{Yrs}$
62	$(2.35\% \times \text{FAS1} - 1/3 \times 2.35\% \times \$350 \times 12) \times \text{Yrs}$
65 or later	$(2.61\% \times \text{FAS1} - 1/3 \times 2.61\% \times \$350 \times 12) \times \text{Yrs}$

*General Tier 1 and Tier 3 (Enhanced) (§31676.16)*

50	$(1.43\% \times \text{FAS1} - 1/3 \times 1.43\% \times \$350 \times 12) \times \text{Yrs}$
55	$(2.00\% \times \text{FAS1} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
60	$(2.26\% \times \text{FAS1} - 1/3 \times 2.26\% \times \$350 \times 12) \times \text{Yrs}$
62	$(2.37\% \times \text{FAS1} - 1/3 \times 2.37\% \times \$350 \times 12) \times \text{Yrs}$
65 or later	$(2.42\% \times \text{FAS1} - 1/3 \times 2.42\% \times \$350 \times 12) \times \text{Yrs}$

For members previously covered under the non-enhanced §31676.11 formula, they are entitled to at least the benefits they could have received under §31676.11.

<i>General Tier 2 (§31752)</i>	50	$0.83\% \times \text{FAS3} \times \text{Yrs} - 0.57\% \times \text{Yrs} \times 30 \times \text{PIA}$
	55	$1.13\% \times \text{FAS3} \times \text{Yrs} - 0.87\% \times \text{Yrs} \times 30 \times \text{PIA}$
	60	$1.43\% \times \text{FAS3} \times \text{Yrs} - 1.37\% \times \text{Yrs} \times 30 \times \text{PIA}$
	62	$1.55\% \times \text{FAS3} \times \text{Yrs} - 1.67\% \times \text{Yrs} \times 30 \times \text{PIA}$
	65 or later	$1.73\% \times \text{FAS3} \times \text{Yrs} - 1.67\% \times \text{Yrs} \times 30 \times \text{PIA}$

The offsets shown in all of the above formulas only apply to members integrated with Social Security.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Benefit Formula:**

<i>PEPRA General Tiers 4 and 5</i> (§7522.20(a))	Retirement Age	Benefit Formula
	52	1.00%xFAS3xYrs
	55	1.30%xFAS3xYrs
	60	1.80%xFAS3xYrs
	62	2.00%xFAS3xYrs
	65	2.30%xFAS3xYrs
	67 or later	2.50%xFAS3xYrs
<i>Safety Tier A (Non-enhanced)(§31664)</i>	50	2.00%xFAS1xYrs
	55 or later	2.62%xFAS1xYrs
<i>Safety Tier A (Enhanced)(§31664.1)</i>	50 or later	3.00%xFAS1xYrs
<i>Safety Tier C (Enhanced)(§31664.1)</i>	50 or later	3.00%xFAS3xYrs
<i>PEPRA Safety Tiers D and E</i> (§7522.25(d))	50	2.00%xFAS3xYrs
	55	2.50%xFAS3xYrs
	57 or later	2.70%xFAS3xYrs

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**Maximum Benefit:**

<i>General Tiers 1 and 3</i> <i>Safety Tiers A and C</i>	100% of Final Compensation (§31676.11, §31676.16, §31664, §31664.1)
<i>General Tier 2</i> <i>PEPRA General Tiers 4 and 5</i> <i>PEPRA Safety Tiers D and E</i>	None



**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Ordinary Disability:**

General Tiers 1 and 4

*Eligibility*

Five years of service (§31720).

*Benefit Formula*

1.5% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 65, but total benefit cannot be more than one-third of Final Compensation (§31727).

General Tiers 2, 3 and 5

*Eligibility*

Ten years of service (definition of disability is more strict than Tier 1 Plan) (§31720.1).

*Benefit Formula*

40% of Final Compensation plus 10% of Final Compensation used in the benefit determination for each minor child (maximum of three) (§31727.01).

*Offset*

Disability benefits are offset by other plans of the employer except Workers Compensation and Social Security.

Safety

*Eligibility*

Five years of service (§31720).

*Benefit Formula*

1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 55, but total benefit cannot be more than one-third of Final Compensation (§31727.2).

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**Line-of-Duty Disability:**

General Tiers 1 and 4, and Safety

*Eligibility*

No age or service requirements (§31720).

*Benefit Formula*

50% of the Final Compensation (§31727.4).

General Tiers 2, 3 and 5

*Eligibility*

No age or service requirements (§31720).

*Benefit Formula*

40% of Final Compensation plus 10% of Final Compensation for each minor child (maximum of three) (§31727.01).

*Offset*

Disability benefits are offset by other plans of the Employer except Workers Compensation and Social Security.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Pre-Retirement Death:**

Non-General Tier 2

*Eligibility - A*

None

*Benefit - A*

Refund of employee contributions with interest plus one month's compensation for each year of service to a maximum of six month's compensation (§31781); 50% of Final Compensation payable to spouse if Line of Duty death (§31787).

OR

*Eligibility - B*

Five years of service (Ten years for Tiers 3 and 5).

*Benefit - B*

Option 2 (100% continuation) of Service Retirement or Ordinary Disability benefit payable to designated beneficiary.

*Death in line of duty*

50% of Final compensation.

General Tier 2

*Eligibility - A*

None

*Benefit - A*

Refund of employee contributions with interest plus \$2,000 lump sum benefit offset by any Social Security payment. (§31781.01); If a Line of Duty death, then 60% of Service or Disability Retirement Benefit (minimum benefit is 24% of Final Compensation) plus, for each minor child, 10% of the allowance otherwise paid to the member. Minimum family benefit is 60% of the member's allowance. Maximum family benefit is 100% of member's allowance.

OR

*Eligibility - B*

Ten years of service.

*Benefit - B*

Option 2 (100% continuation) of Service Retirement or Ordinary Disability benefit payable to designated beneficiary.

## SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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### Death After Retirement:

#### Non-General Tier 2

##### *Service or*

##### *Ordinary Disability Retirement*

60% of member's unmodified allowance continued to eligible spouse. An eligible spouse is a surviving spouse who was married to the member one year prior to member's retirement or at least two years prior to the date of death and has attained age 55 on or prior to the date of death (§31760.2). An additional lump sum benefit of \$5,000 is payable to the member's beneficiary (§31789.5).

##### *Line-of-Duty Disability*

100% of members allowance continued to eligible spouse (§31786). An additional lump sum benefit of \$5,000 is payable to the member's beneficiary (§31789.5).

#### General Tier 2

##### *Service or*

##### *Disability Retirement*

60% of member's unmodified allowance continued to eligible spouse plus 20% of allowance to each minor child (§31789.11). Minimum benefit is 60% of allowance. Maximum benefit is 100% of allowance. \$5,000 lump sum death benefit (§31789.5) plus \$2,000 less any Social Security Lump sum payment (§31789.01) are payable to member's beneficiary.

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### Withdrawal Benefits:

##### *Less than Five Years of Service*

Refund of accumulated employee contributions with interest, or earned benefit at age 70 (§31628).

##### *Five or More Years of Service*

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

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

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**Post-Retirement**

**Cost-of-Living Benefits:**

*General Tiers 1, 3, 4 and 5  
Safety Tiers A and D*

Future changes based on Consumer Price Index to a maximum of 3% per year, excess "banked." Tier 3 and PEPRA Tier 5 disability benefits have a maximum of 4% per year, excess "banked." Benefits for PEPRA Tier 4 and Tier 5 members covered under certain memoranda of understanding have a maximum of 2% per year, excess "banked".

*General Tier 2*

Future changes based on Consumer Price Index to a maximum of 4% per year, excess "banked."

*Safety Tiers C and E*

Future changes based on Consumer Price Index to a maximum of 2% per year, excess "banked."

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**Member Contributions:**

Please refer to Appendices A and B for the specific rates.

General Tiers 1 and 3 (Non-enhanced)

*Basic*

Provide for one-half of the \$31676.11 benefit payable at age 55.

*Cost-of-Living*

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

General Tiers 1 and 3 (Enhanced)

*Basic*

Provide for an average annuity at age 60 equal to 1/120 of FAS1.

*Cost-of-Living*

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

PEPRA General Tiers 4 and 5

50% of the total Normal Cost rate.

Safety Tier A (Non-enhanced)

*Basic*

Provide for one-half of the \$31664 benefit payable at age 50.

*Cost-of-Living*

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

#### SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

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##### Member Contributions (continued):

Safety Tier A (Enhanced)

*Basic*

Provide for an average annuity at age 50 equal to 1/100 of FAS1.

*Cost-of-Living*

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

Safety Tier C (Enhanced)

*Basic*

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

*Cost-of-Living*

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

PEPRA Safety Tiers D and E

50% of the total Normal Cost rate.

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##### Other Information:

Transfers from the Tier 1 Plan to the Tier 2 Plan were made on an individual voluntary irrevocable basis. Credit is given under the Tier 2 Plan for future service only. The Cost-of-Living maximum is 4% only for the credit under the Tier 2 Plan. Transferred Tier 2 Plan members keep the five-year requirement for nonservice-connected disability. Those who were members on or before March 7, 1973 and Safety members under the enhanced benefit formula with membership dates on or before January 1, 2013 will be exempt from paying member contributions after 30 years of service.

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##### Plan Provisions Not Valued:

Additional \$5,000 lump sum post-retirement death benefit (except for \$2,000 for General Tier 2 members paid out of the Valuation Value of Assets) payable to a member's beneficiary. This benefit is paid from a reserve that is not included in the Valuation Value of Assets and is subject at all times to the availability of funds.

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##### Plan Changes:

There have been no changes in plan provisions since the previous actuarial valuation.

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

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #1 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>		<b>COLA</b>		<b>Total</b>	
	<b>First \$350</b>	<b>Over \$350</b>	<b>First \$350</b>	<b>Over \$350</b>	<b>First \$350</b>	<b>Over \$350</b>
15	3.76%	5.41%	1.79%	2.69%	5.55%	8.10%
16	3.82%	5.50%	1.83%	2.74%	5.65%	8.24%
17	3.88%	5.59%	1.86%	2.79%	5.74%	8.38%
18	3.94%	5.68%	1.89%	2.84%	5.83%	8.52%
19	4.00%	5.77%	1.93%	2.89%	5.93%	8.66%
20	4.06%	5.86%	1.96%	2.94%	6.02%	8.80%
21	4.13%	5.96%	1.99%	2.99%	6.12%	8.95%
22	4.19%	6.05%	2.03%	3.04%	6.22%	9.09%
23	4.26%	6.15%	2.07%	3.10%	6.33%	9.25%
24	4.32%	6.25%	2.10%	3.15%	6.42%	9.40%
25	4.39%	6.35%	2.14%	3.21%	6.53%	9.56%
26	4.46%	6.45%	2.17%	3.26%	6.63%	9.71%
27	4.53%	6.56%	2.21%	3.32%	6.74%	9.88%
28	4.60%	6.66%	2.25%	3.37%	6.85%	10.03%
29	4.67%	6.77%	2.29%	3.43%	6.96%	10.20%
30	4.74%	6.88%	2.33%	3.49%	7.07%	10.37%
31	4.82%	6.99%	2.37%	3.55%	7.19%	10.54%
32	4.89%	7.10%	2.41%	3.61%	7.30%	10.71%
33	4.96%	7.21%	2.45%	3.67%	7.41%	10.88%
34	5.04%	7.33%	2.49%	3.74%	7.53%	11.07%
35	5.12%	7.45%	2.53%	3.80%	7.65%	11.25%
36	5.20%	7.57%	2.58%	3.87%	7.78%	11.44%
37	5.28%	7.69%	2.63%	3.94%	7.91%	11.63%
38	5.37%	7.82%	2.67%	4.01%	8.04%	11.83%
39	5.46%	7.95%	2.72%	4.08%	8.18%	12.03%
40	5.54%	8.08%	2.77%	4.15%	8.31%	12.23%
41	5.64%	8.22%	2.81%	4.22%	8.45%	12.44%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #1 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
42	5.73%	8.36%	2.87%	4.30%	8.60%	12.66%
43	5.82%	8.50%	2.92%	4.38%	8.74%	12.88%
44	5.92%	8.65%	2.97%	4.46%	8.89%	13.11%
45	6.03%	8.81%	3.03%	4.55%	9.06%	13.36%
46	6.12%	8.95%	3.08%	4.62%	9.20%	13.57%
47	6.22%	9.10%	3.13%	4.70%	9.35%	13.80%
48	6.32%	9.25%	3.19%	4.79%	9.51%	14.04%
49	6.43%	9.41%	3.25%	4.87%	9.68%	14.28%
50	6.54%	9.57%	3.31%	4.96%	9.85%	14.53%
51	6.64%	9.73%	3.37%	5.05%	10.01%	14.78%
52	6.76%	9.90%	3.43%	5.14%	10.19%	15.04%
53	6.86%	10.06%	3.49%	5.23%	10.35%	15.29%
54	6.94%	10.18%	3.53%	5.29%	10.47%	15.47%
55	7.04%	10.32%	3.58%	5.37%	10.62%	15.69%
56	7.09%	10.40%	3.61%	5.41%	10.70%	15.81%
57	7.08%	10.39%	3.61%	5.41%	10.69%	15.80%
58	7.02%	10.29%	3.57%	5.35%	10.59%	15.64%
59	6.84%	10.02%	3.47%	5.21%	10.31%	15.23%
60	6.84%	10.02%	3.47%	5.21%	10.31%	15.23%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 1.25%

COLA Loading: 54.51% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #2 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.76%	5.40%	1.65%	2.47%	5.41%	7.87%
16	3.82%	5.49%	1.67%	2.51%	5.49%	8.00%
17	3.88%	5.58%	1.71%	2.56%	5.59%	8.14%
18	3.94%	5.67%	1.73%	2.60%	5.67%	8.27%
19	4.00%	5.76%	1.77%	2.65%	5.77%	8.41%
20	4.06%	5.85%	1.79%	2.69%	5.85%	8.54%
21	4.12%	5.94%	1.83%	2.74%	5.95%	8.68%
22	4.18%	6.04%	1.86%	2.79%	6.04%	8.83%
23	4.25%	6.14%	1.89%	2.84%	6.14%	8.98%
24	4.32%	6.24%	1.93%	2.89%	6.25%	9.13%
25	4.38%	6.34%	1.96%	2.94%	6.34%	9.28%
26	4.45%	6.44%	1.99%	2.99%	6.44%	9.43%
27	4.52%	6.54%	2.03%	3.04%	6.55%	9.58%
28	4.58%	6.64%	2.06%	3.09%	6.64%	9.73%
29	4.66%	6.75%	2.09%	3.14%	6.75%	9.89%
30	4.73%	6.86%	2.13%	3.20%	6.86%	10.06%
31	4.80%	6.97%	2.17%	3.25%	6.97%	10.22%
32	4.88%	7.08%	2.21%	3.31%	7.09%	10.39%
33	4.96%	7.20%	2.25%	3.37%	7.21%	10.57%
34	5.03%	7.31%	2.28%	3.42%	7.31%	10.73%
35	5.11%	7.43%	2.32%	3.48%	7.43%	10.91%
36	5.19%	7.55%	2.36%	3.54%	7.55%	11.09%
37	5.28%	7.68%	2.41%	3.61%	7.69%	11.29%
38	5.36%	7.80%	2.45%	3.67%	7.81%	11.47%
39	5.44%	7.93%	2.49%	3.73%	7.93%	11.66%
40	5.54%	8.07%	2.53%	3.80%	8.07%	11.87%
41	5.62%	8.20%	2.58%	3.87%	8.20%	12.07%



**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #2 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
42	5.72%	8.34%	2.63%	3.94%	8.35%	12.28%
43	5.82%	8.49%	2.67%	4.01%	8.49%	12.50%
44	5.91%	8.63%	2.72%	4.08%	8.63%	12.71%
45	6.01%	8.78%	2.77%	4.16%	8.78%	12.94%
46	6.12%	8.94%	2.83%	4.24%	8.95%	13.18%
47	6.22%	9.09%	2.87%	4.31%	9.09%	13.40%
48	6.31%	9.23%	2.92%	4.38%	9.23%	13.61%
49	6.41%	9.38%	2.97%	4.46%	9.38%	13.84%
50	6.52%	9.54%	3.03%	4.54%	9.55%	14.08%
51	6.64%	9.72%	3.09%	4.63%	9.73%	14.35%
52	6.74%	9.88%	3.14%	4.71%	9.88%	14.59%
53	6.84%	10.03%	3.19%	4.78%	10.03%	14.81%
54	6.94%	10.18%	3.24%	4.86%	10.18%	15.04%
55	7.01%	10.28%	3.27%	4.91%	10.28%	15.19%
56	7.06%	10.35%	3.29%	4.94%	10.35%	15.29%
57	7.04%	10.32%	3.29%	4.93%	10.33%	15.25%
58	6.93%	10.16%	3.23%	4.85%	10.16%	15.01%
59	6.85%	10.04%	3.19%	4.79%	10.04%	14.83%
60	6.85%	10.04%	3.19%	4.79%	10.04%	14.83%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 0.50% for Tier 2 and 1.00% for Tier 3

COLA Loading: 50.01% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #3 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.90%	5.62%	1.90%	2.85%	5.80%	8.47%
16	3.96%	5.71%	1.93%	2.90%	5.89%	8.61%
17	4.02%	5.80%	1.97%	2.95%	5.99%	8.75%
18	4.09%	5.90%	2.00%	3.00%	6.09%	8.90%
19	4.15%	5.99%	2.03%	3.05%	6.18%	9.04%
20	4.22%	6.09%	2.07%	3.11%	6.29%	9.20%
21	4.28%	6.18%	2.11%	3.16%	6.39%	9.34%
22	4.34%	6.28%	2.14%	3.21%	6.48%	9.49%
23	4.42%	6.39%	2.18%	3.27%	6.60%	9.66%
24	4.48%	6.49%	2.22%	3.33%	6.70%	9.82%
25	4.55%	6.59%	2.26%	3.39%	6.81%	9.98%
26	4.62%	6.70%	2.30%	3.45%	6.92%	10.15%
27	4.70%	6.81%	2.34%	3.51%	7.04%	10.32%
28	4.76%	6.91%	2.37%	3.56%	7.13%	10.47%
29	4.84%	7.03%	2.42%	3.63%	7.26%	10.66%
30	4.92%	7.14%	2.46%	3.69%	7.38%	10.83%
31	4.99%	7.25%	2.50%	3.75%	7.49%	11.00%
32	5.07%	7.37%	2.55%	3.82%	7.62%	11.19%
33	5.15%	7.49%	2.59%	3.88%	7.74%	11.37%
34	5.23%	7.61%	2.63%	3.95%	7.86%	11.56%
35	5.31%	7.73%	2.68%	4.02%	7.99%	11.75%
36	5.40%	7.86%	2.73%	4.09%	8.13%	11.95%
37	5.48%	7.99%	2.77%	4.16%	8.25%	12.15%
38	5.57%	8.12%	2.82%	4.23%	8.39%	12.35%
39	5.66%	8.25%	2.87%	4.30%	8.53%	12.55%
40	5.75%	8.39%	2.92%	4.38%	8.67%	12.77%
41	5.84%	8.53%	2.97%	4.46%	8.81%	12.99%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #3 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
42	5.94%	8.68%	3.03%	4.54%	8.97%	13.22%
43	6.04%	8.82%	3.08%	4.62%	9.12%	13.44%
44	6.14%	8.98%	3.14%	4.71%	9.28%	13.69%
45	6.24%	9.13%	3.19%	4.79%	9.43%	13.92%
46	6.34%	9.28%	3.25%	4.87%	9.59%	14.15%
47	6.45%	9.44%	3.31%	4.96%	9.76%	14.40%
48	6.56%	9.60%	3.37%	5.05%	9.93%	14.65%
49	6.65%	9.74%	3.42%	5.13%	10.07%	14.87%
50	6.76%	9.91%	3.48%	5.22%	10.24%	15.13%
51	6.87%	10.07%	3.54%	5.31%	10.41%	15.38%
52	6.98%	10.24%	3.60%	5.40%	10.58%	15.64%
53	7.09%	10.40%	3.66%	5.49%	10.75%	15.89%
54	7.18%	10.54%	3.71%	5.57%	10.89%	16.11%
55	7.24%	10.62%	3.74%	5.61%	10.98%	16.23%
56	7.28%	10.69%	3.77%	5.65%	11.05%	16.34%
57	7.26%	10.66%	3.76%	5.64%	11.02%	16.30%
58	7.14%	10.48%	3.69%	5.54%	10.83%	16.02%
59	6.77%	9.92%	3.49%	5.23%	10.26%	15.15%
60	6.77%	9.92%	3.49%	5.23%	10.26%	15.15%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 5.50%

COLA Loading: 55.32% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #4 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.74%	5.38%	1.78%	2.67%	5.52%	8.05%
16	3.80%	5.46%	1.81%	2.71%	5.61%	8.17%
17	3.86%	5.55%	1.84%	2.76%	5.70%	8.31%
18	3.92%	5.64%	1.87%	2.81%	5.79%	8.45%
19	3.98%	5.73%	1.91%	2.86%	5.89%	8.59%
20	4.04%	5.82%	1.94%	2.91%	5.98%	8.73%
21	4.10%	5.92%	1.97%	2.96%	6.07%	8.88%
22	4.16%	6.01%	2.01%	3.01%	6.17%	9.02%
23	4.23%	6.11%	2.04%	3.06%	6.27%	9.17%
24	4.30%	6.21%	2.08%	3.12%	6.38%	9.33%
25	4.36%	6.31%	2.11%	3.17%	6.47%	9.48%
26	4.43%	6.41%	2.15%	3.23%	6.58%	9.64%
27	4.50%	6.51%	2.19%	3.28%	6.69%	9.79%
28	4.57%	6.62%	2.23%	3.34%	6.80%	9.96%
29	4.64%	6.72%	2.27%	3.40%	6.91%	10.12%
30	4.71%	6.83%	2.31%	3.46%	7.02%	10.29%
31	4.78%	6.94%	2.35%	3.52%	7.13%	10.46%
32	4.86%	7.05%	2.39%	3.58%	7.25%	10.63%
33	4.94%	7.17%	2.43%	3.64%	7.37%	10.81%
34	5.01%	7.28%	2.47%	3.70%	7.48%	10.98%
35	5.09%	7.40%	2.51%	3.77%	7.60%	11.17%
36	5.17%	7.52%	2.55%	3.83%	7.72%	11.35%
37	5.25%	7.64%	2.60%	3.90%	7.85%	11.54%
38	5.34%	7.77%	2.65%	3.97%	7.99%	11.74%
39	5.42%	7.90%	2.69%	4.04%	8.11%	11.94%
40	5.51%	8.03%	2.74%	4.11%	8.25%	12.14%
41	5.60%	8.16%	2.79%	4.18%	8.39%	12.34%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #4 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<u>Entry Age</u>	<u>Basic</u>		<u>COLA</u>		<u>Total</u>	
	<u>First \$350</u>	<u>Over \$350</u>	<u>First \$350</u>	<u>Over \$350</u>	<u>First \$350</u>	<u>Over \$350</u>
42	5.69%	8.30%	2.83%	4.25%	8.52%	12.55%
43	5.79%	8.45%	2.89%	4.34%	8.68%	12.79%
44	5.88%	8.59%	2.94%	4.41%	8.82%	13.00%
45	5.99%	8.75%	3.00%	4.50%	8.99%	13.25%
46	6.09%	8.90%	3.05%	4.58%	9.14%	13.48%
47	6.19%	9.05%	3.11%	4.66%	9.30%	13.71%
48	6.28%	9.19%	3.16%	4.74%	9.44%	13.93%
49	6.39%	9.35%	3.22%	4.83%	9.61%	14.18%
50	6.49%	9.50%	3.27%	4.91%	9.76%	14.41%
51	6.60%	9.67%	3.33%	5.00%	9.93%	14.67%
52	6.72%	9.84%	3.39%	5.09%	10.11%	14.93%
53	6.82%	9.99%	3.45%	5.17%	10.27%	15.16%
54	6.91%	10.13%	3.50%	5.25%	10.41%	15.38%
55	6.99%	10.25%	3.54%	5.31%	10.53%	15.56%
56	7.06%	10.36%	3.58%	5.37%	10.64%	15.73%
57	7.05%	10.34%	3.57%	5.36%	10.62%	15.70%
58	6.95%	10.19%	3.52%	5.28%	10.47%	15.47%
59	6.68%	9.79%	3.37%	5.06%	10.05%	14.85%
60	6.68%	9.79%	3.37%	5.06%	10.05%	14.85%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 0.50%

COLA Loading: 54.34% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #5 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.76%	5.40%	1.77%	2.66%	5.53%	8.06%
16	3.82%	5.49%	1.80%	2.70%	5.62%	8.19%
17	3.88%	5.58%	1.83%	2.75%	5.71%	8.33%
18	3.94%	5.67%	1.87%	2.80%	5.81%	8.47%
19	4.00%	5.76%	1.90%	2.85%	5.90%	8.61%
20	4.06%	5.85%	1.93%	2.90%	5.99%	8.75%
21	4.12%	5.94%	1.97%	2.95%	6.09%	8.89%
22	4.18%	6.04%	2.00%	3.00%	6.18%	9.04%
23	4.25%	6.14%	2.03%	3.05%	6.28%	9.19%
24	4.32%	6.24%	2.07%	3.11%	6.39%	9.35%
25	4.38%	6.34%	2.11%	3.16%	6.49%	9.50%
26	4.45%	6.44%	2.15%	3.22%	6.60%	9.66%
27	4.52%	6.54%	2.18%	3.27%	6.70%	9.81%
28	4.58%	6.64%	2.21%	3.32%	6.79%	9.96%
29	4.66%	6.75%	2.25%	3.38%	6.91%	10.13%
30	4.73%	6.86%	2.29%	3.44%	7.02%	10.30%
31	4.80%	6.97%	2.33%	3.50%	7.13%	10.47%
32	4.88%	7.08%	2.37%	3.56%	7.25%	10.64%
33	4.96%	7.20%	2.42%	3.63%	7.38%	10.83%
34	5.03%	7.31%	2.46%	3.69%	7.49%	11.00%
35	5.11%	7.43%	2.50%	3.75%	7.61%	11.18%
36	5.19%	7.55%	2.54%	3.81%	7.73%	11.36%
37	5.28%	7.68%	2.59%	3.88%	7.87%	11.56%
38	5.36%	7.80%	2.63%	3.95%	7.99%	11.75%
39	5.44%	7.93%	2.68%	4.02%	8.12%	11.95%
40	5.54%	8.07%	2.73%	4.09%	8.27%	12.16%
41	5.62%	8.20%	2.77%	4.16%	8.39%	12.36%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #5 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
42	5.72%	8.34%	2.83%	4.24%	8.55%	12.58%
43	5.82%	8.49%	2.88%	4.32%	8.70%	12.81%
44	5.91%	8.63%	2.93%	4.40%	8.84%	13.03%
45	6.01%	8.78%	2.99%	4.48%	9.00%	13.26%
46	6.12%	8.94%	3.04%	4.56%	9.16%	13.50%
47	6.22%	9.09%	3.09%	4.64%	9.31%	13.73%
48	6.31%	9.23%	3.15%	4.72%	9.46%	13.95%
49	6.41%	9.38%	3.20%	4.80%	9.61%	14.18%
50	6.52%	9.54%	3.26%	4.89%	9.78%	14.43%
51	6.64%	9.72%	3.32%	4.98%	9.96%	14.70%
52	6.74%	9.88%	3.38%	5.07%	10.12%	14.95%
53	6.84%	10.03%	3.43%	5.15%	10.27%	15.18%
54	6.94%	10.18%	3.49%	5.23%	10.43%	15.41%
55	7.01%	10.28%	3.53%	5.29%	10.54%	15.57%
56	7.06%	10.35%	3.55%	5.32%	10.61%	15.67%
57	7.04%	10.32%	3.54%	5.31%	10.58%	15.63%
58	6.93%	10.16%	3.48%	5.22%	10.41%	15.38%
59	6.85%	10.04%	3.44%	5.16%	10.29%	15.20%
60	6.85%	10.04%	3.44%	5.16%	10.29%	15.20%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 1.00%

COLA Loading: 53.88% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #6 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	4.24%	6.13%	1.74%	2.61%	5.98%	8.74%
16	4.31%	6.23%	1.77%	2.66%	6.08%	8.89%
17	4.38%	6.33%	1.81%	2.71%	6.19%	9.04%
18	4.44%	6.43%	1.83%	2.75%	6.27%	9.18%
19	4.52%	6.54%	1.87%	2.80%	6.39%	9.34%
20	4.58%	6.64%	1.90%	2.85%	6.48%	9.49%
21	4.66%	6.75%	1.93%	2.90%	6.59%	9.65%
22	4.73%	6.86%	1.97%	2.95%	6.70%	9.81%
23	4.80%	6.97%	2.00%	3.00%	6.80%	9.97%
24	4.88%	7.08%	2.03%	3.05%	6.91%	10.13%
25	4.96%	7.20%	2.07%	3.11%	7.03%	10.31%
26	5.03%	7.31%	2.11%	3.16%	7.14%	10.47%
27	5.11%	7.43%	2.14%	3.21%	7.25%	10.64%
28	5.19%	7.55%	2.18%	3.27%	7.37%	10.82%
29	5.27%	7.67%	2.22%	3.33%	7.49%	11.00%
30	5.36%	7.80%	2.26%	3.39%	7.62%	11.19%
31	5.44%	7.93%	2.30%	3.45%	7.74%	11.38%
32	5.53%	8.06%	2.34%	3.51%	7.87%	11.57%
33	5.62%	8.19%	2.38%	3.57%	8.00%	11.76%
34	5.70%	8.32%	2.42%	3.63%	8.12%	11.95%
35	5.80%	8.46%	2.46%	3.69%	8.26%	12.15%
36	5.90%	8.61%	2.51%	3.76%	8.41%	12.37%
37	5.99%	8.75%	2.55%	3.82%	8.54%	12.57%
38	6.09%	8.90%	2.59%	3.89%	8.68%	12.79%
39	6.20%	9.06%	2.65%	3.97%	8.85%	13.03%
40	6.31%	9.23%	2.70%	4.05%	9.01%	13.28%
41	6.41%	9.38%	2.75%	4.12%	9.16%	13.50%



**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**General Cost Group #6 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
42	6.52%	9.54%	2.79%	4.19%	9.31%	13.73%
43	6.62%	9.69%	2.84%	4.26%	9.46%	13.95%
44	6.73%	9.86%	2.89%	4.34%	9.62%	14.20%
45	6.84%	10.02%	2.94%	4.41%	9.78%	14.43%
46	6.95%	10.19%	2.99%	4.49%	9.94%	14.68%
47	7.08%	10.38%	3.05%	4.58%	10.13%	14.96%
48	7.18%	10.53%	3.10%	4.65%	10.28%	15.18%
49	7.28%	10.69%	3.15%	4.72%	10.43%	15.41%
50	7.38%	10.83%	3.19%	4.79%	10.57%	15.62%
51	7.42%	10.90%	3.21%	4.82%	10.63%	15.72%
52	7.40%	10.87%	3.20%	4.80%	10.60%	15.67%
53	7.30%	10.71%	3.15%	4.73%	10.45%	15.44%
54	7.01%	10.28%	3.02%	4.53%	10.03%	14.81%
55	7.01%	10.28%	3.02%	4.53%	10.03%	14.81%
56	7.01%	10.28%	3.02%	4.53%	10.03%	14.81%
57	7.01%	10.28%	3.02%	4.53%	10.03%	14.81%
58	7.01%	10.28%	3.02%	4.53%	10.03%	14.81%
59	7.01%	10.28%	3.02%	4.53%	10.03%	14.81%
60	7.01%	10.28%	3.02%	4.53%	10.03%	14.81%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 0.75%

COLA Loading: 46.19% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #7 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
15	9.05%	6.42%	15.47%
16	9.05%	6.42%	15.47%
17	9.05%	6.42%	15.47%
18	9.05%	6.42%	15.47%
19	9.05%	6.42%	15.47%
20	9.05%	6.42%	15.47%
21	9.05%	6.42%	15.47%
22	9.19%	6.52%	15.71%
23	9.34%	6.63%	15.97%
24	9.50%	6.75%	16.25%
25	9.65%	6.87%	16.52%
26	9.81%	6.99%	16.80%
27	9.97%	7.11%	17.08%
28	10.14%	7.23%	17.37%
29	10.31%	7.36%	17.67%
30	10.48%	7.49%	17.97%
31	10.65%	7.61%	18.26%
32	10.84%	7.76%	18.60%
33	11.03%	7.90%	18.93%
34	11.22%	8.04%	19.26%
35	11.42%	8.19%	19.61%
36	11.62%	8.34%	19.96%
37	11.81%	8.48%	20.29%
38	12.01%	8.63%	20.64%
39	12.22%	8.79%	21.01%
40	12.44%	8.95%	21.39%
41	12.67%	9.13%	21.80%
42	12.90%	9.30%	22.20%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #7 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
43	13.19%	9.51%	22.70%
44	13.42%	9.69%	23.11%
45	13.62%	9.84%	23.46%
46	13.66%	9.87%	23.53%
47	13.60%	9.82%	23.42%
48	13.39%	9.66%	23.05%
49	13.01%	9.38%	22.39%
50	13.01%	9.38%	22.39%
51	13.01%	9.38%	22.39%
52	13.01%	9.38%	22.39%
53	13.01%	9.38%	22.39%
54	13.01%	9.38%	22.39%
55	13.01%	9.38%	22.39%
56	13.01%	9.38%	22.39%
57	13.01%	9.38%	22.39%
58	13.01%	9.38%	22.39%
59	13.01%	9.38%	22.39%
60	13.01%	9.38%	22.39%

Interest: 7.00%  
 Salary Increase: See Exhibit II.  
 Administrative Expense: 0.47% of payroll added to Basic rates  
 Leave Cashout: 1.00%  
 COLA Loading: 74.80% applied to Basic rates prior to adjustment for administrative expenses.  
 Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #8 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
15	9.03%	6.56%	15.59%
16	9.03%	6.56%	15.59%
17	9.03%	6.56%	15.59%
18	9.03%	6.56%	15.59%
19	9.03%	6.56%	15.59%
20	9.03%	6.56%	15.59%
21	9.03%	6.56%	15.59%
22	9.17%	6.66%	15.83%
23	9.32%	6.78%	16.10%
24	9.48%	6.90%	16.38%
25	9.63%	7.01%	16.64%
26	9.79%	7.14%	16.93%
27	9.95%	7.26%	17.21%
28	10.12%	7.39%	17.51%
29	10.28%	7.51%	17.79%
30	10.46%	7.65%	18.11%
31	10.64%	7.79%	18.43%
32	10.82%	7.93%	18.75%
33	11.00%	8.06%	19.06%
34	11.20%	8.22%	19.42%
35	11.39%	8.36%	19.75%
36	11.59%	8.52%	20.11%
37	11.79%	8.67%	20.46%
38	11.99%	8.82%	20.81%
39	12.20%	8.98%	21.18%
40	12.41%	9.14%	21.55%
41	12.63%	9.31%	21.94%
42	12.88%	9.50%	22.38%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #8 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
43	13.16%	9.72%	22.88%
44	13.42%	9.92%	23.34%
45	13.58%	10.04%	23.62%
46	13.61%	10.06%	23.67%
47	13.52%	9.99%	23.51%
48	13.41%	9.91%	23.32%
49	13.04%	9.63%	22.67%
50	13.04%	9.63%	22.67%
51	13.04%	9.63%	22.67%
52	13.04%	9.63%	22.67%
53	13.04%	9.63%	22.67%
54	13.04%	9.63%	22.67%
55	13.04%	9.63%	22.67%
56	13.04%	9.63%	22.67%
57	13.04%	9.63%	22.67%
58	13.04%	9.63%	22.67%
59	13.04%	9.63%	22.67%
60	13.04%	9.63%	22.67%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 0.75%

COLA Loading: 76.58% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #9 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
15	8.64%	3.90%	12.54%
16	8.64%	3.90%	12.54%
17	8.64%	3.90%	12.54%
18	8.64%	3.90%	12.54%
19	8.64%	3.90%	12.54%
20	8.64%	3.90%	12.54%
21	8.64%	3.90%	12.54%
22	8.78%	3.97%	12.75%
23	8.92%	4.04%	12.96%
24	9.07%	4.11%	13.18%
25	9.22%	4.18%	13.40%
26	9.37%	4.25%	13.62%
27	9.52%	4.32%	13.84%
28	9.68%	4.40%	14.08%
29	9.84%	4.48%	14.32%
30	10.01%	4.56%	14.57%
31	10.18%	4.64%	14.82%
32	10.35%	4.72%	15.07%
33	10.53%	4.81%	15.34%
34	10.71%	4.89%	15.60%
35	10.89%	4.98%	15.87%
36	11.07%	5.06%	16.13%
37	11.25%	5.15%	16.40%
38	11.45%	5.25%	16.70%
39	11.64%	5.34%	16.98%
40	11.83%	5.43%	17.26%
41	12.05%	5.53%	17.58%
42	12.27%	5.64%	17.91%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #9 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
43	12.45%	5.72%	18.17%
44	12.53%	5.76%	18.29%
45	12.51%	5.75%	18.26%
46	12.43%	5.71%	18.14%
47	12.17%	5.59%	17.76%
48	12.55%	5.77%	18.32%
49	13.14%	6.05%	19.19%
50	13.14%	6.05%	19.19%
51	13.14%	6.05%	19.19%
52	13.14%	6.05%	19.19%
53	13.14%	6.05%	19.19%
54	13.14%	6.05%	19.19%
55	13.14%	6.05%	19.19%
56	13.14%	6.05%	19.19%
57	13.14%	6.05%	19.19%
58	13.14%	6.05%	19.19%
59	13.14%	6.05%	19.19%
60	13.14%	6.05%	19.19%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 0.00%

COLA Loading: 47.78% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #10 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
15	9.05%	6.39%	15.44%
16	9.05%	6.39%	15.44%
17	9.05%	6.39%	15.44%
18	9.05%	6.39%	15.44%
19	9.05%	6.39%	15.44%
20	9.05%	6.39%	15.44%
21	9.05%	6.39%	15.44%
22	9.19%	6.50%	15.69%
23	9.34%	6.61%	15.95%
24	9.50%	6.73%	16.23%
25	9.65%	6.84%	16.49%
26	9.81%	6.96%	16.77%
27	9.97%	7.08%	17.05%
28	10.14%	7.20%	17.34%
29	10.31%	7.33%	17.64%
30	10.48%	7.46%	17.94%
31	10.65%	7.58%	18.23%
32	10.84%	7.73%	18.57%
33	11.03%	7.87%	18.90%
34	11.22%	8.01%	19.23%
35	11.42%	8.16%	19.58%
36	11.62%	8.31%	19.93%
37	11.81%	8.45%	20.26%
38	12.01%	8.60%	20.61%
39	12.22%	8.75%	20.97%
40	12.44%	8.92%	21.36%
41	12.67%	9.09%	21.76%
42	12.90%	9.26%	22.16%



**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #10 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
43	13.19%	9.48%	22.67%
44	13.42%	9.65%	23.07%
45	13.62%	9.80%	23.42%
46	13.66%	9.83%	23.49%
47	13.60%	9.78%	23.38%
48	13.39%	9.63%	23.02%
49	13.01%	9.34%	22.35%
50	13.01%	9.34%	22.35%
51	13.01%	9.34%	22.35%
52	13.01%	9.34%	22.35%
53	13.01%	9.34%	22.35%
54	13.01%	9.34%	22.35%
55	13.01%	9.34%	22.35%
56	13.01%	9.34%	22.35%
57	13.01%	9.34%	22.35%
58	13.01%	9.34%	22.35%
59	13.01%	9.34%	22.35%
60	13.01%	9.34%	22.35%

Interest: 7.00%  
 Salary Increase: See Exhibit II.  
 Administrative Expense: 0.47% of payroll added to Basic rates  
 Leave Cashout: 1.00%  
 COLA Loading: 74.50% applied to Basic rates prior to adjustment for administrative expenses.  
 Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #11 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
15	9.17%	6.88%	16.05%
16	9.17%	6.88%	16.05%
17	9.17%	6.88%	16.05%
18	9.17%	6.88%	16.05%
19	9.17%	6.88%	16.05%
20	9.17%	6.88%	16.05%
21	9.17%	6.88%	16.05%
22	9.32%	7.00%	16.32%
23	9.47%	7.12%	16.59%
24	9.63%	7.25%	16.88%
25	9.78%	7.37%	17.15%
26	9.94%	7.49%	17.43%
27	10.11%	7.63%	17.74%
28	10.28%	7.76%	18.04%
29	10.45%	7.90%	18.35%
30	10.62%	8.03%	18.65%
31	10.80%	8.17%	18.97%
32	10.99%	8.32%	19.31%
33	11.17%	8.47%	19.64%
34	11.37%	8.62%	19.99%
35	11.57%	8.78%	20.35%
36	11.77%	8.94%	20.71%
37	11.97%	9.10%	21.07%
38	12.17%	9.26%	21.43%
39	12.38%	9.42%	21.80%
40	12.59%	9.59%	22.18%
41	12.83%	9.78%	22.61%
42	13.07%	9.97%	23.04%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #11 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
43	13.34%	10.18%	23.52%
44	13.60%	10.39%	23.99%
45	13.76%	10.52%	24.28%
46	13.80%	10.55%	24.35%
47	13.71%	10.48%	24.19%
48	13.44%	10.26%	23.70%
49	12.83%	9.78%	22.61%
50	12.83%	9.78%	22.61%
51	12.83%	9.78%	22.61%
52	12.83%	9.78%	22.61%
53	12.83%	9.78%	22.61%
54	12.83%	9.78%	22.61%
55	12.83%	9.78%	22.61%
56	12.83%	9.78%	22.61%
57	12.83%	9.78%	22.61%
58	12.83%	9.78%	22.61%
59	12.83%	9.78%	22.61%
60	12.83%	9.78%	22.61%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.47% of payroll added to Basic rates

Leave Cashout: 2.50%

COLA Loading: 79.12% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #12 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
15	9.17%	4.75%	13.92%
16	9.17%	4.75%	13.92%
17	9.17%	4.75%	13.92%
18	9.17%	4.75%	13.92%
19	9.17%	4.75%	13.92%
20	9.17%	4.75%	13.92%
21	9.17%	4.75%	13.92%
22	9.32%	4.83%	14.15%
23	9.47%	4.91%	14.38%
24	9.63%	5.00%	14.63%
25	9.78%	5.08%	14.86%
26	9.94%	5.17%	15.11%
27	10.11%	5.26%	15.37%
28	10.28%	5.35%	15.63%
29	10.45%	5.44%	15.89%
30	10.62%	5.54%	16.16%
31	10.80%	5.64%	16.44%
32	10.99%	5.74%	16.73%
33	11.17%	5.84%	17.01%
34	11.37%	5.95%	17.32%
35	11.57%	6.06%	17.63%
36	11.77%	6.16%	17.93%
37	11.97%	6.27%	18.24%
38	12.17%	6.38%	18.55%
39	12.38%	6.50%	18.88%
40	12.59%	6.61%	19.20%
41	12.83%	6.74%	19.57%
42	13.07%	6.87%	19.94%

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix A (continued)**

**Member Contribution Rates for Members with Membership Dates before January 1, 2013**

**Safety Cost Group #12 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)  
For Members with Membership Dates before January 1, 2013  
Calculated Under Recommended Assumptions**

<b>Entry Age</b>	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
43	13.34%	7.02%	20.36%
44	13.60%	7.16%	20.76%
45	13.76%	7.25%	21.01%
46	13.80%	7.27%	21.07%
47	13.71%	7.22%	20.93%
48	13.44%	7.08%	20.52%
49	12.83%	6.74%	19.57%
50	12.83%	6.74%	19.57%
51	12.83%	6.74%	19.57%
52	12.83%	6.74%	19.57%
53	12.83%	6.74%	19.57%
54	12.83%	6.74%	19.57%
55	12.83%	6.74%	19.57%
56	12.83%	6.74%	19.57%
57	12.83%	6.74%	19.57%
58	12.83%	6.74%	19.57%
59	12.83%	6.74%	19.57%
60	12.83%	6.74%	19.57%

Interest: 7.00%  
 Salary Increase: See Exhibit II.  
 Administrative Expense: 0.47% of payroll added to Basic rates  
 Leave Cashout: 2.50%  
 COLA Loading: 54.55% applied to Basic rates prior to adjustment for administrative expenses.  
 Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix B**

**Member Contribution Rates for Members with Membership Dates on or after January 1, 2013**

**General Members' Contribution Rates for Members with Membership Dates on or after January 1, 2013  
(Expressed as a Percentage of Monthly Payroll)**

**Calculated Under Recommended Assumptions**

	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
Cost Group #1 – PEPRA Tier 4 (2% COLA)	8.80%	2.02%	10.82%
Cost Group #1 – PEPRA Tier 4 (3% COLA)	8.95%	3.01%	11.96%
Cost Group #2 - PEPRA Tier 5 (2% COLA)	8.20%	1.87%	10.07%
Cost Group #2 - PEPRA Tier 5 (3%/4% COLA)	8.42%	2.79%	11.21%
Cost Group #3 - PEPRA Tier 4 (3% COLA)	8.03%	2.80%	10.83%
Cost Group #4 - PEPRA Tier 4 (3% COLA)	9.49%	3.24%	12.73%
Cost Group #5 - PEPRA Tier 4 (2% COLA)	9.46%	2.19%	11.65%
Cost Group #5 - PEPRA Tier 4 (3% COLA)	11.44%	3.90%	15.34%
Cost Group #6 - PEPRA Tier 4 (3% COLA)	10.01%	3.47%	13.48%

The PEPRA member contribution rates are 50% of the Normal Cost rate. The Basic rates shown above also include an administrative expense load of 0.47% of payroll.

Note: It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2018 is equal to the Social Security Taxable Wage Base or \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is \$145,666 or 120% of the Social Security Taxable Wage Base). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix B**

**Member Contribution Rates for Members with Membership Dates on or after January 1, 2013**

**Safety Members' Contribution Rates for Members with Membership Dates on or after January 1, 2013  
(Expressed as a Percentage of Monthly Payroll)**

**Calculated Under Recommended Assumptions**

	<b>Basic</b>	<b>COLA</b>	<b>Total</b>
Cost Group #7 - PEPRA Tier D	14.86%	6.13%	20.99%
Cost Group #8 - PEPRA Tier D	14.28%	6.00%	20.28%
Cost Group #8 - PEPRA Tier E	13.90%	3.90%	17.80%
Cost Group #9 - PEPRA Tier E	13.50%	3.76%	17.26%
Cost Group #10 - PEPRA Tier D	13.33%	5.65%	18.98%
Cost Group #11 - PEPRA Tier D	12.66%	5.40%	18.06%
Cost Group #12 - PEPRA Tier D	11.92%	5.07%	16.99%

The PEPRA member contribution rates are 50% of the Normal Cost rate. The Basic rates shown above also include an administrative expense load of 0.47% of payroll.

Note: It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2018 is equal to the Social Security Taxable Wage Base or \$121,388. (For an employer that is not enrolled in Social Security, the maximum amount is \$145,666 or 120% of the Social Security Taxable Wage Base). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2018. (reference: Section 7522.10(d))

**SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association**

**Appendix C**

**Refundability Factors**

	December 31, 2017		December 31, 2016	
	Legacy Tiers	PEPRA Tiers	Legacy Tiers	PEPRA Tiers
<b>General</b>				
Cost Group #1 – County and Small Districts (Tier 1)	0.9602		0.9599	
PEPRA Tier 4 (2% COLA)		0.9605		0.9605
PEPRA Tier 4 (3% COLA)		0.9613		0.9625
Cost Group #2 – County and Small Districts (Tier 3)	0.9576		0.9576	
PEPRA Tier 5 (2% COLA)		0.9611		0.9621
PEPRA Tier 5 (3%/4% COLA)		0.9631		0.9630
Cost Group #3 – Central Contra Costa Sanitary District	0.9588	0.9670	0.9588	0.9661
Cost Group #4 – Contra Costa Housing Authority	0.9571	0.9654	0.9563	0.9667
Cost Group #5 – Contra Costa County Fire Protection District	0.9591		0.9590	
PEPRA Tier 4 (2% COLA)		0.9630		0.9635
PEPRA Tier 4 (3% COLA)		0.9606		0.9637
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	0.9556	0.9643	0.9535	0.9511
<b>Safety</b>				
Cost Group #7 – County (Tier A and D)	0.9657	0.9758	0.9657	0.9755
Cost Group #8 – Contra Costa and East Fire Protection Districts	0.9666		0.9665	
PEPRA Tier D (3% COLA)		0.9770		0.9779
PEPRA Tier E (2% COLA)		0.9748		0.9757
Cost Group #9 – County (Tier C and E)	0.9670	0.9752	0.9668	0.9747
Cost Group #10 – Moraga-Orinda Fire District	0.9688	0.9787	0.9693	0.9786
Cost Group #11 – San Ramon Valley Fire District	0.9665	0.9794	0.9670	0.9784
Cost Group #12 – Rodeo-Hercules Fire Protection District	0.9718	0.9803	0.9718	0.9807

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