



AGENDA

RETIREMENT BOARD MEETING

REGULAR MEETING
October 9, 2019
9:00 a.m.

Board Conference Room
1200 Concord Avenue, Suite 350
Concord, California

THE RETIREMENT BOARD MAY DISCUSS AND TAKE ACTION ON THE FOLLOWING:

1. Pledge of Allegiance.
2. Accept comments from the public.
3. Approve minutes from the August 28 and September 11, 2019 meetings.
4. Routine items for October 9, 2019.
 - a. Approve certifications of membership.
 - b. Approve service and disability allowances.
 - c. Accept disability applications and authorize subpoenas as required.
 - d. Approve death benefits.
 - e. Accept Asset Allocation Report.
 - f. Accept Liquidity Report.

CLOSED SESSION

5. The Board will go into closed session pursuant to Govt. Code Section 54957 to consider recommendations from the medical advisor and/or staff regarding the following disability retirement applications:

<u>Member</u>	<u>Type Sought</u>	<u>Recommendation</u>
a. Randall Crane	Service Connected	Service Connected
b. Theresa Draper	Non-Service Connected	Non-Service Connected

The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.

OPEN SESSION

6. Consider and take possible action to accept the GASB 68 Report from Segal Consulting.
7. Presentation from Segal Consulting regarding the December 31, 2018 Valuation Report.
8. Presentation on mental health conditions.
9. Consider authorizing the attendance of Board:
 - a. Trustees' Roundtable, CALAPRS, October 25, 2019, Oakland, CA.
10. Miscellaneous
 - a. Staff Report
 - b. Outside Professionals' Report
 - c. Trustees' comments

The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.



Meeting Date
10/09/19
Agenda Item
#3

MINUTES

RETIREMENT BOARD MEETING MINUTES

REGULAR MEETING
August 28, 2019
9:00 a.m.

Retirement Board Conference Room
The Willows Office Park
1355 Willow Way, Suite 221
Concord, California

Present: Candace Andersen, Scott Gordon, Jerry Holcombe, Louie Kroll, Jay Kwon, David MacDonald, John Phillips, William Pigeon, Todd Smithey and Russell Watts

Absent: Donnie Finley and Mike Sloan

Staff: Gail Strohl, Chief Executive Officer; Christina Dunn, Deputy Chief Executive Officer; Timothy Price, Chief Investment Officer; Karen Levy, General Counsel; Wrally Dutkiewicz, Compliance Officer; Anne Sommers, Administrative/HR Manager; Henry Gudino, Accounting Manager and Tim Hoppe, Retirement Services Manager

Outside Professional Support:	Representing:
Eileen Neill	Verus Investments
Thomas Garrett	Verus Investments

Board member Andersen attended remotely from 1516 Kamole Street, Honolulu, Hawaii.

1. Pledge of Allegiance

The Board, staff and audience joined in the *Pledge of Allegiance*.

2. Accept comments from the public

No member of the public offered comment.

3. Approval of Minutes

It was **M/S/C** to approve the minutes from the July 24, 2019 meeting with the following wording added to Item 7 – “The Board directed staff to continue conversations with ECCFPD and CCCFPD and report back at a future Board meeting.” (Yes: Andersen, Holcombe, Kwon, MacDonald, Phillips, Smithey and Watts)

Gordon was present for subsequent discussion and voting.

4. Review of total portfolio performance for the period ending June 30, 2019

- a. Presentation from Verus

Neill reviewed CCCERA's investment fund performance for the period ending June 30, 2019.

Kroll and Pigeon were present for subsequent discussion and voting.

b. Presentation from staff

Price reviewed CCCERA's sub-portfolios noting all of them are meeting expectations except for achieving positive real returns in the Risk Diversifying sub-portfolio. He reported AFL-CIO will be making a presentation to the Board in a few months.

5. Review of portfolio rebalancing report

Price reviewed the portfolio rebalancing report.

6. Update from Chief Investment Officer on Trident and TPG Healthcare Partners

Price reported commitments of \$40 million and \$24 million were made to Trident VIII, L.P. and TPG Healthcare Partners, L.P., respectively.

7. Investment education session: currency

An education session on currency was conducted.

8. Consider authorizing the attendance of Board:

- a. There was no action taken on this item - 2019 Annual Limited Partners Meeting, DLJ Real Estate Capital Partners, September 24, 2019, Boston, MA.
- b. It was M/S/C to authorize the attendance of 4 Board members at the 7th Annual California Institutional Forum, Markets Group, December 4, 2019, Santa Rosa, CA. (Yes: Andersen, Gordon, Holcombe, Kroll, MacDonald, Phillips, Pigeon, Smithey and Watts)

9. Miscellaneous

(a) Staff Report –

Price reported that Scott Hart from StepStone is moving into a Co-CEO position and there will be a sale of minority interest in the firm; TT announced they are selling their entire firm to Sumitomo Matsui Financial Group and are going from a partnership structure to a bank subsidiary noting there are no immediate concerns at this time; we will be reviewing the role and function of the Growth sub-portfolio at the second meeting in September, the Diversifying sub-portfolio at the second meeting in October and StepStone will be presenting at the second meeting in November.

Strohl reported the Benefit Statements will be mailed out in September; CCCERA will open at the new location on September 17 and the September 25 Board meeting will be held in the conference center at the new location.

(b) Outside Professionals' Report –

None

(c) Trustees' comments -

Smithey reported an Audit Committee meeting will be held following this meeting.

It was **M/S/C** to adjourn the meeting. (Yes: Andersen, Gordon, Holcombe, Kroll, MacDonald, Phillips, Pigeon, Smithey and Watts)

Todd Smithey, Chairman

David MacDonald, Secretary



Meeting Date
10/09/19
Agenda Item
#3

MINUTES

RETIREMENT BOARD MEETING MINUTES

REGULAR MEETING
September 11, 2019
9:00 a.m.

Retirement Board Conference Room
The Willows Office Park
1355 Willow Way, Suite 221
Concord, California

Present: Candace Andersen, Donald Finley, Scott Gordon, Jerry Holcombe, Louie Kroll, Jay Kwon, David MacDonald, John Phillips, William Pigeon, Mike Sloan, Todd Smithey and Belinda Zhu (Deputy Treasurer, present and voting in Russell Watts' absence)

Absent: None

Staff: Gail Strohl, Chief Executive Officer; Christina Dunn, Deputy Chief Executive Officer; Timothy Price, Chief Investment Officer; Karen Levy, General Counsel; Wrally Dutkiewicz, Compliance Officer; Anne Sommers, Administrative/HR Manager; Henry Gudino, Accounting Manager; and Tim Hoppe, Retirement Services Manager

Outside Professional Support: None
Representing:

1. Pledge of Allegiance

The Board, staff and audience joined in the *Pledge of Allegiance*.

2. Accept comments from the public

No member of the public offered comment.

3. Approval of minutes

It was **M/S/C** to approve the minutes of the August 14, 2019 Board meeting. (Yes: Andersen, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, Smithey and Zhu).

4. Routine Items

It was **M/S/C** to approve the routine items of the September 11, 2019 meeting. (Yes: Andersen, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, Smithey and Zhu)

CLOSED SESSION

The Board moved into closed session pursuant to Govt. Code Section 54956.9(d)(1) and 54957.

It was the consensus of the Board to move to Item 6.

The Board moved into open session.

6. It was **M/S/C** to accept the Medical Advisor's recommendation and grant the following disability benefits:
 - a. Felipe Barreto – Service Connected (Yes: Andersen, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, Smithey and Zhu)

Pigeon was present for subsequent discussion and voting.

- b. Steven Grubka – Service Connected (Yes: Andersen, Gordon, Holcombe, Kroll, MacDonald, Phillips, Pigeon, Smithey and Zhu)
 - c. Peter Marshall – Service Connected - Pigeon recused himself from this item and was not present for subsequent discussion and voting. It was **M/S/C** that the Board finds that Peter Marshall has not provided sufficient evidence showing: 1) permanent incapacitation; 2) that his conditions arose out of and in the course of his employment; and 3) that the employment contributed substantially to the disability. CCCERA will offer the member the opportunity to request a hearing before a hearing officer. (Yes: Andersen, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, Smithey and Zhu)
 - d. Kevin Prescott – Service Connected (Yes: Andersen, Gordon, Holcombe, Kroll, MacDonald, Phillips, Pigeon, Smithey and Zhu)
5. There was no reportable action related to *CCCERA v. Salgado*, Contra Costa County Superior Court, Case No. MSC19-00580.

Andersen and Pigeon were no longer present for subsequent discussion and voting.

7. Presentation of Semi-Annual Disability Retirement Report

Hoppe reviewed the semi-annual disability report noting there were 21 disability retirement applications (20 service connected, and 1 non-service connected) accepted during the first six months of 2019.

8. Review of the Procurement of Products and Services Policy

Strohl reported the policy is required to be reviewed every three years. Based on the review there are not any recommended changes to the policy.

9. Consider and take possible action on SACRS voting proxy form

It was **M/S/C** to appoint Mike Sloan as the Voting Delegate and David MacDonald as the Alternate Voting Delegate to vote on behalf of CCCERA at the upcoming SACRS Fall Conference. (Yes: Finley, Gordon, Holcombe, Kroll, Kwon, MacDonald, Phillips, Smithey and Zhu)

10. Report from Audit Committee Chair on August 28, 2019 Audit Committee meeting

Phillips provided an update on the August 28, 2019 Audit Committee meeting noting the items discussed were: a job description for an Internal Auditor, procedures regarding tax payments, and the CCCERA employer audit.

11. Consider authorizing the attendance of Board:

- a. It was **M/S/C** to authorize the attendance of 2 Board members at the 2019 CRCEA Fall Conference, October 28-30, 2019, Rohnert Park, CA. (Yes: Finley, Gordon, Holcombe, Kroll, Kwon, MacDonald, Phillips, Smithey and Zhu)
- b. It was **M/S/C** to authorize the attendance of 12 Board members at the SACRS Fall Conference, November 12-15, 2019, Monterey, CA. (Yes: Finley, Gordon, Holcombe, Kroll, Kwon, MacDonald, Phillips, Smithey and Zhu)

12. Miscellaneous

- (a) Staff Report –

Strohl reported on the Request For Proposal for an oversight project manager and noted staff have been evaluating the proposals received; staff has been packing for the office move; and, CCCERA will be open for business at the new location on Tuesday, September 17th. She noted this is the last Board meeting at this location and the next Board meeting will be held at 1220 Concord Avenue in the Conference Center on the first floor.

- (b) Outside Professionals' Report -

None

- (c) Trustees' comments –

Sloan reported on the CALAPRS Principles of Pension Governance Conference he and Finley attended.

Gordon complimented and thanked Strohl and the staff for all their hard work transitioning for the move to the new office location.

Holcombe asked we adjourn the meeting in memory of the 2,997 people who died on September 11, 2001, which included 422 first responders.

It was **M/S/C** to adjourn the meeting in memory of the 2,997 people who died on September 11, 2011, which included 422 first responders. (Yes: Finley, Gordon, Holcombe, Kroll, Kwon, MacDonald, Phillips, Smithey and Zhu)

Todd Smithey, Chairman

David MacDonald, Secretary

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

BOARD OF RETIREMENT

Meeting Date
10/09/19
Agenda Item
#4

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October 9, 2019

Items requiring Board Action

A. Certifications of Membership – see list and classification forms.

B. Service and Disability Retirement Allowances:

<u>Name</u>	<u>Number</u>	<u>Effective Date</u>	<u>Option Type</u>	<u>Tier</u>	<u>Selected</u>
Bailey, Maureen	44881	07/13/19	SR	Safety A	Unmodified
Boehrer, Michael	48566	06/06/19	SR	Safety A	Unmodified
Brown, Bobbie	56772	05/15/19	SR	Tier II and III	Unmodified
Burns, Mary	79128	08/01/19	SR	Tier II	Unmodified
Bustamante, Mary	61459	07/12/19	SR	Safety A	Unmodified
Delano, Teresa	60687	07/09/19	SR	Tier I	Unmodified
Dovzak, Carrie	66397	06/29/19	SR	Tier III	Unmodified
Ewing, Margaret	43849	06/25/19	SR	Tier II and III	Unmodified
Fischer, Michael	70232	07/01/19	SR	Tier III	Unmodified
France, Linda	67176	06/29/19	SR	Tier III	Unmodified
Freudenthal, Margaret	68307	06/30/19	SR	Tier I	Unmodified
Frey, Michael	51240	06/15/19	SR	Safety A	Unmodified
Friedman, John	60528	06/29/19	SR	Tier II and III	Option 4
Giacobazzi, Bradley	55721	06/28/19	SR	Safety A	Unmodified
Jeppesen, Debra	D9500	06/22/19	SR	Tier III	Unmodified
Johnson, Billie	72894	03/30/19	SR	Tier III	Unmodified
Johnson-Davis, Angela	68125	06/06/19	SR	Safety A	Unmodified
Kearns, Helen	65576	06/29/19	SR	Tier II and III	Unmodified
Limrite, Steven	43580	07/01/19	SR	Tier I, II and III	Unmodified
Maupin, Darcy	67740	07/12/19	SR	Safety A	Unmodified
McMillan, Pamela	D3406	03/30/19	SR	Tier I	Unmodified
Middleton, Lynda	50142	06/15/19	SR	Tier II and III	Unmodified
Norris, Angela	68303	06/29/19	SR	Tier III	Unmodified
Ramiro, Zeny	65733	06/29/19	SR	Tier III	Unmodified
Reeder, Terrence	51588	07/06/19	SR	Safety A	Unmodified
Stromberg, Lynette	74395	07/01/19	SR	Tier III	Unmodified
Thompson, Bobbie J	66685	06/14/19	SR	Tier III	Option 1

Option Type

NSP = Non-Specified
 SCD = Service Connected Disability
 SR = Service Retirement
 NSCD = Non-Service Connected Disability
 * = County Advance
 Selected w/option

Tier

I = Tier I
 II = Tier II
 III = Tier III
 S/A = Safety Tier A
 S/C = Safety Tier C

Pepra 4.2 = Pepra Tier 4 (2% COLA)
 Pepra 4.3 = Pepra Tier 4 (3% COLA)
 Pepra 5.2 = Pepra Tier 5 (2% COLA)
 Pepra 5.3 = Pepra Tier 5 (3% COLA)
 S/D = Pepra Safety Tier D
 S/E = Pepra Safety Tier E

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

BOARD OF RETIREMENT

C. Disability Retirement Applications: The Board's Hearing Officer is hereby authorized to issue subpoenas in the following cases involving disability applications:

<u>Name</u>	<u>Number</u>	<u>Filed</u>	<u>Type</u>
Nevarez, Pauline	69821	09/23/19	NSCD
Nasseh, Siamak	D9990	09/30/19	SCD

D. Deaths:

<u>Name</u>	<u>Date of Death</u>	<u>Employer as of Date of Death</u>
Belche, Joseph	07/22/19	Contra Costa County
Farrands, Carole	08/26/19	Contra Costa County
Fee, Barbara	08/20/19	Byron-Brentwood-Knightesen Union Cemetery District
Kostolny, Cynthia	06/17/19	Contra Costa County
Lewis, Terry	08/27/19	Contra Costa County Fire Protection District
Lipovac, Joseph	09/09/19	Contra Costa County
Mackey, Velma	08/31/19	Superior Courts
Montgomery, Ralph	03/10/19	Contra Costa County
Palacios, Ruby	09/05/19	Contra Costa County
Payton-Felder, Tama	09/06/19	Contra Costa County
Silva, Kenneth	08/26/19	Contra Costa County
Wach, Sally	08/31/19	Contra Costa County
Worth, Guy	09/11/19	Contra Costa County
Zurlinden, Betty	08/22/19	Contra Costa County

Option Type
 NSP = Non-Specified
 SCD = Service Connected Disability
 SR = Service Retirement
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 * = County Advance
 Selected w/option

Tier
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 Pepra 4.3 = Pepra Tier 4 (3% COLA)
 Pepra 5.2 = Pepra Tier 5 (2% COLA)
 Pepra 5.3 = Pepra Tier 5 (3% COLA)
 S/D = Pepra Safety Tier D
 S/E = Pepra Safety Tier E

CERTIFICATION OF MEMBERSHIPS

<i>Name</i>	<i>Employee Number</i>	<i>Tier</i>	<i>Membership Date</i>	<i>Employer</i>
Acasio, Marilyn	83585	P5.2	07/01/19	Contra Costa County
Acosta, Sophia	88444	P5.2	08/01/19	Contra Costa County
Aguilar, Ignacio	61222	P5.2	08/01/19	Contra Costa County
Aleksunas, Christopher	D7160	S/A	08/01/19	East Contra Costa County Fire Protection District
All, Aaron	D7160	S/A	08/01/19	East Contra Costa County Fire Protection District
Allen, Tamara	82518	P5.2	07/01/19	Contra Costa County
Alli, Bilikisu Adedayo	88441	P5.2	08/01/19	Contra Costa County
Anderson, Nathan	88455	P5.2	08/01/19	Contra Costa County
Arteaga, Arcelia	84845	P5.2	08/01/19	Contra Costa County
Ashman, Monika	88319	P5.2	08/01/19	Contra Costa County
Arriaga, Jose	88380	III	08/01/19	Contra Costa County
Barker, Robin	88479	P5.2	08/01/19	Contra Costa County
Basman, Trisha	88526	P5.2	08/01/19	Contra Costa County
Bell, Shelby	88423	P5.2	08/01/19	Contra Costa County
Bothwell, Dave	88352	P5.2	08/01/19	Contra Costa County
Bristow, Kanisha	88358	P5.2	08/01/19	Contra Costa County
Brown, Luis	88403	P5.2	08/01/19	Contra Costa County
Burke, Sarena	88396	P5.2	08/01/19	Contra Costa County
Canilao, Martin	88416	P5.2	08/01/19	Contra Costa County
Canty, Anesia	88353	P5.2	07/01/19	Contra Costa County
Cardona, Kelly	88481	P5.2	08/01/19	Contra Costa County
Chan, Karina	88503	P5.2	08/01/19	Contra Costa County
Colorado, Eileen	88470	P5.2	08/01/19	Contra Costa County
Coniglio, Desirae	86837	S/E	08/01/19	Contra Costa County
Crecy, Joy	88421	P5.2	08/01/19	Contra Costa County
Davidson, Steven	88493	P5.2	08/01/19	Contra Costa County
Dean-Jessie, Sydney	88438	P5.2	08/01/19	Contra Costa County
Dempsey, Ana Maria	88359	P5.2	08/01/19	Contra Costa County
Diaz, Jaclyn	88513	P5.2	08/01/19	Contra Costa County
DiSilvestre, Anthony	88480	P5.2	08/01/19	Contra Costa County
Dominguez, Jessica	88404	P5.2	08/01/19	Contra Costa County
Dowling, Peter	80966	P5.2	08/01/19	Contra Costa County
Dyes, Reisha	88532	P5.2	08/01/19	Contra Costa County
Esteban, Emily	88461	P5.2	08/01/19	Contra Costa County
Faletti, Staci	86957	P5.2	08/01/19	Contra Costa County
Fernandez, Princess Fay	88363	P5.2	08/01/19	Contra Costa County
Flowers, Kortney	78767	P5.2	08/01/19	Contra Costa County
Freund, Mark	88525	P4.2	08/01/19	Contra Costa County Fire Protection District
Frey, Cassidy	88401	P5.2	08/01/19	Contra Costa County
Gabriel, Ezekiel	88417	P5.2	08/01/19	Contra Costa County

Key:

I = Tier I	P4.2 = PEPRA Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPRA Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPRA Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPRA Tier 5 (3% COLA)	S/E = Safety Tier E

CERTIFICATION OF MEMBERSHIPS

<i>Name</i>	<i>Employee Number</i>	<i>Tier</i>	<i>Membership Date</i>	<i>Employer</i>
Galman, Genevieve	84813	P5.2	08/01/19	Contra Costa County
Gargalikis, Mark	D7160	S/E	08/01/19	East Contra Costa County Fire Protection District
Giddis, Christopher	88523	P4.2	08/01/19	Contra Costa County Fire Protection District
Giron, Ross	88415	P5.2	08/01/19	Contra Costa County
Gomez, Samanta	88458	P5.2	08/01/19	Contra Costa County
Gonzalez, Lidia	88445	P5.2	08/01/19	Contra Costa County
Gonzalez, Rosa	88449	P5.2	08/01/19	Contra Costa County
Grossi, Jenna	88399	P5.2	08/01/19	Contra Costa County
Ho, Lisa	88501	P5.2	08/01/19	Contra Costa County
Jacob, Melise	88452	P5.2	08/01/19	Contra Costa County
Jackson, Ayesha	D9990	P4.3	08/01/19	Contra Costa County Housing Authority
Jindoian, Silva	D9990	P4.3	08/01/19	Contra Costa County Housing Authority
Joaquin, David	88420	P5.2	08/01/19	Contra Cosa County
Jones, DeAjuane	88433	S/E	08/01/19	Contra Cosa County
Kane, Erica	88430	P5.2	08/01/19	Contra Costa County
King, Taylor	88522	P4.2	08/01/19	Contra Costa County Fire Protection District
Kuto, Elizabeth	88504	P5.2	08/01/19	Contra Costa County
Lacques-Aranda, Madeline	88290	P5.2	07/01/19	Contra Costa County
Lazarev, Peter	88474	P5.2	08/01/19	Contra Costa County
Lee, Eric	76980	P5.2	08/01/19	Contra Costa County
Lougee, Mariel	81824	P5.2	08/01/19	Contra Costa County
Lytle, Amber	88327	P5.2	08/01/19	Contra Costa County
Maisto, Michelle	86572	P5.2	08/01/19	Contra Costa County
Martin, Dominic	88521	P4.2	08/01/19	Contra Costa County Fire Protection District
Mizuno, Thomas	D3406	P4.3	08/01/19	Central Contra Costa Sanitary District
McCarron, Sinead	88159	P5.2	08/01/19	Contra Costa County
McConnell, Shannon	88467	P5.2	08/01/19	Contra Costa County
McGrattan, Ian	87376	P5.2	08/01/19	Contra Costa County
Mehta, Natasha	87856	P5.2	08/01/19	Contra Costa County
Melendez, Brian	88425	P5.2	08/01/19	Contra Costa County
Mendoza, Albert	88432	P5.2	08/01/19	Contra Costa County
Moreno, Edgar	88451	P5.2	08/01/19	Contra Costa County
Morano, Mike	88369	P5.2	08/01/19	Contra Costa County
Nelson, Daniel	D7160	S/E	08/01/19	East Contra Costa County Fire Protection District
Negrete, Jose	88414	P5.2	08/01/19	Contra Costa County
Nguyen, Kenny	88496	P5.2	08/01/19	Contra Costa County
Osejo, Francina	88440	P5.2	08/01/19	Contra Costa County
Pankito, Bridget	84500	P5.2	08/01/19	Contra Costa County
Paredes Urvina, Francisco	87764	P5.2	08/01/19	Contra Costa County
Parslow, Matthew	D7160	S/E	08/01/19	East Contra Costa County Fire Protection District

Key:

I = Tier I	P4.2 = PEPRA Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPRA Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPRA Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPRA Tier 5 (3% COLA)	S/E = Safety Tier E

CERTIFICATION OF MEMBERSHIPS

<i>Name</i>	<i>Employee Number</i>	<i>Tier</i>	<i>Membership Date</i>	<i>Employer</i>
Parker, Sherline	75911	P5.2	08/01/19	Contra Costa County
Patterson, Wendy	88408	P5.2	08/01/19	Contra Costa County
Pen, Sokleang	D3406	P4.3	08/01/19	Central Contra Costa Sanitary District
Quintana, Gabriella	88460	P5.2	08/01/19	Contra Costa County
Roberts, Jacob	88412	P5.2	08/01/19	Contra Costa County
Sargent, Chrystie	88514	P5.2	08/01/19	Contra Costa County
Sharp, Kevin	77064	III	08/01/19	Contra Costa County
Short, Errol	87064	P5.2	08/01/19	Contra Costa County
Sotomayor, Kalani	88211	S/E	08/01/19	Contra Costa County
Stewart, Tashara	87297	P5.2	08/01/19	Contra Costa County
Swanson, Amber-Marie	88524	P4.2	08/01/19	Contra Costa County Fire Protection District
Talbot, Lauren	88456	P4.3	08/01/19	Local Agency Formation Commission
Tanjin, Tasnuva	88199	P5.2	08/01/19	Contra Costa County
Trombetta, Conor	88475	P5.2	08/01/19	Contra Costa County
Viergutz, Jennifer	88489	P5.2	08/01/19	Contra Costa County
Viktorynova, Klara	87809	P5.2	08/01/19	Contra Costa County
Walton, Zachary	84836	P5.2	08/01/19	Contra Costa County
Wells, Tylyn	88431	P5.2	08/01/19	Contra Costa County
Wong, Nang Kit	88413	P5.2	08/01/19	Contra Costa County
Wright, Kimberly	88410	P5.2	08/01/19	Contra Costa County
Wright, Rebecca	88370	P5.2	08/01/19	Contra Costa County
Yates, Sashell	88457	P5.2	08/01/19	Contra Costa County

Key:

I = Tier I	P4.2 = PEPRA Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPRA Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPRA Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPRA Tier 5 (3% COLA)	S/E = Safety Tier E

TIER CHANGES

<i>Name</i>	<i>Employee Number</i>	<i>Old Tier</i>	<i>New Tier</i>	<i>Effective Date</i>	<i>Employer</i>	<i>Reason for Change</i>
Holcomb, Robin	84824	P5.2	P4.2	08/01/19	Contra Costa County Fire Protection District	Transfer Employer
Kociolek, Elaine	87937	P5.2	III	04/01/19	Contra Costa County	Recip In : Age & Tier Change

Key:

I = Tier I	P4.2 = PEPRA Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPRA Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPRA Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPRA Tier 5 (3% COLA)	S/E = Safety Tier E

Contra Costa County Employees' Retirement Association
Asset Allocation as of August 31, 2019

Meeting Date 10/09/19 Agenda Item #4

Liquidity	Market Value	Percentage of Total Fund	Phase 3 Target Percentage	Phase 3 Over/(Under)	Long Term Target	Long Term Over/(Under)
Insight	1,052,823,818	11.6%	12.0%	-0.4%		
Sit	545,812,356	6.0%	6.0%	0.0%		
Dimensional Fund Advisors	515,337,279	5.7%	6.0%	-0.3%		
Total Liquidity	2,113,973,453	23.4%	24.0%	-0.6%	24.0%	-0.6%

Range
16% - 28%

Growth	Market Value	Percentage of Total Fund	Phase 3 Target Percentage	Phase 3 Over/(Under)	Long Term Target	Long Term Over/(Under)
Domestic Equity						
Boston Partners	225,198,501	2.5%	2.5%	-0.0%		
Jackson Square	231,011,937	2.6%	2.5%	0.1%		
BlackRock Index Fund	184,445,767	2.0%	2.0%	0.0%		
Emerald Advisors	147,745,988	1.6%	1.5%	0.1%		
Ceredex	149,794,381	1.7%	1.5%	0.2%		
Total Domestic Equity	938,196,574	10.4%	10.0%	0.4%	5.0%	5.4%

Global & International Equity	Market Value	Percentage of Total Fund	Phase 3 Target Percentage	Phase 3 Over/(Under)	Long Term Target	Long Term Over/(Under)
Pyrford (BMO)	439,908,718	4.9%	5.0%	-0.1%		
William Blair	446,688,224	4.9%	5.0%	-0.1%		
First Eagle	364,772,124	4.0%	4.0%	0.0%		
Artisan Global Opportunities	368,952,264	4.1%	4.0%	0.1%		
PIMCO/RAE Emerging Markets	323,529,118	3.6%	4.0%	-0.4%		
TT Emerging Markets	312,446,512	3.5%	4.0%	-0.5%		
Total Global & International Equity	2,256,296,960	25.0%	26.0%	-1.0%	24.0%	1.0%

Private Equity	Market Value	Percentage of Total Fund	Phase 3 Target Percentage	Phase 3 Over/(Under)	Long Term Target	Long Term Over/(Under)
Private Equity	1,010,886,094	11.2%	11.0%	0.2%	11.0%	0.2%
Private Credit	421,525,152	4.7%	5.0%	-0.3%	12.0%	-7.3%
Real Estate - Value Add	173,831,065	1.9%	4.0%	-2.1%	4.0%	-2.1%
Real Estate - Opportunistic & Distressed	491,717,420	5.4%	4.0%	1.4%	4.0%	1.4%
Real Estate - REIT (Adelante)	78,699,080	0.9%	1.0%	-0.1%	1.0%	-0.1%
High Yield (Allianz)	242,126,342	2.7%	2.0%	0.7%	0.0%	2.7%
Risk Parity			5.0%	0.0%	5.0%	0.0%
AQR GRP EL	228,759,927	2.5%				
PanAgora	223,723,055	2.5%				
Total Other Growth Assets	2,871,268,135	31.8%	32.0%	-0.2%	37.0%	-5.2%

Total Growth Assets	6,065,761,669	67.1%	68.0%	-0.9%	66.0%	1.1%
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Range
60% - 80%

Risk Diversifying	Market Value	Percentage of Total Fund	Phase 3 Target Percentage	Phase 3 Over/(Under)	Long Term Target	Long Term Over/(Under)
AFL-CIO	340,659,461	3.8%	3.5%	0.3%	3.0%	0.8%
Parametric Defensive Equity	201,283,382	2.2%	2.5%	-0.3%	3.5%	-1.3%
Wellington Real Total Return	189,320,931	2.1%	2.0%	0.1%	3.5%	-1.4%
Total Risk Diversifying	731,263,774	8.1%	8.0%	0.1%	10.0%	-1.9%

Range
0% - 10%

Cash and Overlay	Market Value	Percentage of Total Fund	Phase 3 Target Percentage	Phase 3 Over/(Under)	Long Term Target	Long Term Over/(Under)
Overlay (Parametric)	24,164,197	0.3%		0.3%		
Cash	103,729,204	1.1%		1.1%		
Total Cash and Overlay	127,893,401	1.4%	0.0%	1.4%	0.0%	1.4%

Total Fund	9,038,892,296.47	100%	100%	0%	100%	0%
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*Phase 3 targets and ranges reflect Phase 3 asset allocation targets accepted by the Board on June 27, 2018 (BOR Resolution 2018-2)

Private Market Investments
As of August 31, 2019

REAL ESTATE - Value Add	Inception Date	Target Termination	# of Extension in full liq.	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
Invesco IREF II	05/30/07	12/31/15				85,000,000	11,858	0.00%	
Invesco IREF III	08/01/13	08/01/20				35,000,000	3,411,598	0.04%	
Invesco IREF IV	12/01/14	12/01/21				35,000,000	22,246,509	0.25%	5,191,261
Invesco IREF V	09/11/18	09/11/25				75,000,000	18,474,809	0.20%	56,981,266
Long Wharf FREG IV	08/14/13	09/30/21				25,000,000	7,021,713	0.08%	
Long Wharf FREG V	10/31/16	09/30/24				50,000,000	43,672,898	0.48%	
LaSalle Income & Growth Fund VI	01/31/12	01/31/19				75,000,000	28,250,949	0.31%	3,946,000
LaSalle Income & Growth Fund VII	10/31/16	09/30/24				75,000,000	50,740,731	0.56%	20,836,646
Outstanding Commitments						580,000,000	173,831,065	1.92%	86,955,173
Total							86,955,173		260,786,238

REAL ESTATE - Opportunistic & Distressed

REAL ESTATE - Opportunistic & Distressed	Inception Date	Target Termination	# of Extension in full liq.	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
DJ Real Estate Capital Partners, L.P. III	06/30/05	06/30/14				75,000,000	21,327,120	0.24%	4,031,338
DJ Real Estate Capital Partners, L.P. IV	12/31/07	09/30/18				100,000,000	80,125,279	0.89%	2,890,809
DJ Real Estate Capital Partners, L.P. V	07/31/13	12/31/22				75,000,000	51,658,345	0.57%	15,635,816
DJ Real Estate Capital Partners, L.P. VI	02/28/19	01/31/29				50,000,000	29,230,647	0.32%	20,386,999
Oaktree Real Estate Opportunities Fund V	02/01/11	02/01/21				50,000,000	4,713,271	0.05%	25,750,000
Oaktree Real Estate Opportunities Fund VI	09/30/13	09/30/20				80,000,000	32,672,167	0.36%	18,400,000
Oaktree Real Estate Opportunities Fund VII	02/28/15	02/28/23				65,000,000	55,623,691	0.62%	20,020,000
Siguler Guff Distressed Real Estate Opp. Fund	07/30/11	07/30/22				75,000,000	32,817,708	0.36%	5,625,000
Siguler Guff Distressed Real Estate Opp. Fund II	08/31/13	08/31/25				70,000,000	48,924,386	0.54%	9,590,000
Siguler Guff Distressed Real Estate Opp. II Co-Inv	01/31/16	10/31/25				25,000,000	24,195,010	0.27%	4,462,138
Paulson Real Estate Fund II	11/10/13	11/10/20				20,000,000	25,548,028	0.28%	654,377
Angelo Gordon Realty Fund VIII	12/31/11	12/31/18				80,000,000	23,462,072	0.26%	4,598,145
Angelo Gordon Realty Fund IX	10/10/14	10/10/22				65,000,000	61,419,696	0.68%	9,425,000
Outstanding Commitments						830,000,000	491,717,420	5.44%	141,469,622
Total							633,187,042		1,014,163,920

PRIVATE CREDIT

PRIVATE CREDIT	Inception Date	Target Termination	# of Extension 2nd 1 YR	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
Torchlight Debt Opportunity Fund III	09/30/08	06/30/16		LP	06/30/18	75,000,000	0	0.00%	0
Torchlight Debt Opportunity Fund IV	08/01/12	08/30/20				60,000,000	15,017,276	0.17%	0
Torchlight Debt Opportunity Fund V	12/31/14	09/17/22				75,000,000	44,369,392	0.49%	15,000,000
Angelo Gordon Energy Credit Opportunities	09/10/15	09/10/20				16,500,000	4,337,752	0.05%	2,319,783
CCCERA StepStone	12/01/17	11/30/27				920,000,000	357,800,732	3.96%	575,318,985
Outstanding Commitments						1,274,500,000	421,525,152	4.66%	592,638,768
Total							1,014,163,920		1,014,163,920

**Private Market Investments
As of August 31, 2019**

PRIVATE EQUITY	Inception Date	Target Termination	# of Extension	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
Adams Street Partners	12/22/95	12/22/25				269,565,614	148,972,497	1.65%	27,025,080
Adams Street Secondary II	12/31/08	12/31/20				30,000,000	8,077,621	0.09%	1,635,000
Adams Street Secondary V	10/31/12	10/31/22				40,000,000	21,660,433	0.24%	9,388,100
Adams Street Venture Innovation Fund	03/09/16	03/09/28				75,000,000	45,625,010	0.50%	35,212,500
AE Industrial Partners Fund II	05/18/18	05/18/28				35,000,000	4,471,762	0.05%	29,896,316
Bay Area Equity Fund	06/14/04	12/31/14	2nd 2 YR	LP	12/31/2017	10,000,000	2,407,545	0.03%	
Bay Area Equity Fund II	2/29/09	12/31/19				10,000,000	12,346,571	0.14%	
Carpenter Community BancFund	10/31/09	10/31/19				30,000,000		0.00%	
EIF USPF II	06/15/05	06/15/15	3rd 1 YR	LP	06/15/18	30,000,000	8,089,512	0.09%	0
EIF USPF III	02/28/07	02/28/17	1st 1 YR	LP	02/28/18	65,000,000	17,615,068	0.19%	0
EIF USPF IV	06/28/10	06/28/20				47,622,799	47,622,799	0.53%	4
Ares EIF V	09/09/15	11/19/25				50,000,000	44,837,821	0.50%	6,756,160
Genstar Capital Partners IX, L.P.	02/21/19					50,000,000	0		49,813,347
Oaktree Private Investment Fund 2009	02/28/10	12/15/19				40,000,000	6,475,501	0.07%	6,308,961
Ocean Avenue Fund II	05/07/14	05/07/24				30,000,000	29,959,808	0.33%	3,900,000
Ocean Avenue Fund III	12/09/15	12/09/25				50,000,000	54,155,372	0.60%	8,000,000
Paladin III	08/15/08	08/15/18				25,000,000	29,196,629	0.32%	626,911
Pathway	11/09/98	05/31/21				125,000,000	16,238,067	0.18%	10,925,354
Nogales Investment Pathway 2008	02/15/04	02/15/14			sold last inv.	15,000,000			0
Pathway 6	12/26/08	12/26/23				30,000,000	19,192,175	0.21%	3,354,158
Pathway 7	05/24/11	05/24/26				40,000,000	35,261,442	0.39%	4,276,924
Pathway 8	02/07/13	02/07/23				70,000,000	68,969,368	0.76%	8,765,254
Pathway 8	11/23/15	11/23/25				50,000,000	43,593,269	0.48%	15,575,658
Siguler Guff CCCERA Opportunities	06/03/14	05/31/25				200,000,000	163,696,020	1.81%	61,224,772
Siguler Guff Secondary Opportunities	12/31/16	12/31/26				50,000,000	175,871	0.00%	49,356,046
Siris Partners IV	05/18/18	05/18/28				35,000,000	10,333,894	0.11%	24,327,036
TPG Healthcare Partners, L.P.	06/28/19					24,000,000	0		24,000,000
Trident VIII, L.P.	05/24/19					40,000,000	0		40,000,000
Real Assets									
Aether III & III Surplus	11/30/13	11/30/20				75,000,000	70,789,411	0.78%	7,607,042
Aether IV	01/01/16	01/01/28				50,000,000	39,406,953	0.44%	16,778,671
Commonfund Capital Natural Resources IX	06/30/13	06/30/20				50,000,000	43,771,673	0.48%	6,675,005
Wastewater Opportunity Fund	12/31/15	11/30/22				25,000,000	17,944,002	0.20%	4,353,023
Outstanding Commitments						1,818,565,614	1,010,886,094	11.18%	455,781,322
Total							455,781,322		1,466,667,416

Market value equals the most recent reported net asset value, plus capital calls after net asset value date, less distributions after net asset value date. The Target Termination column is the beginning of liquidation of the fund, however, some funds may be extended for an additional two or three years.



Meeting Date 10/09/19 Agenda Item #4

**Contra Costa County Employees' Retirement Association
Liquidity Report – August 2019**

August 2019 Performance

	Cash Flow	Coverage Ratio
Benefit Cash Flow Projected by Model	\$41,000,000	
Liquidity Sub-Portfolio Cash Flow	\$41,000,000	100%
Actual Benefits Paid	\$40,717,635	101%
Next Month's Projected Benefit Payment	\$41,500,000	

Monthly Manager Positioning – August 2019

	Beginning Market Value	Liquidity Program Cash Flow	Market Value Change/Other Activity	Ending Market Value
Sit	\$538,837,001	(\$1,250,000)	\$8,225,355	\$545,812,356
DFA	\$527,265,321	(\$14,000,000)	\$2,071,958	\$515,337,279
Insight	\$1,072,817,411	(\$25,750,000)	\$5,756,407	\$1,052,823,818
Liquidity	\$2,138,919,733	(\$41,000,000)	\$16,053,720	\$2,113,973,453
Cash	\$108,715,756	\$282,365	(\$5,268,917)	\$103,729,204
Liquidity + Cash	\$2,247,635,489	(\$40,717,635)	\$10,784,803	\$2,217,702,657

Functional Roles

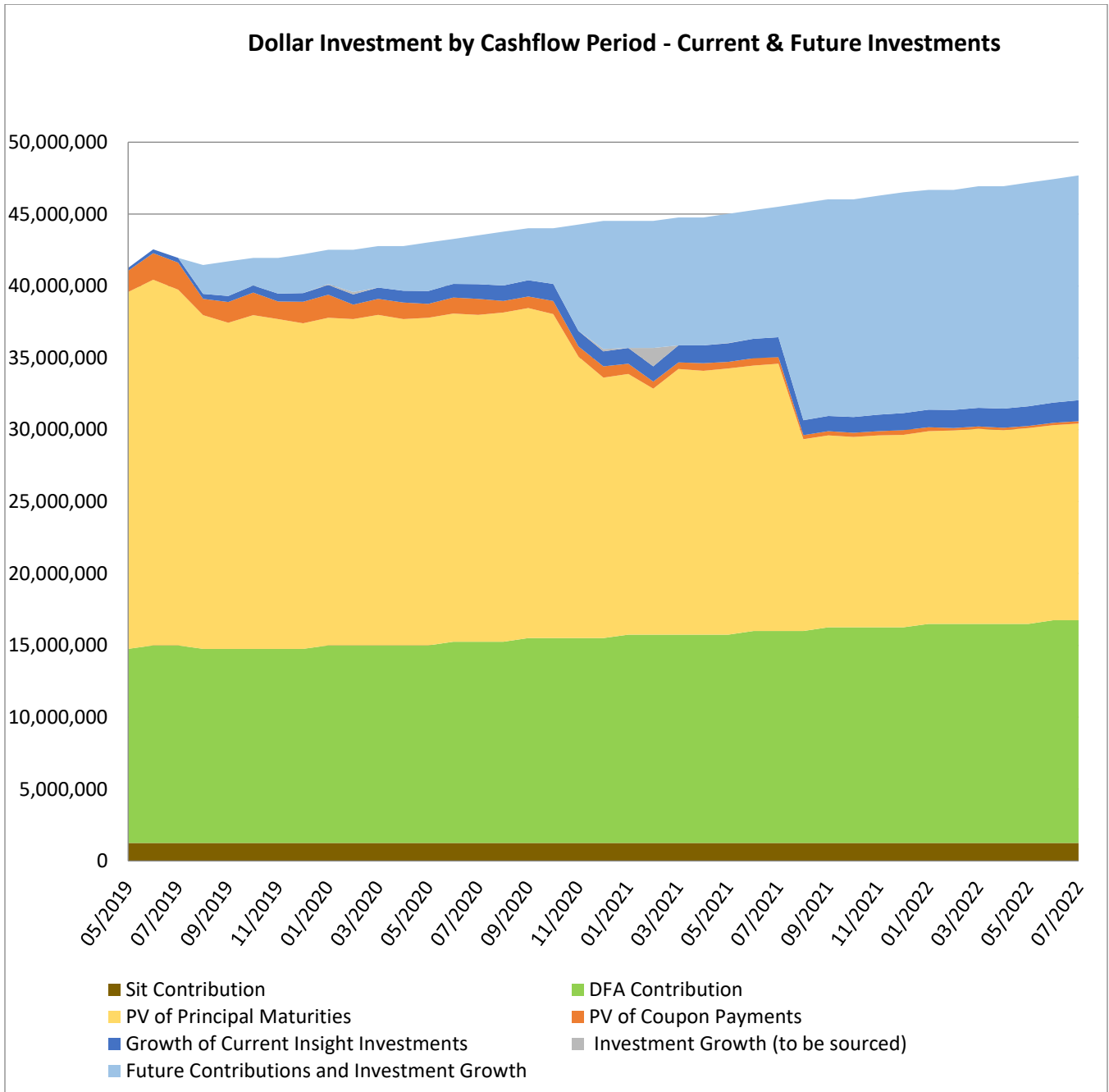
Manager	Portfolio Characteristics	Liquidity Contribution
Sit	High quality portfolio of small balance, government guaranteed mortgages with higher yields.	Pays out net income on monthly basis.
DFA	High quality, short duration portfolio of liquid, low volatility characteristics.	Pays out a pre-determined monthly amount. DFA sources liquidity from across their portfolio.
Insight	Buy and maintain (limited trading) portfolio of high quality, short duration, primarily corporates.	Completion portfolio makes a payment through net income and bond maturities that bridges the gap between other managers and projected payment.
Cash	STIF account at custodial bank.	Buffer in the event of any Liquidity shortfall/excess.

Notes

The eighth cash flow for 2019 from the liquidity program was completed on August 23rd. The actuarial model cash flow was slightly higher than actual experience, producing \$282 thousand more than the actual benefits paid.

Cash Flow Structure

The chart below shows the sources of cash flow for the next several years of CCCERA’s projected benefit payments. This table will change slightly as the model is tweaked and as the portfolios receive new rounds of funding each August as part of the Annual Funding Plan.





<i>Meeting Date</i> 10/09/19 <i>Agenda Item</i> #6

MEMORANDUM

Date: October 9, 2019
To: CCCERA Board of Retirement
From: Gail Strohl, Chief Executive Officer
Subject: Consider and take possible action to accept the GASB 68 report from Segal Consulting.

Background

The Governmental Accounting Standards Board (GASB) issued Statement No. 68 in June 2012 to be effective for fiscal years beginning after June 15, 2014. This Statement's objective is to improve accounting and financial reporting. CCCERA's participating employers can utilize the information contained in the GASB 68 report in their own reporting. Employers are currently assessed a pro-rata share of the report preparation cost. The Segal Consulting report is based on a December 31, 2018 measurement date for employer reporting as of June 30, 2019.

Recommendation

Consider and take possible action to accept the GASB 68 report from Segal Consulting.

Meeting Date
10/09/19
Agenda Item
#6

**CONTRA COSTA COUNTY EMPLOYEES'
RETIREMENT ASSOCIATION**

**SCHEDULE OF EMPLOYER ALLOCATIONS AND
SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

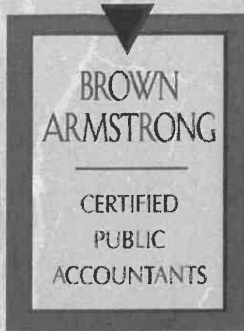
**FOR EMPLOYER REPORTING UNDER
GOVERNMENTAL ACCOUNTING STANDARDS
BOARD (GASB) STATEMENT NO. 68
AS OF JUNE 30, 2019
USING A MEASUREMENT DATE OF DECEMBER 31, 2018**

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
SCHEDULE OF EMPLOYER ALLOCATIONS AND
SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

**FOR EMPLOYER REPORTING UNDER
GOVERNMENTAL ACCOUNTING STANDARDS
BOARD (GASB) STATEMENT NO. 68
AS OF JUNE 30, 2019
USING A MEASUREMENT DATE OF DECEMBER 31, 2018**

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Schedule of Pension Amounts by Employer.....	7
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BROWN ARMSTRONG

Certified Public Accountants

INDEPENDENT AUDITOR'S REPORT

To the Board of Retirement and Audit Committee of
Contra Costa County Employees' Retirement Association
Concord, California

Report on the Schedules

We have audited the accompanying Schedule of Employer Allocations of Contra Costa County Employees' Retirement Association (CCCERA) for the years ended December 31, 2018 and 2017, and the related notes to the schedule. We have also audited the total for all entities of the columns titled net pension liability, total deferred outflows of resources, total deferred inflows of resources, and total pension expense (specified column totals) included in the accompanying Schedule of Pension Amounts by Employer as of and for the year ended December 31, 2018, and the related notes to the schedule.

Management's Responsibility for these Schedules

Management is responsible for the preparation and fair presentation of these schedules in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of schedules that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on the Schedule of Employer Allocations and the specified column totals included in the Schedule of Pension Amounts by Employer based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the Schedule of Employer Allocations and specified column totals included in the Schedule of Pension Amounts by Employer are free from material misstatement.

Our audit involved performing procedures to obtain audit evidence about the amounts and disclosures in the Schedule of Employer Allocations and specified column totals included in the Schedule of Pension Amounts by Employer. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the Schedule of Employer Allocations and specified column totals included in the Schedule of Pension Amounts by Employer, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to CCCERA's preparation and fair presentation of the Schedule of Employer Allocations and the specified column totals included in the Schedule of Pension Amounts by Employer in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of CCCERA's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting

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policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the Schedule of Employer Allocations and specified column totals included in the Schedule of Pension Amounts by Employer.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, the schedules referred to above present fairly, in all material respects, the employer allocations for the years ended December 31, 2018 and 2017, and net pension liability, total deferred outflows of resources, total deferred inflows of resources, and total pension expense (specified column totals) for the total of all participating entities for CCCERA as of and for the year ended December 31, 2018, in accordance with accounting principles generally accepted in the United States of America.

Other Matters

We have audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of CCCERA as of and for the year ended December 31, 2018, and our report thereon, dated June 19, 2019, expressed an unmodified opinion on those financial statements.

Restriction on Use

Our report is intended solely for the information and use of CCCERA's management, the Board of Retirement and the Audit Committee of CCCERA, and CCCERA participating employers and their auditors and is not intended to be, and should not be, used by anyone other than these specified parties.

BROWN ARMSTRONG
ACCOUNTANCY CORPORATION

Brown Armstrong
Accountancy Corporation

Bakersfield, California
October 2, 2019

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
SCHEDULE OF EMPLOYER ALLOCATIONS
FOR THE YEAR ENDED DECEMBER 31, 2018**

<u>Employer Name</u>	<u>Net Pension Liability (NPL) (1)</u>	<u>Allocation Percentage (2)</u>
Bethel Island Municipal District	\$ 383,118	0.027%
Byron Brentwood Cemetery	52,348	0.004%
Contra Costa Mosquito and Vector Control District	4,737,389	0.332%
Contra Costa County Fire Protection District	160,817,317	11.261%
Central Contra Costa Sanitary District	90,430,104	6.332%
First 5 - Children and Families Commission	2,881,759	0.202%
Contra Costa County	976,031,747	68.347%
Contra Costa County Employees' Retirement Association	7,315,532	0.512%
East Contra Costa Fire Protection District	18,245,316	1.278%
Contra Costa Housing Authority	10,796,497	0.756%
In-Home Supportive Services Authority	1,309,899	0.092%
Local Agency Formation Commission	304,195	0.021%
Moraga-Orinda Fire District	34,418,805	2.410%
Rodeo Sanitary District	187,143	0.013%
Rodeo-Hercules Fire Protection District	11,716,980	0.820%
San Ramon Valley Fire District	69,577,960	4.872%
Superior Court	27,420,745	1.920%
Delta Diablo Sanitation District (Terminated Employer) (3)	2,433,196	0.170%
Diablo Water District (Terminated Employer) (3)	1,034,726	0.072%
City of Pittsburg (Terminated Employer) (3)	7,949,368	0.557%
Total for All Employers	\$ 1,428,044,144	100.000%

(1) The NPL is including pension obligation bonds and Unfunded Actuarial Accrued Liability prepayments for certain employers.

(2) The unrounded percentages excluding terminated employers are actually used in the allocation of NPL for active employers.

(3) Beginning with the December 31, 2016 funding valuation, the assets and liabilities associated with three terminated employers have been moved to their own cost group. As such, each pension expense and NPL of these three terminated employers have been directly allocated starting with the June 30, 2017 reporting date.

The accompanying notes are an integral part of this schedule.

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
SCHEDULE OF EMPLOYER ALLOCATIONS
FOR THE YEAR ENDED DECEMBER 31, 2017**

<u>Employer Name</u>	<u>Net Pension Liability (NPL) (1)</u>	<u>Allocation Percentage (2)</u>
Bethel Island Municipal District	\$ 157,443	0.019%
Byron Brentwood Cemetery	29,395	0.004%
Contra Costa Mosquito and Vector Control District	3,017,908	0.372%
Contra Costa County Fire Protection District	110,215,347	13.583%
Central Contra Costa Sanitary District	63,806,000	7.863%
First 5 - Children and Families Commission	1,289,083	0.159%
Contra Costa County	503,558,908	62.058%
Contra Costa County Employees' Retirement Association	4,287,094	0.528%
East Contra Costa Fire Protection District	16,350,262	2.015%
Contra Costa Housing Authority	6,267,604	0.772%
In-Home Supportive Services Authority	794,473	0.098%
Local Agency Formation Commission	181,268	0.022%
Moraga-Orinda Fire District	23,498,575	2.896%
Rodeo Sanitary District	111,965	0.014%
Rodeo-Hercules Fire Protection District	11,693,174	1.441%
San Ramon Valley Fire District	47,110,096	5.806%
Superior Court	12,606,159	1.554%
Delta Diablo Sanitation District (Terminated Employer) (3)	1,435,257	0.177%
Diablo Water District (Terminated Employer) (3)	827,520	0.102%
City of Pittsburg (Terminated Employer) (3)	4,199,080	0.517%
Total for All Employers	\$ 811,436,611	100.000%

(1) The NPL is including pension obligation bonds and Unfunded Actuarial Accrued Liability prepayments for certain employers.

(2) The unrounded percentages excluding terminated employers are actually used in the allocation of NPL for active employers.

(3) Beginning with the December 31, 2016 funding valuation, the assets and liabilities associated with three terminated employers have been moved to their own cost group. As such, each pension expense and NPL of these three terminated employers have been directly allocated starting with the June 30, 2017 reporting date.

The accompanying notes are an integral part of this schedule.

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
NOTES TO SCHEDULE OF EMPLOYER ALLOCATIONS
FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017**

NOTE 1 – PLAN DESCRIPTION

The Contra Costa County Employees' Retirement Association (CCCERA) is governed by the Board of Retirement (Board) under the County Employees Retirement Law of 1937 (CERL); the California Public Employees' Pension Reform Act of 2013 (PEPRA); and the California State Constitution. Members should refer to CERL and PEPRA for more complete information.

CCCERA is a contributory defined benefit pension plan (the Plan) initially organized under the provisions of the CERL on July 1, 1945. It provides benefits upon retirement, death, or disability of members. Prior to 2010, CCCERA operated as a cost-sharing, multiple employer defined benefit pension plan that covered substantially all of the employees of the County of Contra Costa (the County) and 16 other member agencies, and three terminated employers.

In October 2009, the Board depooled CCCERA's assets, actuarial accrued liability (AAL), and normal cost both by tier and employer for determining employer contribution rates. This Board action yielded 12 separate cost groups by employer, with the exception of smaller employers (those with less than 50 active members at that time) who continue to be pooled with the applicable County tier. The December 31, 2009 valuation was the first to incorporate the new "depooled" employer contribution rates, and those rates were effective July 1, 2011.

CCCERA, with its own governing board, is an independent governmental entity, separate and distinct from the County. CCCERA is presented in the County's basic financial statements as a pension trust fund. Costs of administering the Plan are financed through contributions and investment earnings. Effective January 1, 2015, California Senate Bill 673 (SB 673) makes the CCCERA retirement system an independent "district" and the employer for its entire staff, subject to terms and conditions of employment established by the Board.

NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING AND REPORTING POLICIES

Basis of Presentation and Basis of Accounting

Employers participating in CCCERA are required to report pension information in their financial statements for fiscal periods beginning on or after June 15, 2014, in accordance with Governmental Accounting Standards Board (GASB) Statement No. 68, *Accounting and Financial Reporting for Pensions – an Amendment of GASB Statement No. 27*. The Schedule of Employer Allocations, along with CCCERA's audited financial statements, the GASB Statement No. 67 Actuarial Valuation as of December 31, 2018, and the GASB Statement No. 68 Actuarial Valuation based on a December 31, 2018 Measurement Date for Employer Reporting as of June 30, 2019, prepared by CCCERA's independent actuary, provide the required information for financial reporting related to CCCERA that employers may use in their financial statements.

The accompanying schedule was prepared by CCCERA's independent actuary and was derived from information provided by CCCERA in accordance with accounting principles generally accepted in the United States of America as applicable to governmental organizations.

Use of Estimates in the Preparation of the Schedules

The preparation of this schedule in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect certain amounts and disclosures. Actual results could differ from those estimates.

NOTE 3 – ACTUARIAL METHODS AND ASSUMPTIONS

Net Pension Liability

The collective Plan's Fiduciary Net Position (FNP) as of December 31, 2018, was audited as part of CCCERA's financial statements for the fiscal year ended December 31, 2018. The net pension liability (NPL) for each cost group is the Total Pension Liability (TPL) minus the Plan's FNP (plan assets). The TPL for each cost group is obtained from internal valuation results based on the actual participants in each cost group. The Plan FNP for each cost group was determined by adjusting the Valuation Value of Assets (VVA) for each cost group (which is used to determine employer contribution rates) by the ratio of the total CCCERA Plan FNP to total CCCERA VVA. Based on this methodology, any non-valuation reserves (such as the Post Retirement Death Benefit) are allocated amongst the cost groups based on each cost group's VVA.

For this report, the reporting dates for the employer are June 30, 2019 and 2018. The FNP and NPL were measured as of December 31, 2018 and 2017, respectively, and determined based upon rolling forward the TPL from actuarial valuations as of December 31, 2017 and 2016, respectively. In addition, any significant changes in actuarial assumptions or Plan provisions that occurred between the valuation date and the measurement date have been reflected. The TPL as of December 31, 2018, was measured by (1) valuing the TPL as of December 31, 2017, (before the rollforward) to include the following actuarial assumptions that the Board has adopted for use in the pension funding valuation as of December 31, 2018, and (2) using this TPL in rolling forward the results from December 31, 2017, to December 31, 2018. All assumptions are the same as those used in the December 31, 2018 funding valuation and were based on the results of an actuarial experience study for the period January 1, 2015, through December 31, 2017. Consistent with the provisions of GASB Statement No. 68, the assets and liabilities measured as of December 31, 2018 and 2017, are not adjusted or rolled forward to June 30, 2019 and 2018 reporting dates, respectively.

Allocation of Net Pension Liability to Individual Employers

The allocation method used to derive each employer's proportionate share of the NPL is consistent with GASB Statement No. 68, paragraph 49. The Determination of Proportionate Share is based on the actual January 1, 2018 through December 31, 2018 compensation information provided by CCCERA. In determining the employer's proportionate share, a ratio is calculated using the employees' compensation by employer and cost group.

Paragraph 49 of GASB Statement No. 68 indicates that, to the extent different contribution rates are assessed based on separate relationships that constitute the collective NPL, the determination of the employer's proportionate share of the collective NPL should be made in a manner that reflects those relationships. The allocation method utilized by CCCERA (as described earlier) to determine the employer's proportionate share reflects these relationships through the cost groups. For cost groups that have one employer, all of the NPL for the cost group is allocated to the corresponding employer. For cost groups with multiple employers, NPL is allocated based upon a ratio calculated by using the employer's compensation to the total cost group allocation. If an employer is in multiple cost groups, the employer's total allocated NPL is the sum of its allocated NPL from each cost group. Terminated employers have been directly allocated NPL based on results for the specific employer. The corresponding employer allocation percentage or proportionate share shown on the Schedule of Employer Allocations is on the total Plan basis.

NOTE 4 – RELATIONSHIP TO THE BASIC FINANCIAL STATEMENTS

The components of the schedule have been determined based on the FNP for the CCCERA as shown in the CCCERA Statement of Changes in Fiduciary Net Position and in accordance with requirements promulgated by GASB Statements No. 67 and No. 68. The NPL at December 31, 2018 and 2017, is reported in CCCERA's Required Supplementary Information following the Notes.

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
SCHEDULE OF PENSION AMOUNTS BY EMPLOYER
AS OF AND FOR THE YEAR ENDED DECEMBER 31, 2018**

Employer	Net Pension Liability	Deferred Outflows of Resources				Deferred Inflows of Resources				Net Amortization of Deferred Amounts in Proportion to Contributions and Differences Between Employers' Proportionate Share of Contributions and Differences Between Employers' Proportionate Share of Plan Pension Expense (1)		Total Pension Expense (1)	
		Differences Between Expected and Actual Experience in the Total Pension Liability	Changes of Assumptions or Other Inputs	Changes in Proportion Between Employers' Contributions and Share of Proportionate	Net Excess of Actual Pension Plan Investments	Total Outflows of Resources	Differences Between Expected and Actual Experience in Total Pension Liability	Changes of Assumptions or Other Inputs	Changes in Proportion Between Employers' Contributions and Share of Proportionate	Total Inflows of Resources	Proportionate Share of Plan Pension Expense (1)		Proportionate Share of Contributions
Bethel Island Municipal District	\$ 383,118	\$ 11,069	\$ 2,246	\$ 152,245	\$ 114,792	\$ 280,352	\$ 8,328	\$ 19,516	\$ 2,852	\$ 30,098	\$ 81,758	\$ 48,965	\$ 130,723
Byron Brentwood Cemetery	52,348	1,572	307	45,042	15,685	65,546	1,138	2,667	3,549	7,354	11,172	36,785	47,957
Contra Costa Mosquito and Vector Control District	4,737,369	136,871	27,772	94,346	1,419,449	1,678,438	102,881	241,317	288,315	612,613	1,010,950	(127,150)	883,800
Contra Costa County Fire Protection District	160,317,317	4,046,267	942,751	2,720,914	48,185,181	56,495,113	3,495,840	8,191,846	28,857,560	40,545,246	34,318,213	(7,355,804)	26,862,309
Central Contra Costa Sanitary District	90,430,104	2,612,669	530,124	7,836,777	27,095,284	37,874,854	1,965,766	4,906,404	17,164,806	23,736,976	19,297,671	(4,398,113)	14,889,558
First 5 - Children and Families Commission	2,881,759	83,259	16,894	495,162	863,452	1,458,767	62,644	146,793	10,845	220,382	614,863	245,673	860,638
Contra Costa County	976,031,747	28,199,103	5,721,740	67,617,522	292,445,266	393,983,651	21,216,832	49,717,915	16,598,469	87,533,316	208,283,949	20,408,610	228,692,559
Contra Costa County Employees' Retirement Association	7,315,532	211,357	42,885	582,902	2,191,930	3,029,074	159,025	372,645	9,271	540,941	1,561,127	205,640	1,766,767
East Contra Costa Fire Protection District	18,245,316	527,136	106,959	1,064,092	5,466,786	7,184,973	396,616	928,395	7,441,710	8,767,721	3,893,528	(3,565,874)	327,654
Contra Costa Housing Authority	10,796,497	311,928	63,292	204,887	3,234,920	3,815,027	234,694	549,961	316,182	1,100,837	2,303,958	(21,009)	2,282,949
In-Home Supportive Services Authority	1,309,889	37,845	7,679	81,110	392,481	519,115	28,475	66,725	25,691	120,891	279,532	32,369	311,901
Local Agency Formation Commission	304,195	8,789	1,783	12,318	91,145	114,035	6,613	15,495	4,121	26,229	64,916	(2,692)	62,224
Moraga-Orinda Fire District	34,418,805	994,414	201,772	1,753,189	10,312,797	13,282,172	748,194	1,753,254	8,136,089	10,637,537	7,344,929	(2,896,305)	4,448,624
Rodeo Sanitary District	187,143	5,407	1,097	199,722	56,073	262,289	4,068	9,533	8,554	22,155	39,935	124,297	164,232
Rodeo-Hercules Fire Protection District	11,716,980	338,522	68,688	1,343,137	3,510,721	5,261,068	254,703	596,849	5,482,478	6,334,030	2,500,389	(1,903,356)	597,033
San Ramon Valley Fire District	69,577,960	2,010,218	407,683	4,456,142	20,847,423	27,721,666	1,512,483	3,544,220	6,936,643	11,993,346	14,847,848	(2,326,343)	12,521,505
Superior Court	27,420,745	792,229	160,747	4,162,686	8,215,991	13,331,653	596,071	1,396,781	1,377,958	3,370,910	5,851,554	1,484,407	7,345,961
Delta Diablo Sanitation District (Terminated Employer) (2)	2,433,196	172,343	18,012	-	453,235	643,590	9,467	-	-	9,467	245,966	-	245,966
Diablo Water District (Terminated Employer) (2)	1,034,726	156,720	-	-	58,418	215,138	-	13,531	-	13,531	122,215	-	122,215
City of Pittsburg (Terminated Employer) (2)	7,949,368	386,749	-	-	1,596,069	1,982,818	-	39,123	-	39,123	672,478	-	672,478
Total for All Employers	\$ 1,428,044,144	\$ 41,644,407	\$ 8,322,631	\$ 92,645,193	\$ 426,567,118	\$ 589,179,349	\$ 30,804,038	\$ 72,213,970	\$ 92,645,193	\$ 185,663,201	\$ 303,347,051	\$ -	\$ 303,347,051

(1) Starting with the June 30, 2017 reporting date, the employer contributions now exclude any employer subventions of member contributions and include any member subventions of employer contributions. This change has not been applied on a retroactive basis prior to the June 30, 2017 reporting date.
(2) Beginning with the December 31, 2016 funding valuation, the assets and liabilities associated with three terminated employers have been moved to their own cost group. As such, these three terminated employers have been direct allocated to each their pension expense and NPL starting with the June 30, 2017 reporting date.
(3) Calculated in accordance with Paragraphs 54 and 55 of GASB Statement No. 68.

The accompanying notes are an integral part of this schedule.

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
NOTES TO SCHEDULE OF PENSION AMOUNTS BY EMPLOYER
AS OF AND FOR THE YEAR ENDED DECEMBER 31, 2018**

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING AND REPORTING POLICIES

Basis of Presentation and Basis of Accounting

Employers participating in Contra Costa County Employees' Retirement Association (CCCERA) are required to report pension information in their financial statements for fiscal periods beginning on or after June 15, 2014, in accordance with Governmental Accounting Standards Board (GASB) Statement No. 68, *Accounting and Financial Reporting for Pensions – an Amendment of GASB Statement No. 27*. The Schedule of Pension Amounts by Employer, along with CCCERA's audited financial statements, the GASB Statement No. 67 Actuarial Valuation as of December 31, 2018, and the GASB Statement No. 68 Actuarial Valuation Based on a December 31, 2018 Measurement Date for Employer Reporting as of June 30, 2019, prepared by CCCERA's independent actuary, provide the required information for financial reporting related to CCCERA that employers may use in their financial statements.

The accompanying schedule was allocated by employer based on the Employer Allocation Schedule and was prepared by CCCERA's independent actuary. The information was derived from information provided by CCCERA and the County of Contra Costa in accordance with accounting principles generally accepted in the United States of America as applicable to governmental organizations.

Use of Estimates in the Preparation of the Schedule

The preparation of this schedule in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts and disclosures during the reporting period. Actual results could differ from those estimates.

NOTE 2 – ACTUARIAL ASSUMPTIONS

Actuarial Methods and Assumptions Used to Determine Total Pension Liability

The Net Pension Liability (NPL) was measured as of December 31, 2018 and 2017. CCCERA's defined contribution benefit pension plan's (Plan) Fiduciary Net Position (FNP) was valued as of the measurement date while the Total Pension Liability (TPL) was determined based upon rolling forward the TPL from actuarial valuations as of December 31, 2017 and 2016, respectively.

The components of the NPL of CCCERA at December 31, 2018 and 2017, were as follows:

Measurement Date for Employer under GASB Statement No. 68	<u>December 31, 2018</u>	<u>December 31, 2017</u>
Total Pension Liability	\$ 9,578,029,937	\$ 9,202,017,660
Plan Fiduciary Net Position	<u>(8,149,985,793)</u>	<u>(8,390,581,049)</u>
Net Pension Liability	<u>\$ 1,428,044,144</u>	<u>\$ 811,436,611</u>
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	<u>85.09%</u>	<u>91.18%</u>

NOTE 2 – ACTUARIAL ASSUMPTIONS (Continued)

Actuarial Methods and Assumptions Used to Determine Total Pension Liability (Continued)

TPL as of December 31, 2018, was measured by (1) valuing the TPL as of December 31, 2017, (before the rollforward) to include the following actuarial assumptions that the Board of Retirement has adopted for use in the pension funding valuation as of December 31, 2018, and (2) using this TPL in rolling forward the results from December 31, 2017, to December 31, 2018. Other assumptions are the same as those used in the December 31, 2018 funding valuation were based on the results of an actuarial experience study for the period January 1, 2012, through December 31, 2014.

In particular, the following actuarial assumptions were applied to all periods included in the December 31, 2018 measurements:

ACTUARIAL VALUATION ASSUMPTIONS

Valuation Date	December 31, 2018
Investment Rate of Return	7.00%, net of pension plan investment expense, including inflation.
Administrative Expenses	1.10% of payroll allocated to both the employer and member based on the components of the Normal Cost (before expenses) rates for the employer and member.
Projected Salary Increases (1)	General: 3.75% - 15.25% and Safety: 4.25% - 16.25%, varying by service, including inflation.
Attributed to Inflation	2.75%
Cost-of-Living Adjustments (COLA)	2.75% per year except for Safety Tier C, California Public Employees' Pension Reform Act of 2013 (PEPRA) Tier E benefits and PEPRA Tier 4 (2% COLA) and Tier 5 (2% COLA) benefits for members covered under certain memoranda of understanding are assumed to increase at 2% per year. All increases are contingent upon actual increases in the Consumer Price Index.

Post-retirement mortality rates for healthy retirement were based on Amount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional MP-2018 projection scale.

Post-retirement mortality rates for a disabled retirement were based on Amount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional MP-2018 improvement scale.

Pre-retirement mortality rates were based on Amount-Weighted Above-Median Mortality Tables, projected generationally with the two-dimensional mortality improvement scale MP-2018.

(1) Includes inflation at 2.75% plus real across-the-board salary increase of 0.50% plus promotional and merit increase that vary by service.

NOTE 2 – ACTUARIAL ASSUMPTIONS (Continued)**Discount**

The discount rate used to measure the TPL was 7.00% as of December 31, 2018 and 2017. The projection of cash flows used to determine the discount rate assumed that employee and employer contributions will be made at rates equal to the actuarially determined contribution rates. For this purpose, only employee and employer contributions that are intended to fund benefits for current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs for future Plan members and their beneficiaries, as well as projected contributions from future Plan members, are not included. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current Plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the TPL as of both December 31, 2018 and 2017.

Long-Term Expected Rate of Return by Asset Class

The long-term expected rate of return on pension plan investments was determined using a building-block method in which expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. These returns are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation and subtracting expected investment expenses and a risk margin. The target allocation and projected arithmetic real rates of return for each major asset class, after deducting inflation, but before deducting investment expenses, used in the derivation of the long-term expected investment rate of return assumption are summarized in the following table below.

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Large Cap U.S. Equity	5%	5.44%
Developed International Equity	13%	6.54%
Emerging Markets Equity	11%	8.73%
Short-Term Govt/Credit	23%	0.84%
U.S. Treasury	3%	1.05%
Private Equity	8%	9.27%
Risk Diversifying Strategies	7%	3.53%
Global Infrastructure	3%	7.90%
Private Credit	12%	5.80%
REIT	1%	6.80%
Value Add Real Estate	5%	8.80%
Opportunistic Real Estate	4%	12.00%
Risk Parity	5%	5.80%
Total	100%	

Amortization of Deferred Outflows and Deferred Inflows of Resources

The difference between projected and actual investment earnings on pension plan investments is amortized over 5 years on a straight-line basis. One-fifth was recognized in pension expense during the measurement period, and the remaining difference between projected and actual investment earnings on pension plan investments at December 31, 2018, is to be amortized over the remaining periods.

The changes in assumptions and differences between expected and actual experience are recognized over the average of the expected remaining service lives of all employees that are provided with pensions through CCCERA (active and inactive employees) determined as of December 31, 2017, (the beginning of the measurement period ending December 31, 2018) and is 4.57 years. Prior period changes of assumptions and differences between expected and actual experience are continued to be recognized based on the expected remaining service lives of all employees calculated as of those prior measurement dates.

NOTE 2 – ACTUARIAL ASSUMPTIONS (Continued)

Amortization of Deferred Outflows and Deferred Inflows of Resources (Continued)

In addition, the net effect of the change in the employer's proportionate share of the collective NPL and collective deferred outflows of resources and deferred inflows of resources is also recognized over the average expected remaining service lives of all employees noted above. The difference between the actual employer contributions and the proportionate share of the employer contributions during the measurement period ending on December 31, 2018, is recognized over the same period as noted above. The Schedule of Pension Amounts by Employer does not reflect contributions made to CCCERA subsequent to the measurement date as defined in GASB Statement No. 68 Paragraphs 54, 55, and 57. Appropriate treatment of such amounts is the responsibility of the employers.

NOTE 3 – RELATIONSHIP TO THE BASIC FINANCIAL STATEMENTS

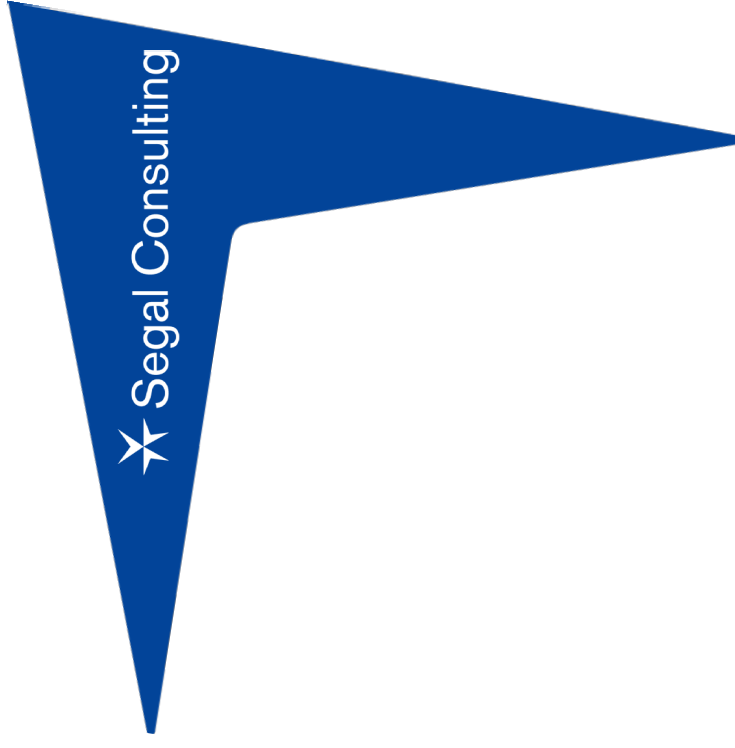
The components of the schedule associated with pension expense and deferred outflows and inflows of resources have been determined based on the net increase in FNP for CCCERA as shown in the CCCERA Statement of Changes in Fiduciary Net Position and in accordance with requirements promulgated by the GASB Statements No. 67 and No. 68. The NPL at December 31, 2018, is reported in the Notes to CCCERA's Basic Financial Statements and Required Supplementary Information following the Notes.

NOTE 4 – ADDITIONAL FINANCIAL AND ACTUARIAL INFORMATION

Additional financial and actuarial information required for GASB Statement No. 68 disclosures is located in CCCERA's Comprehensive Annual Financial Report for the fiscal year ended December 31, 2018, which can be found on CCCERA's website, and the GASB Statement No. 68 Actuarial Valuation Based on December 31, 2018 Measurement Date for Employer Reporting as of June 30, 2019, which is available upon request from CCCERA.

Contra Costa County Employees' Retirement Association

**Governmental Accounting Standards (GAS) 68
Actuarial Valuation Based on December 31, 2018
Measurement Date for Employer Reporting as of
June 30, 2019**



<u>Meeting Date</u> 10/09/19 <u>Agenda Item</u> #6

This report has been prepared at the request of the Board of Retirement to assist the sponsors of the Fund in preparing their financial report for their liabilities associated with the CCCERA pension plan. 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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October 1, 2019

Board of Retirement
Contra Costa County Employees' Retirement Association
1200 Concord Avenue, Suite 300
Concord, CA 94520

Dear Board Members:

We are pleased to submit this Governmental Accounting Standards (GAS) 68 Actuarial Valuation based on a December 31, 2018 measurement date for employer reporting as of June 30, 2019. It contains various information that will need to be disclosed in order for Contra Costa County Employees' Retirement Association (CCCERA) employers to comply with GAS 68.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist the sponsors in preparing their financial report for their liabilities associated with the CCCERA pension plan. The census and financial information on which our calculations were based was provided by CCCERA. 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; 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 expectations for CCCERA.

Sincerely,

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

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

John Monroe, ASA, MAAA, EA
Vice President and Actuary

By:

EK/jl

SECTION 1

VALUATION SUMMARY

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SECTION 3

ACTUARIAL ASSUMPTIONS AND METHODS AND APPENDICES

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

Purpose

This report has been prepared by Segal Consulting to present certain disclosure information required by Governmental Accounting Standards (GAS) 68 for employer reporting as of June 30, 2019. The results used in preparing this GAS 68 report are comparable to those used in preparing the Governmental Accounting Standards (GAS) 67 report for the plan based on a reporting date and a measurement date as of December 31, 2018. This valuation is based on:

- The benefit provisions of CCCERA, as administered by the Board of Retirement;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of December 31, 2017, provided by CCCERA;
- The assets of the Plan as of December 31, 2018, provided by CCCERA;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board for the December 31, 2018 valuation; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc. adopted by the Board for the December 31, 2018 valuation.

General Observations on GAS 68 Actuarial Valuation

The following points should be considered when reviewing this GAS 68 report:

- The Governmental Accounting Standards Board (GASB) rules only define pension liability and expense for financial reporting purposes, and do not apply to contribution amounts for pension funding purposes. Employers and plans still develop and adopt funding policies under current practices.
- When measuring pension liability GASB uses the same actuarial cost method (Entry Age method) and the same type of discount rate (expected return on assets) as CCCERA uses for funding. This means that the Total Pension Liability (TPL) measure for financial reporting shown in this report is determined on generally the same basis as CCCERA's Actuarial Accrued Liability (AAL) measure for funding. We note that the same is generally true for the Normal Cost component of the annual plan cost for funding and financial reporting.
- The TPL and the Plan's Fiduciary Net Position include liabilities and assets held for the Post Retirement Death Benefit Reserve. The TPL only includes a liability up to the amount in the Post Retirement Death Benefit Reserve. This is because we understand that the post retirement death benefit is a nonvested benefit and once the reserve is depleted no further benefits would need to be paid.

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- The Net Pension Liability (NPL) is equal to the difference between the TPL and the Plan's Fiduciary Net Position. The Plan's Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to an Unfunded Actuarial Accrued Liability (UAAL) on a market value basis.
- For this report, the reporting dates for the employer are June 30, 2019 and 2018. The NPLs were measured as of December 31, 2018 and 2017, respectively. The Plan's Fiduciary Net Position (plan assets) was valued as of the measurement dates while the TPLs were determined based upon rolling forward the results of the actuarial valuations as of December 31, 2017 and 2016, respectively. In addition, any changes in actuarial assumptions or plan provisions that occurred between the valuation date and the measurement date have been reflected. Consistent with the provisions of GAS 68, the assets and liabilities measured as of December 31, 2018 and 2017 are not adjusted or rolled forward to the June 30, 2019 and 2018 reporting dates, respectively.

Significant Issues in Valuation Year

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

- The NPL increased from \$0.81 billion as of December 31, 2017 to \$1.43 billion as of December 31, 2018 primarily due to the approximately -2.3% return on the market value of assets during 2018 (that was lower than the assumed return of 7.00%), offset to some degree by the effect of the changes in assumptions. Changes in these values during the last two plan years ending December 31, 2018 and December 31, 2017 can be found in Exhibit 5.
- The Board has approved new actuarial assumptions for use in the pension funding valuation as of December 31, 2018. We have included the impact of these assumption changes by (1) revaluing the actuarial valuation TPL as of December 31, 2017 (before the roll forward) and (2) using this revalued TPL in rolling forward the results from December 31, 2017 to December 31, 2018.
- The discount rate used to determine the TPL and NPL as of December 31, 2018 and 2017 was 7.00% following the same assumptions used by CCCERA in the pension funding valuations as of the same dates. The detailed derivation of the discount rate of 7.00% used in the calculation of the TPL and NPL as of December 31, 2018 can be found in Appendix A of Section 3. Various other information that is required to be disclosed can be found throughout Exhibits 1 through 13 in Section 2.
- Based on discussions with CCCERA and their auditors, starting with the June 30, 2017 reporting date for the employers, the employer contributions now exclude any employer subvention of member contributions and include any member subvention of employer contributions in the amounts shown through Exhibits 1 through 13 in Section 2. This change has not been applied on a retroactive basis prior to the June 30, 2017 reporting date.

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- Prior to the June 30, 2017 reporting date, the pension expense, NPL and other results attributed to these three terminated employers: (1) Delta Diablo Sanitation District, (2) Diablo Water District and (3) City of Pittsburg were allocated to other employers within the applicable Cost Groups. Starting with the December 31, 2016 funding valuation, the assets and liabilities associated with the three terminated employers have been moved to their own Cost Group. Therefore, we have directly allocated to each of these terminated employers their pension expense and NPL starting with the June 30, 2017 reporting date. In particular, the TPL for each terminated employer is obtained directly from internal valuation results for that specific employer. Furthermore, the Plan's Fiduciary Net Position for each terminated employer has been set equal to the amount in their respective bookkeeping account.
- Results shown in this report exclude any employer contributions made after the measurement date of December 31, 2018. For employers that participate in the prepayment program, it is our understanding that the portion of the prepayment made in July 2018 that was for the period from January 1, 2019 through June 30, 2019 has also been excluded¹. Employers should consult with their auditors to determine the deferred outflow that should be created for these contributions.
- All Cost Groups except Cost Groups #1, #2, #6 and #8 only have one active employer, so all of the NPL for those Cost Groups are allocated to that employer. The NPL has already been reduced by any proceeds from Pension Obligation Bonds and any UAAL prepayments.
For Cost Groups #1, #2, #6 and #8, the NPL is allocated based on the actual compensation by employer within the Cost Group. The steps we used are as follows:
 - Calculate ratio of employer's compensation to the total compensation for the Cost Group.
 - Multiply this ratio by an "adjusted" NPL. This adjusted NPL is larger than the actual NPL as it excludes proceeds from Pension Obligation Bonds and any UAAL prepayments from the Cost Group's assets when determining the employer's proportionate share of the NPL for the Cost Group. It also excludes the NPLs for the three terminated employers.
 - Subtract from the adjusted NPL the outstanding balance of the proceeds from any Pension Obligation Bonds and any UAAL prepayments for those employers in each Cost Group that are subject to these adjustments.
 - If the employer is in several Cost Groups, the employer's total allocated NPL is the sum of its allocated NPL from each Cost Group.Proportionate share of total plan NPL is then the ratio of the employer's total allocated NPL to the total NPL of all employers. The NPL allocation can be found in Exhibit 7 in Section 2.

¹ With the exception of the 6-months of contributions made by Rodeo-Hercules Fire Protection District during the 2018 calendar year that were pre-paid for the 2019 calendar year. Those contributions are reflected in the December 31, 2018 market value of assets of CCCERA.

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- The following table contains a summary with the names for all active participating employers in CCCERA. Also shown are the employer name abbreviations and employer numbers that are used throughout the rest of this report.

Summary of Active Participating Employers within CCCERA

#	<u>Employer Name</u>	<u>Abbreviation</u>
1	Bethel Island Municipal Improvement District	1 - BIMID
2	Byron-Brentwood-Knighten Union Cemetery District	2 - Union Cemetery
3	Contra Costa Mosquito & Vector Control District	3 - CC Mosquito
4	Contra Costa County Fire Protection District	4 - CCCFPD
5	Central Contra Costa Sanitary District	5 - CCCSD
6	First 5 CC Children & Families Commission	6 - First 5
7	Contra Costa County	7 - County
8	Contra Costa County Employees' Retirement Association	8 - CCCERA (the employer)
9	East Contra Costa Fire Protection District	9 - ECCFPD
10	Contra Costa Housing Authority	10 - Housing Authority
11	In-Home Supportive Services Authority	11 - IHSS
12	Contra Costa Local Agency Formation Commission	12 - LAFCO
13	Moraga-Orinda Fire Protection District	13 - MOFD
14	Rodeo Sanitary District	14 - Rodeo SD
15	Rodeo-Hercules Fire Protection District	15 - RHFD
16	San Ramon Valley Fire Protection District	16 - SRVFPD
17	Contra Costa Superior Court	17 - Court
18	Delta Diablo Sanitation District (Terminated Employer)	18 - DDSDD (Term)
19	Diablo Water District (Terminated Employer)	19 - DWD (Term)
20	City of Pittsburg (Terminated Employer)	20 - Pittsburg (Term)

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

Summary of Key Valuation Results		
Reporting Date for Employer under GAS 68	6/30/2019⁽¹⁾	6/30/2018⁽¹⁾
Measurement Date for Employer under GAS 68	12/31/2018	12/31/2017
Disclosure elements for fiscal year ending December 31:		
1. Service Cost ⁽²⁾	\$229,098,552	\$212,257,626
2. Total Pension Liability	9,578,029,937	9,202,017,660
3. Plan's Fiduciary Net Position	8,149,985,793	8,390,581,049
4. Net Pension Liability	1,428,044,144	811,436,611
5. Pension Expense	303,347,051	162,333,068
Schedule of contributions for fiscal year ending December 31:		
6. Actuarially determined contributions ⁽³⁾	\$324,863,103	\$314,512,561
7. Actual employer contributions ⁽³⁾	324,863,103	314,512,561
8. Contribution deficiency (excess) (6) – (7)	0	0
Demographic data for plan year ending December 31:⁽⁴⁾		
9. Number of retired members and beneficiaries	9,547	9,267
10. Number of inactive vested members ⁽⁵⁾	3,477	3,327
11. Number of active members	10,021	10,038
Key assumptions as of December 31:		
12. Investment rate of return	7.00%	7.00%
13. Inflation rate	2.75%	2.75%
14. Projected salary increases ⁽⁶⁾	General: 3.75% to 15.25% and Safety: 4.25% to 16.25%	General: 4.00% to 13.25% and Safety: 4.00% to 13.75%

⁽¹⁾ The reporting dates and measurement dates for the plan are December 31, 2018 and 2017, respectively.

⁽²⁾ Excludes administrative expense load. The service cost is based on the previous year's valuation, meaning the December 31, 2018 and December 31, 2017 values are based on the valuations as of December 31, 2017 and December 31, 2016, respectively. Furthermore, the actuarial assumptions used to determine the service cost in the December 31, 2016 valuation were the same as those used in the December 31, 2017 valuation.

⁽³⁾ See footnote (1) under Exhibit 6 on page 12.

⁽⁴⁾ Data as of December 31, 2017 is used in the measurement of the TPL as of December 31, 2018.

⁽⁵⁾ Includes inactive members with member contributions on deposit.

⁽⁶⁾ Includes inflation at 2.75% plus real across-the-board salary increases of 0.50% plus promotional and merit increases that vary by service as of December 31, 2018 and 2017.

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

Important Information about Actuarial Valuations

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

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

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan description in this report (as well as the plan summary included in our funding valuation 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 CCCERA. 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 measurement date, as provided by CCCERA.
- **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, termination, 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 Board to assist the sponsors of the Fund in preparing items related to the pension plan in their financial reports. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan’s assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term

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

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: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 1

General Information – “Financial Statements”, Note Disclosures and Required Supplementary Information for a Cost-Sharing Pension Plan

Plan Description

Plan administration. The Contra Costa County Employees' Retirement Association (CCCERA) was established by the County of Contra Costa in 1945. CCCERA is governed by the County Employees' Retirement Law of 1937 (California Government Code Section 31450 et seq.), the California Public Employees' Pension Reform Act of 2013 (PEPRA), and the regulations, procedures, and policies adopted by CCCERA's Board of Retirement. CCCERA is a cost-sharing multiple employer public employee retirement association whose main function is to provide service retirement, disability, death and survivor benefits to the General and Safety members employed by the County of Contra Costa. CCCERA also provides retirement benefits to the employee members for 16 other participating agencies which are members of CCCERA.

The management of CCCERA is vested with the CCCERA Board of Retirement. The Board consists of twelve trustees. Of the twelve members, three are alternates. Four trustees are appointed by the County Board of Supervisors; four trustees (including the Safety alternate) are elected by CCCERA's active members; two trustees (including one alternate) are elected by the retired membership. Board members serve three-year terms, with the exception of the County Treasurer who is elected by the general public and serves during his tenure in office.

Plan membership. At December 31, 2018, pension plan membership consisted of the following:

Retired members or beneficiaries currently receiving benefits	9,547
Inactive vested members entitled to, but not yet receiving benefits ⁽¹⁾	3,477
Active members	<u>10,021</u>
Total	23,045

⁽¹⁾ Includes inactive members with contributions on deposit

Note: Data as of December 31, 2018 is not used in the measurement of the TPL as of December 31, 2018.

Benefits provided. CCCERA provides service retirement, disability, death and survivor benefits to eligible employees. All regular full-time employees of the County of Contra Costa or participating agencies become members of CCCERA effective on the first day of the first full pay period after employment. Part-time employees in permanent positions must work at least 20 hours a week in order to be a member of CCCERA. There are separate retirement plans for General and Safety members. Safety membership is extended to those involved in active law enforcement, fire suppression, and certain other “Safety”

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classifications. There are currently five tiers applicable to Safety members. Safety members with membership dates before January 1, 2013 are included in Tier A (Enhanced and Non-Enhanced). 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. Any new Safety Member who becomes a member on or after January 1, 2013 is designated PEPPRA Safety Tier D or E (Safety members from certain bargaining units) and is subject to the provisions of California Government Code 7522 et seq.

All other employees are classified as General members. There are currently eight tiers applicable to General members. General Tier 1 (Enhanced and Non-Enhanced) includes general members hired before July 1, 1980 and electing not to transfer to Tier 2 Plan. In addition, 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. General Tier 2 includes 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 (Enhanced and Non-Enhanced). Effective January 1, 2005, all CNA employees in Tier 2 were placed in Tier 3. New General Members who become a member on or after January 1, 2013 are designated as PEPPRA General Tier 4 (hired by specific employers who did not adopt Tier 2) and Tier 5 (with 2%/3% maximum COLAs) and are subject to the provisions of California Government Code 7522 et seq.

General members prior to January 1, 2013, are eligible to retire once they attain the age of 70 regardless of service or at age 50 and have acquired 10 or more years of retirement service credit. A member with 30 years of service is eligible to retire regardless of age. General members who are first hired on or after January 1, 2013, are eligible to retire once they have attained the age of 70 regardless of service or at age 52, and have acquired five years of retirement service credit.

Safety members prior to January 1, 2013, are eligible to retire once they attain the age of 70 regardless of service or at age 50 and have acquired 10 or more years of retirement service credit. A member with 20 years of service is eligible to retire regardless of age. Safety members who are first hired on or after January 1, 2013, are eligible to retire once they have attained the age of 70 regardless of service or at age 50, and have acquired five years of retirement service credit.

The retirement benefit the member will receive is based upon age at retirement, final average compensation, years of retirement service credit and retirement plan and tier.

General Tier 1 and Tier 3 benefits are calculated pursuant to the provisions of Sections §31676.11 and §31676.16 for Non-Enhanced and Enhanced benefit formulae, respectively. The monthly allowance is equal to 1/60th (Non-Enhanced) and 1/50th (Enhanced) of final compensation times years of accrued retirement service credit times age factor from either section §31676.11 (Non-Enhanced) or §31676.16 (Enhanced). Note that for members previously covered under the Non-Enhanced formula (§31676.11), they are entitled to at least the benefits they could have received under the Non-Enhanced formula (§31676.11). General Tier 2 benefit is calculated pursuant to the provisions of Sections §31752. General member benefits for

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those with membership dates on or after January 1, 2013 (PEPRA General Tier 4 and Tier 5) are calculated pursuant to the provisions found in California Government Code Section §7522.20(a). The monthly allowance is equal to the final compensation multiplied by years of accrued retirement credit multiplied by the age factor from Section §7522.20(a).

Safety member benefits are calculated pursuant to the provisions of California Government Code Sections §31664 and §31664.1 for Non-Enhanced and Enhanced formulae, respectively. The monthly allowance is equal to 1/50th (or 2%) of final compensation times years of accrued retirement service credit times age factor from Section §31664 (Non-Enhanced) or 3% of final compensation times years of accrued retirement service credit times age factor from §31664.1 (Enhanced). For those Safety member with membership dates on or after January 1, 2013 (PEPRA Safety Tier D and Tier E) benefits are calculated pursuant to the provisions found in California Government Code Section §7522.25(d). The monthly allowance is equal to the final compensation multiplied by years of accrued retirement service credit multiplied by the age factor from Section §7522.25(d).

For members with membership dates before January 1, 2013, the maximum monthly retirement allowance is 100% of final compensation. There is no final compensation limit on the maximum retirement benefit for members with membership dates on or after January 1, 2013. However, the maximum amount of compensation earnable that can be taken into account for 2018 for members with membership dates on or after January 1, 1996 but before January 1, 2013 is \$275,000. For members with membership dates on or after January 1, 2013 the maximum amount of pensionable compensation that can be taken into account for 2018 is equal to \$121,388 for those enrolled in Social Security (\$145,666 for those not enrolled in Social Security). These limits are adjusted on an annual basis. Members are exempt from paying member contributions and employers are exempt from paying employer contributions on compensation in excess of the annual cap.

Final average compensation consists of the highest 12 consecutive months for General Tier 1, General Tier 3 (non-disability) and Safety Tier A members and the highest 36 consecutive months for General Tier 2, General Tier 3 (disability), PEPRA General Tier 4, PEPRA General Tier 5, Safety Tier C, PEPRA Safety Tier D and PEPRA Safety Tier E members.

The member may elect an unmodified retirement allowance, or choose an optional retirement allowance. The unmodified retirement allowance provides the highest monthly benefit and a 60% continuance to an eligible surviving spouse or domestic partner. An eligible surviving spouse or domestic partner is one married to or registered with the member one year prior to the effective retirement date or at least two years prior to the date of death and has attained age 55 on or prior to the date of death. There are four optional retirement allowances the member may choose. Each of the optional retirement allowances requires a reduction in the unmodified retirement allowance in order to allow the member the ability to provide certain benefits to a surviving spouse, domestic partner, or named beneficiary having an insurable interest in the life of the member.

CCCERA provides an annual cost-of-living benefit to all retirees. The cost-of-living adjustment, based upon the Consumer Price Index for the San Francisco-Oakland-Hayward Area, is capped at 3.0% for General Tier 1, General Tier 3 (non-disability

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benefits), PEPRA General Tier 4, PEPRA General Tier 5-3% (non-disability benefits), Safety Tier A and PEPRA Safety Tier D. The cost-of-living adjustment is capped at 4.0% for General Tier 3 (disability benefits), General Tier 2 and PEPRA General Tier 5-3% (disability benefits). The cost-of-living adjustment is capped at 2.0% for General Tier 5-2%, Safety Tier C and PEPRA Safety Tier E.

The County of Contra Costa and participating agencies contribute to the retirement plan based upon actuarially determined contribution rates adopted by the Board of Retirement. Employer contribution rates are adopted annually based upon recommendations received from CCCERA's actuary after the completion of the annual actuarial valuation. The average employer contribution rate as of December 31, 2018 for the fiscal year beginning July 1, 2018 (based on the December 31, 2016 valuation) was 38.08% of compensation.

Members are required to make contributions to CCCERA regardless of the retirement plan or tier in which they are included. The average member contribution rate as of December 31, 2018 for the fiscal year beginning July 1, 2018 (based on the December 31, 2016 valuation) was 12.08% of compensation.

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EXHIBIT 2

Net Pension Liability

Reporting Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
The components of the Net Pension Liability are as follows:		
Total Pension Liability	\$9,578,029,937	\$9,202,017,660
Plan's Fiduciary Net Position	<u>(8,149,985,793)</u>	<u>(8,390,581,049)</u>
Net Pension Liability	\$1,428,044,144	\$811,436,611
Plan's Fiduciary Net Position as a percentage of the Total Pension Liability	85.09%	91.18%

The Net Pension Liability (NPL) was measured as of December 31, 2018 and 2017. The Plan's Fiduciary Net Position (plan assets) was valued as of the measurement date while the Total Pension Liability (TPL) was determined based upon rolling forward the TPL from actuarial valuations as of December 31, 2017 and 2016, respectively.

Plan provisions. The plan provisions used in the measurement of the NPL as of December 31, 2018 and 2017 are the same as those used in the CCCERA actuarial valuation as of December 31, 2018 and 2017, respectively. The TPL and the Plan's Fiduciary Net Position include liabilities and assets held for the Post Retirement Death Benefit Reserve.

Actuarial assumptions and methods. The TPL as of December 31, 2018 that was determined by an actuarial valuation as of December 31, 2017, was re-measured as of December 31, 2018 to reflect the actuarial assumptions that the Board of Retirement has approved for use in the funding valuation as of December 31, 2018. Those actuarial assumptions were based on the results of an experience study for the period January 1, 2015 through December 31, 2017. They are the same as the assumptions used in the December 31, 2018 funding valuation for CCCERA and are outlined on page 13 of this report. In particular, the following actuarial assumptions were applied to all periods included in the December 31, 2018 measurement:

Inflation	2.75%
Salary increases	General: 3.75% to 15.25% and Safety: 4.25% to 16.25%, varying by service, including inflation.
Investment rate of return	7.00%, net of pension plan investment expense, including inflation.
Administrative expenses for December 31, 2018 valuation	1.10% of payroll allocated to both the employer and member based on the components of the Normal Cost rates for the employer and member.
Other assumptions	Same as those used in December 31, 2018 funding valuation.

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EXHIBIT 2 (continued)

Net Pension Liability

The TPL as of December 31, 2017 was determined by an actuarial valuation as of December 31, 2016. The actuarial assumptions used were based on the results of an experience study for the period January 1, 2012 through December 31, 2014. They are the same as the assumptions used in the December 31, 2017 funding actuarial valuation for CCCERA. In particular, the following actuarial assumptions were applied to all periods included in the December 31, 2017 measurement:

Inflation	2.75%
Salary increases	General: 4.00% to 13.25% and Safety: 4.00% to 13.75%, varying by service, including inflation.
Investment rate of return	7.00%, net of pension plan investment expense, including inflation.
Administrative expenses for December 31, 2017 valuation	1.13% of payroll allocated to both the employer and member based on the components of the Normal Cost rates for the employer and member.
Other assumptions	Same as those used in December 31, 2017 funding valuation.

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EXHIBIT 3

Target Asset Allocation

The December 31, 2018 long-term expected rate of return on pension plan investments was determined in 2019 using a building-block method in which expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. These returns are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage, adding expected inflation and subtracting expected investment expenses and a risk margin. The target allocation and projected arithmetic real rates of return for each major asset class, after deducting inflation but before deducting investment expenses, used in the derivation of the December 31, 2018 long-term expected investment rate of return assumption are summarized in the following table. This information will change every three years based on the actuarial experience study.

Asset Class	Target Allocation	Long-Term Expected Arithmetic Real Rate of Return
Large Cap U.S. Equity	5%	5.44%
Developed International Equity	13%	6.54%
Emerging Market Equity	11%	8.73%
Short-Term Govt/Credit	23%	0.84%
U.S. Treasury	3%	1.05%
Private Equity	8%	9.27%
Risk Diversifying	7%	3.53%
Global Infrastructure	3%	7.90%
Private Credit	12%	5.80%
REIT	1%	6.80%
Value Add Real Estate	5%	8.80%
Opportunistic Real Estate	4%	12.00%
Risk Parity	<u>5%</u>	5.80%
Total	100%	

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EXHIBIT 3 (continued)

Target Asset Allocation

The December 31, 2017 long-term expected rate of return on pension plan investments was determined in 2016 using a building-block method in which expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. These returns are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage, adding expected inflation and subtracting expected investment expenses and a risk margin. The target allocation and projected arithmetic real rates of return for each major asset class, after deducting inflation but before deducting investment expenses, used in the derivation of the December 31, 2017 long-term expected investment rate of return assumption are summarized in the following table. This information will change every three years based on the actuarial experience study.

Asset Class	Target Allocation	Long-Term Expected Arithmetic Real Rate of Return
Large Cap U.S. Equity	6%	5.75%
Developed International Equity	10%	6.99%
Emerging Markets Equity	14%	8.95%
Short-Term Govt/Credit	24%	0.20%
U.S. Treasury	2%	0.30%
Real Estate	7%	4.45%
Cash & Equivalents	1%	-0.46%
Risk Diversifying Strategies	2%	4.30%
Private Credit	17%	6.30%
Private Equity	17%	8.10%
Total	100%	

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 3 (continued)

Target Asset Allocation

Discount rate: The discount rate used to measure the TPL was 7.00% as of December 31, 2018 and December 31, 2017. The projection of cash flows used to determine the discount rate assumed employer and employee contributions will be made at rates equal to the actuarially determined contribution rates. For this purpose, only employer and employee contributions that are intended to fund benefits for current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs for future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the Plan's Fiduciary Net Position was projected to be available to make all projected future benefit payments for current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the TPL as of both December 31, 2018 and December 31, 2017.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 4

Discount Rate Sensitivity

Sensitivity of the Net Pension Liability to changes in the discount rate. The following presents the NPL of the CCCERA as of December 31, 2018, which is allocated to all employers, calculated using the discount rate of 7.00%, as well as what the CCCERA's NPL would be if it were calculated using a discount rate that is 1-percentage-point lower (6.00%) or 1-percentage-point higher (8.00%) than the current rate. The determination of the NPL by employer is shown later in Exhibit 7.

Employer	1% Decrease (6.00%)	Current Discount Rate (7.00%)	1% Increase (8.00%)
1 - BIMID	\$673,018	\$383,118	\$145,615
2 - Union Cemetery	257,541	52,348	(115,757)
3 - CC Mosquito	8,322,109	4,737,389	1,800,583
4 - CCCFPD	295,517,656	160,817,317	50,463,180
5 - CCCSD	145,193,990	90,430,104	45,564,431
6 - First 5	5,678,971	2,881,759	590,125
7 - County	1,906,547,101	976,031,747	213,700,934
8 - CCCERA (the employer)	12,851,099	7,315,532	2,780,482
9 - ECCFPD	29,262,205	18,245,316	9,219,657
10 - Housing Authority	19,360,517	10,796,497	3,780,368
11 - IHSS	2,301,082	1,309,899	497,866
12 - LAFCO	557,481	304,195	96,689
13 - MOFD	60,749,206	34,418,805	12,847,451
14 - Rodeo SD	920,710	187,143	(413,837)
15 - RHFD	17,868,738	11,716,980	6,677,112
16 - SRVFPD	131,387,473	69,577,960	18,940,111
17 - Court	54,719,557	27,420,745	5,056,014
18 - DDS (Term)	4,284,832	2,433,196	916,231
19 - DWD (Term)	1,392,367	1,034,726	741,726
20 - Pittsburg (Term)	<u>14,310,878</u>	<u>7,949,368</u>	<u>2,737,659</u>
Total for all Employers	\$2,712,156,531	\$1,428,044,144	\$376,026,640

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 5

Schedule of Changes in Net Pension Liability – Last Two Plan Years

Reporting Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Total Pension Liability		
1. Service cost	\$229,098,552	\$212,257,626
2. Interest	647,734,058	616,272,848
3. Change of benefit terms	0	0
4. Differences between expected and actual experience	52,852,841	(29,192,221)
5. Changes of assumptions	(92,418,915)	0
6. Benefit payments, including refunds of member contributions	<u>(461,254,259)</u>	<u>(436,295,020)</u>
7. Net change in Total Pension Liability	\$376,012,277	\$363,043,233
8. Total Pension Liability – beginning	9,202,017,660	8,838,974,427
9. Total Pension Liability – ending	<u>\$9,578,029,937</u>	<u>\$9,202,017,660</u>
Plan's Fiduciary Net Position		
10. Contributions – employer ⁽¹⁾	\$325,117,103	\$314,836,561
11. Contributions – plan members ⁽¹⁾	103,541,529	96,466,906
12. Net investment income ⁽²⁾	(195,030,888)	987,415,981
13. Benefit payments, including refunds of member contributions	(461,254,259)	(436,295,020)
14. Administrative expense	(9,337,053)	(9,146,115)
15. Other expenses	<u>(3,631,688)</u>	<u>(1,216,768)</u>
16. Net change in Plan's Fiduciary Net Position	(\$240,595,256)	\$952,061,545
17. Plan's Fiduciary Net Position – beginning	8,390,581,049	7,438,519,504
18. Plan's Fiduciary Net Position – ending	\$8,149,985,793	\$8,390,581,049
19. Net Pension Liability – ending (9) – (18)	<u>\$1,428,044,144</u>	<u>\$811,436,611</u>
20. Plan's Fiduciary Net Position as a percentage of the Total Pension Liability	85.09%	91.18%
21. Covered payroll ⁽³⁾	\$850,929,106	\$809,960,088
22. Plan Net Pension Liability as percentage of covered payroll	167.82%	100.18%

⁽¹⁾ See footnote (1) under Exhibit 6 on page 12.

⁽²⁾ Includes Contribution Prepayment Discount.

⁽³⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 6

Schedule of Employer Contributions – Last Ten Plan Years

Year Ended December 31	Actuarially Determined Contributions ⁽¹⁾	Contributions in Relation to the Actuarially Determined Contributions ⁽¹⁾	Contribution Deficiency/(Excess)	Covered Payroll ⁽²⁾	Contributions as a Percentage of Covered Payroll
2009	\$195,631,673	\$195,631,673	\$0	\$704,947,668	27.75%
2010	183,950,930	183,950,930	0	694,443,999	26.49%
2011	200,388,994	200,388,994	0	687,443,206	29.15%
2012	212,321,325	212,321,325	0	666,394,146	31.86%
2013	228,017,452	228,017,452 ⁽³⁾	0	638,635,912	35.70%
2014	288,760,413	288,760,413 ⁽⁴⁾	0	671,485,798	43.00%
2015	321,220,270	321,220,270 ⁽⁵⁾	0	709,818,858	45.25%
2016	307,909,509	307,909,509	0	755,138,882	40.78%
2017	314,512,561	314,512,561 ⁽⁶⁾	0	809,960,088	38.83%
2018	324,863,103	324,863,103 ⁽⁷⁾	0	850,929,106	38.18%

⁽¹⁾ Starting with the year ended December 31, 2016, includes "member subvention of employer contributions" and excludes "employer subvention of member contributions". Prior to that year, the contributions excluded "member subvention of employer contributions" and included "employer subvention of member contributions".

⁽²⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

⁽³⁾ Excludes additional contributions towards UAAL of \$7,000,000.

⁽⁴⁾ Excludes additional contributions towards UAAL of \$5,000,000.

⁽⁵⁾ Excludes additional contributions towards UAAL of \$2,500,000.

⁽⁶⁾ Excludes additional contributions towards UAAL of \$324,000.

⁽⁷⁾ Excludes additional contributions towards UAAL of \$254,000.

See accompanying notes to this schedule on next page.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

Notes to Exhibit 6

Methods and assumptions used to establish "actuarially determined contribution" rates:

Valuation date	Actuarially determined contribution rates are calculated as of December 31, two and a half years prior to the end of the fiscal year in which contributions are reported	
Actuarial cost method	Entry Age Actuarial Cost Method	
Amortization method	Level percent of payroll	
Remaining amortization period	Remaining balance of December 31, 2007 UAAL is amortized over a fixed (decreasing or closed) period with 5 years remaining as of December 31, 2017. Any changes in UAAL after December 31, 2007 will be separately amortized over a fixed 18-year period effective with that valuation. Effective December 31, 2013, any changes in UAAL due to plan amendments (with the exception of a change due to retirement incentives) will be amortized over a 10-year fixed period effective with that valuation. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive.	
Asset valuation method	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. The Actuarial Value of Assets is reduced by the value of the non-valuation reserves and designations.	
Actuarial assumptions:	<u>December 31, 2018 Valuation Date</u>	<u>December 31, 2017 Valuation Date</u>
Investment rate of return	7.00%, net of pension plan investment expenses, including inflation	7.00%, net of pension plan investment expenses, including inflation
Inflation rate	2.75%	2.75%
Administrative expenses	1.10% of payroll allocated to both the employer and member based on the components of the Normal Cost rates for the employer and member.	1.13% of payroll allocated to both the employer and member based on the components of the Normal Cost rates for the employer and member.
Real across-the-board salary increase Projected salary increases ⁽¹⁾	0.50% General: 3.75% to 15.25% and Safety: 4.25% to 16.25%	0.50% General: 4.00% to 13.25% and Safety: 4.00% to 13.75%
Cost of living adjustments	2.75% per year except for Safety Tier C, PEPRA Tier E benefits and PEPRA Tier 4 (2% COLA) and Tier 5 (2% COLA) benefits for members covered under certain memoranda of understanding are assumed to increase at 2% per year. All increases are contingent upon actual increases in CPI.	2.75% per year except for Safety Tier C, PEPRA Tier E benefits and PEPRA Tier 4 (2% COLA) and Tier 5 (2% COLA) benefits for members covered under certain memoranda of understanding are assumed to increase at 2% per year. All increases are contingent upon actual increases in CPI.
Other assumptions	Same as those used in the December 31, 2018 funding actuarial valuation	Same as those used in the December 31, 2017 funding actuarial valuation

⁽¹⁾ Includes inflation at 2.75% plus real across-the-board salary increases of 0.50% plus merit and promotion increases that vary by service for December 31, 2018 and December 31, 2017.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7

Determination of Proportionate Share

**Actual Compensation by Employer and Cost Group
January 1, 2018 to December 31, 2018**

Employer	Cost Group						
	Cost Group #1 & 2	Percentage	Cost Group #3	Percentage	Cost Group #3 Percentage	Cost Group #4	Percentage
1 - BIMID	\$261,689	0.041%	\$0	0.000%	\$0	0.000%	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%	0.000%
3 - CC Mosquito	3,235,876	0.504%	0	0.000%	0	0.000%	0.000%
4 - CCCFPD	0	0.000%	0	0.000%	0	0.000%	0.000%
5 - CCCSD	0	0.000%	33,793,159	100.000%	0	0.000%	0.000%
6 - First 5	2,525,004	0.393%	0	0.000%	0	0.000%	0.000%
7 - County	600,140,253	93.521%	0	0.000%	0	0.000%	0.000%
8 - CCCERA (the employer)	4,996,878	0.779%	0	0.000%	0	0.000%	0.000%
9 - ECCFPD	151,631	0.024%	0	0.000%	0	0.000%	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	5,288,211	100.000%	100.000%
11 - IHSS	894,727	0.139%	0	0.000%	0	0.000%	0.000%
12 - LAFCO	228,637	0.036%	0	0.000%	0	0.000%	0.000%
13 - MOFD	766,265	0.119%	0	0.000%	0	0.000%	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%	0.000%
15 - RHFD	70,710	0.011%	0	0.000%	0	0.000%	0.000%
16 - SRVFPD	3,803,163	0.593%	0	0.000%	0	0.000%	0.000%
17 - Court	24,642,251	3.840%	0	0.000%	0	0.000%	0.000%
18 - DDSD (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19 - DWD (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20 - Pittsburg (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$641,717,085	100.000%	\$33,793,159	100.000%	\$5,288,211	100.000%	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	Actual Compensation by Employer and Cost Group January 1, 2018 to December 31, 2018					
	Cost Group #5 \$0	Percentage 0.000%	Cost Group #5 \$5,329,149	Percentage 100.000%	Cost Group #6 \$0	Percentage 0.000%
1 - BIMID						
2 - Union Cemetery	0	0.000%			192,930	21.858%
3 - CC Mosquito	0	0.000%			0	0.000%
4 - CCCFPD			5,329,149	100.000%	0	0.000%
5 - CCCSD	0	0.000%			0	0.000%
6 - First 5	0	0.000%			0	0.000%
7 - County	0	0.000%			0	0.000%
8 - CCCERA (the employer)	0	0.000%			0	0.000%
9 - ECCFPD	0	0.000%			0	0.000%
10 - Housing Authority	0	0.000%			0	0.000%
11 - IHSS	0	0.000%			0	0.000%
12 - LAFCO	0	0.000%			0	0.000%
13 - MOFD	0	0.000%			0	0.000%
14 - Rodeo SD	0	0.000%			689,729	78.142%
15 - RHFD	0	0.000%			0	0.000%
16 - SRVFPD	0	0.000%			0	0.000%
17 - Court	0	0.000%			0	0.000%
18 - DDS (Term)	N/A	N/A			N/A	N/A
19 - DWD (Term)	N/A	N/A			N/A	N/A
20 - Pittsburg (Term)	N/A	N/A			N/A	N/A
Total	\$5,329,149	100.000%			\$882,659	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	Actual Compensation by Employer and Cost Group January 1, 2018 to December 31, 2018					
	Cost Group #7 & 9	Cost Group #7 & 9 Percentage	Cost Group #8	Cost Group #8 Percentage	Cost Group #10	Cost Group #10 Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	0	0.000%	34,943,479	92.115%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	95,661,123	100.000%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	0	0.000%	2,991,338	7.885%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	7,373,168	100.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	0	0.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	N/A	N/A	N/A	N/A	N/A	N/A
19 - DWD (Term)	N/A	N/A	N/A	N/A	N/A	N/A
20 - Pittsburg (Term)	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$95,661,123	100.000%	\$37,934,817	100.000%	\$7,373,168	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	Actual Compensation by Employer and Cost Group January 1, 2018 to December 31, 2018						Total Compensation	Total Percentage
	Cost Group #11	Percentage	Cost Group #11	Cost Group #12	Percentage	Cost Group #12		
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%	\$261,689	0.031%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%	192,930	0.023%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%	3,235,876	0.380%
4 - CCCFPD	0	0.000%	0	0.000%	0	0.000%	40,272,628	4.733%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%	33,793,159	3.971%
6 - First 5	0	0.000%	0	0.000%	0	0.000%	2,525,004	0.297%
7 - County	0	0.000%	0	0.000%	0	0.000%	695,801,377	81.770%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%	4,996,878	0.587%
9 - ECCFPD	0	0.000%	0	0.000%	0	0.000%	3,142,969	0.369%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%	5,288,211	0.621%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%	894,727	0.105%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%	228,637	0.027%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%	8,139,433	0.957%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%	689,729	0.081%
15 - RHFD	0	0.000%	2,275,546	100.000%	2,275,546	100.000%	2,346,256	0.276%
16 - SRVFPD	20,674,190	100.000%	0	0.000%	0	0.000%	24,477,353	2.877%
17 - Court	0	0.000%	0	0.000%	0	0.000%	24,642,251	2.896%
18 - DDS (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19 - DWD (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20 - Pittsburg (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$20,674,190	100.000%	\$2,275,546	100.000%	\$2,275,546	100.000%	\$850,929,106	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART ONE - Allocation of December 31, 2018 Net Pension Liability (NPL)
Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers**

Employer	Cost Group			
	Cost Group #1 & 2	Percentage	Cost Group #3	Cost Group #4
1 - BIMID	\$383,118	0.041%	\$0	\$0
2 - Union Cemetery	0	0.000%	0	0
3 - CC Mosquito	4,737,389	0.504%	0	0
4 - CCCFPD	0	0.000%	0	0
5 - CCCSD	0	0.000%	90,430,104	0
6 - First 5	3,696,657	0.393%	0	0
7 - County	878,617,625	93.521%	0	0
8 - CCCERA (the employer)	7,315,532	0.779%	0	0
9 - ECCFPD	221,991	0.024%	0	0
10 - Housing Authority	0	0.000%	0	10,796,497
11 - IHSS	1,309,899	0.139%	0	0
12 - LAFCO	334,730	0.036%	0	0
13 - MOFD	1,121,828	0.119%	0	0
14 - Rodeo SD	0	0.000%	0	0
15 - RHFD	103,521	0.011%	0	0
16 - SRVFPD	5,567,909	0.593%	0	0
17 - Court	36,076,760	3.840%	0	0
18 - DDS (Term)	0	0.000%	0	0
19 - DWD (Term)	0	0.000%	0	0
20 - Pittsburg (Term)	0	0.000%	0	0
Total	\$939,486,959	100.000%	\$90,430,104	\$10,796,497

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART ONE - Allocation of December 31, 2018 Net Pension Liability (NPL)
Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers**

Employer	Cost Group #5		Cost Group #6		Cost Group #7 & 9	
	Cost Group #5 \$0	Percentage 0.000%	Cost Group #6 \$0	Percentage 0.000%	Cost Group #7 & 9 \$0	Percentage 0.000%
1 - BIMID						
2 - Union Cemetery	0	0.000%	52,348	21.858%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	11,919,203	100.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	308,223,719	100.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	0	0.000%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	187,143	78.142%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	0	0.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$11,919,203	100.000%	\$239,491	100.000%	\$308,223,719	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART ONE - Allocation of December 31, 2018 Net Pension Liability (NPL)
Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers**

Employer	Cost Group #8		Cost Group #10		Cost Group #11	
	Cost Group #8	Percentage	Cost Group #10	Percentage	Cost Group #11	Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	210,540,497	92.115%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	18,023,325	7.885%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	33,636,062	100.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	64,010,051	100.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$228,563,822	100.000%	\$33,636,062	100.000%	\$64,010,051	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART ONE - Allocation of December 31, 2018 Net Pension Liability (NPL)
Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers**

Employer	Cost Group #12		Cost Group #12		Terminated		Terminated		Total NPL	Total Percentage
	\$0	0.000%	Percentage	Employers	Employers	Percentage	Employers	Percentage		
1 - BIMID	\$0	0.000%		\$0		0.000%			\$383,118	0.022%
2 - Union Cemetery	0	0.000%		0		0.000%			52,348	0.003%
3 - CC Mosquito	0	0.000%		0		0.000%			4,737,389	0.277%
4 - CCCFPD	0	0.000%		0		0.000%			222,459,700	13.007%
5 - CCCSD	0	0.000%		0		0.000%			90,430,104	5.287%
6 - First 5	0	0.000%		0		0.000%			3,696,657	0.216%
7 - County	0	0.000%		0		0.000%			1,186,841,344	69.392%
8 - CCCERA (the employer)	0	0.000%		0		0.000%			7,315,532	0.428%
9 - ECCFPD	0	0.000%		0		0.000%			18,245,316	1.067%
10 - Housing Authority	0	0.000%		0		0.000%			10,796,497	0.631%
11 - IHSS	0	0.000%		0		0.000%			1,309,899	0.077%
12 - LAFCO	0	0.000%		0		0.000%			334,730	0.020%
13 - MOFD	0	0.000%		0		0.000%			34,757,890	2.032%
14 - Rodeo SD	0	0.000%		0		0.000%			187,143	0.011%
15 - RHFD	11,613,459	100.000%		0		0.000%			11,716,980	0.685%
16 - SRVFPD	0	0.000%		0		0.000%			69,577,960	4.068%
17 - Court	0	0.000%		0		0.000%			36,076,760	2.109%
18 - DDS (Term) ⁽¹⁾	0	0.000%		2,433,196		21.312%			2,433,196	0.142%
19 - DWD (Term) ⁽¹⁾	0	0.000%		1,034,726		9.063%			1,034,726	0.060%
20 - Pittsburg (Term) ⁽¹⁾	0	0.000%		7,949,368		69.626%			7,949,368	0.465%
Total	\$11,613,459	100.000%		\$11,417,290		100.000%			\$1,710,336,657	100.000%

⁽¹⁾ The NPLs for the three terminated employers are determined based on the Plan's Fiduciary Net Positions from the December 31, 2018 bookkeeping account letters and the TPLs obtained from internal valuation results (by rolling forward their TPLs from December 31, 2017).

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART TWO - Allocation of December 31, 2018 Net Pension Liability (NPL)
Including Pension Obligation Bonds (POB) and U/AAL Prepayments for Certain Employers**

Employer	Cost Group					
	Cost Group #1 & 2	Percentage #1 & 2	Cost Group #3	Percentage #3	Cost Group #4	Percentage #4
1 - BIMID	\$383,118	0.053%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	4,737,389	0.659%	0	0.000%	0	0.000%
4 - CCCFPD	0	0.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	90,430,104	100.000%	0	0.000%
6 - First 5	2,881,759	0.401%	0	0.000%	0	0.000%
7 - County	667,808,028	92.901%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	7,315,532	1.018%	0	0.000%	0	0.000%
9 - ECCFPD	221,991	0.031%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	10,796,497	100.000%
11 - IHSS	1,309,899	0.182%	0	0.000%	0	0.000%
12 - LAFCO	304,195	0.042%	0	0.000%	0	0.000%
13 - MOFD	782,743	0.109%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	103,521	0.014%	0	0.000%	0	0.000%
16 - SRVFPD	5,567,909	0.775%	0	0.000%	0	0.000%
17 - Court	27,420,745	3.815%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$718,836,829	100.000%	\$90,430,104	100.000%	\$10,796,497	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART TWO - Allocation of December 31, 2018 Net Pension Liability (NPL)
Including Pension Obligation Bonds (POB) and U/AAL Prepayments for Certain Employers**

Employer	Cost Group #5		Cost Group #6		Cost Group #7 & 9	
	Cost Group #5 \$0	Percentage 0.000%	Cost Group #6 \$0	Percentage 0.000%	Cost Group #7 & 9 \$0	Percentage 0.000%
1 - BIMID						
2 - Union Cemetery	0	0.000%	52,348	21.858%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	11,919,203	100.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	308,223,719	100.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	0	0.000%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	187,143	78.142%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	0	0.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$11,919,203	100.000%	\$239,491	100.000%	\$308,223,719	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART TWO - Allocation of December 31, 2018 Net Pension Liability (NPL)
Including Pension Obligation Bonds (POB) and U/AAL Prepayments for Certain Employers**

Employer	Cost Group #8		Cost Group #10		Cost Group #11	
	Cost Group #8	Percentage	Cost Group #10	Percentage	Cost Group #11	Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	148,898,114	89.203%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	18,023,325	10.797%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	33,636,062	100.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	64,010,051	100.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$166,921,439	100.000%	\$33,636,062	100.000%	\$64,010,051	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

PART TWO - Allocation of December 31, 2018 Net Pension Liability (NPL)
Including Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers

Employer	Cost Group #12	Cost Group #12 Percentage	Terminated Employers	Terminated Employers Percentage	Total NPL	Total Percentage	Total Percentage Excluding Terminated Employers ⁽¹⁾
1 - BIMID	\$0	0.000%	\$0	0.000%	\$383,118	0.027%	0.027%
2 - Union Cemetery	0	0.000%	0	0.000%	52,348	0.004%	0.004%
3 - CC Mosquito	0	0.000%	0	0.000%	4,737,389	0.332%	0.334%
4 - CCCFPD	0	0.000%	0	0.000%	160,817,317	11.261%	11.352%
5 - CCCSD	0	0.000%	0	0.000%	90,430,104	6.332%	6.383%
6 - First 5	0	0.000%	0	0.000%	2,881,759	0.202%	0.203%
7 - County	0	0.000%	0	0.000%	976,031,747	68.347%	68.898%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	7,315,532	0.512%	0.516%
9 - ECCFPD	0	0.000%	0	0.000%	18,245,316	1.278%	1.288%
10 - Housing Authority	0	0.000%	0	0.000%	10,796,497	0.756%	0.762%
11 - IHSS	0	0.000%	0	0.000%	1,309,899	0.092%	0.092%
12 - LAFCO	0	0.000%	0	0.000%	304,195	0.021%	0.021%
13 - MOFD	0	0.000%	0	0.000%	34,418,805	2.410%	2.430%
14 - Rodeo SD	0	0.000%	0	0.000%	187,143	0.013%	0.013%
15 - RHFD	11,613,459	100.000%	0	0.000%	11,716,980	0.820%	0.827%
16 - SRVFPD	0	0.000%	0	0.000%	69,577,960	4.872%	4.912%
17 - Court	0	0.000%	0	0.000%	27,420,745	1.920%	1.936%
18 - DDS (Term) ⁽²⁾	0	0.000%	2,433,196	21.312%	2,433,196	0.170%	N/A
19 - DWD (Term) ⁽²⁾	0	0.000%	1,034,726	9.063%	1,034,726	0.072%	N/A
20 - Pittsburg (Term) ⁽²⁾	0	0.000%	7,949,368	69.626%	7,949,368	0.557%	N/A
Total	\$11,613,459	100.000%	\$11,417,290	100.000%	\$1,428,044,144	100.000%	100.000%

⁽¹⁾ For informational purposes; these percentages show the allocation of the NPL for employers excluding terminated employers.

⁽²⁾ The NPLs for the three terminated employers are determined based on the Plan's Fiduciary Net Positions from the December 31, 2018 bookkeeping account letters and the TPLs obtained from internal valuation results (by rolling forward their TPLs from December 31, 2017).

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Notes Regarding Determination of Proportionate Share as of December 31, 2018 Measurement Date:

1. Based on actual January 1, 2018 through December 31, 2018 compensation information that was provided by CCCERA.
2. The Net Pension Liability (NPL) for each Cost Group is the Total Pension Liability (TPL) minus the Plan's Fiduciary Net Position (plan assets). The TPL for each Cost Group is obtained from internal valuation results based on the actual participants in each Cost Group. The Plan's Fiduciary Net Position for each Cost Group was determined by adjusting the Valuation Value of Assets (VVA) for each Cost Group (which is used to determine employer contribution rates) by the ratio of the total CCCERA Plan's Fiduciary Net Position (excluding the terminated employers' assets and the Post Retirement Death Benefit reserve) to total CCCERA VVA (excluding the terminated employers' VVA). The Post Retirement Death Benefit reserve is allocated to Cost Group #1 and #2. The liability for the post-retirement death benefit up to the amount in the Post Retirement Death Benefit reserve is also allocated to Cost Group #1 and #2.
3. For terminated employers, the TPL is obtained from internal valuation results for each employer. The Plan's Fiduciary Net Position for each terminated employer has been set equal to the amount in their respective bookkeeping account. The NPL is then determined separately for each terminated employer.
4. For Cost Groups that have one employer, all of the NPL for that Cost Group is allocated to the corresponding employer. The NPL has already been reduced by any proceeds from Pension Obligation Bonds and any UAAL prepayments.
5. For Cost Groups that have multiple employers, the NPL is allocated based on the actual compensation within the Cost Group.
 - a. Calculate ratio of employer's compensation to the total compensation for the Cost Group.
 - b. Multiply this ratio by an "adjusted" NPL. This adjusted NPL is larger than the actual NPL as it excludes proceeds from Pension Obligation Bonds and any Unfunded Actuarial Accrued Liability (UAAL) prepayments from the Cost Group's assets when determining the employer's proportionate share of the NPL for the Cost Group. It also excludes the NPLs for the three terminated employers. The allocation of the adjusted NPL is shown above in PART ONE of Exhibit 7.
 - c. The amounts of the proceeds from Pension Obligation Bonds and UAAL prepayments as of December 31, 2018 allocated to those employers within each Cost Group are as follows:

Cost Group #1: County	\$210,809,597
Cost Group #1: Court	\$8,656,015
Cost Group #1: MOFD	\$339,085
Cost Group #1: LAFCO	\$30,535
Cost Group #1: First 5	\$814,898
Cost Group #8: CCCFPD	\$61,642,383

Note that the proceeds from Pension Obligation Bonds for Contra Costa County and the Superior Court as of December 31, 2018 (total of \$219,465,612) were allocated proportionally based on the compensation information.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)
Determination of Proportionate Share

Notes Regarding Determination of Proportionate Share as of December 31, 2018 Measurement Date:

- d. Subtract from the adjusted NPL in PART ONE the outstanding balance of the proceeds from any Pension Obligation Bonds and any UAAL prepayments for those employers in each Cost Group that are subject to these adjustments. The resulting actual NPL is shown in PART TWO of Exhibit 7.
- 6. If the employer is in several Cost Groups, the employer's total allocated NPL is the sum of its allocated NPL from each Cost Group.
- 7. Cost Group #1 and Cost Group #2 were combined and Cost Group #7 and Cost Group #9 were combined consistent with the determination of the UAAL rate in the annual funding actuarial valuation.

The following items are allocated based on the corresponding employer allocation percentage or proportionate share shown above after excluding terminated employers.

- 1) Net Pension Liability
- 2) Service Cost
- 3) Interest on the Total Pension Liability
- 4) Expensed portion of current-period benefit changes
- 5) Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability
- 6) Expensed portion of current-period changes of assumptions or other inputs
- 7) Member contributions
- 8) Projected earnings on plan investments
- 9) Expensed portion of current-period differences between actual and projected earnings on plan investments
- 10) Administrative expense
- 11) Other expenses
- 12) Recognition of beginning of year deferred outflows of resources as pension expense
- 13) Recognition of beginning of year deferred inflows of resources as pension expense

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**Actual Compensation by Employer and Cost Group
January 1, 2017 to December 31, 2017**

Employer	Cost Group							
	Cost Group #1 & 2	Percentage	Cost Group #3	Percentage	Cost Group #3	Percentage	Cost Group #4	Percentage
1 - BIMID	\$166,430	0.027%	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	3,190,169	0.522%	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	0	0.000%	0	0.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	33,306,938	100.000%	0	0.000%	0	0.000%
6 - First 5	2,405,397	0.394%	0	0.000%	0	0.000%	0	0.000%
7 - County	570,303,416	93.336%	0	0.000%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	4,531,800	0.742%	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	61,149	0.010%	0	0.000%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	5,183,762	100.000%	0	0.000%
11 - IHSS	839,821	0.137%	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	221,780	0.036%	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	739,827	0.121%	0	0.000%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	71,410	0.012%	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	3,642,063	0.596%	0	0.000%	0	0.000%	0	0.000%
17 - Court	24,851,809	4.067%	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19 - DWD (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20 - Pittsburg (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$611,025,072	100.000%	\$33,306,938	100.000%	\$5,183,762	100.000%	\$5,183,762	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	Actual Compensation by Employer and Cost Group January 1, 2017 to December 31, 2017					
	Cost Group #5	Cost Group #5 Percentage	Cost Group #5	Cost Group #6	Cost Group #6 Percentage	Cost Group #6 Percentage
1 - BIMID	\$0	0.000%	\$0	\$0	0.000%	0.000%
2 - Union Cemetery	0	0.000%	166,890	166,890	20.794%	20.794%
3 - CC Mosquito	0	0.000%	0	0	0.000%	0.000%
4 - CCCFPD	4,600,602	100.000%	0	0	0.000%	0.000%
5 - CCCSD	0	0.000%	0	0	0.000%	0.000%
6 - First 5	0	0.000%	0	0	0.000%	0.000%
7 - County	0	0.000%	0	0	0.000%	0.000%
8 - CCCERA (the employer)	0	0.000%	0	0	0.000%	0.000%
9 - ECCFPD	0	0.000%	0	0	0.000%	0.000%
10 - Housing Authority	0	0.000%	0	0	0.000%	0.000%
11 - IHSS	0	0.000%	0	0	0.000%	0.000%
12 - LAFCO	0	0.000%	0	0	0.000%	0.000%
13 - MOFD	0	0.000%	0	0	0.000%	0.000%
14 - Rodeo SD	0	0.000%	635,682	635,682	79.206%	79.206%
15 - RHFD	0	0.000%	0	0	0.000%	0.000%
16 - SRVFPD	0	0.000%	0	0	0.000%	0.000%
17 - Court	0	0.000%	0	0	0.000%	0.000%
18 - DDS (Term)	N/A	N/A	N/A	N/A	N/A	N/A
19 - DWD (Term)	N/A	N/A	N/A	N/A	N/A	N/A
20 - Pittsburg (Term)	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$4,600,602	100.000%	\$802,572	\$802,572	100.000%	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	Actual Compensation by Employer and Cost Group January 1, 2017 to December 31, 2017					
	Cost Group #7 & 9	Cost Group #7 & 9 Percentage	Cost Group #8	Cost Group #8 Percentage	Cost Group #10	Cost Group #10 Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	0	0.000%	31,428,170	91.628%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	91,271,780	100.000%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	0	0.000%	2,871,722	8.372%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	7,220,389	100.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	0	0.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	N/A	N/A	N/A	N/A	N/A	N/A
19 - DW (Term)	N/A	N/A	N/A	N/A	N/A	N/A
20 - Pittsburg (Term)	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$91,271,780	100.000%	\$34,299,893	100.000%	\$7,220,389	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	Actual Compensation by Employer and Cost Group January 1, 2017 to December 31, 2017						Total Compensation	Total Percentage
	Cost Group #11	Percentage	Cost Group #11	Percentage	Cost Group #12	Percentage		
1 - BIMID	\$0	0.000%	\$0	0.000%	0	0.000%	\$166,430	0.021%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%	166,890	0.021%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%	3,190,169	0.394%
4 - CCCFPD	0	0.000%	0	0.000%	0	0.000%	36,028,772	4.448%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%	33,306,938	4.112%
6 - First 5	0	0.000%	0	0.000%	0	0.000%	2,405,397	0.297%
7 - County	0	0.000%	0	0.000%	0	0.000%	661,575,196	81.680%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%	4,531,800	0.560%
9 - ECCFPD	0	0.000%	0	0.000%	0	0.000%	2,932,872	0.362%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%	5,183,762	0.640%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%	839,821	0.104%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%	221,780	0.027%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%	7,960,215	0.983%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%	635,682	0.078%
15 - RHFD	0	0.000%	2,123,195	100.000%	0	0.000%	2,194,605	0.271%
16 - SRVFPD	20,125,886	100.000%	0	0.000%	0	0.000%	23,767,950	2.934%
17 - Court	0	0.000%	0	0.000%	0	0.000%	24,851,809	3.068%
18 - DDS (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19 - DWD (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20 - Pittsburg (Term)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	\$20,125,886	100.000%	\$2,123,195	100.000%	0	0.000%	\$809,960,088	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART ONE - Allocation of December 31, 2017 Net Pension Liability (NPL)
Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers**

Employer	Cost Group #1 & 2		Cost Group #3		Cost Group #4	
	Cost Group #1 & 2	Percentage	Cost Group #3	Percentage	Cost Group #4	Percentage
1 - BIMID	\$157,443	0.027%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	3,017,908	0.522%	0	0.000%	0	0.000%
4 - CCCFPD	0	0.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	63,806,000	100.000%	0	0.000%
6 - First 5	2,275,512	0.394%	0	0.000%	0	0.000%
7 - County	539,508,482	93.336%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	4,287,094	0.742%	0	0.000%	0	0.000%
9 - ECCFPD	57,847	0.010%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	6,267,604	100.000%
11 - IHSS	794,473	0.137%	0	0.000%	0	0.000%
12 - LAFCO	209,805	0.036%	0	0.000%	0	0.000%
13 - MOFD	699,878	0.121%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	67,554	0.012%	0	0.000%	0	0.000%
16 - SRVFPD	3,445,401	0.596%	0	0.000%	0	0.000%
17 - Court	23,509,875	4.067%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$578,031,272	100.000%	\$63,806,000	100.000%	\$6,267,604	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART ONE - Allocation of December 31, 2017 Net Pension Liability (NPL)
Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers**

Employer	Cost Group #5		Cost Group #6		Cost Group #7 & 9	
	Cost Group #5	Percentage	Cost Group #6	Percentage	Cost Group #7 & 9	Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	29,395	20.794%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	5,254,103	100.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	214,270,694	100.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	0	0.000%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	111,965	79.206%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	0	0.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DW (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$5,254,103	100.000%	\$141,360	100.000%	\$214,270,694	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	PART ONE - Allocation of December 31, 2017 Net Pension Liability (NPL) Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers					
	Cost Group #8		Cost Group #10		Cost Group #11	
	Cost Group #8	Percentage	Cost Group #10	Percentage	Cost Group #11	Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	178,304,418	91.628%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	16,292,415	8.372%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	23,202,147	100.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	43,664,695	100.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$194,596,833	100.000%	\$23,202,147	100.000%	\$43,664,695	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART ONE - Allocation of December 31, 2017 Net Pension Liability (NPL)
Excluding Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers**

Employer	Cost Group #12		Terminated		Terminated		Total NPL	Total Percentage
	Cost Group #12	Percentage	Employers	Percentage	Employers	Percentage		
1 - BIMID	\$0	0.000%	\$0	0.000%	\$157,443	0.014%		
2 - Union Cemetery	0	0.000%	0	0.000%	29,395	0.003%		
3 - CC Mosquito	0	0.000%	0	0.000%	3,017,908	0.263%		
4 - CCCFPD	0	0.000%	0	0.000%	183,558,521	15.999%		
5 - CCCSD	0	0.000%	0	0.000%	63,806,000	5.561%		
6 - First 5	0	0.000%	0	0.000%	2,275,512	0.198%		
7 - County	0	0.000%	0	0.000%	753,779,176	65.699%		
8 - CCCERA (the employer)	0	0.000%	0	0.000%	4,287,094	0.374%		
9 - ECCFPD	0	0.000%	0	0.000%	16,350,262	1.425%		
10 - Housing Authority	0	0.000%	0	0.000%	6,267,604	0.546%		
11 - IHSS	0	0.000%	0	0.000%	794,473	0.069%		
12 - LAFCO	0	0.000%	0	0.000%	209,805	0.018%		
13 - MOFD	0	0.000%	0	0.000%	23,902,025	2.083%		
14 - Rodeo SD	0	0.000%	0	0.000%	111,965	0.010%		
15 - RHFD	11,625,620	100.000%	0	0.000%	11,693,174	1.019%		
16 - SRVFPD	0	0.000%	0	0.000%	47,110,096	4.106%		
17 - Court	0	0.000%	0	0.000%	23,509,875	2.049%		
18 - DDSID (Term) ⁽¹⁾	0	0.000%	1,435,257	22.211%	1,435,257	0.125%		
19 - DWD (Term) ⁽¹⁾	0	0.000%	827,520	12.806%	827,520	0.072%		
20 - Pittsburg (Term) ⁽¹⁾	0	0.000%	4,199,080	64.983%	4,199,080	0.366%		
Total	\$11,625,620	100.000%	\$6,461,857	100.000%	\$1,147,322,185	100.000%		

⁽¹⁾ The NPLs for the three terminated employers are determined based on the Plan's Fiduciary Net Positions from the December 31, 2017 bookkeeping account letters and the TPLs obtained from internal valuation results (by rolling forward their TPLs from December 31, 2016).

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART TWO - Allocation of December 31, 2017 Net Pension Liability (NPL)
Including Pension Obligation Bonds (POB) and U/AAL Prepayments for Certain Employers**

Employer	Cost Group #1 & 2		Cost Group #3		Cost Group #4	
	Cost Group #1 & 2	Percentage	Cost Group #3	Percentage	Cost Group #4	Percentage
1 - BIMID	\$157,443	0.050%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	3,017,908	0.957%	0	0.000%	0	0.000%
4 - CCCFPD	0	0.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	63,806,000	100.000%	0	0.000%
6 - First 5	1,289,083	0.409%	0	0.000%	0	0.000%
7 - County	289,288,214	91.695%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	4,287,094	1.359%	0	0.000%	0	0.000%
9 - ECCFPD	57,847	0.018%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	6,267,604	100.000%
11 - IHSS	794,473	0.252%	0	0.000%	0	0.000%
12 - LAFCO	181,268	0.057%	0	0.000%	0	0.000%
13 - MOFD	296,428	0.094%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	67,554	0.021%	0	0.000%	0	0.000%
16 - SRVFPD	3,445,401	1.092%	0	0.000%	0	0.000%
17 - Court	12,606,159	3.996%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$315,488,872	100.000%	\$63,806,000	100.000%	\$6,267,604	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

**PART TWO - Allocation of December 31, 2017 Net Pension Liability (NPL)
Including Pension Obligation Bonds (POB) and U/AAL Prepayments for Certain Employers**

Employer	Cost Group #5		Cost Group #6		Cost Group #7 & 9	
	Cost Group #5	Percentage	Cost Group #6	Percentage	Cost Group #7 & 9	Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	29,395	20.794%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	5,254,103	100.000%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	214,270,694	100.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	0	0.000%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	0	0.000%	0	0.000%
14 - Rodeo SD	0	0.000%	111,965	79.206%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	0	0.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$5,254,103	100.000%	\$141,360	100.000%	\$214,270,694	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Employer	PART TWO - Allocation of December 31, 2017 Net Pension Liability (NPL) Including Pension Obligation Bonds (POB) and U/AAL Prepayments for Certain Employers					
	Cost Group #8		Cost Group #10		Cost Group #11	
	Cost Group #8	Percentage	Cost Group #10	Percentage	Cost Group #11	Percentage
1 - BIMID	\$0	0.000%	\$0	0.000%	\$0	0.000%
2 - Union Cemetery	0	0.000%	0	0.000%	0	0.000%
3 - CC Mosquito	0	0.000%	0	0.000%	0	0.000%
4 - CCCFPD	104,961,244	86.563%	0	0.000%	0	0.000%
5 - CCCSD	0	0.000%	0	0.000%	0	0.000%
6 - First 5	0	0.000%	0	0.000%	0	0.000%
7 - County	0	0.000%	0	0.000%	0	0.000%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	0	0.000%
9 - ECCFPD	16,292,415	13.437%	0	0.000%	0	0.000%
10 - Housing Authority	0	0.000%	0	0.000%	0	0.000%
11 - IHSS	0	0.000%	0	0.000%	0	0.000%
12 - LAFCO	0	0.000%	0	0.000%	0	0.000%
13 - MOFD	0	0.000%	23,202,147	100.000%	0	0.000%
14 - Rodeo SD	0	0.000%	0	0.000%	0	0.000%
15 - RHFD	0	0.000%	0	0.000%	0	0.000%
16 - SRVFPD	0	0.000%	0	0.000%	43,664,695	100.000%
17 - Court	0	0.000%	0	0.000%	0	0.000%
18 - DDS (Term)	0	0.000%	0	0.000%	0	0.000%
19 - DWD (Term)	0	0.000%	0	0.000%	0	0.000%
20 - Pittsburg (Term)	0	0.000%	0	0.000%	0	0.000%
Total	\$121,253,659	100.000%	\$23,202,147	100.000%	\$43,664,695	100.000%

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

PART TWO - Allocation of December 31, 2017 Net Pension Liability (NPL)
Including Pension Obligation Bonds (POB) and UAAL Prepayments for Certain Employers

Employer	Cost Group #12	Cost Group #12 Percentage	Terminated Employers	Terminated Employers Percentage	Total NPL	Total Percentage	Total Percentage Excluding Terminated Employers ⁽¹⁾
1 - BIMID	\$0	0.000%	\$0	0.000%	\$157,443	0.019%	0.020%
2 - Union Cemetery	0	0.000%	0	0.000%	29,395	0.004%	0.004%
3 - CC Mosquito	0	0.000%	0	0.000%	3,017,908	0.372%	0.375%
4 - CCCFPD	0	0.000%	0	0.000%	110,215,347	13.583%	13.692%
5 - CCCSD	0	0.000%	0	0.000%	63,806,000	7.863%	7.926%
6 - First 5	0	0.000%	0	0.000%	1,289,083	0.159%	0.160%
7 - County	0	0.000%	0	0.000%	503,558,908	62.058%	62.556%
8 - CCCERA (the employer)	0	0.000%	0	0.000%	4,287,094	0.528%	0.533%
9 - ECCFPD	0	0.000%	0	0.000%	16,350,262	2.015%	2.031%
10 - Housing Authority	0	0.000%	0	0.000%	6,267,604	0.772%	0.779%
11 - IHSS	0	0.000%	0	0.000%	794,473	0.098%	0.099%
12 - LAFCO	0	0.000%	0	0.000%	181,268	0.022%	0.023%
13 - MOFD	0	0.000%	0	0.000%	23,498,575	2.896%	2.919%
14 - Rodeo SD	0	0.000%	0	0.000%	111,965	0.014%	0.014%
15 - RHFD	11,625,620	100.000%	0	0.000%	11,693,174	1.441%	1.453%
16 - SRVFPD	0	0.000%	0	0.000%	47,110,096	5.806%	5.852%
17 - Court	0	0.000%	0	0.000%	12,606,159	1.554%	1.566%
18 - DDS (Term) ⁽²⁾	0	0.000%	1,435,257	22.211%	1,435,257	0.177%	N/A
19 - DWD (Term) ⁽²⁾	0	0.000%	827,520	12.806%	827,520	0.102%	N/A
20 - Pittsburg (Term) ⁽²⁾	0	0.000%	4,199,080	64.983%	4,199,080	0.517%	N/A
Total	\$11,625,620	100.000%	\$6,461,857	100.000%	\$811,436,611	100.000%	100.000%

⁽¹⁾ For informational purposes; these percentages show the allocation of the NPL for employers excluding terminated employers.

⁽²⁾ The NPLs for the three terminated employers are determined based on the Plan's Fiduciary Net Positions from the December 31, 2017 bookkeeping account letters and the TPLs obtained from internal valuation results (by rolling forward their TPLs from December 31, 2016).

Note: Results may not add due to rounding.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)

Determination of Proportionate Share

Notes Regarding Determination of Proportionate Share as of December 31, 2017 Measurement Date:

1. Based on actual January 1, 2017 through December 31, 2017 compensation information that was provided by CCCERA.
2. The Net Pension Liability (NPL) for each Cost Group is the Total Pension Liability (TPL) minus the Plan's Fiduciary Net Position (plan assets). The TPL for each Cost Group is obtained from internal valuation results based on the actual participants in each Cost Group. The Plan's Fiduciary Net Position for each Cost Group was determined by adjusting the Valuation Value of Assets (VVA) for each Cost Group (which is used to determine employer contribution rates) by the ratio of the total CCCERA Plan's Fiduciary Net Position (excluding the terminated employers' assets and the Post Retirement Death Benefit reserve) to total CCCERA VVA (excluding the terminated employers' VVA). The Post Retirement Death Benefit reserve is allocated to Cost Group #1 and #2. The liability for the post-retirement death benefit up to the amount in the Post Retirement Death Benefit reserve is also allocated to Cost Group #1 and #2.
3. For terminated employers, the TPL is obtained from internal valuation results for each employer. The Plan's Fiduciary Net Position for each terminated employer has been set equal to the amount in their respective bookkeeping account. The NPL is then determined separately for each terminated employer.
4. For Cost Groups that have one employer, all of the NPL for that Cost Group is allocated to the corresponding employer. The NPL has already been reduced by any proceeds from Pension Obligation Bonds and any UAAL prepayments.
5. For Cost Groups that have multiple employers, the NPL is allocated based on the actual compensation within the Cost Group.
 - a. Calculate ratio of employer's compensation to the total compensation for the Cost Group.
 - b. Multiply this ratio by an "adjusted" NPL. This adjusted NPL is larger than the actual NPL as it excludes proceeds from Pension Obligation Bonds and any Unfunded Actuarial Accrued Liability (UAAL) prepayments from the Cost Group's assets when determining the employer's proportionate share of the NPL for the Cost Group. It also excludes the NPLs for the three terminated employers. The allocation of the adjusted NPL is shown above in PART ONE of Exhibit 7.
 - c. The amounts of the proceeds from Pension Obligation Bonds and UAAL prepayments as of December 31, 2017 allocated to those employers within each Cost Group are as follows:

Cost Group #1: County	\$250,220,268
Cost Group #1: Court	\$10,903,716
Cost Group #1: MOFD	\$403,450
Cost Group #1: LAFCO	\$28,537
Cost Group #1: First 5	\$986,429
Cost Group #8: CCCFPD	\$73,343,174

Note that the proceeds from Pension Obligation Bonds for Contra Costa County and the Superior Court as of December 31, 2017 (total of \$261,123,984) were allocated proportionally based on the compensation information.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 7 (continued)
Determination of Proportionate Share

Notes Regarding Determination of Proportionate Share as of December 31, 2017 Measurement Date:

- d. Subtract from the adjusted NPL in PART ONE the outstanding balance of the proceeds from any Pension Obligation Bonds and any UAAL prepayments for those employers in each Cost Group that are subject to these adjustments. The resulting actual NPL is shown in PART TWO of Exhibit 7.
- 6. If the employer is in several Cost Groups, the employer's total allocated NPL is the sum of its allocated NPL from each Cost Group.
- 7. Cost Group #1 and Cost Group #2 were combined and Cost Group #7 and Cost Group #9 were combined consistent with the determination of the UAAL rate in the annual funding actuarial valuation.

The following items are allocated based on the corresponding employer allocation percentage or proportionate share shown above after excluding terminated employers.

- 1) Net Pension Liability
- 2) Service Cost
- 3) Interest on the Total Pension Liability
- 4) Expensed portion of current-period benefit changes
- 5) Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability
- 6) Expensed portion of current-period changes of assumptions or other inputs
- 7) Member contributions
- 8) Projected earnings on plan investments
- 9) Expensed portion of current-period differences between actual and projected earnings on plan investments
- 10) Administrative expense
- 11) Other expenses
- 12) Recognition of beginning of year deferred outflows of resources as pension expense
- 13) Recognition of beginning of year deferred inflows of resources as pension expense

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8

Pension Expense: Total for all Employers

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$229,098,552	\$212,257,626
2. Interest on the Total Pension Liability	647,734,058	616,272,848
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	0	0
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	11,565,173	(6,373,848)
6. Expensed portion of current-period changes of assumptions or other inputs	(20,222,957)	0
7. Member contributions ⁽¹⁾	(103,541,529)	(96,466,906)
8. Projected earnings on plan investments	(585,734,855)	(519,447,895)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	156,153,149	(93,593,617)
10. Administrative expense	9,337,053	9,146,115
11. Other expenses	3,631,688	1,216,768
12. Recognition of beginning of year deferred outflows of resources as pension expense	101,497,331	101,362,730
13. Recognition of beginning of year deferred inflows of resources as pension expense	(146,170,612)	(62,040,753)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	0	0
Pension Expense	\$303,347,051	\$162,333,068

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 1 - BIMID

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$61,958	\$41,515
2. Interest on the Total Pension Liability	173,997	119,675
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	20,236	26,337
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	3,101	(1,273)
6. Expensed portion of current-period changes of assumptions or other inputs	(5,467)	0
7. Member contributions ⁽¹⁾	(28,002)	(18,868)
8. Projected earnings on plan investments	(157,353)	(100,872)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	41,951	(18,173)
10. Administrative expense	2,525	1,789
11. Other expenses	982	238
12. Recognition of beginning of year deferred outflows of resources as pension expense	27,413	19,825
13. Recognition of beginning of year deferred inflows of resources as pension expense	(39,348)	(12,134)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>28,730</u>	<u>2,524</u>
Pension Expense	\$130,723	\$60,583

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 2 - Union Cemetery

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$8,466	\$7,752
2. Interest on the Total Pension Liability	23,774	22,344
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	8,905	1,974
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	424	(238)
6. Expensed portion of current-period changes of assumptions or other inputs	(747)	0
7. Member contributions ⁽¹⁾	(3,826)	(3,523)
8. Projected earnings on plan investments	(21,500)	(18,833)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	5,732	(3,393)
10. Administrative expense	345	334
11. Other expenses	134	44
12. Recognition of beginning of year deferred outflows of resources as pension expense	3,746	3,701
13. Recognition of beginning of year deferred inflows of resources as pension expense	(5,376)	(2,266)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>27,880</u>	<u>30,379</u>
Pension Expense	\$47,957	\$38,275

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 3 - CC Mosquito

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$766,137	\$795,771
2. Interest on the Total Pension Liability	2,151,528	2,293,954
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(58,408)	28,662
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	38,339	(24,401)
6. Expensed portion of current-period changes of assumptions or other inputs	(67,596)	0
7. Member contributions ⁽¹⁾	(346,257)	(361,657)
8. Projected earnings on plan investments	(1,945,725)	(1,933,538)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	518,738	(348,352)
10. Administrative expense	31,224	34,289
11. Other expenses	12,145	4,562
12. Recognition of beginning of year deferred outflows of resources as pension expense	338,970	380,016
13. Recognition of beginning of year deferred inflows of resources as pension expense	(486,551)	(232,595)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>(68,744)</u>	<u>(94,336)</u>
Pension Expense	\$883,800	\$542,375

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

**EXHIBIT 8 (continued)
Pension Expense: 4 - CCCFPD**

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$26,007,565	\$29,061,841
2. Interest on the Total Pension Liability	73,036,651	83,776,234
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(7,439,424)	576,584
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	1,301,475	(891,122)
6. Expensed portion of current-period changes of assumptions or other inputs	(2,294,635)	0
7. Member contributions ⁽¹⁾	(11,754,169)	(13,207,881)
8. Projected earnings on plan investments	(66,050,349)	(70,613,667)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	17,609,273	(12,721,974)
10. Administrative expense	1,059,954	1,252,266
11. Other expenses	412,274	166,597
12. Recognition of beginning of year deferred outflows of resources as pension expense	11,506,829	13,878,359
13. Recognition of beginning of year deferred inflows of resources as pension expense	(16,516,655)	(8,494,481)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>83,520</u>	<u>(1,426,820)</u>
Pension Expense	\$26,962,309	\$21,355,936

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 5 - CCCSD

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$14,624,463	\$16,824,515
2. Interest on the Total Pension Liability	41,069,656	48,499,837
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(4,296,855)	2,760,509
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	731,840	(515,890)
6. Expensed portion of current-period changes of assumptions or other inputs	(1,290,309)	0
7. Member contributions ⁽¹⁾	(6,609,554)	(7,646,322)
8. Projected earnings on plan investments	(37,141,149)	(40,879,748)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	9,901,971	(7,365,020)
10. Administrative expense	596,029	724,963
11. Other expenses	231,828	96,447
12. Recognition of beginning of year deferred outflows of resources as pension expense	6,470,470	8,034,476
13. Recognition of beginning of year deferred inflows of resources as pension expense	(9,287,574)	(4,917,635)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>(101,258)</u>	<u>(2,648,365)</u>
Pension Expense	\$14,899,558	\$12,967,767

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 6 - First 5

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$466,040	\$339,909
2. Interest on the Total Pension Liability	1,308,777	979,850
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	107,547	(4,242)
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	23,322	(10,423)
6. Expensed portion of current-period changes of assumptions or other inputs	(41,119)	0
7. Member contributions ⁽¹⁾	(210,628)	(154,480)
8. Projected earnings on plan investments	(1,183,586)	(825,900)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	315,549	(148,797)
10. Administrative expense	18,994	14,647
11. Other expenses	7,388	1,949
12. Recognition of beginning of year deferred outflows of resources as pension expense	206,196	162,322
13. Recognition of beginning of year deferred inflows of resources as pension expense	(295,969)	(99,352)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>138,125</u>	<u>151,860</u>
Pension Expense	\$860,636	\$407,343

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 7 - County

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Components of Pension Expense		
1. Service Cost	\$157,844,999	\$132,779,588
2. Interest on the Total Pension Liability	443,273,714	382,762,203
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	17,217,254	(6,433,519)
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	7,898,908	(4,071,415)
6. Expensed portion of current-period changes of assumptions or other inputs	(13,926,587)	0
7. Member contributions ⁽¹⁾	(71,338,347)	(60,345,008)
8. Projected earnings on plan investments	(400,872,484)	(322,624,227)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	106,874,120	(58,124,964)
10. Administrative expense	6,433,071	5,721,430
11. Other expenses	2,502,171	761,159
12. Recognition of beginning of year deferred outflows of resources as pension expense	69,837,194	63,408,332
13. Recognition of beginning of year deferred inflows of resources as pension expense	(100,242,809)	(38,810,128)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>3,191,355</u>	<u>11,141,807</u>
Pension Expense	\$228,692,559	\$106,165,258

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 8 - CCCERA (the employer)

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Components of Pension Expense		
1. Service Cost	\$1,183,076	\$1,130,431
2. Interest on the Total Pension Liability	3,322,416	3,258,680
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions		
4. Expensed portion of current-period benefit changes	17,163	196,325
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	59,204	(34,662)
6. Expensed portion of current-period changes of assumptions or other inputs	(104,382)	0
7. Member contributions ⁽¹⁾	(534,694)	(513,753)
8. Projected earnings on plan investments	(3,004,611)	(2,746,690)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	801,041	(494,852)
10. Administrative expense	48,217	48,710
11. Other expenses	18,754	6,480
12. Recognition of beginning of year deferred outflows of resources as pension expense	523,442	539,833
13. Recognition of beginning of year deferred inflows of resources as pension expense	(751,338)	(330,414)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>188,479</u>	<u>(7,613)</u>
Pension Expense	\$1,766,767	\$1,052,475

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

**EXHIBIT 8 (continued)
Pension Expense: 9 - ECCFPD**

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$2,950,654	\$4,311,275
2. Interest on the Total Pension Liability	8,286,277	12,428,064
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(1,811,053)	348,019
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	147,657	(132,197)
6. Expensed portion of current-period changes of assumptions or other inputs	(260,335)	0
7. Member contributions ⁽¹⁾	(1,333,554)	(1,959,367)
8. Projected earnings on plan investments	(7,493,655)	(10,475,419)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	1,997,837	(1,887,283)
10. Administrative expense	120,256	185,772
11. Other expenses	46,774	24,714
12. Recognition of beginning of year deferred outflows of resources as pension expense	1,305,492	2,058,831
13. Recognition of beginning of year deferred inflows of resources as pension expense	(1,873,875)	(1,260,142)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>(1,754,821)</u>	<u>(2,332,198)</u>
Pension Expense	\$327,654	\$1,310,069

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 10 - Housing Authority

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$1,746,022	\$1,652,657
2. Interest on the Total Pension Liability	4,903,328	4,764,094
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(85,560)	63,691
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	87,375	(50,675)
6. Expensed portion of current-period changes of assumptions or other inputs	(154,051)	0
7. Member contributions ⁽¹⁾	(789,118)	(751,091)
8. Projected earnings on plan investments	(4,434,301)	(4,015,580)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	1,182,201	(723,459)
10. Administrative expense	71,160	71,212
11. Other expenses	27,678	9,474
12. Recognition of beginning of year deferred outflows of resources as pension expense	772,513	789,219
13. Recognition of beginning of year deferred inflows of resources as pension expense	(1,108,848)	(483,055)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>64,550</u>	<u>(2,030)</u>
Pension Expense	\$2,282,949	\$1,324,457

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 11 - IHSS

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$211,837	\$209,489
2. Interest on the Total Pension Liability	594,903	603,890
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(7,196)	16,574
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	10,601	(6,424)
6. Expensed portion of current-period changes of assumptions or other inputs	(18,690)	0
7. Member contributions ⁽¹⁾	(95,741)	(95,207)
8. Projected earnings on plan investments	(537,997)	(509,009)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	143,432	(91,705)
10. Administrative expense	8,634	9,027
11. Other expenses	3,358	1,201
12. Recognition of beginning of year deferred outflows of resources as pension expense	93,726	100,040
13. Recognition of beginning of year deferred inflows of resources as pension expense	(134,532)	(61,231)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>39,566</u>	<u>22,019</u>
Pension Expense	\$311,901	\$198,664

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 12 - LAFCO

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$49,194	\$47,797
2. Interest on the Total Pension Liability	138,153	137,784
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	2,051	1,698
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	2,462	(1,466)
6. Expensed portion of current-period changes of assumptions or other inputs	(4,340)	0
7. Member contributions ⁽¹⁾	(22,234)	(21,723)
8. Projected earnings on plan investments	(124,938)	(116,136)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	33,309	(20,923)
10. Administrative expense	2,005	2,060
11. Other expenses	780	274
12. Recognition of beginning of year deferred outflows of resources as pension expense	21,766	22,825
13. Recognition of beginning of year deferred inflows of resources as pension expense	(31,242)	(13,971)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>(4,742)</u>	<u>(5,715)</u>
Pension Expense	\$62,224	\$32,504

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 13 - MOFD

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$5,566,249	\$6,196,159
2. Interest on the Total Pension Liability	15,631,614	17,861,597
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(1,696,380)	679,531
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	278,547	(189,993)
6. Expensed portion of current-period changes of assumptions or other inputs	(491,107)	0
7. Member contributions ⁽¹⁾	(2,515,677)	(2,816,000)
8. Projected earnings on plan investments	(14,136,376)	(15,055,259)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	3,768,811	(2,712,401)
10. Administrative expense	226,856	266,991
11. Other expenses	88,237	35,520
12. Recognition of beginning of year deferred outflows of resources as pension expense	2,462,740	2,958,950
13. Recognition of beginning of year deferred inflows of resources as pension expense	(3,534,965)	(1,811,075)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>(1,199,925)</u>	<u>(2,135,837)</u>
Pension Expense	\$4,448,624	\$3,278,183

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 14 - Rodeo SD

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$30,264	\$29,524
2. Interest on the Total Pension Liability	84,993	85,106
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	30,323	24,166
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	1,515	(905)
6. Expensed portion of current-period changes of assumptions or other inputs	(2,670)	0
7. Member contributions ⁽¹⁾	(13,678)	(13,418)
8. Projected earnings on plan investments	(76,863)	(71,735)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	20,492	(12,924)
10. Administrative expense	1,233	1,272
11. Other expenses	480	169
12. Recognition of beginning of year deferred outflows of resources as pension expense	13,390	14,099
13. Recognition of beginning of year deferred inflows of resources as pension expense	(19,220)	(8,629)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>93,973</u>	<u>82,643</u>
Pension Expense	\$164,232	\$129,368

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 15 – RHFD

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$1,894,884	\$3,083,283
2. Interest on the Total Pension Liability	5,321,373	8,888,146
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(1,389,022)	520,596
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	94,824	(94,543)
6. Expensed portion of current-period changes of assumptions or other inputs	(167,185)	0
7. Member contributions ⁽¹⁾	(856,396)	(1,401,275)
8. Projected earnings on plan investments	(4,812,359)	(7,491,678)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	1,282,993	(1,349,724)
10. Administrative expense	77,227	132,858
11. Other expenses	30,038	17,675
12. Recognition of beginning of year deferred outflows of resources as pension expense	838,375	1,472,409
13. Recognition of beginning of year deferred inflows of resources as pension expense	(1,203,386)	(901,213)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>(514,333)</u>	<u>(1,239,294)</u>
Pension Expense	\$597,033	\$1,637,240

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 16 - SRVFPD

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Components of Pension Expense		
1. Service Cost	\$11,252,228	\$12,422,099
2. Interest on the Total Pension Liability	31,599,465	35,809,046
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	(1,636,227)	1,727,187
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	563,086	(380,898)
6. Expensed portion of current-period changes of assumptions or other inputs	(992,779)	0
7. Member contributions ⁽¹⁾	(5,085,466)	(5,645,534)
8. Projected earnings on plan investments	(28,576,826)	(30,182,880)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	7,618,690	(5,437,840)
10. Administrative expense	458,592	535,264
11. Other expenses	178,371	71,210
12. Recognition of beginning of year deferred outflows of resources as pension expense	4,978,454	5,932,121
13. Recognition of beginning of year deferred inflows of resources as pension expense	(7,145,966)	(3,630,854)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	(690,117)	(2,740,034)
Pension Expense	\$12,521,505	\$8,478,887

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 17 - Court

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Components of Pension Expense		
1. Service Cost	\$4,434,516	\$3,324,021
2. Interest on the Total Pension Liability	12,453,381	9,582,119
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	1,016,646	(534,092)
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	221,913	(101,924)
6. Expensed portion of current-period changes of assumptions or other inputs	(391,255)	0
7. Member contributions ⁽¹⁾	(2,004,188)	(1,510,685)
8. Projected earnings on plan investments	(11,262,156)	(8,076,617)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	3,002,534	(1,455,108)
10. Administrative expense	180,731	143,231
11. Other expenses	70,296	19,055
12. Recognition of beginning of year deferred outflows of resources as pension expense	1,962,014	1,587,372
13. Recognition of beginning of year deferred inflows of resources as pension expense	(2,816,233)	(971,578)
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>477,762</u>	<u>1,201,010</u>
Pension Expense	\$7,345,961	\$3,206,804

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 18 - DDSD (Term)

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$0	\$0
2. Interest on the Total Pension Liability	938,381	949,272
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	0	0
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	(2,652)	66,799
6. Expensed portion of current-period changes of assumptions or other inputs	5,046	0
7. Member contributions ⁽¹⁾	0	0
8. Projected earnings on plan investments	(838,762)	(793,581)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	221,774	(144,620)
10. Administrative expense	0	0
11. Other expenses	0	0
12. Recognition of beginning of year deferred outflows of resources as pension expense	66,799	0
13. Recognition of beginning of year deferred inflows of resources as pension expense	(144,620)	0
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	0	0
Pension Expense	\$245,966	\$77,870

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 19 - DWD (Term)

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Components of Pension Expense		
1. Service Cost	\$0	\$0
2. Interest on the Total Pension Liability	189,103	197,688
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	0	0
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	20,143	32,871
6. Expensed portion of current-period changes of assumptions or other inputs	(3,790)	0
7. Member contributions ⁽¹⁾	0	0
8. Projected earnings on plan investments	(124,733)	(129,530)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	32,554	(23,933)
10. Administrative expense	0	0
11. Other expenses	0	0
12. Recognition of beginning of year deferred outflows of resources as pension expense	32,871	0
13. Recognition of beginning of year deferred inflows of resources as pension expense	(23,933)	0
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	0	0
Pension Expense	\$122,215	\$77,096

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 8 (continued)

Pension Expense: 20 - Pittsburg (Term)

	Reporting Date for Employer under GAS 68	
Measurement Date for Employer under GAS 68	June 30, 2019	June 30, 2018
Components of Pension Expense	December 31, 2018	December 31, 2017
1. Service Cost	\$0	\$0
2. Interest on the Total Pension Liability	3,232,574	3,253,265
3. Expensed portion of current-period changes in proportion and differences between employer's contributions and proportionate share of contributions	0	0
4. Expensed portion of current-period benefit changes	0	0
5. Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	83,089	34,931
6. Expensed portion of current-period changes of assumptions or other inputs	(10,959)	0
7. Member contributions ⁽¹⁾	0	(1,114)
8. Projected earnings on plan investments	(2,939,132)	(2,786,996)
9. Expensed portion of current-period differences between actual and projected earnings on plan investments	780,147	(508,172)
10. Administrative expense	0	0
11. Other expenses	0	0
12. Recognition of beginning of year deferred outflows of resources as pension expense	34,931	0
13. Recognition of beginning of year deferred inflows of resources as pension expense	(508,172)	0
14. Net amortization of deferred amounts from changes in proportion and differences between employer's contributions and proportionate share of contributions	<u>0</u>	<u>0</u>
Pension Expense	\$672,478	\$(8,086)

⁽¹⁾ Includes "employer subvention of member contributions" and excludes "member subvention of employer contributions".

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9

Deferred Outflows of Resources and Deferred Inflows of Resources: Total for all Employers

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$92,645,193		\$47,965,240	
2. Changes of assumptions or other inputs	8,322,631		24,275,041	
3. Net excess of projected over actual earnings on pension plan investments (if any)	426,567,118		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>41,644,407</u>		<u>481,873</u>	
5. Total Deferred Outflows of Resources	\$569,179,349		\$72,722,154	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$92,645,193		\$47,965,240	
7. Changes of assumptions or other inputs	72,213,970		9,860	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		210,246,943	
9. Difference between expected and actual experience in the Total Pension Liability	<u>30,804,038</u>		<u>79,361,548</u>	
10. Total Deferred Inflows of Resources	\$195,663,201		\$337,583,591	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

	2019	2018	2017
	N/A		
	\$128,382,877		\$(44,673,281)
	43,710,144		(19,112,488)
	50,204,918		(103,785,221)
	151,218,209		(97,290,447)
	0		0
	0		0
Thereafter	0		0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 1 – BIMID

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$152,245		\$114,216	
2. Changes of assumptions or other inputs	2,246		4,748	
3. Net excess of projected over actual earnings on pension plan investments (if any)	114,792		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>11,069</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$280,352		\$118,964	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$2,852		\$8,336	
7. Changes of assumptions or other inputs	19,516		2	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		40,592	
9. Difference between expected and actual experience in the Total Pension Liability	<u>8,328</u>		<u>15,322</u>	
10. Total Deferred Inflows of Resources	\$30,696		\$64,452	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

2019	N/A
2020	\$85,961
2021	62,611
2022	48,947
2023	52,137
2024	0
Thereafter	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 2 - Union Cemetery

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$48,042		\$46,391	
2. Changes of assumptions or other inputs	307		886	
3. Net excess of projected over actual earnings on pension plan investments (if any)	15,685		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>1,512</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$65,546		\$47,277	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$3,549		\$5,810	
7. Changes of assumptions or other inputs	2,667		0	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		7,579	
9. Difference between expected and actual experience in the Total Pension Liability	<u>1,138</u>		<u>2,898</u>	
10. Total Deferred Inflows of Resources	\$7,354		\$16,287	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	
2019	N/A
2020	\$24,499
2021	11,185
2022	11,885
2023	10,623
2024	0
Thereafter	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 3 - CC Mosquito

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$94,346		\$140,600	
2. Changes of assumptions or other inputs	27,772		91,009	
3. Net excess of projected over actual earnings on pension plan investments (if any)	1,419,449		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>136,871</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$1,678,438		\$231,609	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$268,315		\$174,797	
7. Changes of assumptions or other inputs	241,317		37	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		778,082	
9. Difference between expected and actual experience in the Total Pension Liability	<u>102,981</u>		<u>297,532</u>	
10. Total Deferred Inflows of Resources	\$612,613		\$1,250,448	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	Deferred Outflows of Resources		Deferred Inflows of Resources	
	2019	2020	2019	2020
	N/A			
		\$350,826		\$(234,195)
		121,882		(87,767)
		124,347		(350,998)
		468,770		(345,879)
		0		0
		0		0
	Thereafter	0		0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 4 - CCCFPD

	June 30, 2019		June 30, 2018	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$2,720,914		\$5,669,284	
2. Changes of assumptions or other inputs	942,751		3,323,684	
3. Net excess of projected over actual earnings on pension plan investments (if any)	48,185,181		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>4,646,267</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$56,495,113		\$8,992,968	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$28,857,560		\$5,163,668	
7. Changes of assumptions or other inputs	8,191,846		1,350	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		28,415,919	
9. Difference between expected and actual experience in the Total Pension Liability	<u>3,495,840</u>		<u>10,866,006</u>	
10. Total Deferred Inflows of Resources	\$40,545,246		\$44,446,943	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	Deferred Outflows of Resources		Deferred Inflows of Resources	
	2019	2020	2019	2020
	N/A		\$5,958,820	
		\$7,414,256	(2,196,915)	
		(2,801,621)	(14,393,834)	
		(1,465,470)	(12,904,406)	
		12,802,702	0	
		2024	0	
	Thereafter	0	0	

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 5 - CCCSD

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$7,636,777		\$11,045,200	
2. Changes of assumptions or other inputs	530,124		1,924,151	
3. Net excess of projected over actual earnings on pension plan investments (if any)	27,095,284		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>2,612,669</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$37,874,854		\$12,969,351	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$17,164,806		\$5,334,713	
7. Changes of assumptions or other inputs	4,606,404		782	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		16,450,578	
9. Difference between expected and actual experience in the Total Pension Liability	<u>1,965,766</u>		<u>6,290,561</u>	
10. Total Deferred Inflows of Resources	\$23,736,976		\$28,076,634	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	Deferred Outflows of Resources		Deferred Inflows of Resources	
	2019	2020	2019	2020
	N/A			
		\$5,124,501		\$(3,599,296)
		1,403,504		(208,682)
		475,439		(5,236,162)
		7,134,434		(6,063,143)
		0		0
		0		0
	Thereafter	0		0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 6 - First 5

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$495,162		\$253,585	
2. Changes of assumptions or other inputs	16,894		38,874	
3. Net excess of projected over actual earnings on pension plan investments (if any)	863,452		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>83,259</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$1,458,767		\$292,459	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$10,945		\$15,187	
7. Changes of assumptions or other inputs	146,793	16		
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		332,354	
9. Difference between expected and actual experience in the Total Pension Liability	<u>62,644</u>		<u>127,089</u>	
10. Total Deferred Inflows of Resources	\$220,382		\$474,646	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

Reporting Date	2019	2020	2021	2022	2023	2024	Thereafter
	N/A						
		\$450,292	215,241	206,143	366,709	0	0
		\$67,454	(145,369)	(157,304)	0	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 7 - County

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$67,617,522		\$15,776,802	
2. Changes of assumptions or other inputs	5,721,740		15,185,462	
3. Net excess of projected over actual earnings on pension plan investments (if any)	292,445,286		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>28,199,103</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$393,983,651		\$30,962,264	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$16,598,469		\$23,031,988	
7. Changes of assumptions or other inputs	49,717,915		6,168	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		129,828,465	
9. Difference between expected and actual experience in the Total Pension Liability	<u>21,216,932</u>		<u>49,645,301</u>	
10. Total Deferred Inflows of Resources	\$87,533,316		\$202,511,922	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:		
2019	N/A	
2020	\$103,722,474	\$(24,415,272)
2021	41,762,411	(13,163,410)
2022	47,713,271	(69,753,164)
2023	113,252,179	(64,217,812)
2024	0	0
Thereafter	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 8 - CCCERA (the employer)

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$582,902		\$727,934	
2. Changes of assumptions or other inputs	42,885		129,283	
3. Net excess of projected over actual earnings on pension plan investments (if any)	2,191,930		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>211,357</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$3,029,074		\$857,217	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$9,271		\$27,096	
7. Changes of assumptions or other inputs	372,645		53	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		1,105,306	
9. Difference between expected and actual experience in the Total Pension Liability	<u>159,025</u>		<u>422,660</u>	
10. Total Deferred Inflows of Resources	\$540,941		\$1,555,115	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	
2019	N/A
2020	\$873,806
2021	441,686
2022	387,571
2023	785,070
2024	0
Thereafter	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 9 - ECCFPD

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$1,084,092		\$1,550,714	
2. Changes of assumptions or other inputs	106,959		493,063	
3. Net excess of projected over actual earnings on pension plan investments (if any)	5,466,786		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>527,136</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$7,184,973		\$2,043,777	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$7,441,710		\$3,197,693	
7. Changes of assumptions or other inputs	929,395		200	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		4,215,454	
9. Difference between expected and actual experience in the Total Pension Liability	<u>396,616</u>		<u>1,611,954</u>	
10. Total Deferred Inflows of Resources	\$8,767,721		\$9,025,301	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

Reporting Date for Employer under GAS 68 Year Ended June 30:	2019	2018	2017
	N/A		
	2020	2019	2018
	2021	2020	2019
	2022	2021	2020
	2023	2022	2021
	2024	2023	2022
	Thereafter	2024	2023

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 10 - Housing Authority

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$204,887		\$294,415	
2. Changes of assumptions or other inputs	63,292		189,008	
3. Net excess of projected over actual earnings on pension plan investments (if any)	3,234,920		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>311,928</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$3,815,027		\$483,423	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$316,182		\$35,713	
7. Changes of assumptions or other inputs	549,961		77	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		1,615,925	
9. Difference between expected and actual experience in the Total Pension Liability	<u>234,694</u>		<u>617,916</u>	
10. Total Deferred Inflows of Resources	\$1,100,837		\$2,269,631	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	
2019	N/A
2020	\$967,229
2021	321,542
2022	329,990
2023	1,095,429
2024	0
Thereafter	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 11 - IHSS

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$81,110		\$122,132	
2. Changes of assumptions or other inputs	7,679		23,958	
3. Net excess of projected over actual earnings on pension plan investments (if any)	392,481		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>37,845</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$519,115		\$146,090	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$25,691		\$1,456	
7. Changes of assumptions or other inputs	66,725		10	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		204,832	
9. Difference between expected and actual experience in the Total Pension Liability	<u>28,475</u>		<u>78,326</u>	
10. Total Deferred Inflows of Resources	\$120,891		\$284,624	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	
2019	N/A
2020	\$151,983
2021	63,171
2022	48,352
2023	134,718
2024	0
Thereafter	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 12 - LAFCO

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$12,318		\$8,177	
2. Changes of assumptions or other inputs	1,783		5,466	
3. Net excess of projected over actual earnings on pension plan investments (if any)	91,145		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>8,789</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$114,035		\$13,643	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$4,121		\$12,043	
7. Changes of assumptions or other inputs	15,495		2	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		46,735	
9. Difference between expected and actual experience in the Total Pension Liability	<u>6,613</u>		<u>17,871</u>	
10. Total Deferred Inflows of Resources	\$26,229		\$76,651	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

2019	N/A	\$ (14,680)
2020	\$27,461	(6,215)
2021	13,234	(21,327)
2022	13,706	(20,786)
2023	33,405	0
2024	0	0
Thereafter	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 13 - MOFD

	June 30, 2019		June 30, 2018	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$1,753,189		\$2,432,720	
2. Changes of assumptions or other inputs	201,772		708,630	
3. Net excess of projected over actual earnings on pension plan investments (if any)	10,312,797		0	
4. Difference between expected and actual experience in the Total Pension Liability	994,414		0	
5. Total Deferred Outflows of Resources	\$13,262,172		\$3,141,350	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$8,136,089		\$3,959,470	
7. Changes of assumptions or other inputs	1,753,254		288	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		6,058,445	
9. Difference between expected and actual experience in the Total Pension Liability	748,194		2,316,698	
10. Total Deferred Inflows of Resources	\$10,637,537		\$12,334,901	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	Reporting Date for Employer under GAS 68 Year Ended June 30:	
	2019	2018
2019	N/A	
2020	\$715,362	\$(2,488,188)
2021	(676,189)	(1,235,418)
2022	(95,256)	(3,041,475)
2023	2,680,718	(2,428,470)
2024	0	0
Thereafter	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 14 - Rodeo SD

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$199,722		\$190,893	
2. Changes of assumptions or other inputs	1,097		3,376	
3. Net excess of projected over actual earnings on pension plan investments (if any)	56,073		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>5,407</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$262,299		\$194,269	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$8,554		\$14,003	
7. Changes of assumptions or other inputs	9,533		1	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		28,867	
9. Difference between expected and actual experience in the Total Pension Liability	<u>4,068</u>		<u>11,039</u>	
10. Total Deferred Inflows of Resources	\$22,155		\$53,910	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

2019	N/A	\$87,835
2020	\$95,047	45,258
2021	57,081	6,701
2022	50,901	565
2023	37,115	0
2024	0	0
Thereafter	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 15 - RHFD

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$1,343,137		\$1,863,733	
2. Changes of assumptions or other inputs	68,688		352,623	
3. Net excess of projected over actual earnings on pension plan investments (if any)	3,510,721		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>338,522</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$5,261,068		\$2,216,356	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$5,482,478		\$1,558,600	
7. Changes of assumptions or other inputs	596,849		143	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		3,014,755	
9. Difference between expected and actual experience in the Total Pension Liability	<u>254,703</u>		<u>1,152,817</u>	
10. Total Deferred Inflows of Resources	\$6,334,030		\$5,726,315	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:		
2019	N/A	
2020	\$(256,396)	\$(1,155,388)
2021	(590,386)	(194,166)
2022	(676,186)	(1,057,792)
2023	450,006	(1,102,613)
2024	0	0
Thereafter	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 16 - SRVFPD

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$4,456,142		\$6,183,329	
2. Changes of assumptions or other inputs	407,883		1,420,665	
3. Net excess of projected over actual earnings on pension plan investments (if any)	20,847,423		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>2,010,218</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$27,721,666		\$7,603,994	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$6,936,643		\$3,512,617	
7. Changes of assumptions or other inputs	3,544,220		577	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		12,146,010	
9. Difference between expected and actual experience in the Total Pension Liability	<u>1,512,483</u>		<u>4,644,531</u>	
10. Total Deferred Inflows of Resources	\$11,993,346		\$20,303,735	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

Reporting Date for Employer under GAS 68 Year Ended June 30:	2019	2020	2021	2022	2023	2024	Thereafter
	N/A	\$5,321,439	2,160,267	1,805,499	6,441,115	0	0
		(406,050)	(4,363,862)	(4,656,994)	0	0	0
		\$(3,272,835)					

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 17 - Court

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$4,162,686		\$1,545,115	
2. Changes of assumptions or other inputs	160,747		380,155	
3. Net excess of projected over actual earnings on pension plan investments (if any)	8,215,991		0	
4. Difference between expected and actual experience in the Total Pension Liability	<u>792,229</u>		<u>0</u>	
5. Total Deferred Outflows of Resources	\$13,331,653		\$1,925,270	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$1,377,958		\$1,912,050	
7. Changes of assumptions or other inputs	1,396,781		154	
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		3,250,143	
9. Difference between expected and actual experience in the Total Pension Liability	<u>596,071</u>		<u>1,242,827</u>	
10. Total Deferred Inflows of Resources	\$3,370,810		\$6,405,174	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	
2019	N/A
2020	\$3,405,606
2021	1,401,280
2022	1,668,462
2023	3,485,495
2024	0
Thereafter	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 18 - DDS (Term)

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$0		\$0	\$0
2. Changes of assumptions or other inputs	18,012		0	0
3. Net excess of projected over actual earnings on pension plan investments (if any)	453,235		0	0
4. Difference between expected and actual experience in the Total Pension Liability	<u>172,343</u>		<u>239,142</u>	
5. Total Deferred Outflows of Resources	\$643,590		\$239,142	
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$0		\$0	\$0
7. Changes of assumptions or other inputs	0		0	0
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		578,481	
9. Difference between expected and actual experience in the Total Pension Liability	<u>9,467</u>		<u>0</u>	
10. Total Deferred Inflows of Resources	\$9,467		\$578,481	

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

Reporting Date	2019	2020	2021	2022	2023	2024	Thereafter
	N/A	\$146,347	146,347	118,292	223,137	0	0
		(77,821)	(77,821)	(105,876)	0	0	0
		\$ (77,821)	(77,821)	(105,876)	0	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 19 - DWD (Term)

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$0	\$0		\$0
2. Changes of assumptions or other inputs	0	0		0
3. Net excess of projected over actual earnings on pension plan investments (if any)	58,418	58,418		0
4. Difference between expected and actual experience in the Total Pension Liability	<u>156,720</u>	<u>156,720</u>		<u>117,680</u>
5. Total Deferred Outflows of Resources	\$215,138	\$215,138		\$117,680
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$0	\$0		\$0
7. Changes of assumptions or other inputs	13,531	13,531		0
8. Net excess of actual over projected earnings on pension plan investments (if any)	0	0		95,732
9. Difference between expected and actual experience in the Total Pension Liability	<u>0</u>	<u>0</u>		<u>0</u>
10. Total Deferred Inflows of Resources	\$13,531	\$13,531		\$95,732

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:	
2019	N/A
2020	\$57,845
2021	57,845
2022	44,041
2023	41,876
2024	0
Thereafter	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources: 20 - Pittsburg (Term)

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Deferred Outflows of Resources				
1. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$0		\$0	\$0
2. Changes of assumptions or other inputs	0		0	0
3. Net excess of projected over actual earnings on pension plan investments (if any)	1,596,069		1,596,069	0
4. Difference between expected and actual experience in the Total Pension Liability	386,749		386,749	125,051
5. Total Deferred Outflows of Resources	\$1,982,818		\$1,982,818	\$125,051
Deferred Inflows of Resources				
6. Changes in proportion and differences between employer's contributions and proportionate share of contributions ⁽¹⁾	\$0		\$0	\$0
7. Changes of assumptions or other inputs	39,123		39,123	0
8. Net excess of actual over projected earnings on pension plan investments (if any)	0		0	2,032,689
9. Difference between expected and actual experience in the Total Pension Liability	0		0	0
10. Total Deferred Inflows of Resources	\$39,123		\$39,123	\$2,032,689

Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:

Reporting Date for Employer under GAS 68 Year Ended June 30:

Reporting Date for Employer under GAS 68 Year Ended June 30:	2019	2018	2017
	N/A		
	\$379,036		\$(473,241)
	379,036		(473,241)
	364,362		(487,915)
	821,261		0
	2024	0	0
	Thereafter	0	0

⁽¹⁾ Calculated in accordance with Paragraphs 54 and 55 of GAS 68.

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EXHIBIT 9 (continued)

Deferred Outflows of Resources and Deferred Inflows of Resources

There are changes in each employer's proportionate share of the total NPL during the measurement period ended December 31, 2018. The net effect of the change on the employer's proportionate share of the collective NPL and collective deferred outflows of resources and deferred inflows of resources for the current period (i.e., 2018) is recognized over the average of the expected remaining service lives of all employees that are provided with pensions through CCCERA which is 4.57 years determined as of December 31, 2017 (the beginning of the measurement period ending December 31, 2018). This is described in Paragraph 33a. of GAS 68.

In addition, the difference between the actual employer contributions and the proportionate share of the employer contributions during the measurement period ended December 31, 2018 is recognized over the same period. This difference is calculated based on actual employer contributions reported to us by CCCERA for each active employer.

The net effects of the change on the employer's proportionate share of the collective NPL and collective deferred outflows of resources and deferred inflows of resources and the difference between the actual employer contributions and the proportionate share of the employer contributions for prior periods are continued to be recognized based on the expected remaining service lives of all employees calculated as of those prior measurement dates.

The average of the expected service lives of all employees is determined by:

- Calculating each active employee's expected remaining service life as the present value of \$1 per year of future service at zero percent interest.
- Setting the remaining service life to zero for each nonactive or retired member.
- Dividing the sum of the above amounts by the total number of active employee, nonactive and retired members.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10

Schedule of Proportionate Share of the Net Pension Liability: Total for all Employers

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	100.000%	\$1,471,449,251	\$638,635,912	230.41%	81.44%
2015	100.000%	1,195,701,397	671,485,798	178.07%	85.25%
2016	100.000%	1,507,127,140	709,818,858	212.33%	82.24%
2017	100.000%	1,400,454,923	755,138,882	185.46%	84.16%
2018	100.000%	811,436,611	809,960,088	100.18%	91.18%
2019	100.000%	1,428,044,144	850,929,106	167.82%	85.09%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 1 - BIMID

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.010%	\$141,029	\$98,547	143.11%	74.40%
2015	0.010%	114,600	63,762	179.73%	79.57%
2016	0.007%	111,818	58,347	191.64%	77.84%
2017	0.010%	137,084	82,174	166.82%	80.32%
2018	0.019%	157,443	166,430	94.60%	88.49%
2019	0.027%	383,118	261,689	146.40%	82.28%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 2 - Union Cemetery

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.006%	\$81,639	\$202,342	40.35%	94.52%
2015	0.006%	66,340	213,716	31.04%	95.83%
2016	0.010%	147,774	213,336	69.27%	91.43%
2017	0.005%	75,800	226,811	33.42%	95.67%
2018	0.004%	29,395	166,890	17.61%	98.00%
2019	0.004%	52,348	192,930	27.13%	96.58%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 3 - CC Mosquito

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.427%	\$6,281,902	\$2,787,246	225.38%	74.40%
2015	0.427%	5,104,681	2,840,172	179.73%	79.57%
2016	0.376%	5,665,700	2,956,365	191.64%	77.84%
2017	0.367%	5,140,418	3,081,368	166.82%	80.32%
2018	0.372%	3,017,908	3,190,169	94.60%	88.49%
2019	0.332%	4,737,389	3,235,876	146.40%	82.28%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 4 - CCCFPD

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	9.723%	\$143,074,496	\$30,880,667	463.31%	83.82%
2015	9.723%	116,262,504	29,582,625	393.01%	86.85%
2016	11.568%	174,340,795	32,275,397	540.17%	81.54%
2017	11.934%	167,124,048	35,011,978	477.33%	82.69%
2018	13.583%	110,215,347	36,028,772	305.91%	88.88%
2019	11.261%	160,817,317	40,272,628	399.32%	83.99%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 5 - CCCSD

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	7.488%	\$110,183,830	\$25,791,346	427.21%	67.22%
2015	7.488%	89,535,510	26,906,131	332.77%	73.86%
2016	6.088%	91,746,888	29,061,743	315.70%	74.14%
2017	6.273%	87,847,116	31,584,169	278.14%	76.44%
2018	7.863%	63,806,000	33,306,938	191.57%	83.58%
2019	6.332%	90,430,104	33,793,159	267.60%	77.86%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 6 - First 5

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.141%	\$2,071,332	\$1,631,923	126.93%	86.00%
2015	0.141%	1,683,167	1,735,009	97.01%	88.97%
2016	0.164%	2,465,341	1,962,961	125.59%	85.48%
2017	0.173%	2,423,899	2,140,380	113.25%	86.64%
2018	0.159%	1,289,083	2,405,397	53.59%	93.48%
2019	0.202%	2,881,759	2,525,004	114.13%	86.19%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 7 - County

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	67.521%	\$993,538,168	\$513,965,613	193.31%	82.57%
2015	67.521%	807,350,288	547,669,428	147.42%	86.21%
2016	67.951%	1,024,104,604	578,312,679	177.08%	83.30%
2017	67.071%	939,305,464	613,565,068	153.09%	85.20%
2018	62.058%	503,558,908	661,575,196	76.12%	92.40%
2019	68.347%	976,031,747	695,801,377	140.27%	85.94%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 8 - CCCERA (the employer)

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.490%	\$7,215,926	\$3,280,849	219.94%	74.40%
2015	0.490%	5,863,670	3,262,463	179.73%	79.57%
2016	0.474%	7,138,680	3,724,967	191.64%	77.84%
2017	0.462%	6,475,713	3,881,797	166.82%	80.32%
2018	0.528%	4,287,094	4,531,800	94.60%	88.49%
2019	0.512%	7,315,532	4,996,878	146.40%	82.28%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 9 - ECCFPD

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	2.033%	\$29,920,976	\$3,075,280	972.95%	69.43%
2015	2.033%	24,313,820	3,033,964	801.39%	74.65%
2016	1.526%	22,992,216	2,578,801	891.59%	70.89%
2017	1.668%	23,362,447	2,981,911	783.47%	73.30%
2018	2.015%	16,350,262	2,932,872	557.48%	81.00%
2019	1.278%	18,245,316	3,142,969	580.51%	77.80%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 10 - Housing Authority

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.724%	\$10,648,283	\$4,677,572	227.65%	80.04%
2015	0.724%	8,652,807	4,691,885	184.42%	84.06%
2016	0.716%	10,788,391	4,841,907	222.81%	80.83%
2017	0.726%	10,162,604	5,215,890	194.84%	82.73%
2018	0.772%	6,267,604	5,183,762	120.91%	89.72%
2019	0.756%	10,796,497	5,288,211	204.16%	83.10%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 11 - IHSS

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.087%	\$1,280,362	\$600,371	213.26%	74.40%
2015	0.087%	1,040,424	578,877	179.73%	79.57%
2016	0.086%	1,292,792	674,579	191.64%	77.84%
2017	0.092%	1,294,522	775,987	166.82%	80.32%
2018	0.098%	794,473	839,821	94.60%	88.49%
2019	0.092%	1,309,899	894,727	146.40%	82.28%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 12 - LAFCO

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.030%	\$448,684	\$202,880	221.16%	74.40%
2015	0.030%	364,601	202,859	179.73%	79.57%
2016	0.027%	400,173	208,810	191.64%	77.84%
2017	0.026%	359,329	215,396	166.82%	80.32%
2018	0.022%	181,268	221,780	81.73%	90.06%
2019	0.021%	304,195	228,637	133.05%	83.90%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 13 - MOFD

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	2.393%	\$35,211,427	\$7,353,174	478.86%	80.06%
2015	2.393%	28,612,847	7,350,163	389.28%	83.79%
2016	2.608%	39,299,357	6,858,003	573.04%	78.77%
2017	2.326%	32,569,913	7,347,757	443.26%	82.41%
2018	2.896%	23,498,575	7,960,215	295.20%	87.85%
2019	2.410%	34,418,805	8,139,433	422.86%	82.47%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 14 - Rodeo SD

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	0.015%	\$225,142	\$546,354	41.21%	94.52%
2015	0.015%	182,951	589,379	31.04%	95.83%
2016	0.026%	393,628	568,265	69.27%	91.43%
2017	0.015%	203,750	609,667	33.42%	95.67%
2018	0.014%	111,965	635,682	17.61%	98.00%
2019	0.013%	187,143	689,729	27.13%	96.58%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 15 - RHFD

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	1.129%	\$16,612,346	\$1,766,704	940.30%	59.86%
2015	1.129%	13,499,212	2,069,510	652.29%	65.89%
2016	1.012%	15,252,152	2,342,844	651.01%	63.59%
2017	1.049%	14,693,106	2,241,786	655.42%	66.55%
2018	1.441%	11,693,174	2,194,605	532.81%	74.20%
2019	0.820%	11,716,980	2,346,256	499.39%	74.46%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 16 - SRVFPD

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	5.815%	\$85,561,055	\$19,053,093	449.07%	76.94%
2015	5.815%	69,527,014	18,614,252	373.51%	81.67%
2016	5.357%	80,736,003	19,540,557	413.17%	79.70%
2017	5.176%	72,491,195	22,113,973	327.81%	82.68%
2018	5.806%	47,110,096	23,767,950	198.21%	89.41%
2019	4.872%	69,577,960	24,477,353	284.25%	84.91%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 17 - Court

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	1.968%	\$28,952,654	\$22,721,953	127.42%	84.75%
2015	1.968%	23,526,961	22,081,605	106.55%	87.89%
2016	2.007%	30,250,828	23,639,297	127.97%	85.21%
2017	1.939%	27,158,829	24,062,771	112.87%	86.68%
2018	1.554%	12,606,159	24,851,809	50.73%	93.83%
2019	1.920%	27,420,745	24,642,251	111.28%	86.53%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 18 - DDSD (Term)

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	N/A	N/A	N/A	N/A	N/A
2015	N/A	N/A	N/A	N/A	N/A
2016	N/A	N/A	N/A	N/A	N/A
2017	0.137%	\$1,918,215	\$0	N/A	86.09%
2018	0.177%	1,435,257	0	N/A	89.73%
2019	0.170%	2,433,196	0	N/A	82.38%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)

Schedule of Proportionate Share of the Net Pension Liability: 19 - DWD (Term)

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	N/A	N/A	N/A	N/A	N/A
2015	N/A	N/A	N/A	N/A	N/A
2016	N/A	N/A	N/A	N/A	N/A
2017	0.059%	\$823,144	\$0	N/A	71.42%
2018	0.102%	827,520	0	N/A	70.60%
2019	0.072%	1,034,726	0	N/A	61.21%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 10 (continued)
Schedule of Proportionate Share of the Net Pension Liability: 20 - Pittsburg (Term)

Reporting Date for Employer under GAS 68 as of June 30	Proportion of the Net Pension Liability	Proportionate share of Net Pension Liability	Covered payroll ⁽¹⁾	Proportionate share of the Net Pension Liability as a percentage of its covered payroll	Plan's Fiduciary Net Position as a percentage of the Total Pension Liability
2014	N/A	N/A	N/A	N/A	N/A
2015	N/A	N/A	N/A	N/A	N/A
2016	N/A	N/A	N/A	N/A	N/A
2017	0.492%	\$6,888,327	\$0	N/A	85.75%
2018	0.517%	4,199,080	0	N/A	91.20%
2019	0.557%	7,949,368	0	N/A	83.25%

⁽¹⁾ Covered payroll represents payroll on which contributions to the pension plan are based.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11

Schedule of Reconciliation of Net Pension Liability: Total for all Employers

	June 30, 2019		June 30, 2018	
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68				
Reconciliation of Net Pension Liability				
1. Beginning Net Pension Liability	\$811,436,611	\$1,400,454,923		
2. Pension Expense	303,347,051	162,333,068		
3. Employer Contributions ⁽¹⁾	(325,117,103)	(314,836,561)		
4. New Net Deferred Inflows/Outflows	593,704,304	(397,192,842)		
5. Change in Allocation of Prior Deferred Inflows/Outflows	0	0		
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	0	0		
7. Recognition of Prior Deferred Inflows/Outflows	44,673,281	(39,321,977)		
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	0	0		
9. Ending Net Pension Liability	\$1,428,044,144	\$811,436,611		

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 1 - BIMID

	June 30, 2018		June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68						
Measurement Date for Employer under GAS 68						
Reconciliation of Net Pension Liability						
1. Beginning Net Pension Liability		\$137,084	\$157,443			\$137,084
2. Pension Expense		60,583	130,723			60,583
3. Employer Contributions ⁽¹⁾		(63,700)	(100,193)			(63,700)
4. New Net Deferred Inflows/Outflows		(77,251)	159,357			(77,251)
5. Change in Allocation of Prior Deferred Inflows/Outflows		16,655	(19,660)			16,655
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾		94,287	72,243			94,287
7. Recognition of Prior Deferred Inflows/Outflows		(7,691)	11,935			(7,691)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾		<u>(2,524)</u>	<u>(28,730)</u>			<u>(2,524)</u>
9. Ending Net Pension Liability		\$157,443	\$383,118			\$157,443

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 2 - Union Cemetery

	June 30, 2018		June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68						
Measurement Date for Employer under GAS 68						
Reconciliation of Net Pension Liability						
1. Beginning Net Pension Liability		\$75,800	\$29,395			
2. Pension Expense		38,275	47,957			
3. Employer Contributions ⁽¹⁾		(42,422)	(52,206)			
4. New Net Deferred Inflows/Outflows		(14,423)	21,774			
5. Change in Allocation of Prior Deferred Inflows/Outflows		(3,087)	(114)			
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾		7,066	31,792			
7. Recognition of Prior Deferred Inflows/Outflows		(1,435)	1,630			
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾		<u>(30,379)</u>	<u>(27,880)</u>			
9. Ending Net Pension Liability		\$29,395	\$52,348			

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 3 - CC Mosquito

	June 30, 2019	June 30, 2018
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$3,017,908	\$5,140,418
2. Pension Expense	883,800	542,375
3. Employer Contributions ⁽¹⁾	(1,248,984)	(1,242,766)
4. New Net Deferred Inflows/Outflows	1,970,504	(1,480,763)
5. Change in Allocation of Prior Deferred Inflows/Outflows	106,352	9,119
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(208,516)	102,610
7. Recognition of Prior Deferred Inflows/Outflows	147,581	(147,421)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>68,744</u>	<u>94,336</u>
9. Ending Net Pension Liability	\$4,737,389	\$3,017,908

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 4 - CCCFPD

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$110,215,347	\$167,124,048
2. Pension Expense	26,962,309	21,355,936
3. Employer Contributions ⁽¹⁾	(27,764,181)	(25,169,858)
4. New Net Deferred Inflows/Outflows	66,891,513	(54,078,112)
5. Change in Allocation of Prior Deferred Inflows/Outflows	6,144,765	2,876,221
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(26,558,742)	2,064,170
7. Recognition of Prior Deferred Inflows/Outflows	5,009,826	(5,383,878)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>(83,520)</u>	<u>1,426,820</u>
9. Ending Net Pension Liability	\$160,817,317	\$110,215,347

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 5 - CCCSD

	June 30, 2019	June 30, 2018
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$63,806,000	\$87,847,116
2. Pension Expense	14,899,558	12,967,767
3. Employer Contributions ⁽¹⁾	(17,520,615)	(17,880,152)
4. New Net Deferred Inflows/Outflows	37,614,149	(31,306,965)
5. Change in Allocation of Prior Deferred Inflows/Outflows	4,052,424	2,764,089
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(15,339,774)	9,882,621
7. Recognition of Prior Deferred Inflows/Outflows	2,817,104	(3,116,841)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>101,258</u>	<u>2,648,365</u>
9. Ending Net Pension Liability	\$90,430,104	\$63,806,000

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 6 - First 5

	June 30, 2019	June 30, 2018
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$1,289,083	\$2,423,899
2. Pension Expense	860,636	407,343
3. Employer Contributions ⁽¹⁾	(688,531)	(655,373)
4. New Net Deferred Inflows/Outflows	1,198,660	(632,500)
5. Change in Allocation of Prior Deferred Inflows/Outflows	(113,681)	(24,269)
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	383,944	(15,187)
7. Recognition of Prior Deferred Inflows/Outflows	89,773	(62,970)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>(138,125)</u>	<u>(151,860)</u>
9. Ending Net Pension Liability	\$2,881,759	\$1,289,083

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 7 - County

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$503,558,908	\$939,305,464
2. Pension Expense	228,692,559	106,165,258
3. Employer Contributions ⁽¹⁾	(234,219,710)	(227,515,999)
4. New Net Deferred Inflows/Outflows	405,977,670	(247,075,523)
5. Change in Allocation of Prior Deferred Inflows/Outflows	(16,657,534)	(8,548,293)
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	61,465,594	(23,031,988)
7. Recognition of Prior Deferred Inflows/Outflows	30,405,615	(24,598,204)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>(3,191,355)</u>	<u>(11,141,807)</u>
9. Ending Net Pension Liability	\$976,031,747	\$503,558,908

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 8 - CCCERA (the employer)

	June 30, 2018		June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68						
Measurement Date for Employer under GAS 68						
Reconciliation of Net Pension Liability						
1. Beginning Net Pension Liability		\$6,475,713	\$4,287,094			
2. Pension Expense		1,052,475	1,766,767			
3. Employer Contributions ⁽¹⁾		(1,753,591)	(1,924,361)			
4. New Net Deferred Inflows/Outflows		(2,103,500)	3,042,875			
5. Change in Allocation of Prior Deferred Inflows/Outflows		114,961	42,468			
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾		702,842	61,272			
7. Recognition of Prior Deferred Inflows/Outflows		(209,419)	227,896			
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾		<u>7,613</u>	<u>(188,479)</u>			
9. Ending Net Pension Liability		\$4,287,094	\$7,315,532			

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 9 - ECCFPD

	June 30, 2019	June 30, 2018
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$16,350,262	\$23,362,447
2. Pension Expense	327,654	1,310,069
3. Employer Contributions ⁽¹⁾	(3,831,375)	(3,682,458)
4. New Net Deferred Inflows/Outflows	7,589,088	(8,022,397)
5. Change in Allocation of Prior Deferred Inflows/Outflows	1,951,943	603,186
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(6,465,460)	1,245,906
7. Recognition of Prior Deferred Inflows/Outflows	568,383	(798,689)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>1,754,821</u>	<u>2,332,198</u>
9. Ending Net Pension Liability	\$18,245,316	\$16,350,262

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 10 - Housing Authority

	June 30, 2019	June 30, 2018
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$6,267,604	\$10,162,604
2. Pension Expense	2,282,949	1,324,457
3. Employer Contributions ⁽¹⁾	(2,254,454)	(2,150,337)
4. New Net Deferred Inflows/Outflows	4,490,773	(3,075,254)
5. Change in Allocation of Prior Deferred Inflows/Outflows	43,287	82,256
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(305,447)	228,012
7. Recognition of Prior Deferred Inflows/Outflows	336,335	(306,164)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>(64,550)</u>	<u>2,030</u>
9. Ending Net Pension Liability	\$10,796,497	\$6,267,604

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 11 - IHSS

	June 30, 2018		June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68						
Measurement Date for Employer under GAS 68						
Reconciliation of Net Pension Liability						
1. Beginning Net Pension Liability		\$794,473		\$1,294,522		
2. Pension Expense		311,901		198,664		
3. Employer Contributions ⁽¹⁾		(333,234)		(317,051)		
4. New Net Deferred Inflows/Outflows		544,849		(389,815)		
5. Change in Allocation of Prior Deferred Inflows/Outflows		16,361		9,646		
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾		(25,691)		59,335		
7. Recognition of Prior Deferred Inflows/Outflows		40,806		(38,809)		
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾		(39,566)		(22,019)		
9. Ending Net Pension Liability		\$1,309,899		\$794,473		

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 12 - LAFCO

	June 30, 2018		June 30, 2019		June 30, 2018	
Reporting Date for Employer under GAS 68						
Measurement Date for Employer under GAS 68						
Reconciliation of Net Pension Liability						
1. Beginning Net Pension Liability			\$181,268		\$359,329	
2. Pension Expense			62,224		32,504	
3. Employer Contributions ⁽¹⁾			(90,110)		(118,872)	
4. New Net Deferred Inflows/Outflows			126,529		(88,941)	
5. Change in Allocation of Prior Deferred Inflows/Outflows			2,745		(5,694)	
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾			7,321		6,081	
7. Recognition of Prior Deferred Inflows/Outflows			9,476		(8,854)	
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾			<u>4,742</u>		<u>5,715</u>	
9. Ending Net Pension Liability			\$304,195		\$181,268	

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 13 - MOFD

	June 30, 2019	June 30, 2018
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$23,498,575	\$32,569,913
2. Pension Expense	4,448,624	3,278,183
3. Employer Contributions ⁽¹⁾	(5,346,581)	(5,231,551)
4. New Net Deferred Inflows/Outflows	14,316,406	(11,529,779)
5. Change in Allocation of Prior Deferred Inflows/Outflows	1,285,706	991,127
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(6,056,075)	2,432,720
7. Recognition of Prior Deferred Inflows/Outflows	1,072,225	(1,147,875)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>1,199,925</u>	<u>2,135,837</u>
9. Ending Net Pension Liability	\$34,418,805	\$23,498,575

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 14 - Rodeo SD

	Reporting Date for Employer under GAS 68 Measurement Date for Employer under GAS 68	
	June 30, 2019 December 31, 2018	June 30, 2018 December 31, 2017
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$111,965	\$203,750
2. Pension Expense	164,232	129,368
3. Employer Contributions ⁽¹⁾	(188,839)	(163,345)
4. New Net Deferred Inflows/Outflows	77,842	(54,937)
5. Change in Allocation of Prior Deferred Inflows/Outflows	1,835	(1,271)
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	108,251	86,513
7. Recognition of Prior Deferred Inflows/Outflows	5,830	(5,470)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>(93,973)</u>	<u>(82,643)</u>
9. Ending Net Pension Liability	\$187,143	\$111,965

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 15 - RHFD

	June 30, 2019	June 30, 2018
Reporting Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$11,693,174	\$14,693,106
2. Pension Expense	597,033	1,637,240
3. Employer Contributions ⁽¹⁾	(3,010,225)	(2,111,707)
4. New Net Deferred Inflows/Outflows	4,873,645	(5,737,357)
5. Change in Allocation of Prior Deferred Inflows/Outflows	1,642,816	680,061
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(4,958,807)	1,863,733
7. Recognition of Prior Deferred Inflows/Outflows	365,011	(571,196)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>514,333</u>	<u>1,239,294</u>
9. Ending Net Pension Liability	\$11,716,980	\$11,693,174

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 16 - SRVFPD

	Reporting Date for Employer under GAS 68	
	June 30, 2019	June 30, 2018
Measurement Date for Employer under GAS 68	December 31, 2018	December 31, 2017
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$47,110,096	\$72,491,195
2. Pension Expense	12,521,505	8,478,887
3. Employer Contributions ⁽¹⁾	(18,481,702)	(18,466,152)
4. New Net Deferred Inflows/Outflows	28,940,758	(23,114,975)
5. Change in Allocation of Prior Deferred Inflows/Outflows	2,471,004	1,099,045
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	(5,841,330)	6,183,329
7. Recognition of Prior Deferred Inflows/Outflows	2,167,512	(2,301,267)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>690,117</u>	<u>2,740,034</u>
9. Ending Net Pension Liability	\$69,577,960	\$47,110,096

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 17 - Court

	June 30, 2019	June 30, 2018
	December 31, 2018	December 31, 2017
Reporting Date for Employer under GAS 68		
Measurement Date for Employer under GAS 68		
Reconciliation of Net Pension Liability		
1. Beginning Net Pension Liability	\$12,606,159	\$27,158,829
2. Pension Expense	7,345,961	3,206,804
3. Employer Contributions ⁽¹⁾	(6,972,122)	(7,181,547)
4. New Net Deferred Inflows/Outflows	11,405,582	(6,185,321)
5. Change in Allocation of Prior Deferred Inflows/Outflows	(970,717)	(663,752)
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	3,629,425	(1,912,050)
7. Recognition of Prior Deferred Inflows/Outflows	854,219	(615,794)
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	<u>(477,762)</u>	<u>(1,201,010)</u>
9. Ending Net Pension Liability	\$27,420,745	\$12,606,159

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 18 - DDS (Term)

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Reconciliation of Net Pension Liability				
1. Beginning Net Pension Liability	\$1,435,257		\$1,918,215	
2. Pension Expense	245,966		77,870	
3. Employer Contributions ⁽¹⁾	(221,489)		(221,489)	
4. New Net Deferred Inflows/Outflows	895,641		(339,339)	
5. Change in Allocation of Prior Deferred Inflows/Outflows	0		0	
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	0		0	
7. Recognition of Prior Deferred Inflows/Outflows	77,821		0	
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	0		0	
9. Ending Net Pension Liability	\$2,433,196		\$1,435,257	

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 19 - DWD (Term)

	June 30, 2019		June 30, 2018	
	December 31, 2018		December 31, 2017	
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Reconciliation of Net Pension Liability				
1. Beginning Net Pension Liability	\$827,520		\$823,144	
2. Pension Expense	122,215		77,096	
3. Employer Contributions ⁽¹⁾	(94,668)		(94,668)	
4. New Net Deferred Inflows/Outflows	188,597		21,948	
5. Change in Allocation of Prior Deferred Inflows/Outflows	0		0	
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	0		0	
7. Recognition of Prior Deferred Inflows/Outflows	(8,938)		0	
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	0		0	
9. Ending Net Pension Liability	\$1,034,726		\$827,520	

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 11 (continued)

Schedule of Reconciliation of Net Pension Liability: 20 - Pittsburg (Term)

	June 30, 2019		June 30, 2018	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Reporting Date for Employer under GAS 68				
Measurement Date for Employer under GAS 68				
Reconciliation of Net Pension Liability				
1. Beginning Net Pension Liability	\$4,199,080	\$6,888,327		
2. Pension Expense	672,478	(8,086)		
3. Employer Contributions ⁽¹⁾	(773,523)	(773,523)		
4. New Net Deferred Inflows/Outflows	3,378,092	(1,907,638)		
5. Change in Allocation of Prior Deferred Inflows/Outflows	0	0		
6. New Net Deferred Flows Due to Change in Proportion ⁽²⁾	0	0		
7. Recognition of Prior Deferred Inflows/Outflows	473,241	0		
8. Recognition of Prior Deferred Flows Due to Change in Proportion ⁽²⁾	0	0		
9. Ending Net Pension Liability	\$7,949,368	\$4,199,080		

⁽¹⁾ Includes "member subvention of employer contributions" and excludes "employer subvention of member contributions".

⁽²⁾ Includes differences between employer contributions and proportionate share of contributions.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 12

Schedule of Recognition of Changes in Total Net Pension Liability

Reporting Date for Employer under GAS 68 Year Ended June 30:	Differences between Expected and Actual Experience	Recognition Period (Years)	Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of Differences between Expected and Actual Experience on Total Pension Liability					
			2018	2019	2020	2021	2022	2023
2015	\$(183,604,761) ⁽¹⁾	4.60	\$(39,914,078)	\$(23,948,449)	\$0	\$0	\$0	\$0
2016	(62,117,935) ⁽¹⁾	4.52	(13,742,906)	(13,742,906)	(7,146,311)	0	0	0
2017	(19,957,982) ⁽¹⁾	4.57	(4,367,173)	(4,367,173)	(4,367,173)	(2,489,290)	0	0
2018	(29,192,221)	4.58	(6,373,848)	(6,373,848)	(6,373,848)	(6,373,848)	(3,696,829)	0
2019	52,852,841	4.57	N/A	11,565,173	11,565,173	11,565,173	11,565,173	6,592,149
Net increase (decrease) in pension expense			\$(64,398,005)	\$(36,867,203)	\$(6,322,159)	\$2,702,035	\$7,868,344	\$6,592,149

Reporting Date for Employer under GAS 68 Year Ended June 30:	Effects of Assumption Changes	Recognition Period (Years)	Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of Assumption Changes					
			2018	2019	2020	2021	2022	2023
2015	\$(75,608) ⁽¹⁾	4.60	\$(16,437)	\$(9,860)	\$0	\$0	\$0	\$0
2016	72,186,307 ⁽¹⁾	4.52	15,970,422	15,970,422	8,304,619	0	0	0
2019	(92,418,915)	4.57	N/A	(20,222,957)	(20,222,957)	(20,222,957)	(20,222,957)	(11,527,087)
Net increase (decrease) in pension expense			\$15,953,985	\$(4,262,395)	\$(11,918,338)	\$(20,222,957)	\$(20,222,957)	\$(11,527,087)

As described in Exhibit 9, for the current period, the average of the expected remaining service lives of all employees that are provided with pensions through CCCERA (active and inactive employees) determined as of December 31, 2017 (the beginning of the measurement period ending December 31, 2018) is 4.57 years.

⁽¹⁾ The amortization amounts prior to the June 30, 2018 reporting date have been omitted from this exhibit. Those amounts can be found in prior years' GAS 68 reports.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 12 (continued)

Schedule of Recognition of Changes in Total Net Pension Liability

Reporting Date for Employer under GAS 68 Year Ended June 30	Differences between Projected and Actual Earnings	Recognition Period (Years)	Increase (Decrease) in Pension Expense Arising from the Recognition of Differences between Projected and Actual Earnings on Pension Plan Investments					
			2018	2019	2020	2021	2022	2023
2015	\$(13,358,454) ⁽¹⁾	5.00	\$(2,671,691)	\$0	\$0	\$0	\$0	\$0
2016	426,961,542 ⁽¹⁾	5.00	85,392,308	85,392,310	85,392,310	0	0	0
2017	(6,642,338) ⁽¹⁾	5.00	(1,328,468)	(1,328,468)	(1,328,468)	(1,328,466)	0	0
2018	(467,968,086)	5.00	(93,593,617)	(93,593,617)	(93,593,617)	(93,593,617)	(93,593,618)	0
2019	780,765,743	5.00	N/A	156,153,149	156,153,149	156,153,149	156,153,149	156,153,147
Net increase (decrease) in pension expense			\$(12,201,468)	\$143,951,682	\$146,623,374	\$61,231,066	\$62,559,531	\$156,153,147

The differences between projected and actual earnings on pension plan investments are recognized over a five-year period per Paragraph 33b. of GAS 68.

Total Increase (Decrease) in Pension Expense

Reporting Date for Employer under GAS 68 Year Ended June 30	Total Differences	Reporting Date for Employer under GAS 68 Year Ended June 30:					
		2018	2019	2020	2021	2022	2023
2015	\$(197,038,823) ⁽¹⁾	\$(42,602,206)	\$(26,629,999)	\$0	\$0	\$0	\$0
2016	437,029,914 ⁽¹⁾	87,619,824	87,619,824	86,550,618	0	0	0
2017	(26,600,320) ⁽¹⁾	(5,695,641)	(5,695,641)	(5,695,641)	(3,817,756)	0	0
2018	(497,160,307)	(99,967,465)	(99,967,465)	(99,967,465)	(99,967,465)	(97,290,447)	0
2019	741,199,669	N/A	147,495,365	147,495,365	147,495,365	147,495,365	151,218,209
Net increase (decrease) in pension expense		\$(60,645,488)	\$102,822,084	\$128,382,877	\$43,710,144	\$50,204,918	\$151,218,209

⁽¹⁾ The amortization amounts prior to the June 30, 2018 reporting date have been omitted from this exhibit. Those amounts can be found in prior years' GAS 68 reports.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 13

Allocation of Changes in Total Net Pension Liability

In addition to the amounts shown in Exhibit 12, there are changes in each employer's proportionate share of the total NPL during the measurement period ending on December 31, 2018. The net effect of the change in the employer's proportionate share of the collective NPL and collective deferred outflows of resources and deferred inflows of resources is also recognized over the average of the expected remaining service lives of all employees shown previously. The difference between the actual employer contributions and the proportionate share of the employer contributions during the measurement period ending on December 31, 2018 is recognized over the same period. These amounts are shown on the following page with the corresponding amounts for prior measurement periods shown on the pages after that. While these amounts are different for each employer, they sum to zero over the entire CCCERA.

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 13 (continued)

Allocation of Changes in Total Net Pension Liability

Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of the Change in Proportion and Change in Employer Contributions for the Year Ended December 31, 2018

	Total Change to be Recognized	Recognition Period (Years)	Reporting Date for Employer under GAS 68 Year Ended June 30:					Thereafter
			2019	2020	2021	2022	2023	
1 - BIMID	\$92,479	4.57	\$20,236	\$20,236	\$20,236	\$20,236	\$11,535	\$0
2 - Union Cemetery	40,697	4.57	8,905	8,905	8,905	8,905	5,077	0
3 - CC Mosquito	(266,924)	4.57	(58,408)	(58,408)	(58,408)	(58,408)	(33,292)	0
4 - CCCFPD	(33,998,166)	4.57	(7,439,424)	(7,439,424)	(7,439,424)	(7,439,424)	(4,240,470)	0
5 - CCCSD	(19,636,629)	4.57	(4,296,855)	(4,296,855)	(4,296,855)	(4,296,855)	(2,449,209)	0
6 - First 5	491,491	4.57	107,547	107,547	107,547	107,547	61,303	0
7 - County	78,682,848	4.57	17,217,254	17,217,254	17,217,254	17,217,254	9,813,832	0
8 - CCCERA (the employer)	78,435	4.57	17,163	17,163	17,163	17,163	9,783	0
9 - ECCFPD	(8,276,513)	4.57	(1,811,053)	(1,811,053)	(1,811,053)	(1,811,053)	(1,032,301)	0
10 - Housing Authority	(391,007)	4.57	(85,560)	(85,560)	(85,560)	(85,560)	(48,767)	0
11 - IHSS	(32,887)	4.57	(7,196)	(7,196)	(7,196)	(7,196)	(4,103)	0
12 - LAFCO	9,372	4.57	2,051	2,051	2,051	2,051	1,168	0
13 - MOFD	(7,752,455)	4.57	(1,696,380)	(1,696,380)	(1,696,380)	(1,696,380)	(966,935)	0
14 - Rodeo SD	138,574	4.57	30,323	30,323	30,323	30,323	17,282	0
15 - RHFD	(6,347,829)	4.57	(1,389,022)	(1,389,022)	(1,389,022)	(1,389,022)	(791,741)	0
16 - SRVFPD	(7,477,557)	4.57	(1,636,227)	(1,636,227)	(1,636,227)	(1,636,227)	(932,649)	0
17 - Court	4,646,071	4.57	1,016,646	1,016,646	1,016,646	1,016,646	579,487	0
18 - DDSD (Term)	0	4.57	0	0	0	0	0	0
19 - DWD (Term)	0	4.57	0	0	0	0	0	0
20 - Pittsburg (Term)	0	4.57	0	0	0	0	0	0
Total for all Employers	\$0		\$0	\$0	\$0	\$0	\$0	\$0

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 13 (continued)

Allocation of Changes in Total Net Pension Liability

The corresponding amounts for the measurement period ending December 31, 2017 are as follows:

Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of the Change in Proportion and Change in Employer Contributions for the Year Ended December 31, 2017

	Total Change to be Recognized	Recognition Period (Years)	Reporting Date for Employer under GAS 68 Year Ended June 30:					Thereafter
			2018	2019	2020	2021	2022	
1 - BIMID	\$120,624	4.58	\$26,337	\$26,337	\$26,337	\$26,337	\$15,276	\$0
2 - Union Cemetery	9,040	4.58	1,974	1,974	1,974	1,974	1,144	0
3 - CC Mosquito	131,272	4.58	28,662	28,662	28,662	28,662	16,624	0
4 - CCCFPD	2,640,754	4.58	576,584	576,584	576,584	576,584	334,418	0
5 - CCCSD	12,643,130	4.58	2,760,509	2,760,509	2,760,509	2,760,509	1,601,094	0
6 - First 5	(19,429)	4.58	(4,242)	(4,242)	(4,242)	(4,242)	(2,461)	0
7 - County	(29,465,507)	4.58	(6,433,519)	(6,433,519)	(6,433,519)	(6,433,519)	(3,731,431)	0
8 - CCCERA (the employer)	899,167	4.58	196,325	196,325	196,325	196,325	113,867	0
9 - ECCFPD	1,593,925	4.58	348,019	348,019	348,019	348,019	201,849	0
10 - Housing Authority	291,703	4.58	63,691	63,691	63,691	63,691	36,939	0
11 - IHSS	75,909	4.58	16,574	16,574	16,574	16,574	9,613	0
12 - LAFCO	7,779	4.58	1,698	1,698	1,698	1,698	987	0
13 - MOFD	3,112,251	4.58	679,531	679,531	679,531	679,531	394,127	0
14 - Rodeo SD	110,679	4.58	24,166	24,166	24,166	24,166	14,015	0
15 - RHFD	2,384,329	4.58	520,596	520,596	520,596	520,596	301,945	0
16 - SRVFPD	7,910,516	4.58	1,727,187	1,727,187	1,727,187	1,727,187	1,001,768	0
17 - Court	(2,446,142)	4.58	(534,092)	(534,092)	(534,092)	(534,092)	(309,774)	0
18 - DDS (Term)	0	4.58	0	0	0	0	0	0
19 - DWD (Term)	0	4.58	0	0	0	0	0	0
20 - Pittsburg (Term)	0	4.58	0	0	0	0	0	0
Total for all Employers	\$0		\$0	\$0	\$0	\$0	\$0	\$0

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

**EXHIBIT 13 (continued)
Allocation of Changes in Total Net Pension Liability**

The corresponding amounts for the measurement period ending December 31, 2016 are as follows:

Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of the Change in Proportion and Change in Employer Contributions for the Year Ended December 31, 2016

	Total Change to be Recognized	Recognition Period (Years)	Reporting Date for Employer under GAS 68 Year Ended June 30:					Thereafter
			2017	2018	2019	2020	2021	
1 - BIMID	\$35,083	4.57	\$7,677	\$7,677	\$7,677	\$7,677	\$4,375	\$0
2 - Union Cemetery	(10,332)	4.57	(2,261)	(2,261)	(2,261)	(2,261)	(1,288)	0
3 - CC Mosquito	59,374	4.57	12,992	12,992	12,992	12,992	7,406	0
4 - CCCFPD	(6,691,460)	4.57	(1,464,214)	(1,464,214)	(1,464,214)	(1,464,214)	(834,604)	0
5 - CCCSD	1,498,104	4.57	327,813	327,813	327,813	327,813	186,852	0
6 - First 5	194,082	4.57	42,469	42,469	42,469	42,469	24,206	0
7 - County	10,141,906	4.57	2,219,235	2,219,235	2,219,235	2,219,235	1,264,966	0
8 - CCCERA (the employer)	43,988	4.57	9,625	9,625	9,625	9,625	5,488	0
9 - ECCFPD	542,014	4.57	118,603	118,603	118,603	118,603	67,602	0
10 - Housing Authority	118,077	4.57	25,837	25,837	25,837	25,837	14,729	0
11 - IHSS	111,579	4.57	24,416	24,416	24,416	24,416	13,915	0
12 - LAFCO	1,784	4.57	390	390	390	390	224	0
13 - MOFD	(5,669,733)	4.57	(1,240,642)	(1,240,642)	(1,240,642)	(1,240,642)	(707,165)	0
14 - Rodeo SD	(24,901)	4.57	(5,449)	(5,449)	(5,449)	(5,449)	(3,105)	0
15 - RHFD	(630,705)	4.57	(138,010)	(138,010)	(138,010)	(138,010)	(78,665)	0
16 - SRVFPD	(391,910)	4.57	(85,757)	(85,757)	(85,757)	(85,757)	(48,882)	0
17 - Court	673,050	4.57	147,276	147,276	147,276	147,276	83,946	0
18 - DDS (Term)	0	4.57	0	0	0	0	0	0
19 - DWD (Term)	0	4.57	0	0	0	0	0	0
20 - Pittsburg (Term)	0	4.57	0	0	0	0	0	0
Total for all Employers	\$0		\$0	\$0	\$0	\$0	\$0	\$0

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 13 (continued)

Allocation of Changes in Total Net Pension Liability

The corresponding amounts for the measurement period ending December 31, 2015 are as follows:

Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of the Change in Proportion and Change in Employer Contributions for the Year Ended December 31, 2015

	Total Change to be Recognized	Recognition Period (Years)	Reporting Date for Employer under GAS 68 Year Ended June 30:					Thereafter
			2016	2017	2018	2019	2020	
1 - BIMID	\$(24,788)	4.52	\$(5,484)	\$(5,484)	\$(5,484)	\$(5,484)	\$(2,852)	\$0
2 - Union Cemetery	96,986	4.52	21,457	21,457	21,457	21,457	11,158	0
3 - CC Mosquito	(519,791)	4.52	(114,998)	(114,998)	(114,998)	(114,998)	(59,799)	0
4 - CCCFPD	10,720,472	4.52	2,371,786	2,371,786	2,371,786	2,371,786	1,233,328	0
5 - CCCSD	(15,863,756)	4.52	(3,509,681)	(3,509,681)	(3,509,681)	(3,509,681)	(1,825,032)	0
6 - First 5	387,179	4.52	85,659	85,659	85,659	85,659	44,543	0
7 - County	23,188,647	4.52	5,130,230	5,130,230	5,130,230	5,130,230	2,667,727	0
8 - CCCERA (the employer)	(80,571)	4.52	(17,825)	(17,825)	(17,825)	(17,825)	(9,271)	0
9 - ECCFPD	(8,485,858)	4.52	(1,877,402)	(1,877,402)	(1,877,402)	(1,877,402)	(976,250)	0
10 - Housing Authority	(93,307)	4.52	(20,643)	(20,643)	(20,643)	(20,643)	(10,735)	0
11 - IHSS	146	4.52	32	32	32	32	18	0
12 - LAFCO	(35,809)	4.52	(7,922)	(7,922)	(7,922)	(7,922)	(4,121)	0
13 - MOFD	(1,149,167)	4.52	(254,240)	(254,240)	(254,240)	(254,240)	(132,207)	0
14 - Rodeo SD	253,152	4.52	56,007	56,007	56,007	56,007	29,124	0
15 - RHFD	(2,668,492)	4.52	(590,374)	(590,374)	(590,374)	(590,374)	(306,996)	0
16 - SRVFPD	(8,350,466)	4.52	(1,847,448)	(1,847,448)	(1,847,448)	(1,847,448)	(960,674)	0
17 - Court	2,625,423	4.52	580,846	580,846	580,846	580,846	302,039	0
Total for all Employers	\$0		\$0	\$0	\$0	\$0	\$0	\$0

SECTION 2: GAS 68 Information for the Contra Costa County Employees' Retirement Association

EXHIBIT 13 (continued)

Allocation of Changes in Total Net Pension Liability

The corresponding amounts for the measurement period ending December 31, 2014 are as follows:

Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of the Change in Proportion and Change in Employer Contributions for the Year Ended December 31, 2014

	Total Change to be Recognized	Recognition Period (Years)	Reporting Date for Employer under GAS 68 Year Ended June 30:					Thereafter
			2015	2016	2017	2018	2019	
1 - BIMID	\$1,524	4.60	\$331	\$331	\$331	\$331	\$200	\$0
2 - Union Cemetery	51,442	4.60	11,183	11,183	11,183	11,183	6,710	0
3 - CC Mosquito	35,280	4.60	7,670	7,670	7,670	7,670	4,600	0
4 - CCCFPD	(10,738,204)	4.60	(2,334,392)	(2,334,392)	(2,334,392)	(2,334,392)	(1,400,636)	0
5 - CCCSD	2,454,113	4.60	533,503	533,503	533,503	533,503	320,101	0
6 - First 5	109,167	4.60	23,732	23,732	23,732	23,732	14,239	0
7 - County	17,444,777	4.60	3,792,342	3,792,342	3,792,342	3,792,342	2,275,409	0
8 - CCCERA (the employer)	2,702	4.60	587	587	587	587	354	0
9 - ECCFPD	(2,637,637)	4.60	(573,399)	(573,399)	(573,399)	(573,399)	(344,041)	0
10 - Housing Authority	(33,231)	4.60	(7,224)	(7,224)	(7,224)	(7,224)	(4,335)	0
11 - IHSS	(11,172)	4.60	(2,429)	(2,429)	(2,429)	(2,429)	(1,456)	0
12 - LAFCO	8,360	4.60	1,817	1,817	1,817	1,817	1,092	0
13 - MOFD	(2,948,394)	4.60	(640,955)	(640,955)	(640,955)	(640,955)	(384,574)	0
14 - Rodeo SD	147,589	4.60	32,085	32,085	32,085	32,085	19,249	0
15 - RHFD	(2,350,185)	4.60	(510,910)	(510,910)	(510,910)	(510,910)	(306,545)	0
16 - SRVFPD	(3,711,415)	4.60	(806,829)	(806,829)	(806,829)	(806,829)	(484,099)	0
17 - Court	2,175,284	4.60	472,888	472,888	472,888	472,888	283,732	0
Total for all Employers	\$0		\$0	\$0	\$0	\$0	\$0	\$0

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

**Actuarial Assumptions and Methods
For December 31, 2018 Measurement Date and Employer Reporting as of June 30, 2019**

Rationale for Assumptions:

The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the January 1, 2015 through December 31, 2017 Actuarial Experience Study dated April 23, 2019. Unless otherwise noted, all actuarial assumptions and methods shown below apply to all tiers. These assumptions were adopted by the Board.

Economic Assumptions

Net Investment Return:

7.00%, net of investment expenses

Administration Expenses:

1.10% 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.

**Employee Contribution
Crediting Rate:**

7.00%, compounded semi-annually

Consumer Price Index:

Increases of 2.75% per year.

Benefits for General Tier 1, Tier 3 (non-disability), Tier 4 and Tier 5 (non-disability) and Safety Tier A and Tier D are subject to a 3.00% maximum COLA increase due to CPI per year (valued as a 2.75% increase).

Benefits for General Tier 2, Tier 3 (disability) and Tier 5 (disability) are subject to a 4.00% maximum change per year (valued as a 2.75% increase).

Benefits for General Tier 4 and Tier 5 members covered under certain memoranda of understanding and Safety Tier C and Tier E are subject to a 2.00% maximum change per year (valued as a 2.00% increase).

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.

Payroll Growth:

Inflation of 2.75% per year plus "across the board" real salary increases of 0.50% per year.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

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:

The annual rate of compensation increase includes: inflation at 2.75%, plus “across the board” real salary increases of 0.50% per year, plus the following merit and promotion increases:

Years of Service	Merit and Promotion Increases	
	General	Safety
Less than 1	12.00	13.00
1 – 2	7.00	8.00
2 – 3	5.25	5.75
3 – 4	3.75	4.75
4 – 5	2.75	2.75
5 – 6	2.25	2.00
6 – 7	1.75	1.75
7 – 8	1.50	1.50
8 – 9	1.40	1.40
9 – 10	1.30	1.30
10 – 11	1.20	1.25
11 – 12	1.10	1.20
12 – 13	1.00	1.15
13 – 14	0.90	1.10
14 – 15	0.80	1.05
15 – 16	0.75	1.00
16 – 17	0.70	1.00
17 – 18	0.65	1.00
18 – 19	0.60	1.00
19 – 20	0.55	1.00
20 & Over	0.50	1.00

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Demographic Assumptions

Post – Retirement Mortality Rates:

Healthy

General Members: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.

Safety Members: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

All Beneficiaries: Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

Disabled

General Members: Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

Safety Members: Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

The Pub-2010 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Pre – Retirement Mortality Rates: **General Members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.

Safety Members: Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.

Age	General		Safety	
	Male	Female	Male	Female
20	0.04	0.01	0.04	0.02
25	0.02	0.01	0.03	0.02
30	0.03	0.01	0.04	0.02
35	0.04	0.02	0.04	0.03
40	0.06	0.03	0.05	0.04
45	0.09	0.05	0.07	0.06
50	0.13	0.08	0.10	0.08
55	0.19	0.11	0.15	0.11
60	0.28	0.17	0.23	0.14
65	0.41	0.27	0.35	0.20
70	0.61	0.44	0.66	0.39

⁽¹⁾ Generational projections beyond the base year (2010) are not reflected in the above mortality rates.

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

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Mortality Rates for Member Contributions:

General Members: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years with the two-dimensional mortality improvement scale MP-2018, weighted 30% male and 70% female.

Safety Members: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected 30 years with the two-dimensional mortality improvement scale MP-2018, weighted 85% male and 15% female.

Disability Incidence:

Age	Rate (%)			
	General Tier 1 and Tier 4	General Tier 3 and Tier 5	Safety	Safety
20	0.01	0.01	0.02	0.02
25	0.02	0.02	0.16	0.16
30	0.04	0.03	0.32	0.32
35	0.08	0.05	0.46	0.46
40	0.22	0.08	0.56	0.56
45	0.36	0.11	0.90	0.90
50	0.52	0.13	2.54	2.54
55	0.60	0.16	3.80	3.80
60	0.60	0.22	4.30	4.30
65	0.60	0.25	4.50	4.50
70	0.60	0.25	4.50	4.50

60% of General Tier 1 and Tier 4 disabilities are assumed to be service connected disabilities. The other 40% are assumed to be non-service connected disabilities.

30% of General Tier 3 and Tier 5 disabilities are assumed to be service connected disabilities. The other 70% are assumed to be non-service connected disabilities.

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

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Termination Rates:

Years of Service	Rate (%)	
	General	Safety
Less than 1	14.00	12.50
1 – 2	9.50	10.00
2 – 3	9.25	8.25
3 – 4	6.50	5.75
4 – 5	5.25	5.00
5 – 6	5.00	4.25
6 – 7	4.50	3.50
7 – 8	4.25	3.25
8 – 9	3.75	3.00
9 – 10	3.50	2.50
10 – 11	3.25	2.25
11 – 12	3.00	2.10
12 – 13	2.75	2.00
13 – 14	2.50	1.90
14 – 15	2.50	1.80
15 – 16	2.25	1.70
16 – 17	2.25	1.60
17 – 18	2.00	1.50
18 – 19	2.00	1.25
19 – 20	1.75	1.00
20 & Over	1.25	0.75

The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit. No termination is assumed after a member is first assumed to retire.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Retirement Rates (General):

Age	Rates (%)						
	Tier 1 Enhanced		Tier 3 Enhanced		Tier 1 Non-Enhanced	Tier 4 and Tier 5	PEPRA
	Less than 30 Years of Service	Over 30 Years of Service	Less than 30 Years of Service	Over 30 Years of Service			
50	5.00	9.00	4.00	7.20	3.00	3.00	0.00
51	4.00	7.20	3.00	5.40	3.00	3.00	0.00
52	4.00	7.20	3.00	5.40	3.00	3.00	2.00
53	4.00	7.20	4.00	7.20	3.00	3.00	3.00
54	12.00	21.60	6.00	10.80	3.00	3.00	3.00
55	15.00	27.00	8.00	14.40	10.00	10.00	5.00
56	17.00	30.60	8.00	9.60	10.00	10.00	5.00
57	17.00	30.60	9.00	10.80	10.00	10.00	6.00
58	17.00	30.60	10.00	12.00	10.00	10.00	6.00
59	22.00	26.40	12.00	14.40	10.00	10.00	8.00
60	25.00	30.00	13.00	15.60	25.00	25.00	8.00
61	30.00	36.00	18.00	21.60	15.00	15.00	12.00
62	30.00	36.00	22.00	26.40	40.00	40.00	18.00
63	25.00	30.00	22.00	26.40	35.00	35.00	18.00
64	25.00	30.00	25.00	30.00	30.00	30.00	20.00
65	35.00	35.00	32.00	32.00	40.00	40.00	25.00
66	40.00	40.00	32.00	32.00	35.00	35.00	25.00
67	40.00	40.00	30.00	30.00	35.00	35.00	25.00
68	40.00	40.00	30.00	30.00	35.00	35.00	25.00
69	40.00	40.00	30.00	30.00	35.00	35.00	25.00
70	35.00	35.00	35.00	35.00	40.00	40.00	40.00
71	35.00	35.00	35.00	35.00	40.00	40.00	40.00
72	35.00	35.00	35.00	35.00	40.00	40.00	40.00
73	35.00	35.00	35.00	35.00	50.00	50.00	40.00
74	35.00	35.00	35.00	35.00	50.00	50.00	40.00
75 & Over	100.00	100.00	100.00	100.00	100.00	100.00	100.00

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Retirement Rates (Safety):

Age	Rates (%)			
	Tier A Enhanced		Tier C Enhanced	Tier A Non-Enhanced and PEPR Tier D and Tier E
	Less than 30 Years of Service	Over 30 Years of Service		
45	7.00	8.75	2.00	0.00
46	3.00	3.75	1.00	0.00
47	10.00	12.50	4.00	0.00
48	10.00	12.50	4.00	0.00
49	25.00	31.25	12.00	0.00
50	25.00	31.25	18.00	5.00
51	25.00	31.25	18.00	4.00
52	18.00	22.50	15.00	4.00
53	18.00	22.50	15.00	5.00
54	18.00	22.50	15.00	6.00
55	20.00	30.00	18.00	10.00
56	20.00	30.00	15.00	10.00
57	22.00	33.00	15.00	18.00
58	22.00	33.00	25.00	18.00
59	22.00	33.00	25.00	18.00
60	25.00	37.50	25.00	18.00
61	25.00	37.50	25.00	20.00
62	25.00	37.50	25.00	20.00
63	30.00	45.00	30.00	20.00
64	40.00	60.00	35.00	25.00
65 & Over	100.00	100.00	100.00	100.00

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Retirement Age and Benefit for Deferred Vested Members:

General:	59
Safety with Reciprocity:	53
Safety without Reciprocity:	50

40% of future General and 70% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 3.75% and 4.25% compensation increases are assumed per annum for General and Safety, respectively.

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.

Definition of Active Members:

All active members of CCCERA as of the valuation date.

Percent Married:

For all active and inactive members, 65% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement.

Age and Gender of Spouse:

For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.

Offsets by Other Plans of the Employer for Disability Benefits:

The Plan requires members who retire because of disability from General Tier 3 and General PEPR A 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 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

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:	1.00%
Cost Group 2:	0.50% for Tier 2 0.75% for Tier 3
Cost Group 3:	4.75%
Cost Group 4:	0.50%
Cost Group 5:	1.25%
Cost Group 6:	0.25%
Cost Group 7:	0.75%
Cost Group 8:	0.50%
Cost Group 9:	0.00%
Cost Group 10:	0.50%
Cost Group 11:	2.50%
Cost Group 12:	2.00%
Terminated Employers	0.00%

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

None

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

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: 1.10%
Safety: 1.80%

Disability Retirements:

General: 0.06%
Safety: 1.20%

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 percentage of compensation.

Expected Remaining Service Lives:

The average of the expected service lives of all employees is determined by:

- Calculating each active employee's expected remaining service life as the present value of \$1 per year of future service at zero percent interest.
- Setting the remaining service life to zero for each nonactive or retired member.
- Dividing the sum of the above amounts by the total number of active employee, nonactive and retired members.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions:

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Administration Expenses:

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.

Individual Salary Increases:

Annual Rate of Compensation Increase		
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

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

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.

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.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

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

Age	Rate (%) Mortality ⁽¹⁾	
	Male	Female
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

⁽¹⁾ 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 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

Disability Incidence:

Age	Rate (%) Disability		
	General Tier 1 and Tier 4 ⁽¹⁾	General Tier 3 and Tier 5 ⁽²⁾	Safety ⁽³⁾
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

⁽¹⁾ 65% of General Tier 1 and Tier 4 disabilities are assumed to be duty disabilities. The other 35% are assumed to be ordinary disabilities.

⁽²⁾ 30% of General Tier 3 and Tier 5 disabilities are assumed to be duty disabilities. The other 70% are assumed to be ordinary disabilities.

⁽³⁾ 100% of Safety disabilities are assumed to be duty disabilities.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

Termination Rates:

Years of Service	Rate (%) ⁽¹⁾	
	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

⁽¹⁾ 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 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

Retirement Rates (General):

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

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

Retirement Rates (Safety):

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

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

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.

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.

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%

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

Changed Actuarial Assumptions (continued):

Service From Accumulated Sick Leave Conversion:

The following assumptions for 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%

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

APPENDIX A

Projection of Plan's Fiduciary Net Position for Use in Calculation of Discount Rate as of December 31, 2018
 (\$ in millions)

Year Beginning January 1	Projected Beginning Plan's Fiduciary Net Position (a)	Projected Total Contributions (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Plan's Fiduciary Net Position (f) = (a) + (b) - (c) - (d) + (e)
2018	\$8,391	\$429	\$465	\$9	-\$195	\$8,150
2019	8,150	379	496	8	566	8,591
2020	8,591	388	523	8	596	9,045
2021	9,045	393	549	8	628	9,509
2022	9,509	397	577	7	659	9,982
2023	9,982	324	605	7	689	10,382
2024	10,382	319	633	7	716	10,776
2025	10,776	314	661	6	742	11,165
2026	11,165	311	689	6	768	11,549
2027	11,549	289	716	6	794	11,910
2058	9,621	2	985	0 *	640	9,278
2059	9,278	1	964	0 *	616	8,931
2060	8,931	1	942	0 *	593	8,583
2061	8,583	1	918	0 *	569	8,235
2062	8,235	0 *	892	0 *	546	7,889
2093	4,879	0	43	0	340	5,175
2094	5,175	0	34	0	361	5,502
2095	5,502	0	27	0	384	5,859
2096	5,859	0	21	0	409	6,248
2097	6,248	0	16	0	437	6,669
2127	47,178	0	0 *	0	3,302	50,481
2128	50,481					
2128	Discounted Value:		32 **			

* Less than \$1 million, when rounded.

** \$50,481 million when discounted with interest at the rate of 7.00% per annum has a value of \$32 million as of December 31, 2018.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

APPENDIX A (continued)

**Projection of Plan's Fiduciary Net Position for Use in Calculation of Discount Rate as of December 31, 2018
(\$ in millions)**

Notes:

- (1) Amounts may not total exactly due to rounding.
- (2) Amounts shown in the year beginning January 1, 2018 row are actual amounts, based on the unaudited financial statements provided by CCCERA.
- (3) Years 2028-2057, 2063-2092, and 2098-2126 have been omitted from this table.
- (4) Column (a): Except for the 'discounted value' shown for 2128, none of the projected beginning Plan's Fiduciary Net Position amounts shown have been adjusted for the time value of money.
- (5) Column (b): Projected total contributions include member and employer normal cost rates applied to closed group projected payroll (based on covered active members as of December 31, 2017); plus employer contributions to the Unfunded Actuarial Accrued Liability. Contributions are assumed to occur halfway through the year, on average.
- (6) Column (c): Projected benefit payments have been determined in accordance with paragraph 39 of GASB Statement No. 67, and are based on the closed group of active, inactive vested, retired members, and beneficiaries as of December 31, 2017. The projected benefit payments reflect the cost of living increase assumptions adopted for use in the December 31, 2018 valuation report and include projected benefits associated with the Post Retirement Death Benefit Reserve.
- (7) Column (d): Projected administrative expenses are assumed to be 1.10% of closed group projected payroll and are assumed to occur halfway through the year, on average.
- (8) Column (e): Projected investment earnings are based on the assumed investment rate of return of 7.00% per annum.
- (9) As illustrated in this Appendix, the Plan's Fiduciary Net Position was projected to be available to make all projected future benefit payments for current Plan members. In other words, there is no projected 'cross-over date' when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 7.00% per annum was applied to all periods of projected benefit payments to determine the Total Pension Liability as of December 31, 2018 shown earlier in this report, pursuant to paragraph 44 of GASB Statement No. 67.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

APPENDIX B

Glossary of Terms

Definitions of certain terms *as they are used in Statement 68*; the terms may have different meanings in other contexts.

Active employees

Individuals employed at the end of the reporting or measurement period, as applicable.

Actual contributions

Cash contributions recognized as additions to a Pension Plan's Fiduciary Net Position.

Actuarial present value of projected benefit payments

Projected benefit payments discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment.

Actuarial valuation

The determination, as of a point in time (the actuarial valuation date), of the service cost, Total Pension Liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.

Actuarial valuation date

The date as of which an actuarial valuation is performed.

Actuarially determined contribution

A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

Ad hoc cost-of-living adjustments (ad hoc COLAs)

Cost-of-living adjustments that require a decision to grant by the authority responsible for making such decisions.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

APPENDIX B (continued)

Glossary of Terms

Automatic cost-of-living adjustments (automatic COLAs)

Cost-of-living adjustments that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

Closed period

A specific number of years that is counted from one date and declines to zero with the passage of time. For example, if the recognition period initially is five years on a closed basis, four years remain after the first year, three years after the second year, and so forth.

Collective deferred outflows of resources and deferred inflows of resources related to pensions

Deferred outflows of resources and deferred inflows of resources related to pensions arising from certain changes in the collective Net Pension Liability.

Collective Net Pension Liability

The Net Pension Liability for benefits provided through (1) a cost-sharing pension plan or (2) a single-employer or agent pension plan in circumstances in which there is a special funding situation.

Collective pension expense

Pension expense arising from certain changes in the collective Net Pension Liability.

Contributions

Additions to a Pension Plan's Fiduciary Net Position for amounts from employers, nonemployer contributing entities (for example, state government contributions to a local government pension plan), or employees. Contributions can result from cash receipts by the pension plan or from recognition by the pension plan of a receivable from one of these sources.

Cost-of-living adjustments

Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.

Cost-sharing employer

An employer whose employees are provided with pensions through a cost-sharing multiple-employer defined benefit pension plan.

APPENDIX B (continued)

Glossary of Terms

Cost-sharing multiple-employer defined benefit pension plan (cost-sharing pension plan)

A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.

Covered payroll

The payroll on which contributions to a pension plan are based.

Defined benefit pension plans

Pension plans that are used to provide defined benefit pensions.

Defined benefit pensions

Pensions for which the income or other benefits that the employee will receive at or after separation from employment are defined by the benefit terms. The pensions may be stated as a specified dollar amount or as an amount that is calculated based on one or more factors such as age, years of service, and compensation. (A pension that does not meet the criteria of a defined contribution pension is classified as a defined benefit pension for purposes of Statement 68.)

Defined contribution pension plans

Pension plans that are used to provide defined contribution pensions.

Defined contribution pensions

Pensions having terms that (1) provide an individual account for each employee; (2) define the contributions that an employer is required to make (or the credits that it is required to provide) to an active employee's account for periods in which that employee renders service; and (3) provide that the pensions an employee will receive will depend only on the contributions (or credits) to the employee's account, actual earnings on investments of those contributions (or credits), and the effects of forfeitures of contributions (or credits) made for other employees, as well as pension plan administrative costs, that are allocated to the employee's account.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

APPENDIX B (continued)

Glossary of Terms

Discount rate

The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:

1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the Pension Plan's Fiduciary Net Position is projected (under the requirements of Statement 68) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.
2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.

Entry age actuarial cost method

A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the *normal cost*. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the *actuarial accrued liability*.

Inactive employees

Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits.

Measurement period

The period between the prior and the current measurement dates.

Multiple-employer defined benefit pension plan

A defined benefit pension plan that is used to provide pensions to the employees of more than one employer.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

APPENDIX B (continued)

Glossary of Terms

Net Pension Liability

The liability of employers and nonemployer contributing entities to employees for benefits provided through a defined benefit pension plan.

Pension plans

Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed, and benefits are paid as they come due.

Pensions

Retirement income and, if provided through a pension plan, postemployment benefits other than retirement income (such as death benefits, life insurance, and disability benefits). Pensions do not include postemployment healthcare benefits and termination benefits.

Plan members

Individuals that are covered under the terms of a pension plan. Plan members generally include (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members).

Postemployment

The period after employment.

Postemployment benefit changes

Adjustments to the pension of an inactive employee.

Projected benefit payments

All benefits estimated to be payable through the pension plan to current active and inactive employees as a result of their past service and their expected future service.

Public employee retirement system

A special-purpose government that administers one or more pension plans; also may administer other types of employee benefit plans, including postemployment healthcare plans and deferred compensation plans.

SECTION 3: Actuarial Assumptions and Methods and Appendices for the Contra Costa County Employees' Retirement Association

APPENDIX B (continued)

Glossary of Terms

Real rate of return

The rate of return on an investment after adjustment to eliminate inflation.

Service costs

The portions of the actuarial present value of projected benefit payments that are attributed to valuation years.

Termination benefits

Inducements offered by employers to active employees to hasten the termination of services, or payments made in consequence of the early termination of services. Termination benefits include early-retirement incentives, severance benefits, and other termination-related benefits.

Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of Statement 68.

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**Contra Costa County Employees'
Retirement Association**

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



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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Meeting Date
10/09/19
Agenda Item
#7



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September 30, 2019

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, 2018. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal year 2020-2021.

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

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

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

Sincerely,

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

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

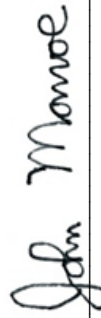

John Monroe, ASA, MAAA, EA
Vice President and Actuary

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Section 1: Actuarial Valuation Summary

Purpose and Basis

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

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

The contribution requirements presented in this report are based on:

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

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

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

The contribution requirements are determined as a percentage of payroll. The Association's employer rates provide for both Normal Cost and a contribution to amortize any unfunded or overfunded actuarial accrued liabilities. In this valuation, we have applied the funding policy adopted by the Board on February 26, 2014, and most recently amended on May 22, 2019. Details of the funding policy are provided in *Section 4, Exhibit I on page 116*.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit I on page 87*. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit J on page 100*.

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

Significant Issues

- Ref: Pg. 106*
1. The results of this valuation reflect changes in the actuarial assumptions as recommended by Segal and adopted by the Board for the December 31, 2018 valuation. These changes were documented in our Actuarial Experience Study and are also outlined in *Section 4, Exhibit I* of this report. These assumption changes resulted in a decrease in the average employer rate of 1.26% of payroll and a decrease in the aggregate member rate of 0.03% of payroll. Of the 1.26% decrease in the employer rate, 0.46% is due to a decrease in the Normal Cost and 0.80% is due to a decrease in the UAAL rate.
- Ref: Pg. 43
Ref: Pg. 28*
2. The ratio of the Valuation Value of Assets to the Actuarial Accrued Liability increased from 88.5% to 89.3% while the ratio of the Market Value of Assets to the Actuarial Accrued Liability decreased from 90.8% to 84.2%. The Association's UAAL (which is based on the Valuation Value of Assets) has decreased from \$1.1 billion to \$1.0 billion. This decrease is mainly due to contributions paying down a portion of the UAAL and the changes in actuarial assumptions, offset to some degree by an investment return on actuarial value (i.e. after smoothing) less than the 7.00% assumed rate, and higher than expected COLA increases for retirees and beneficiaries. A reconciliation of the Association's UAAL is provided in *Section 2, Exhibit E*.
- Ref: Pg. 30*
3. The average employer rate calculated in this valuation (excluding any employer subvention of member rates or member subvention of employer rates) has decreased from 36.07% of payroll to 35.72% of payroll. This decrease is due to the changes in actuarial assumptions and the effect of changes in member demographics on Normal Cost, partially offset by an investment return on actuarial value (i.e. after smoothing) less than the 7.00% assumed rate and higher than expected COLA increases for retirees and beneficiaries. A complete reconciliation of the Association's aggregate employer rate is provided in *Section 2, Subsection F*.
- Ref: Pg. 32
Ref: Pg. 28*
- Separate employer contribution rates are shown 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 in *Section I* are based on all members regardless of their membership date. A detailed schedule of the employer contribution rates is provided in *Section 2, Subsection F*.
- Ref: Pg. 31*
4. The average member rate calculated in this valuation has decreased from 12.03% of payroll to 11.98% of payroll. A complete reconciliation of the Association's aggregate member rate is provided in *Section 2, Subsection F*.
The detailed member rates are provided in *Section 4, Exhibit III* of this report. They are shown by cost group.
- Ref: Pg. 20*
5. The total unrecognized net investment loss as of December 31, 2018 is about \$517 million as compared to an unrecognized net investment gain of \$195 million in the previous valuation. This deferred investment loss of \$517 million will be recognized in the determination of the Actuarial Value of Assets for funding purposes in the next few years as shown in *Section 2, Subsection B*.

The net deferred losses of \$517 million represent about 6.3% of the Market Value of Assets. Unless offset by future investment gains or other favorable experience, the recognition of the \$517 million market losses 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:

- a. If the net deferred losses were recognized immediately in the valuation value of assets, the funded percentage would decrease from 89.3% to 84.0%.
- b. For comparison purposes, if all the deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the funded percentage would have increased from 88.5% to 90.6%.
- b. If the net deferred losses were recognized immediately in the valuation value of assets, the average employer contribution rate would increase from 35.72% to about 40.14% of payroll.
- For comparison purposes, if all the deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the average employer contribution rate would have decreased from 36.1% to 34.3% of payroll.

6. The actuarial valuation report as of December 31, 2018 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.

7. This valuation reflects the \$254,000 additional contributions made by San Ramon Valley Fire Department towards their UAAL. Based on CCCERA's funding policy, this amount will be amortized as a level percent of pay (credit) over a period of eighteen years beginning with the December 31, 2018 valuation to reduce the employer UAAL contributions.

8. The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 is effective with CCCERA's December 31, 2018 actuarial valuation. ASOP 51 requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Examples of key risks listed that are particularly relevant to CCCERA are asset/liability mismatch risk, investment risk, and longevity risk. The standard also requires an actuary to consider if there is any ongoing contribution risk to the plan, however it does not require the actuary to evaluate the particular ability or willingness of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

The actuary's initial assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative. The actuary is also encouraged to consider a recommendation as to whether a more detailed assessment or risk report would be significantly beneficial for the intended user in order to examine particular financial risks. When making that recommendation, the actuary will take into account such factors as the plan's design, risk profile, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions.

Since the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan. We have not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the Association's future financial condition, but have included a brief discussion of key risks that may affect the Association in *Section 2, Subsection J*. A more detailed assessment of the risks tailored to specific interests or concerns of the Board would provide the Board with a better understanding of the inherent risks and is recommended. This assessment would further discuss and highlight information and risks particular to CCCERA such as detailed historical experience and key events, growing plan maturity, heightened contribution sensitivity to asset and liability changes, and projected sensitivity to potential future investment returns through selected scenario or stress test projections.

Summary of Key Valuation Results

	December 31, 2018		December 31, 2017	
	Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)	Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)
Average Employer Contribution Rates:⁽¹⁾				
General				
• Cost Group #1 – County and Small Districts (Tier 1 and 4)	31.11%	\$7,730	31.10%	\$7,606
• Cost Group #2 – County and Small Districts (Tier 3 and 5)	26.42%	172,333	26.36%	165,291
• Cost Group #3 – Central Contra Costa Sanitary District	49.86%	17,672	49.57%	17,028
• Cost Group #4 – Contra Costa Housing Authority	42.22%	2,420	41.91%	2,340
• Cost Group #5 – Contra Costa County Fire Protection District	32.80%	1,885	31.82%	1,637
• Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	15.60%	147	16.59%	141
Safety				
• Cost Group #7 – County (Tier A and D)	70.32%	\$41,860	71.94%	\$43,932
• Cost Group #8 – Contra Costa and East Fire Protection Districts	69.14%	27,814	75.59%	26,987
• Cost Group #9 – County (Tier C and E)	61.10%	24,607	62.56%	22,116
• Cost Group #10 – Moraga-Orinda Fire District	70.81%	5,251	69.74%	5,128
• Cost Group #11 – San Ramon Valley Fire District	75.79%	16,380	75.25%	16,211
• Cost Group #12 – Rodeo-Hercules Fire Protection District	82.95%	2,017	92.28%	2,023
All Employers Combined	35.72%	\$320,116	36.07%	\$310,439

Note: Pages 163 and 164 contain a summary that shows which employers are in each cost group.

⁽¹⁾ Based on projected compensation for each valuation date shown. These rates do not include any employer subvention of member contributions or any member subvention of employer contributions.

Summary of Key Valuation Results (continued)

	December 31, 2018		December 31, 2017	
	Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)	Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)
Average Member Contribution Rates:⁽¹⁾				
General				
• Cost Group #1 – County and Small Districts (Tier 1 and 4)	10.82%	\$2,688	10.89%	\$2,664
• Cost Group #2 – County and Small Districts (Tier 3 and 5)	10.70%	69,785	10.76%	67,469
• Cost Group #3 – Central Contra Costa Sanitary District	11.29%	4,001	11.45%	3,933
• Cost Group #4 – Contra Costa Housing Authority	11.54%	661	11.70%	653
• Cost Group #5 – Contra Costa County Fire Protection District	11.32%	651	11.08%	570
• Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	13.22%	124	13.31%	113
Safety				
• Cost Group #7 – County (Tier A and D)	17.99%	\$10,709	17.92%	\$10,944
• Cost Group #8 – Contra Costa and East Fire Protection Districts	17.25%	6,940	17.54%	6,261
• Cost Group #9 – County (Tier C and E)	16.02%	6,452	16.20%	5,727
• Cost Group #10 – Moraga-Orinda Fire District	17.30%	1,283	17.26%	1,269
• Cost Group #11 – San Ramon Valley Fire District	16.99%	3,672	16.75%	3,608
• Cost Group #12 – Rodeo-Hercules Fire Protection District	15.65%	380	15.52%	340
All Categories Combined	11.98%	\$107,346	12.03%	\$103,551

Note: Pages 163 and 164 contain a summary that shows which employers are in each cost group.

⁽¹⁾ Based on projected compensation for each valuation date shown. These rates do not include any employer subvention of member contributions or any member subvention of employer contributions.

Summary of Key Valuation Results (continued)

	December 31, 2018	December 31, 2017
Actuarial Accrued Liability as of December 31:		
• Retired members and beneficiaries	\$6,186,518,515	\$5,873,017,531
• Inactive vested members ⁽¹⁾	299,877,080	295,691,337
• Active members	3,195,748,155	3,070,538,052
• Total Actuarial Accrued Liability	\$9,682,143,750	\$9,239,246,920
• Normal Cost including administrative expenses for plan year beginning December 31	\$248,940,968	\$246,099,386
Assets as of December 31:		
• Market Value of Assets (MVA)	\$8,149,985,793	\$8,390,581,049
• Actuarial Value of Assets (AVA)	8,666,778,056	8,195,516,541
• Actuarial Value of Assets as a percentage of Market Value of Assets	106.3%	97.7%
• Valuation Value of Assets (VVA)	\$8,650,178,226	\$8,179,891,191
Funded status as of December 31:		
• Unfunded Actuarial Accrued Liability on Market Value of Assets basis	\$1,532,157,957	\$848,665,871
• Funded percentage on MVA basis	84.2%	90.8%
• Unfunded Actuarial Accrued Liability on Valuation Value of Assets basis	\$1,031,965,524	\$1,059,355,729
• Funded percentage on VVA basis	89.3%	88.5%
Key assumptions:		
• Net investment return	7.00%	7.00%
• Price Inflation	2.75%	2.75%
• Payroll growth increase	3.25%	3.25%

⁽¹⁾ Includes inactive members with member contributions on deposit.

Summary of Key Valuation Results (continued)

	December 31, 2018	December 31, 2017	Change From Prior Year
Demographic data as of December 31:			
Active Members:			
• Number of members	10,021	10,038	-0.2%
• Average age	46.2	46.0	0.2
• Average service	9.9	9.8	0.1
• Total projected compensation	\$896,390,768	\$860,624,612	4.2%
• Average projected compensation	\$89,451	\$85,737	4.3%
Retired Members and Beneficiaries:			
• Number of members:			
– Service retired	7,214	6,973	3.5%
– Disability retired	908	896	1.3%
– Beneficiaries	1,425	1,398	1.9%
– Total	9,547	9,267	3.0%
• Average age	70.4	70.3	0.1
• Average monthly benefit	\$3,986	\$3,892	2.4%
Inactive Vested Members:			
• Number of members ⁽¹⁾	3,477	3,327	4.5%
• Average Age	46.5	46.5	0.0
Total Members:	23,045	22,632	1.8%

⁽¹⁾ Includes 1,847 inactive members with member contributions on deposit as of December 31, 2018 and 1,696 as of December 31, 2017.

Important Information About Actuarial Valuations

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

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

Plan of benefits Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.

Participant data An actuarial valuation for a plan is based on data provided to the actuary by the 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 The valuation is based on the Market Value of Assets as of the valuation date, as provided by the Association. The Association uses a “Valuation Value of Assets” that differs from market value to gradually reflect six-month changes in the Market Value of Assets in determining the contribution requirements.

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, termination, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

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

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

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

Section 2: Actuarial Valuation Results

A. Member Data

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

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

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

MEMBER POPULATION: 2009 – 2018

Year Ended December 31	Active Members	Inactive Vested Members ⁽¹⁾	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives	Ratio of Retired Members and Beneficiaries to Actives
2009	8,938	2,209	7,292	9,501	1.06	0.82
2010	8,811	2,231	7,559	9,790	1.11	0.86
2011	8,629	2,214	8,085	10,299	1.19	0.94
2012	8,640	2,288	8,517	10,805	1.25	0.99
2013	9,124	2,345	8,625	10,970	1.20	0.95
2014	9,159	2,647	8,871	11,518	1.26	0.97
2015	9,642	2,790	9,068	11,858	1.23	0.94
2016	9,848	3,089	9,100	12,189	1.24	0.92
2017	10,038	3,327	9,267	12,594	1.25	0.92
2018	10,021	3,477	9,547	13,024	1.30	0.95

⁽¹⁾ Includes inactive members with member contributions on deposit.

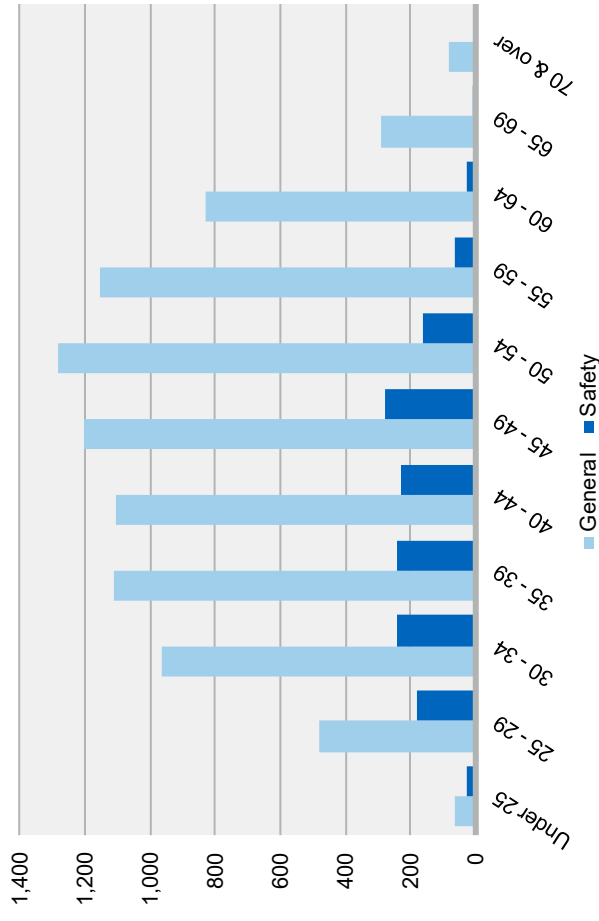
Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,021 active members with an average age of 46.2, average years of service of 9.9 years and average compensation of \$89,451. The 10,038 active members in the prior valuation had an average age of 46.0, average service of 9.8 years and average compensation of \$85,737.

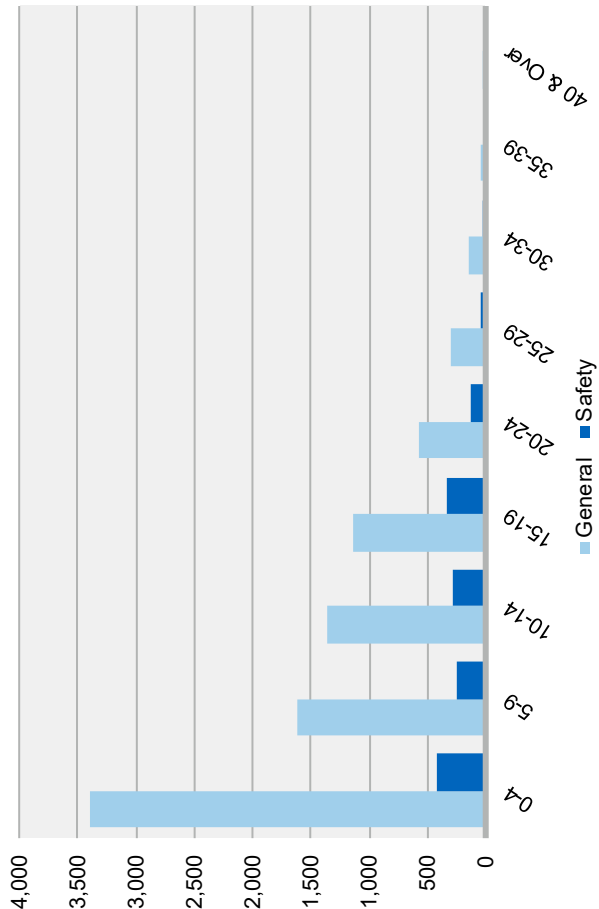
Among the active members, there were none with unknown age information.

Distribution of Active Participants as of December 31, 2018

ACTIVES BY AGE



ACTIVES BY YEARS OF SERVICE



Inactive Members

In this year's valuation, there were 3,477 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their member contributions versus 3,327 in the prior valuation.

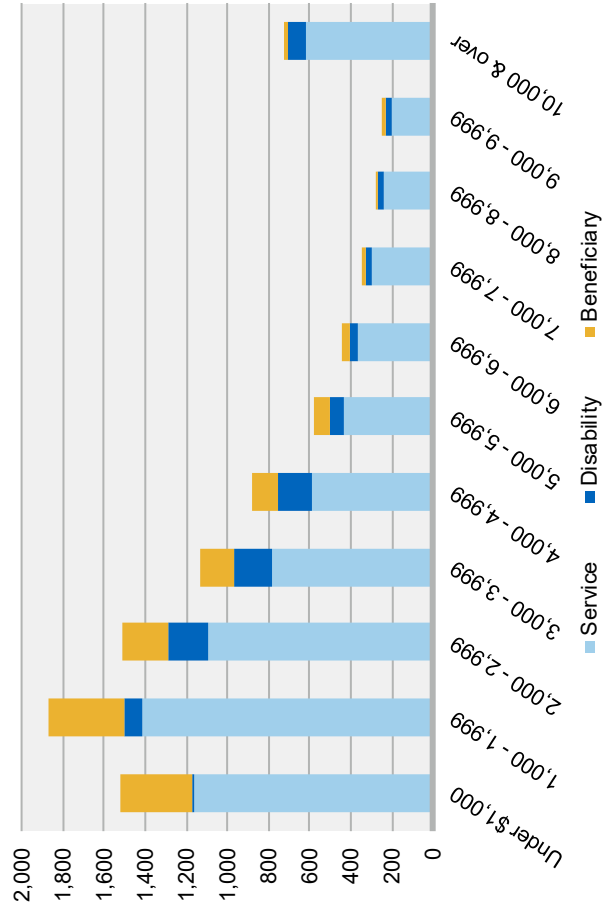
Retired Members and Beneficiaries

As of December 31, 2018, 8,122 retired members and 1,425 beneficiaries were receiving total monthly benefits of \$38,057,250. For comparison, in the previous valuation, there were 7,869 retired members and 1,398 beneficiaries receiving monthly benefits of \$36,067,626.

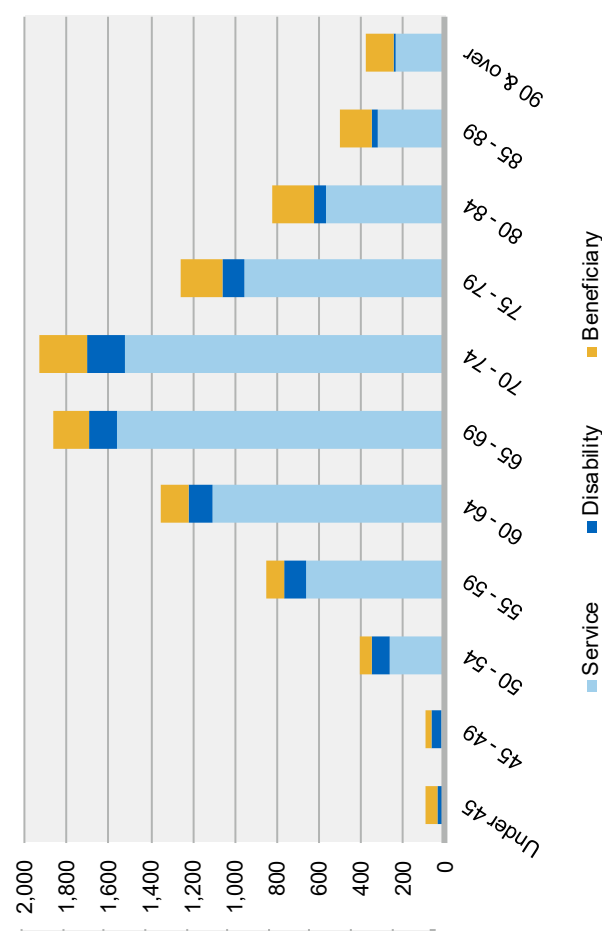
As of December 31, 2018, the average monthly benefit for retired members is \$3,986, compared to \$3,892 in the previous valuation. The average age for retired members is 70.4 in the current valuation, compared with 70.3 in the prior valuation.

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

RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND AGE



Historical Plan Population

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

MEMBER STATISTICS: 2009 – 2018

Year Ended December 31	Active Participants			Retired Members and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2009	8,938	46.4	11.0	7,292	69.2	\$3,111
2010	8,811	46.6	11.1	7,559	69.3	3,248
2011	8,629	46.2	10.7	8,085	69.1	3,381
2012	8,640	45.9	10.2	8,517	69.0	3,518
2013	9,124	45.8	10.1	8,625	69.3	3,579
2014	9,159	45.8	9.9	8,871	69.4	3,669
2015	9,642	45.9	9.9	9,068	69.9	3,706
2016	9,848	45.9	9.9	9,100	70.0	3,799
2017	10,038	46.0	9.8	9,267	70.3	3,892
2018	10,021	46.2	9.9	9,547	70.4	3,986

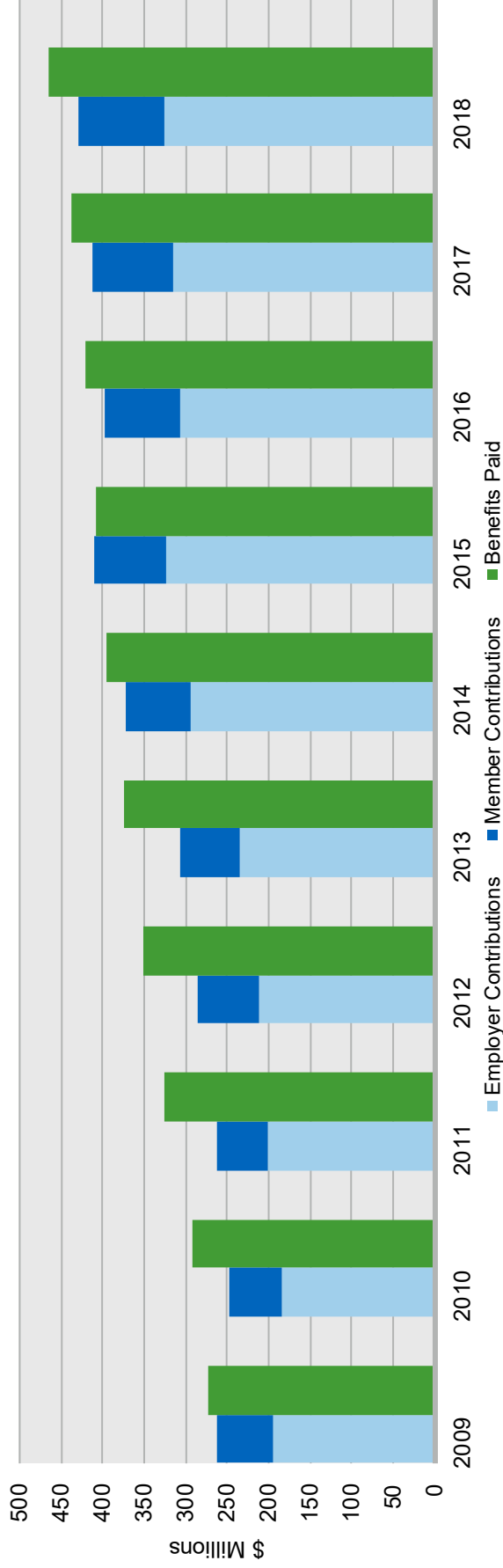
B. Financial Information

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 transactions for the valuation year, is presented in Section 3, Exhibits E, F, G and H.

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

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



DETERMINATION OF ACTUARIAL VALUE OF ASSETS

1 Market Value of Assets		\$8,149,985,793		
2 Calculation of unrecognized return				
	Expected Return	Actual Return		
	Original Amount	Percent Deferred		
	Unrecognized Amount			
a) Period ended December 31, 2013	\$227,909,702	\$588,758,958	0%	\$0
b) Period ended June 30, 2014	249,636,410	347,257,106	0%	0
c) Period ended December 31, 2014	241,361,743	125,727,585	10%	(11,563,416)
d) Period ended June 30, 2015	246,283,585	207,439,920	20%	(7,768,733)
e) Period ended December 31, 2015	253,672,471	(142,612,600)	30%	(118,885,521)
f) Period ended June 30, 2016	239,907,822	297,615,324	40%	23,083,001
g) Period ended December 31, 2016	249,584,567	196,258,919	50%	(26,662,824)
h) Period ended June 30, 2017	255,728,819	488,764,245	60%	139,821,255
i) Period ended December 31, 2017	271,873,066	498,651,736	70%	158,745,069
j) Period ended June 30, 2018	288,460,475	63,645,390	80%	(179,852,068)
k) Period ended December 31, 2018	289,889,306	(258,676,279)	90%	(493,709,026)
l) Total unrecognized return ⁽²⁾		\$ (516,792,263)		\$ (516,792,263)
3 Actuarial Value of Assets 1 – 21		\$8,666,778,056		\$8,666,778,056
4 Actuarial Value of Assets as a percentage of Market Value of Assets				106.3%
5 Non-valuation reserves and designations:				
a) Post Retirement Death Benefit				\$15,757,910
b) Statutory Contingency				0
c) Additional One Percent Contingency				0
d) Unrestricted Designation				0
e) Total				\$15,757,910
6 Valuation Value of Assets 3 – 5e				\$8,651,020,146
7 Adjustment for Pre-Paid Contributions⁽²⁾				841,920
8 Final Valuation Value of Assets 6 – 7				\$8,650,178,226

Note: Results may be slightly off due to rounding.

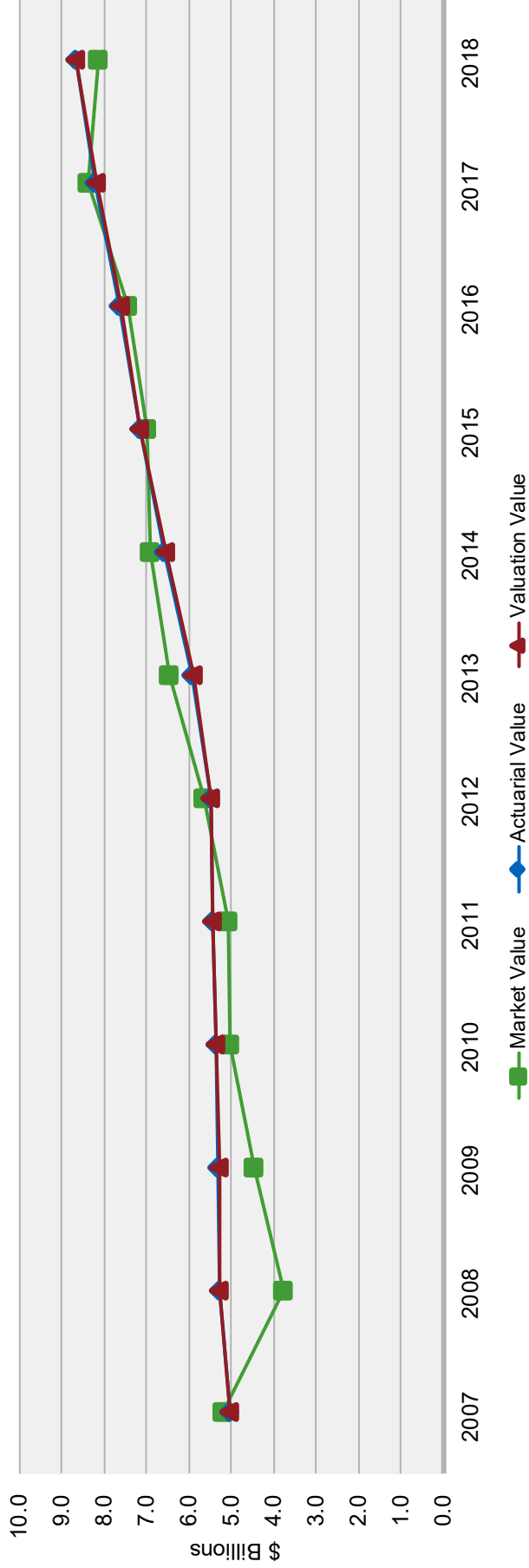
⁽¹⁾ Deferred return as of December 31, 2018 recognized in each of the next five years:

(a) Amount recognized on December 31, 2019	\$(160,426,107)
(b) Amount recognized on December 31, 2020	(101,465,451)
(c) Amount recognized on December 31, 2021	(68,045,880)
(d) Amount recognized on December 31, 2022	(131,998,267)
(e) Amount recognized on December 31, 2023	(54,856,558)
(f) Total unrecognized return as of December 31, 2018	\$(516,792,263)

⁽²⁾ This adjustment is to exclude 6 months of contributions made by Rodeo-Hercules Fire Protection District during the 2018 calendar year that were pre-paid for the 2019 calendar year. These contributions will be reflected in the next valuation.

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

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



C. Actuarial Experience

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

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

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years. This valuation reflects changes in actuarial assumptions adopted by the Board.

The total loss is \$161.2 million, which includes \$55.3 million from investment losses, a gain of \$13.2 million from contribution experience and \$119.1 in losses from all other sources. The net experience variation from individual sources other than investments and contributions was 1.2% of the Actuarial Accrued Liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2018

1	Net loss from investments ⁽¹⁾	\$(55,252,687)
2	Net gain from contribution experience	13,173,304
3	Net loss from other experience ⁽²⁾	<u>(119,141,111)</u>
4	Net experience loss: 1 + 2 + 3	\$(161,220,494)

⁽¹⁾ Details on next page.

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

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. The rate of return on the Market Value of Assets was -2.33% for the year ended December 31, 2018.

For valuation purposes, the assumed rate of return on the Valuation Value of Assets is 7.00%. The actual rate of return on a valuation basis for the 2018 plan year was 6.32%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended December 31, 2018 with regard to its investments.

INVESTMENT EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2018

	Market Value	Actuarial Value	Valuation Value
1 Net investment income	\$(195,030,888)	\$516,825,883	\$515,766,323
2 Average value of assets	8,367,640,787	8,172,576,279	8,157,414,429
3 Rate of return: 1 ÷ 2	-2.33%	6.32%	6.32%
4 Assumed rate of return	7.00%	7.00%	7.00%
5 Expected investment income: 2 x 4	<u>\$585,734,855</u>	<u>\$572,080,339</u>	<u>\$571,019,010</u>
6 Actuarial gain/(loss): 1 - 5	<u>\$(780,765,743)</u>	<u>\$(55,254,456)</u>	<u>\$(55,252,687)</u>

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

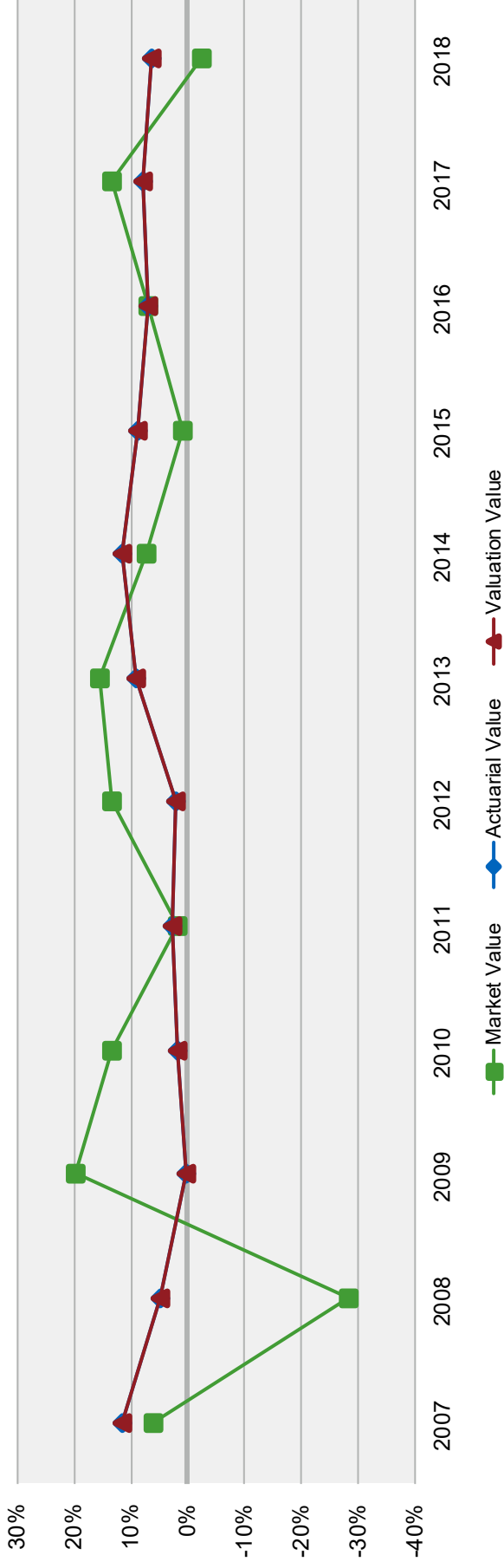
INVESTMENT RETURN – MARKET VALUE, ACTUARIAL VALUE AND VALUATION VALUE: 2009 – 2018

Year Ended December 31	Market Value Investment Return		Actuarial Value Investment Return		Valuation Value Investment Return		
	Amount	Percent	Amount	Percent	Amount	Percent	
2009	\$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%	
2018	(195,030,888)	-2.33%	516,825,883	6.32%	515,766,323	6.32%	
Most recent five-year geometric average return		5.06%					8.13%
Most recent ten-year geometric average return		7.98%					6.03%

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

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

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



Contributions

Contributions for the year ended December 31, 2018 totaled \$427.8 million (after excluding the pre-paid contributions by Rodeo-Hercules Fire Protection District for the 2019 calendar year), compared to the projected amount of \$415.1 million. This resulted in a gain of \$13.2 million for the year, when adjusted for timing.

Other Experience

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

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

The net loss from this other experience for the year ended December 31, 2018 amounted to \$119.1 million, which is 1.2% of the Actuarial Accrued Liability. This loss was mainly due to higher than expected COLA increases and higher than expected individual salary increases for actives. See *Subsection E* for a detailed development of the Unfunded Actuarial Accrued Liability.

D. Other Changes in the Actuarial Accrued Liability

The Actuarial Accrued Liability as of December 31, 2018 is \$9.7 billion, an increase of \$0.4 billion, or 4.8%, from the Actuarial Accrued Liability as of the prior valuation date. The liability is expected to grow each year with Normal Cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

Actuarial Assumptions

- The assumption changes reflected in this report were based on the January 1, 2015 through December 31, 2017 Actuarial Experience Study report dated April 23, 2019.
- These changes decreased the Actuarial Accrued Liability by about \$90 million (or a 0.9% decrease) and decreased the total Normal Cost by 0.49% of payroll (a decrease of about 1.8%). The total (employer and member) contribution rate decrease as a result of the assumption changes was 1.29% of payroll.
- The assumption changes include changes to merit and promotion salary increases, retirement from active employment, mortality, disability incidence, termination, retirement age for deferred vested members, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases, percent married, leave cashouts and sick leave conversions.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

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

E. Development of Unfunded Actuarial Accrued Liability

DEVELOPMENT FOR YEAR ENDED DECEMBER 31, 2018

1	Unfunded Actuarial Accrued Liability at beginning of year	\$1,059,355,729
2	Total Normal Cost at middle of year ⁽¹⁾	238,009,508
3	Expected administrative expenses	9,725,065
4	Expected employer and member contributions	(415,080,401)
5	Interest	<u>68,607,565</u>
6	Expected Unfunded Actuarial Accrued Liability at end of year	\$960,617,466
7	Changes due to:	
	a) Investment return less than expected	\$55,252,687
	b) Actual contributions greater than expected	(12,911,803)
	c) Gain from additional UAAL contributions	(261,501)
	d) Individual salary increases higher than expected	20,984,310
	e) COLA increases higher than expected	67,057,526
	f) Retirement experience loss on actives (earlier retirements than expected)	17,409,557
	g) Other experience loss ⁽²⁾	13,689,718
	h) Assumption changes	<u>(89,872,436)</u>
	Total changes	\$71,348,058
8	Unfunded Actuarial Accrued Liability at end of year	<u>\$1,031,965,524</u>

Note: The sum of items 7d through 7g equals the "Net loss from other experience" shown in Subsection C.

⁽¹⁾ Excludes administrative expense load.

⁽²⁾ Other differences in actual versus expected experience including (but not limited to) disability, termination and leave cashout experience.

F. Recommended Contribution

The recommended contribution is equal to the employer Normal Cost payment and a payment on the Unfunded Actuarial Accrued Liability. As of December 31, 2018, the average recommended employer contribution is 35.72% of compensation.

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

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

AVERAGE RECOMMENDED EMPLOYER CONTRIBUTION FOR YEAR ENDING DECEMBER 31

All Tiers Combined	2018		2017	
	Amount (\$ in '000s)	% of Projected Compensation	Amount (\$ in '000s)	% of Projected Compensation
1 Total Normal Cost	\$248,941	27.78%	\$246,099	28.59%
2 Expected member contributions	<u>107,346</u>	<u>11.98%</u>	<u>103,551</u>	<u>12.03%</u>
3 Employer Normal Cost: 1 – 2	\$141,595	15.80%	\$142,548	16.56%
4 Actuarial Accrued Liability	9,682,144		9,239,247	
5 Valuation Value of Assets	<u>8,650,178</u>		<u>8,179,891</u>	
6 Unfunded Actuarial Accrued Liability: 4 – 5	\$1,031,966		1,059,356	
7 Payment on Unfunded Actuarial Accrued Liability	178,521	19.92%	167,891	19.51%
8 Total average recommended employer contribution: 3 + 7	<u>\$320,116</u>	<u>35.72%</u>	\$310,439	<u>36.07%</u>
9 Projected compensation	\$896,391		\$860,625	

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

Reconciliation of Average Recommended Employer Contribution Rate

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

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

	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾
Average Recommended Employer Contribution as of December 31, 2017	36.07%	\$310,439,414
• Effect of investment return less than expected	0.47%	\$4,213,037
• Effect of actual contributions greater than expected	(0.11%)	(986,030)
• Effect of additional UAAL contributions	0.00%	(20,062)
• Effect of individual salary increases higher than expected	0.18%	1,613,503
• Effect of amortizing prior year's UAAL over a larger than expected projected total payroll	(0.14%)	5,403,862 ⁽³⁾
• Effect of COLA increases higher than expected	0.57%	5,109,427
• Effect of retirement experience loss on actives (earlier retirements than expected)	0.15%	1,344,586
• Effect of changes in member demographics on Normal Cost	(0.30%)	(2,689,172)
• Effect of change in administrative expense load	(0.03%)	(268,917)
• Effect of other losses ⁽⁴⁾	0.12%	(3,775,097)
• Effect of change in assumptions	<u>(1.26%)</u>	<u>(268,917)</u>
Total change	(0.35%)	\$9,676,220
Average Recommended Employer Contribution as of December 31, 2018	35.72%	\$320,115,634

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

⁽²⁾ Based on projected compensation for each valuation date shown.

⁽³⁾ Represents the dollar increase in UAAL amortization payments for amortization bases established prior to the December 31, 2018 valuation.

⁽⁴⁾ Other differences in actual versus expected experience including (but not limited to) disability, mortality, termination and leave cashout experience. Estimated annual dollar cost also reflects changes in payroll from prior valuation.

Reconciliation of Average Recommended Member Contribution

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

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

	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾
Average Recommended Member Contribution as of December 31, 2017	12.03%	\$103,551,307
• Effect of change in administrative expense load	0.00%	\$0
• Effect of changes in member demographics ⁽³⁾	(0.02%)	4,063,987
• Effect of change in assumptions	<u>(0.03%)</u>	<u>(268,917)</u>
Total change	(0.05%)	\$3,795,070
Average Recommended Member Contribution as of December 31, 2018	11.98%	\$107,346,377

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

⁽²⁾ Based on projected compensation for each valuation date shown.

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

Recommended Employer Contribution Rates

Cost Group #1	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
County General Tier 1 w/ Courts								
Normal Cost	11.55%	3.40%	14.95%	\$1,676,698	12.35%	3.55%	15.90%	\$1,874,629
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>1,461,363</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>1,457,259</u>
Total Contributions	22.63%	5.35%	27.98%	\$3,138,061	23.06%	5.20%	28.26%	\$3,331,888
District General Tier 1 w/o POB								
Normal Cost	11.55%	3.40%	14.95%	\$1,048,146	12.35%	3.55%	15.90%	\$1,082,621
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>1,551,537</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>1,464,602</u>
Total Contributions	27.68%	9.40%	37.08%	\$2,599,683	28.14%	9.27%	37.41%	\$2,547,223
District General Tier 1 w/ POB (Moraga)								
Normal Cost	11.55%	3.40%	14.95%	\$104,439	12.35%	3.55%	15.90%	\$89,206
UAAL	<u>9.07%</u>	<u>1.91%</u>	<u>10.98%</u>	<u>76,705</u>	<u>8.47%</u>	<u>1.48%</u>	<u>9.95%</u>	<u>55,824</u>
Total Contributions	20.62%	5.31%	25.93%	\$181,144	20.82%	5.03%	25.85%	\$145,030
District General Tier 1 w/ UAAL Prepayment (First Five)								
Normal Cost	11.55%	3.40%	14.95%	\$223,366	12.35%	3.55%	15.90%	\$238,733
UAAL	<u>11.31%</u>	<u>2.35%</u>	<u>13.66%</u>	<u>204,093</u>	<u>10.56%</u>	<u>1.76%</u>	<u>12.32%</u>	<u>184,980</u>
Total Contributions	22.86%	5.75%	28.61%	\$427,459	22.91%	5.31%	28.22%	\$423,713
District General Tier 1 w/ UAAL Prepayment (LAFCO)								
Normal Cost	11.55%	3.40%	14.95%	\$35,495	12.35%	3.55%	15.90%	\$36,570
UAAL	<u>15.38%</u>	<u>5.72%</u>	<u>21.10%</u>	<u>50,096</u>	<u>15.04%</u>	<u>5.44%</u>	<u>20.48%</u>	<u>47,104</u>
Total Contributions	26.93%	9.12%	36.05%	\$85,591	27.39%	8.99%	36.38%	\$83,674
County General Tier 4 (3% COLA) w/ Courts								
Normal Cost	8.80%	2.96%	11.76%	\$0	8.95%	3.01%	11.96%	\$0
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>0</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>0</u>
Total Contributions	19.88%	4.91%	24.79%	\$0	19.66%	4.66%	24.32%	\$0

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #1	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
District General Tier 4 (3% COLA) w/o POB								
Normal Cost	8.80%	2.96%	11.76%	\$328,749	8.95%	3.01%	11.96%	\$277,255
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>618,641</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>498,642</u>
Total Contributions	24.93%	8.96%	33.89%	\$947,390	24.74%	8.73%	33.47%	\$775,897
District General Tier 4 (3% COLA) w/ POB (Moraga)								
Normal Cost	8.80%	2.96%	11.76%	\$15,569	8.95%	3.01%	11.96%	\$25,744
UAAL	<u>9.07%</u>	<u>1.91%</u>	<u>10.98%</u>	<u>14,537</u>	<u>8.47%</u>	<u>1.48%</u>	<u>9.95%</u>	<u>21,417</u>
Total Contributions	17.87%	4.87%	22.74%	\$30,106	17.42%	4.49%	21.91%	\$47,161
District General Tier 4 (3% COLA) w/ UAAL Prepayment (First Five)								
Normal Cost	8.80%	2.96%	11.76%	\$148,254	8.95%	3.01%	11.96%	\$123,847
UAAL	<u>11.31%</u>	<u>2.35%</u>	<u>13.66%</u>	<u>172,206</u>	<u>10.56%</u>	<u>1.76%</u>	<u>12.32%</u>	<u>127,575</u>
Total Contributions	20.11%	5.31%	25.42%	\$320,460	19.51%	4.77%	24.28%	\$251,422
District General Tier 4 (3% COLA) w/ UAAL Prepayment (LAFCO)								
Normal Cost	8.80%	2.96%	11.76%	\$0	8.95%	3.01%	11.96%	\$0
UAAL	<u>15.38%</u>	<u>5.72%</u>	<u>21.10%</u>	<u>0</u>	<u>15.04%</u>	<u>5.44%</u>	<u>20.48%</u>	<u>0</u>
Total Contributions	24.18%	8.68%	32.86%	\$0	23.99%	8.45%	32.44%	\$0
County General Tier 4 (2% COLA) w/ Courts								
Normal Cost	8.68%	1.99%	10.67%	\$0	8.80%	2.02%	10.82%	\$0
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>0</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>0</u>
Total Contributions	19.76%	3.94%	23.70%	\$0	19.51%	3.67%	23.18%	\$0

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #2	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21			December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Basic	COLA	Total	Estimated Annual Dollar Amount
County General Tier 3 w/ Courts							
Normal Cost	11.84%	3.34%	15.18%	12.31%	3.43%	15.74%	\$65,050,705
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>51,081,748</u>
Total Contributions	22.92%	5.29%	28.21%	23.02%	5.08%	28.10%	\$116,132,453
District General Tier 3 w/o POB							
Normal Cost	11.84%	3.34%	15.18%	12.31%	3.43%	15.74%	\$508,194
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>694,489</u>
Total Contributions	27.97%	9.34%	37.31%	28.10%	9.15%	37.25%	\$1,202,683
County General Tier 5 (3%/4% COLA) w/ Courts							
Normal Cost	8.39%	2.76%	11.15%	8.42%	2.79%	11.21%	\$6,476,314
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>7,140,700</u>
Total Contributions	19.47%	4.71%	24.18%	19.13%	4.44%	23.57%	\$13,617,014
District General Tier 5 (3%/4% COLA) w/o POB							
Normal Cost	8.39%	2.76%	11.15%	8.42%	2.79%	11.21%	\$58,359
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>111,980</u>
Total Contributions	24.52%	8.76%	33.28%	24.21%	8.51%	32.72%	\$170,339
County General Tier 5 (2% COLA) w/ Courts							
Normal Cost	8.16%	1.84%	10.00%	8.20%	1.87%	10.07%	\$15,302,813
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>18,782,797</u>
Total Contributions	19.24%	3.79%	23.03%	18.91%	3.52%	22.43%	\$34,085,610
District General Tier 5 (2% COLA) w/o POB							
Normal Cost	8.16%	1.84%	10.00%	8.20%	1.87%	10.07%	\$26,380
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>56,350</u>
Total Contributions	24.29%	7.84%	32.13%	23.99%	7.59%	31.58%	\$82,730

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #3	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
CCCSO General Tier 1								
Normal Cost	12.36%	3.67%	16.03%	\$4,562,037	13.30%	3.88%	17.18%	\$4,947,250
UAAL	<u>23.23%</u>	<u>11.58%</u>	<u>34.81%</u>	<u>9,906,707</u>	<u>22.99%</u>	<u>10.43%</u>	<u>33.42%</u>	<u>9,623,812</u>
Total Contributions	35.59%	15.25%	50.84%	\$14,468,744	36.29%	14.31%	50.60%	\$14,571,062
CCCSO General Tier 4 (3% COLA)								
Normal Cost	8.23%	2.83%	11.06%	\$772,346	8.03%	2.80%	10.83%	\$601,334
UAAL	<u>23.23%</u>	<u>11.58%</u>	<u>34.81%</u>	<u>2,430,863</u>	<u>22.99%</u>	<u>10.43%</u>	<u>33.42%</u>	<u>1,855,640</u>
Total Contributions	31.46%	14.41%	45.87%	\$3,203,209	31.02%	13.23%	44.25%	\$2,456,974
Cost Group #4								
Contra Costa Housing Authority General Tier 1								
Normal Cost	12.77%	3.65%	16.42%	\$685,017	13.24%	3.74%	16.98%	\$694,627
UAAL	<u>16.44%</u>	<u>10.57%</u>	<u>27.01%</u>	<u>1,126,815</u>	<u>16.36%</u>	<u>9.71%</u>	<u>26.07%</u>	<u>1,066,486</u>
Total Contributions	29.21%	14.22%	43.43%	\$1,811,832	29.60%	13.45%	43.05%	\$1,761,113
Contra Costa Housing Authority General Tier 4 (3% COLA)								
Normal Cost	8.96%	3.02%	11.98%	\$186,734	9.49%	3.24%	12.73%	\$189,928
UAAL	<u>16.44%</u>	<u>10.57%</u>	<u>27.01%</u>	<u>421,010</u>	<u>16.36%</u>	<u>9.71%</u>	<u>26.07%</u>	<u>388,957</u>
Total Contributions	25.40%	13.59%	38.99%	\$607,744	25.85%	12.95%	38.80%	\$578,885

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #5	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
CCCFPD General Tier 1								
Normal Cost	11.75%	3.45%	15.20%	\$584,464	12.27%	3.52%	15.79%	\$606,975
UAAL	<u>10.53%</u>	<u>7.93%</u>	<u>18.46%</u>	<u>709,817</u>	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>651,951</u>
Total Contributions	22.28%	11.38%	33.66%	\$1,294,281	22.39%	10.36%	32.75%	\$1,258,926
CCCFPD General Tier 4 (3% COLA)								
Normal Cost	11.38%	3.79%	15.17%	\$27,024	11.44%	3.90%	15.34%	\$25,753
UAAL	<u>10.53%</u>	<u>7.93%</u>	<u>18.46%</u>	<u>32,885</u>	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>28,473</u>
Total Contributions	21.91%	11.72%	33.63%	\$59,909	21.56%	10.74%	32.30%	\$54,226
CCCFPD General Tier 4 (2% COLA)								
Normal Cost	10.07%	2.27%	12.34%	\$212,717	9.46%	2.19%	11.65%	\$131,956
UAAL	<u>10.53%</u>	<u>7.93%</u>	<u>18.46%</u>	<u>318,213</u>	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>192,101</u>
Total Contributions	20.60%	10.20%	30.80%	\$530,930	19.58%	9.03%	28.61%	\$324,057

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #6	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
Non-Enhanced District General Tier 1								
Normal Cost	12.58%	3.84%	16.42%	\$114,839	13.27%	3.95%	17.22%	\$114,214
UAAL	<u>0.16%</u>	<u>0.00%</u>	<u>0.16%</u>	<u>1,119</u>	<u>0.19%</u>	<u>0.00%</u>	<u>0.19%</u>	<u>1,260</u>
Total Contributions	12.74%	3.84%	16.58%	\$115,958	13.46%	3.95%	17.41%	\$115,474
Non-Enhanced District General Tier 4 (3% COLA)								
Normal Cost	9.39%	3.21%	12.60%	\$30,355	10.01%	3.47%	13.48%	\$25,266
UAAL	<u>0.16%</u>	<u>0.00%</u>	<u>0.16%</u>	<u>385</u>	<u>0.19%</u>	<u>0.00%</u>	<u>0.19%</u>	<u>356</u>
Total Contributions	9.55%	3.21%	12.76%	\$30,740	10.20%	3.47%	13.67%	\$25,622
Cost Group #7								
County Safety Tier A								
Normal Cost	22.36%	7.06%	29.42%	\$16,438,118	23.00%	7.35%	30.35%	\$17,463,315
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>23,176,517</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>24,241,498</u>
Total Contributions	44.37%	26.53%	70.90%	\$39,614,635	45.59%	26.89%	72.48%	\$41,704,813
County Safety Tier D								
Normal Cost	14.31%	5.73%	20.04%	\$731,500	14.86%	6.13%	20.99%	\$740,793
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>1,514,104</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>1,486,879</u>
Total Contributions	36.32%	25.20%	61.52%	\$2,245,604	37.45%	25.67%	63.12%	\$2,227,672

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #8	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
CCCFPD Safety Tier A								
Normal Cost	21.94%	7.00%	28.94%	\$8,890,908	22.60%	7.30%	29.90%	\$8,634,767
UAAL	<u>11.91%</u>	<u>26.53%</u>	<u>38.44%</u>	<u>11,809,485</u>	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>12,415,004</u>
Total Contributions	33.85%	33.53%	67.38%	\$20,700,393	37.23%	35.66%	72.89%	\$21,049,771
East CCCFPD Safety Tier A								
Normal Cost	21.94%	7.00%	28.94%	\$854,868	22.60%	7.30%	29.90%	\$767,350
UAAL	<u>37.82%</u>	<u>46.30%</u>	<u>84.12%</u>	<u>2,484,849</u>	<u>42.84%</u>	<u>49.87%</u>	<u>92.71%</u>	<u>2,379,297</u>
Total Contributions	59.76%	53.30%	113.06%	\$3,339,717	65.44%	57.17%	122.61%	\$3,146,647
CCCFPD Safety Tier D								
Normal Cost	13.05%	5.35%	18.40%	\$330,875	14.28%	6.00%	20.28%	\$359,801
UAAL	<u>11.91%</u>	<u>26.53%</u>	<u>38.44%</u>	<u>691,242</u>	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>762,715</u>
Total Contributions	24.96%	31.88%	56.84%	\$1,022,117	28.91%	34.36%	63.27%	\$1,122,516
East CCCFPD Safety Tier D								
Normal Cost	13.05%	5.35%	18.40%	\$71,748	14.28%	6.00%	20.28%	\$62,491
UAAL	<u>37.82%</u>	<u>46.30%</u>	<u>84.12%</u>	<u>328,012</u>	<u>42.84%</u>	<u>49.87%</u>	<u>92.71%</u>	<u>285,676</u>
Total Contributions	50.87%	51.65%	102.52%	\$399,760	57.12%	55.87%	112.99%	\$348,167
CCCFPD Safety Tier E								
Normal Cost	12.09%	3.32%	15.41%	\$673,206	13.90%	3.90%	17.80%	\$386,348
UAAL	<u>11.91%</u>	<u>26.53%</u>	<u>38.44%</u>	<u>1,679,302</u>	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>933,095</u>
Total Contributions	24.00%	29.85%	53.85%	\$2,352,508	28.53%	32.26%	60.79%	\$1,319,443

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #9	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21			December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Basic	COLA	Total	Estimated Annual Dollar Amount
County Safety Tier C							
Normal Cost	20.48%	4.38%	24.86%	21.06%	4.51%	25.57%	\$3,445,978
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>5,677,710</u>
Total Contributions	42.49%	23.85%	66.34%	43.65%	24.05%	67.70%	\$9,123,688
County Safety Tier E							
Normal Cost	13.17%	3.57%	16.74%	13.50%	3.76%	17.26%	\$3,775,786
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>9,216,330</u>
Total Contributions	35.18%	23.04%	58.22%	36.09%	23.30%	59.39%	\$12,992,116
Cost Group #10							
Moraga-Orinda FD Safety Tier A							
Normal Cost	20.36%	6.75%	27.11%	21.38%	7.06%	28.44%	\$1,825,642
UAAL	<u>14.05%</u>	<u>31.41%</u>	<u>45.46%</u>	<u>13.83%</u>	<u>28.67%</u>	<u>42.50%</u>	<u>2,728,192</u>
Total Contributions	34.41%	38.16%	72.57%	35.21%	35.73%	70.94%	\$4,553,834
Moraga-Orinda FD Safety Tier D							
Normal Cost	12.70%	5.23%	17.93%	13.33%	5.65%	18.98%	\$177,156
UAAL	<u>14.05%</u>	<u>31.41%</u>	<u>45.46%</u>	<u>13.83%</u>	<u>28.67%</u>	<u>42.50%</u>	<u>396,687</u>
Total Contributions	26.75%	36.64%	63.39%	27.16%	34.32%	61.48%	\$573,843

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

Recommended Employer Contribution Rates (continued)

Cost Group #11	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
San Ramon FD Safety Tier A								
Normal Cost	21.64%	6.92%	28.56%	\$4,960,173	22.22%	7.08%	29.30%	\$5,421,031
UAAL	<u>29.75%</u>	<u>19.92%</u>	<u>49.67%</u>	<u>8,626,464</u>	<u>28.83%</u>	<u>18.71%</u>	<u>47.54%</u>	<u>8,795,761</u>
Total Contributions	51.39%	26.84%	78.23%	\$13,586,637	51.05%	25.79%	76.84%	\$14,216,792
San Ramon FD Safety Tier D								
Normal Cost	11.44%	4.71%	16.15%	\$685,315	12.66%	5.40%	18.06%	\$549,052
UAAL	<u>29.75%</u>	<u>19.92%</u>	<u>49.67%</u>	<u>2,107,714</u>	<u>28.83%</u>	<u>18.71%</u>	<u>47.54%</u>	<u>1,445,289</u>
Total Contributions	41.19%	24.63%	65.82%	\$2,793,029	41.49%	24.11%	65.60%	\$1,994,341
Cost Group #12								
Non-Enhanced Rodeo-Hercules FPD Safety Tier A								
Normal Cost	14.30%	4.99%	19.29%	\$364,006	14.89%	5.21%	20.10%	\$371,801
UAAL ^{(3), (4)}	<u>37.31%</u>	<u>26.98%</u>	<u>64.29%</u>	<u>1,213,165</u>	<u>42.63%</u>	<u>30.04%</u>	<u>72.67%</u>	<u>1,344,216</u>
Total Contributions	51.61%	31.97%	83.58%	\$1,577,171	57.52%	35.25%	92.77%	\$1,716,017
Non-Enhanced Rodeo-Hercules FPD Safety Tier D								
Normal Cost	11.65%	4.82%	16.47%	\$89,598	11.92%	5.07%	16.99%	\$58,095
UAAL ^{(3), (4)}	<u>37.31%</u>	<u>26.98%</u>	<u>64.29%</u>	<u>349,743</u>	<u>42.63%</u>	<u>30.04%</u>	<u>72.67%</u>	<u>248,483</u>
Total Contributions	48.96%	31.80%	80.76%	\$439,341	54.55%	35.11%	89.66%	\$306,578
Total All Employers Combined (Aggregate)								
Normal Cost	12.29%	3.51%	15.80%	\$141,594,591	12.87%	3.69%	16.56%	\$142,548,079
UAAL	<u>13.56%</u>	<u>6.36%</u>	<u>19.92%</u>	<u>178,521,043</u>	<u>13.45%</u>	<u>6.06%</u>	<u>19.51%</u>	<u>167,891,335</u>
Total Contributions	25.85%	9.87%	35.72%	\$320,115,634	26.32%	9.75%	36.07%	\$310,439,414

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ 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.

⁽³⁾ The total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,639,716 for FY 2020-21. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 2020-21. The estimated payroll for FY 2020-21 was determined by increasing payroll amounts shown on the following page for 2019 by 18-months of assumed wage inflation.

⁽⁴⁾ The total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,670,971 for FY 2019-20. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 2019-20. The estimated payroll for FY 2019-20 was determined by increasing payroll amounts for 2018 by 18-months of assumed wage inflation.

Recommended Employer Contribution Rates (continued)

The projected compensation for the 2019 calendar year that is used to estimate the annual dollar amount shown on the prior pages as of December 31, 2018 are as follows:

Cost Group #1	Projected Compensation
County General Tier 1 w/ Courts	\$11,215,371
District General Tier 1 w/o POB	7,011,012
District General Tier 1 w/ POB (Moraga)	698,585
District General Tier 1 w/ UAAL Prepayment (First Five)	1,494,090
District General Tier 1 w/ UAAL Prepayment (LAFCO)	237,423
County General Tier 4 (3% COLA) w/ Courts	0
District General Tier 4 (3% COLA) w/o POB	2,795,484
District General Tier 4 (3% COLA) w/ POB (Moraga)	132,392
District General Tier 4 (3% COLA) w/ UAAL Prepayment (First Five)	1,260,660
District General Tier 4 (3% COLA) w/ UAAL Prepayment (LAFCO)	0
County General Tier 4 (2% COLA) w/ Courts	0
Cost Group #2	Projected Compensation
County General Tier 3 w/ Courts	\$403,694,851
District General Tier 3 w/o POB	3,088,198
County General Tier 5 (3%/4% COLA) w/ Courts	57,905,395
District General Tier 5 (3%/4% COLA) w/o POB	817,909
County General Tier 5 (2% COLA) w/ Courts	186,359,376
District General Tier 5 (2% COLA) w/o POB	331,894
Cost Group #3	Projected Compensation
CCCSD General Tier 1	\$28,459,370
CCCSD General Tier 4 (3% COLA)	6,983,233
Cost Group #4	Projected Compensation
Contra Costa Housing Authority General Tier 1	\$4,171,844
Contra Costa Housing Authority General Tier 4 (3% COLA)	1,558,718
Cost Group #5	Projected Compensation
CCCFPD General Tier 1	\$3,845,161
CCCFPD General Tier 4 (3% COLA)	178,144
CCCFPD General Tier 4 (2% COLA)	1,723,800

Cost Group #6	Projected Compensation
Non-Enhanced District General Tier 1	\$699,386
Non-Enhanced District General Tier 4 (3% COLA)	240,911
Cost Group #7	Projected Compensation
County Safety Tier A	\$55,873,955
County Safety Tier D	3,650,202
Cost Group #8	Projected Compensation
CCCFPD Safety Tier A	\$30,721,866
East CCCFPD Safety Tier A	2,953,933
CCCFPD Safety Tier D	1,798,236
East CCCFPD Safety Tier D	389,934
CCCFPD Safety Tier E	4,368,632
Cost Group #9	Projected Compensation
County Safety Tier C	\$14,287,199
County Safety Tier E	25,986,071
Cost Group #10	Projected Compensation
Moraga-Orinda FD Safety Tier A	\$5,992,550
Moraga-Orinda FD Safety Tier D	1,422,967
Cost Group #11	Projected Compensation
San Ramon FD Safety Tier A	\$17,367,553
San Ramon FD Safety Tier D	4,243,434
Cost Group #12	Projected Compensation
Non-Enhanced Rodeo-Hercules FPD Safety Tier A	\$1,887,019
Non-Enhanced Rodeo-Hercules FPD Safety Tier D	544,009
Total All Employers Combined (Aggregate)	\$896,390,767

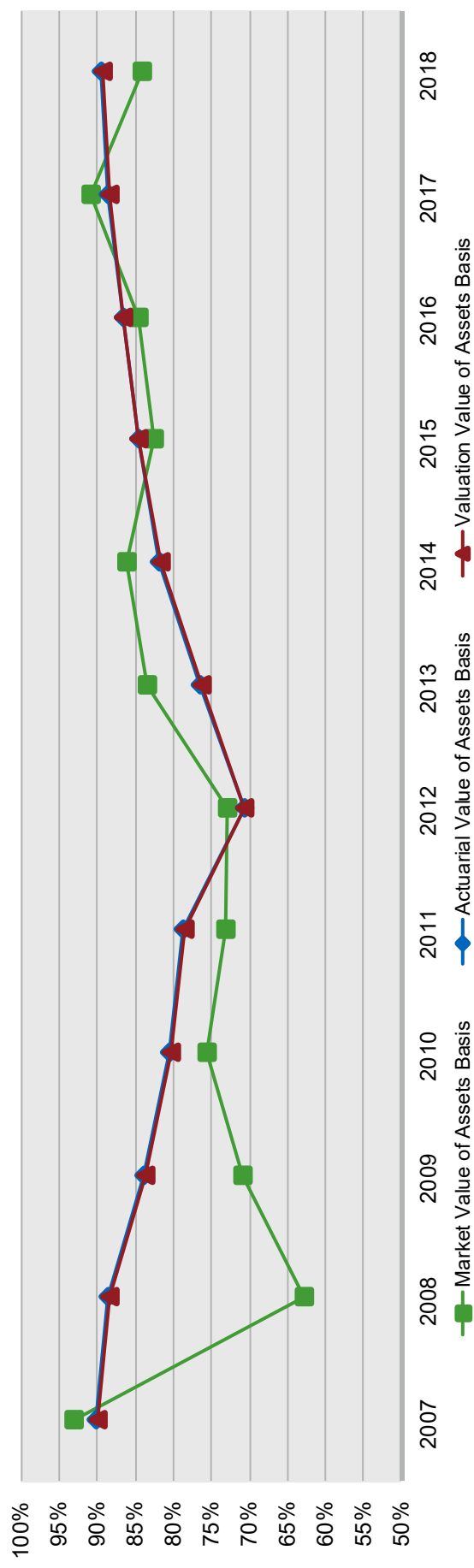
G. Funded Status

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

The chart below depicts a history of the funded ratio for the Plan. The chart on the next page shows the Plan's schedule of funding progress for the last ten years.

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

**FUNDED RATIO
FOR PLAN YEARS ENDING DECEMBER 31, 2007 – 2018**



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

Actuarial Valuation Date as of December 31	Valuation Value of Assets ⁽¹⁾ (a)	Actuarial Accrued Liability (AAL) ⁽²⁾ (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll (%) [(b) - (a)] / (c)
2009	\$5,290,114,102	\$6,314,787,187	\$1,024,673,085	83.8%	\$694,443,999	147.6%
2010	5,341,821,711	6,654,036,801	1,312,215,090	80.3	687,443,206	190.9
2011	5,426,719,066	6,915,311,649	1,488,592,583	78.5	666,394,146	223.4
2012	5,482,257,062	7,761,315,535	2,279,058,473	70.6	652,312,180	349.4
2013	5,907,416,432	7,731,097,407	1,823,680,975	76.4	679,428,911	268.4
2014	6,557,496,101	8,027,438,213	1,469,942,112	81.7	697,831,837	210.6
2015	7,136,801,380	8,448,624,096	1,311,822,716	84.5	746,352,663	175.8
2016	7,606,997,530	8,794,434,139	1,187,436,609	86.5	784,412,260	151.4
2017	8,179,891,191	9,239,246,920	1,059,355,729	88.5	860,624,613	123.1
2018	8,650,178,226	9,682,143,750	1,031,965,524	89.3	896,390,768	115.1

⁽¹⁾ Excludes assets for non-valuation reserves.

⁽²⁾ Excludes liabilities for non-valuation reserves.

H. Actuarial Balance Sheet

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

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

ACTUARIAL BALANCE SHEET FOR YEAR ENDED DECEMBER 31, 2018

	Basic	COLA	Total
Actuarial Present Value of Future Benefits ⁽¹⁾			
• Present value of benefits for retired members and beneficiaries	\$3,496,942,367	\$2,689,576,148	\$6,186,518,515
• Present value of benefits for inactive vested members ⁽²⁾	221,617,079	78,260,001	299,877,080
• Present value of benefits for active members	3,635,330,717	1,306,933,032	4,942,263,749
Total Actuarial Present Value of Future Benefits	<u>\$7,353,890,163</u>	<u>\$4,074,769,181</u>	<u>\$11,428,659,344</u>
Current and future assets ⁽¹⁾			
• Total Valuation Value of Assets	\$5,328,283,167	\$3,321,895,059	\$8,650,178,226
• Present value of future contributions by members	560,203,627	230,942,053	791,145,680
• Present value of future employer contributions for:			
» Entry age Normal Cost	737,339,158	218,030,756	955,369,914
» Unfunded Actuarial Accrued Liability	728,064,211	303,901,313	1,031,965,524
Total of current and future assets	<u>\$7,353,890,163</u>	<u>\$4,074,769,181</u>	<u>\$11,428,659,344</u>

⁽¹⁾ Excludes administrative expenses.

⁽²⁾ Includes inactive members with member contributions on deposit.

I. Volatility Ratios

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

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

The current AVR is about 9.0. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 9.0% of one-year's payroll. Since actuarial gains and losses are amortized over 18 years, 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.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current LVR is about 10.7, but is 8.1 for General compared to 21.8 for Safety. This means that assumption changes will have a greater impact on employer contribution rates for Safety than for General.

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

VOLATILITY RATIOS FOR YEARS ENDED DECEMBER 31, 2009 – 2018

Year Ended December 31	Asset Volatility Ratio			Liability Volatility Ratio		
	General	Safety	Total	General	Safety	Total
2009	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
2018	6.9	18.0	9.0	8.1	21.8	10.7

J. Risk Assessment

Since the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan.

This section does not contain a detailed analysis of the potential range of future measurements, but does include a concise discussion of some of the primary risks that may affect the Plan's future financial condition. We recommend a more detailed assessment of the risks to provide the Board with a better understanding of the risks inherent in the Plan that can inform both financial preparation and future decision making. This assessment would enable us to work with the Board to highlight and illustrate particular risks or potential future outcomes it may be interested in discussing and could include tailored scenario testing, sensitivity testing, stress testing and stochastic modeling.

This section provides descriptions and basic assessments of the primary risks that are likely to have an ongoing influence on the Plan's financial health, as well as a discussion of historical trends and maturity measures.

Risk Assessments

- Asset/Liability Mismatch Risk (the potential that future plan experience does not affect asset and liability values in the same way, causing them to diverge)

The most significant asset/liability mismatch risk to the Plan is investment risk, as discussed below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations: when asset values deviate from assumptions, they are typically independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from any changes in the expected experience of asset growth rates.

Asset/liability mismatch can also be caused by demographic assumption risk such as longevity, which affects liabilities but have no impact on asset levels. This risk is also discussed below.
- Investment Risk (the risk that investment returns will be different than expected)

The investment return assumption is a long-term, static assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. That volatility can cause significant changes in the financial health of the system, affecting both funded status and contribution rates. The inherent year-to-year volatility is reduced by smoothing through the Actuarial Value of Assets, however investment experience can still have a sizable impact. As discussed in *Section 2, Subsection I, Volatility Ratios*, on page 45, a 1% asset gain or loss (relative to the assumed investment return) translates to about 9.0% of one-year's payroll. Since

actuarial gains and losses are amortized over 18 years, there would be a 0.7% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The market value rate of return over the last 10 years has ranged from a low of -2.33% to a high of 19.68%.

➤ Longevity Risk (the risk that mortality experience will be different than expected)

The actuarial valuation includes current life expectancy assumptions and an expectation of future improvement in life expectancy, which are significant assumptions given the relatively long duration of liabilities for pension plans. Emerging plan experience that does not match these expectations will result in increases or decreases in the actuarially determined contribution over time. This risk can be reduced by using tables appropriate for the Plan (public experience tables) that are weighted by benefit levels, and by using generational mortality projections.

➤ Other Risks

In addition to longevity, the valuation includes a variety of other assumptions that are unlikely to match future experience exactly. One example is projected salary scales over time. As salary is central to the determination of benefits paid in retirement, deviations from the projected salary scales could have a material impact on the benefits anticipated for each member. Examples of demographic assumptions include retirement, termination and disability assumptions, and will likely vary in significance for different cost groups (for example, disability assumptions are typically more significant for safety groups).

Some plans also carry significant contribution risk, defined as the potential for actual future contributions deviating from expected future contributions. However, the employers have a proven track-record of making the Actuarially Determined Contributions based on the Board's Actuarial Funding Policy, so contribution risk is minimal.

Evaluation of Historical Trends

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:

- The funded percentage on the Valuation Value of Assets basis has increased from 83.8% to 89.3%. This is primarily due to contributions made to amortize the UAAL (i.e., amortizing each layer of UAAL over 18 years as a level percentage of pay) and average investment return over recent years higher than the assumption on a smoothed basis. For a more detailed history see *Section 2, Subsection G, Funded Status* starting on page 42.
- The average geometric investment return on the Valuation Value of Assets over the last 10 years was 6.03%. This includes a high of a 11.40% return and a low of 0.32%. The average over the last 5 years 8.13%. For more details see the Investment Return table in *Section 2, Subsection B* on page 24.

- The primary source of new UAAL was the strengthening of assumptions through multiple assumption changes. For example, the assumption change in 2012 changed the discount rate from 7.75% to 7.25% and updated mortality tables, adding \$567 million in unfunded liability. The assumption change in 2015 changed the discount rate from 7.25% to 7.00% and updated mortality tables, adding \$114 million in unfunded liability. For more details on the unfunded liability changes see *Section 3, Exhibit I, Table of Amortization Bases* starting on page 87.
- The plan's funding policy effectively deals with these unfunded liabilities over time. This can be seen most clearly in *Section 3, Exhibit J, Projection of UAAL Balances and Payments* provided on pages 100 and 101.

Maturity Measures

In the last 10 years the ratio of members in pay status to active participants has increased from 0.82 to 0.95. This ratio has fluctuated between 0.82 and 0.99 during the last 10 years. An increased ratio indicates that the plan has grown in maturity over time. This is to be expected, but is also informative for understanding plan sensitivity to particular risks. For more details see *Section 2, Subsection A, Member Data* on page 15.

As pension plans mature, the cash needed to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities. For the prior year benefits paid were \$36 million more than contributions received. Plans with high levels of negative cash flows have a need for a larger allocation to income generating assets, which can create a drag on investment return. However, this plan currently has relatively low levels of negative cash flows. For more details on historical cash flows see the Comparison of Contributions with Benefits in *Section 2, Subsection B, Financial Information* on page 19.

A further discussion of plan maturity measures and how they relate to changes in assets and liabilities is included in *Section 2, Subsection I, Volatility Ratios* starting on page 45.

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE TOTAL PLAN

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	10,021	10,038	-0.2%
• Average age	46.2	46.0	0.2
• Average years of service	9.9	9.8	0.1
• Total projected compensation ⁽¹⁾	\$896,390,768	\$860,624,612	4.2%
• Average projected compensation	\$89,451	\$85,737	4.3%
• Account balances	\$1,104,621,126	\$1,035,022,113	6.7%
• Total active vested members	6,225	6,089	2.2%
Inactive vested members:⁽²⁾			
• Number	3,477	3,327	4.5%
• Average age	46.5	46.5	0.0
Retired members:⁽²⁾			
• Number in pay status	7,214	6,973	3.5%
• Average age	70.5	70.4	0.1
• Average monthly benefit	\$4,147	\$4,067	2.0%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	908	896	1.3%
• Average age	66.3	66.2	0.1
• Average monthly benefit	\$4,818	\$4,627	4.1%
Beneficiaries:⁽²⁾			
• Number in pay status	1,425	1,398	1.9%
• Average age	72.6	72.3	0.3
• Average monthly benefit	\$2,645	\$2,551	3.7%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 742 members receiving a service-connected disability and 166 members receiving a non-service connected disability.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	504	529	-4.7%
• Average age	50.8	50.5	0.3
• Average years of service	17.5	16.5	1.0
• Total projected compensation ⁽¹⁾	\$57,832,242	\$58,286,293	-0.8%
• Average projected compensation	\$114,747	\$110,182	4.1%
• Account balances	\$71,819,994	\$66,823,081	7.5%
• Total active vested members	497	512	-2.9%
Inactive vested members:⁽²⁾			
• Number	229	233	-1.7%
• Average age	52.5	52.2	0.3
Retired members:⁽²⁾			
• Number in pay status	2,363	2,437	-3.0%
• Average age	75.2	74.9	0.3
• Average monthly benefit	\$4,402	\$4,247	3.6%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	247	255	-3.1%
• Average age	72.5	71.7	0.8
• Average monthly benefit	\$2,961	\$2,890	2.5%
Beneficiaries:⁽²⁾			
• Number in pay status	683	686	-0.4%
• Average age	78.2	78.0	0.2
• Average monthly benefit	\$2,413	\$2,336	3.3%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 180 members receiving a service-connected disability and 67 members receiving a non-service connected disability.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number ⁽¹⁾	0	0	N/A
• Average age	N/A	N/A	N/A
• Average years of service	N/A	N/A	N/A
• Total projected compensation	N/A	N/A	N/A
• Average projected compensation	N/A	N/A	N/A
• Account balances	N/A	N/A	N/A
• Total active vested members	N/A	N/A	N/A
Inactive vested members:⁽²⁾			
• Number	172	201	-14.4%
• Average age	58.5	57.6	0.9
Retired members:⁽²⁾			
• Number in pay status	425	420	1.2%
• Average age	75.3	75.2	0.1
• Average monthly benefit	\$867	\$857	1.2%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	40	42	-4.8%
• Average age	72.2	71.6	0.6
• Average monthly benefit	\$2,319	\$2,323	-0.2%
Beneficiaries:⁽²⁾			
• Number in pay status	101	102	-1.0%
• Average age	69.6	68.7	0.9
• Average monthly benefit	\$933	\$891	4.7%

⁽¹⁾ As of the December 31, 2005 valuation, there are no longer any Tier 2 active members as they have all transferred to Tier 3.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 21 members receiving a service-connected disability and 19 members receiving a non-service connected disability.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	4,436	4,738	-6.4%
• Average age	51.2	50.7	0.5
• Average years of service	14.6	13.9	0.7
• Total projected compensation ⁽¹⁾	\$406,783,049	\$416,511,431	-2.3%
• Average projected compensation	\$91,700	\$87,909	4.3%
• Account balances	\$553,049,509	\$523,594,120	5.6%
• Total active vested members	4,304	4,507	-4.5%
Inactive vested members:			
• Number	1,745	1,743	0.1%
• Average age	48.7	48.2	0.5
Retired members:			
• Number in pay status	3,124	2,878	8.5%
• Average age	68.1	67.8	0.3
• Average monthly benefit	\$2,854	\$2,778	2.7%
Disabled members:			
• Number in pay status ⁽²⁾	84	83	1.2%
• Average age	62.5	62.6	-0.1
• Average monthly benefit	\$2,489	\$2,390	4.1%
Beneficiaries:			
• Number in pay status	218	204	6.9%
• Average age	62.1	61.0	1.1
• Average monthly benefit	\$1,593	\$1,556	2.4%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ For 2018, includes 26 members receiving a service-connected disability and 58 members receiving a non-service connected disability.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 4 – 2% COLA**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	25	18	38.9%
• Average age	45.5	43.1	2.4
• Average years of service	1.9	1.5	0.4
• Total projected compensation ⁽¹⁾	\$1,723,800	\$1,132,669	52.2%
• Average projected compensation	\$68,952	\$62,926	9.6%
• Account balances	\$302,280	\$147,903	104.4%
• Total active vested members	1	0	N/A
Inactive vested members:			
• Number	4	4	0.0%
• Average age	44.8	48.3	-3.5
Retired members:			
• 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
Disabled members:			
• 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
Beneficiaries:			
• 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

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 4 – 3% COLA**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	148	129	14.7%
• Average age	40.9	41.1	-0.2
• Average years of service	2.6	2.2	0.4
• Total projected compensation ⁽¹⁾	\$13,149,543	\$10,968,716	19.9%
• Average projected compensation	\$88,848	\$85,029	4.5%
• Account balances	\$3,308,530	\$1,994,064	65.9%
• Total active vested members	15	2	650.0%
Inactive vested members:			
• Number	19	14	35.7%
• Average age	39.2	37.0	2.2
Retired members:			
• 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
Disabled members:			
• 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
Beneficiaries:			
• 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

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 5 – 2% COLA

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	2,679	2,350	14.0%
• Average age	40.7	39.9	0.8
• Average years of service	2.0	1.5	0.5
• Total projected compensation ⁽¹⁾	\$186,691,270	\$152,226,351	22.6%
• Average projected compensation	\$69,687	\$64,777	7.6%
• Account balances	\$34,572,429	\$20,015,213	72.7%
• Total active vested members	30	12	150.0%
Inactive vested members:			
• Number	591	417	41.7%
• Average age	39.6	39.6	0.0
Retired members:			
• Number in pay status	3	0	N/A
• Average age	67.9	N/A	N/A
• Average monthly benefit	\$279	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 5 – 3% COLA**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	770	801	-3.9%
• Average age	44.0	43.1	0.9
• Average years of service	4.5	3.6	0.9
• Total projected compensation ⁽¹⁾	\$58,723,304	\$58,293,249	0.7%
• Average projected compensation	\$76,264	\$72,776	4.8%
• Account balances	\$26,327,954	\$20,237,024	30.1%
• Total active vested members	334	3	11033.3%
Inactive vested members:			
• Number	286	274	4.4%
• Average age	42.4	41.5	0.9
Retired members:			
• Number in pay status	8	0	N/A
• Average age	62.8	N/A	N/A
• Average monthly benefit	\$422	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	874	945	-7.5%
• Average age	45.6	45.2	0.4
• Average years of service	16.2	15.8	0.4
• Total projected compensation ⁽¹⁾	\$114,796,876	\$115,755,798	-0.8%
• Average projected compensation	\$131,347	\$122,493	7.2%
• Account balances	\$380,680,946	\$377,672,109	0.8%
• Total active vested members	865	935	-7.5%
Inactive vested members:⁽²⁾			
• Number	297	314	-5.4%
• Average age	45.9	45.2	0.7
Retired members:⁽²⁾			
• Number in pay status	1,289	1,238	4.1%
• Average age	66.4	66.2	0.2
• Average monthly benefit	\$7,929	\$7,796	1.7%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	528	509	3.7%
• Average age	64.0	63.9	0.1
• Average monthly benefit	\$6,268	\$6,063	3.4%
Beneficiaries:⁽²⁾			
• Number in pay status	423	406	4.2%
• Average age	69.7	69.2	0.5
• Average monthly benefit	\$3,969	\$3,833	3.5%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 507 members receiving a service-connected disability and 21 members receiving a non-service connected disability.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	127	128	-0.8%
• Average age	38.2	37.4	0.8
• Average years of service	8.7	7.6	1.1
• Total projected compensation ⁽¹⁾	\$14,287,199	\$13,476,643	6.0%
• Average projected compensation	\$112,498	\$105,286	6.8%
• Account balances	\$15,289,277	\$12,548,377	21.8%
• Total active vested members	124	118	5.1%
Inactive vested members:			
• Number	72	74	-2.7%
• Average age	35.2	34.5	0.7
Retired members:			
• Number in pay status	2	0	N/A
• Average age	63.1	N/A	N/A
• Average monthly benefit	\$1,902	N/A	N/A
Disabled members:			
• Number in pay status ⁽²⁾	8	7	14.3%
• Average age	42.9	43.1	-0.2
• Average monthly benefit	\$3,665	\$3,758	-2.5%
Beneficiaries:			
• 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

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ For 2018, includes 7 members receiving a service-connected disability and 1 member receiving a non-service connected disability.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	122	115	6.1%
• Average age	34.2	33.6	0.6
• Average years of service	3.6	2.8	0.8
• Total projected compensation ⁽¹⁾	\$12,048,783	\$9,927,039	21.4%
• Average projected compensation	\$98,761	\$86,322	14.4%
• Account balances	\$7,062,683	\$4,701,883	50.2%
• Total active vested members	26	0	N/A
Inactive vested members:			
• Number	22	21	4.8%
• Average age	35.3	33.4	1.9
Retired members:			
• 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
Disabled members:			
• Number in pay status ⁽²⁾	1	0	N/A
• Average age	56.2	N/A	N/A
• Average monthly benefit	\$2,160	N/A	N/A
Beneficiaries:			
• 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

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ For 2018, includes 1 member receiving a service-connected disability.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	336	285	17.9%
• Average age	32.6	31.9	0.7
• Average years of service	2.7	2.2	0.5
• Total projected compensation ⁽¹⁾	\$30,354,703	\$24,046,424	26.2%
• Average projected compensation	\$90,341	\$84,373	7.1%
• Account balances	\$12,207,525	\$7,288,339	67.5%
• Total active vested members	29	0	N/A
Inactive vested members:			
• Number	40	32	25.0%
• Average age	31.5	31.3	0.2
Retired members:			
• 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
Disabled members:			
• 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
Beneficiaries:			
• 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

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

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

Age	Years of Service													
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over					
Under 25	93	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$61,317													
25 - 29	661	41	1	--	--	--	--	--	--	--	--	--	--	--
	\$70,820	\$86,763	\$57,237											
30 - 34	1,205	303	53	--	--	--	--	--	--	--	--	--	--	--
	\$80,955	\$90,901	\$102,737											
35 - 39	1,351	340	306	56	--	--	--	--	--	--	--	--	--	--
	\$89,561	\$96,435	\$102,569	\$97,921										
40 - 44	1,336	267	298	256	42	--	--	--	--	--	--	--	--	--
	\$94,063	\$94,677	\$107,384	\$105,749	\$93,950									
45 - 49	1,479	234	297	325	154	39	2	--	--	--	--	--	--	--
	\$96,415	\$91,812	\$101,887	\$110,215	\$117,953	\$118,816	\$77,163							
50 - 54	1,443	217	243	304	187	113	41	5	--	--	--	--	--	1
	\$95,139	\$89,064	\$93,688	\$103,872	\$107,494	\$108,786	\$119,713	\$140,378						\$93,164
55 - 59	1,216	191	177	222	153	105	61	30	6	--	--	--	--	6
	\$91,826	\$83,685	\$90,619	\$94,964	\$100,547	\$110,630	\$118,726	\$82,478	\$173,069					
60 - 64	857	147	161	144	94	69	32	25	12	--	--	--	--	
	\$88,046	\$85,776	\$88,634	\$86,945	\$95,537	\$98,532	\$112,150	\$91,975	\$128,565					
65 - 69	300	84	61	41	36	21	8	4	3	--	--	--	--	
	\$88,027	\$80,837	\$89,586	\$96,322	\$99,058	\$88,687	\$97,664	\$99,774	\$120,235					
70 & over	80	16	22	18	4	3	2	1	--	--	--	--	--	
	\$78,163	\$86,216	\$84,232	\$77,789	\$89,798	\$67,677	\$89,385	\$44,698	--					
Total	10,021	1,840	1,619	1,366	670	350	146	65	22					
	\$89,451	\$75,447	\$98,544	\$101,687	\$105,226	\$106,877	\$115,436	\$91,068	\$137,957					

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
 GENERAL TIER 1 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	--	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	2	--	--	1	1	--	--	--	--	--
	\$146,070	--	--	\$85,239	\$206,901	--	--	--	--	--
50 - 54	1	--	--	--	--	1	--	--	--	--
	\$80,198	--	--	--	--	\$80,198	--	--	--	--
55 - 59	4	--	3	1	--	--	--	--	--	--
	\$81,762	--	\$75,678	\$100,014	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	7	--	3	2	1	1	--	--	--	--
	\$99,912	--	\$75,678	\$92,627	\$206,901	\$80,198	--	--	--	--

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

Age	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	3	3																			
	\$134,182	\$134,182																			
30 - 34	23	17	4																		
	\$115,928	\$104,663	\$116,552	\$118,909																	
35 - 39	51	17	20	6																	
	\$115,789	\$111,813	\$112,104	\$124,570	\$102,258																
40 - 44	63	9	15	18	19	2															
	\$115,709	\$133,124	\$107,514	\$121,374	\$110,968	\$92,855															
45 - 49	74	3	13	15	28	13	2														
	\$119,893	\$132,292	\$122,972	\$118,591	\$121,003	\$112,570	\$123,103														
50 - 54	106	4	9	20	40	16	13														
	\$118,346	\$115,480	\$155,007	\$108,350	\$122,063	\$104,874	\$108,401														
55 - 59	91	5	9	17	26	10	13														
	\$112,482	\$109,123	\$128,815	\$103,586	\$112,511	\$103,494	\$126,100														
60 - 64	60	2	12	10	10	11	8														
	\$106,228	\$116,921	\$118,778	\$111,261	\$111,830	\$91,023	\$106,385														
65 - 69	23	1	4	3	8	1	2														
	\$112,106	\$104,458	\$109,579	\$130,415	\$107,981	\$62,350	\$98,101														
70 & over	3	--	--	2	1	--	--														
	\$88,099	--	--	\$67,886	\$128,524	--	--														
Total	497	34	99	109	138	53	38	16	5	5	5	5	5	5	5	5	5	5	5	5	5
	\$114,955	\$118,961	\$120,395	\$114,663	\$116,149	\$102,371	\$114,263	\$121,345	\$84,680	\$101,955	\$114,955	\$118,961	\$120,395	\$114,663	\$116,149	\$102,371	\$114,263	\$121,345	\$84,680	\$101,955	\$114,955

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

Age	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	11	11	--	--	--	--	--	--	--	--	--	--	--	--
	\$63,797	\$63,797	--	--	--	--	--	--	--	--	--	--	--	--
30 - 34	180	124	28	--	--	--	--	--	--	--	--	--	--	--
	\$79,647	\$78,648	\$83,767	--	--	--	--	--	--	--	--	--	--	--
35 - 39	453	37	185	196	35	--	--	--	--	--	--	--	--	--
	\$91,827	\$91,241	\$95,738	\$90,108	\$81,395	--	--	--	--	--	--	--	--	--
40 - 44	592	38	183	206	133	32	--	--	--	--	--	--	--	--
	\$93,833	\$91,294	\$94,556	\$99,107	\$87,848	\$83,632	--	--	--	--	--	--	--	--
45 - 49	694	27	158	220	174	92	21	2	--	--	--	--	--	--
	\$93,227	\$90,770	\$90,106	\$93,429	\$91,456	\$104,021	\$86,651	\$77,163	--	--	--	--	--	--
50 - 54	860	33	162	203	211	134	79	32	5	--	--	--	--	1
	\$92,981	\$92,079	\$86,075	\$89,150	\$92,241	\$100,637	\$96,792	\$109,161	\$140,378	\$93,164	--	--	--	6
55 - 59	788	22	136	154	171	136	87	49	27	6	--	--	--	6
	\$93,682	\$106,705	\$83,450	\$88,260	\$87,986	\$98,255	\$105,077	\$115,749	\$84,167	\$173,069	--	--	--	10
60 - 64	575	13	93	142	130	78	59	27	23	10	--	--	--	3
	\$90,085	\$92,585	\$86,907	\$85,403	\$84,294	\$94,339	\$93,729	\$111,323	\$93,015	\$139,370	--	--	--	3
65 - 69	220	5	65	55	31	34	19	8	3	--	--	--	--	1
	\$87,718	\$72,848	\$81,900	\$86,307	\$90,387	\$99,291	\$87,696	\$97,664	\$79,262	--	--	--	--	1
70 & over	63	2	14	20	17	4	3	2	1	--	--	--	--	1
	\$79,649	\$36,043	\$83,653	\$85,866	\$74,804	\$89,798	\$67,677	\$89,385	\$44,698	--	--	--	--	17
Total	4,436	205	1,131	1,224	902	510	268	120	59	17	59	17	59	17
	\$91,700	\$90,539	\$88,043	\$90,897	\$88,677	\$98,407	\$97,042	\$110,708	\$91,461	\$148,546	\$91,461	\$148,546	\$91,461	\$148,546

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
 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	--	--	--	--	--	--	--	--	--	--
25 - 29	3	3	--	--	--	--	--	--	--	--
30 - 34	\$65,299	\$65,299	--	--	--	--	--	--	--	--
35 - 39	3	3	--	--	--	--	--	--	--	--
40 - 44	\$70,037	\$70,037	--	--	--	--	--	--	--	--
45 - 49	\$53,084	\$53,084	--	--	--	--	--	--	--	--
50 - 54	\$44,445	\$44,445	--	--	--	--	--	--	--	--
55 - 59	3	3	--	--	--	--	--	--	--	--
60 - 64	\$106,910	\$106,910	--	--	--	--	--	--	--	--
65 - 69	7	6	1	--	--	--	--	--	--	--
70 & over	\$64,460	\$64,830	\$62,243	--	--	--	--	--	--	--
	4	4	--	--	--	--	--	--	--	--
	\$62,608	\$62,608	--	--	--	--	--	--	--	--
	1	1	--	--	--	--	--	--	--	--
	\$91,712	\$91,712	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	25	24	1	--	--	--	--	--	--	--
	\$68,952	\$69,232	\$62,243	--	--	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
 GENERAL TIER 4 – 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	1	1	--	--	--	--	--	--	--	--	--	--	--	--
	\$85,743	\$85,743	--	--	--	--	--	--	--	--	--	--	--	--
25 - 29	24	24	--	--	--	--	--	--	--	--	--	--	--	--
	\$75,268	\$75,268	--	--	--	--	--	--	--	--	--	--	--	--
30 - 34	25	23	2	--	--	--	--	--	--	--	--	--	--	--
	\$92,623	\$94,030	\$76,442	--	--	--	--	--	--	--	--	--	--	--
35 - 39	24	23	1	--	--	--	--	--	--	--	--	--	--	--
	\$95,839	\$97,439	\$59,025	--	--	--	--	--	--	--	--	--	--	--
40 - 44	25	25	--	--	--	--	--	--	--	--	--	--	--	--
	\$87,266	\$87,266	--	--	--	--	--	--	--	--	--	--	--	--
45 - 49	16	15	1	--	--	--	--	--	--	--	--	--	--	--
	\$91,395	\$89,248	\$123,592	--	--	--	--	--	--	--	--	--	--	--
50 - 54	15	11	4	--	--	--	--	--	--	--	--	--	--	--
	\$92,485	\$89,093	\$101,815	--	--	--	--	--	--	--	--	--	--	--
55 - 59	12	10	2	--	--	--	--	--	--	--	--	--	--	--
	\$90,468	\$90,477	\$90,424	--	--	--	--	--	--	--	--	--	--	--
60 - 64	5	4	1	--	--	--	--	--	--	--	--	--	--	--
	\$88,422	\$84,793	\$102,939	--	--	--	--	--	--	--	--	--	--	--
65 - 69	1	1	--	--	--	--	--	--	--	--	--	--	--	--
	\$82,710	\$82,710	--	--	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	148	137	11	--	--	--	--	--	--	--	--	--	--	--
	\$88,848	\$88,489	\$93,322	--	--	--	--	--	--	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
 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	59	59	--	--	--	--	--	--	--	--	--	--	--	--
	\$51,277	\$51,277	--	--	--	--	--	--	--	--	--	--	--	--
25 - 29	396	396	--	--	--	--	--	--	--	--	--	--	--	--
	\$62,062	\$62,062	--	--	--	--	--	--	--	--	--	--	--	--
30 - 34	600	592	8	--	--	--	--	--	--	--	--	--	--	--
	\$71,512	\$70,917	\$115,510	--	--	--	--	--	--	--	--	--	--	--
35 - 39	416	413	3	--	--	--	--	--	--	--	--	--	--	--
	\$73,488	\$73,119	\$124,180	--	--	--	--	--	--	--	--	--	--	--
40 - 44	311	311	--	--	--	--	--	--	--	--	--	--	--	--
	\$72,616	\$72,616	--	--	--	--	--	--	--	--	--	--	--	--
45 - 49	318	315	2	1	--	--	--	--	--	--	--	--	--	--
	\$70,182	\$69,903	\$93,033	\$112,446	--	--	--	--	--	--	--	--	--	--
50 - 54	221	221	--	--	--	--	--	--	--	--	--	--	--	--
	\$70,665	\$70,665	--	--	--	--	--	--	--	--	--	--	--	--
55 - 59	184	180	3	1	--	--	--	--	--	--	--	--	--	--
	\$71,202	\$71,180	\$54,863	\$124,180	--	--	--	--	--	--	--	--	--	--
60 - 64	133	127	6	--	--	--	--	--	--	--	--	--	--	--
	\$68,960	\$68,972	\$68,707	--	--	--	--	--	--	--	--	--	--	--
65 - 69	31	28	3	--	--	--	--	--	--	--	--	--	--	--
	\$71,379	\$72,733	\$58,739	--	--	--	--	--	--	--	--	--	--	--
70 & over	10	10	--	--	--	--	--	--	--	--	--	--	--	--
	\$60,758	\$60,758	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,679	2,652	25	1	1	1	1	1	1	1	1	1	1	1
	\$69,687	\$69,464	\$89,430	\$112,446	\$124,180	\$124,180	\$124,180	\$124,180	\$124,180	\$124,180	\$124,180	\$124,180	\$124,180	\$124,180

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
 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	3	3	--	--	--	--	--	--	--	--	--	--	--	--
	\$47,402	\$47,402	--	--	--	--	--	--	--	--	--	--	--	--
25 - 29	42	29	12	1	--	--	--	--	--	--	--	--	--	--
	\$62,216	\$57,988	\$72,846	\$57,237	--	--	--	--	--	--	--	--	--	--
30 - 34	132	77	55	--	--	--	--	--	--	--	--	--	--	--
	\$75,180	\$77,406	\$72,064	--	--	--	--	--	--	--	--	--	--	--
35 - 39	164	92	71	1	--	--	--	--	--	--	--	--	--	--
	\$79,018	\$81,372	\$76,225	\$60,690	--	--	--	--	--	--	--	--	--	--
40 - 44	112	65	47	--	--	--	--	--	--	--	--	--	--	--
	\$83,152	\$85,227	\$80,282	--	--	--	--	--	--	--	--	--	--	--
45 - 49	95	54	41	--	--	--	--	--	--	--	--	--	--	--
	\$76,848	\$81,758	\$70,382	--	--	--	--	--	--	--	--	--	--	--
50 - 54	74	41	33	--	--	--	--	--	--	--	--	--	--	--
	\$77,039	\$79,959	\$73,410	--	--	--	--	--	--	--	--	--	--	--
55 - 59	72	43	29	--	--	--	--	--	--	--	--	--	--	--
	\$71,514	\$74,440	\$67,176	--	--	--	--	--	--	--	--	--	--	--
60 - 64	54	22	31	1	--	--	--	--	--	--	--	--	--	--
	\$71,669	\$78,676	\$67,338	\$51,772	--	--	--	--	--	--	--	--	--	--
65 - 69	18	7	11	--	--	--	--	--	--	--	--	--	--	--
	\$77,139	\$92,324	\$67,475	--	--	--	--	--	--	--	--	--	--	--
70 & over	4	2	2	--	--	--	--	--	--	--	--	--	--	--
	\$90,807	\$77,452	\$104,163	--	--	--	--	--	--	--	--	--	--	--
Total	770	435	332	3	--	--	--	--	--	--	--	--	--	--
	\$76,264	\$78,704	\$73,245	\$56,566	--	--	--	--	--	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
 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	--	--	--	--	--	--	--
	\$132,559	--	\$132,559	--	--	--	--	--	--	--
40 - 44	2	--	--	--	2	--	--	--	--	--
	\$138,440	--	--	--	\$138,440	--	--	--	--	--
45 - 49	2	--	--	--	2	--	--	--	--	--
	\$144,886	--	--	--	\$144,886	--	--	--	--	--
50 - 54	5	--	1	--	--	--	3	1	--	--
	\$142,938	--	\$130,885	--	--	--	\$143,618	\$152,949	--	--
55 - 59	2	--	--	--	--	--	1	1	--	--
	\$170,281	--	--	--	--	--	\$203,023	\$137,539	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	13	--	3	--	4	--	4	2	--	--
	\$145,155	--	\$132,001	--	\$141,663	--	\$158,469	\$145,244	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
SAFETY TIER A 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	--	--	--	--	--	--	--	--	--	--
	2	1	1	--	--	--	--	--	--	--
	\$112,015	\$113,320	\$110,709	--	--	--	--	--	--	--
30 - 34	67	17	34	16	--	--	--	--	--	--
	\$118,769	\$107,708	\$119,821	\$128,285	--	--	--	--	--	--
35 - 39	139	16	31	77	15	--	--	--	--	--
	\$124,930	\$110,876	\$121,655	\$127,255	\$134,748	--	--	--	--	--
40 - 44	190	5	12	64	101	8	--	--	--	--
	\$128,616	\$152,293	\$121,210	\$128,928	\$127,580	\$135,496	--	--	--	--
45 - 49	252	3	9	55	120	49	16	--	--	--
	\$137,152	\$136,448	\$144,143	\$129,716	\$133,515	\$145,540	\$160,496	--	--	--
50 - 54	133	1	4	17	53	36	18	4	--	--
	\$138,041	\$130,653	\$117,303	\$126,630	\$136,448	\$134,942	\$155,894	\$177,780	--	--
55 - 59	48	1	4	5	24	7	4	3	--	--
	\$128,956	\$91,133	\$110,631	\$117,316	\$124,459	\$140,865	\$158,039	\$154,812	--	--
60 - 64	23	--	2	8	4	5	2	1	1	--
	\$128,985	--	\$122,681	\$122,312	\$110,899	\$124,145	\$208,787	\$161,137	\$99,774	--
65 - 69	7	--	1	3	2	1	--	--	--	--
	\$121,125	--	\$110,080	\$108,877	\$141,663	\$127,837	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	861	44	98	245	319	106	40	8	1	--
	\$131,138	\$116,159	\$122,193	\$127,679	\$131,267	\$139,698	\$160,594	\$167,087	\$99,774	--

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

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	7	--	7	--	--	--	--	--	--	--
	\$111,294	--	\$111,294	--	--	--	--	--	--	--
30 - 34	44	2	37	5	--	--	--	--	--	--
	\$110,782	\$98,216	\$110,990	\$114,271	--	--	--	--	--	--
35 - 39	35	2	21	12	--	--	--	--	--	--
	\$110,775	\$102,052	\$109,464	\$114,523	--	--	--	--	--	--
40 - 44	19	1	7	10	1	--	--	--	--	--
	\$109,288	\$20,056	\$113,022	\$114,813	\$117,131	--	--	--	--	--
45 - 49	12	--	7	5	--	--	--	--	--	--
	\$116,291	--	\$114,345	\$119,016	--	--	--	--	--	--
50 - 54	6	--	3	3	--	--	--	--	--	--
	\$140,740	--	\$165,134	\$116,347	--	--	--	--	--	--
55 - 59	2	--	2	--	--	--	--	--	--	--
	\$110,835	--	\$110,835	--	--	--	--	--	--	--
60 - 64	2	1	1	--	--	--	--	--	--	--
	\$109,271	\$107,607	\$110,935	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	127	6	85	35	1	--	--	--	--	--
	\$112,498	\$88,033	\$112,988	\$115,368	\$117,131	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
 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	3	3	--	--	--	--	--	--	--	--	--	--	--	--
	\$71,032	\$71,032	--	--	--	--	--	--	--	--	--	--	--	--
25 - 29	33	32	1	--	--	--	--	--	--	--	--	--	--	--
	\$95,859	\$96,330	\$80,775	--	--	--	--	--	--	--	--	--	--	--
30 - 34	46	33	13	--	--	--	--	--	--	--	--	--	--	--
	\$99,846	\$100,692	\$97,698	--	--	--	--	--	--	--	--	--	--	--
35 - 39	22	18	4	--	--	--	--	--	--	--	--	--	--	--
	\$100,990	\$96,560	\$120,925	--	--	--	--	--	--	--	--	--	--	--
40 - 44	9	7	2	--	--	--	--	--	--	--	--	--	--	--
	\$92,118	\$83,799	\$121,231	--	--	--	--	--	--	--	--	--	--	--
45 - 49	3	1	2	--	--	--	--	--	--	--	--	--	--	--
	\$113,446	\$85,594	\$127,373	--	--	--	--	--	--	--	--	--	--	--
50 - 54	2	2	--	--	--	--	--	--	--	--	--	--	--	--
	\$116,445	\$116,446	--	--	--	--	--	--	--	--	--	--	--	--
55 - 59	3	2	1	--	--	--	--	--	--	--	--	--	--	--
	\$104,312	\$114,872	\$83,194	--	--	--	--	--	--	--	--	--	--	--
60 - 64	1	--	1	--	--	--	--	--	--	--	--	--	--	--
	\$142,442	--	\$142,442	--	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	122	98	24	--	--	--	--	--	--	--	--	--	--	--
	\$98,761	\$96,851	\$106,558	--	--	--	--	--	--	--	--	--	--	--

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

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	27	27	--	--	--	--	--	--	--	--
	\$82,821	\$82,821	--	--	--	--	--	--	--	--
25 - 29	140	134	6	--	--	--	--	--	--	--
	\$88,209	\$87,620	\$101,382	--	--	--	--	--	--	--
30 - 34	85	72	13	--	--	--	--	--	--	--
	\$91,373	\$89,563	\$101,396	--	--	--	--	--	--	--
35 - 39	42	37	5	--	--	--	--	--	--	--
	\$89,896	\$88,313	\$101,604	--	--	--	--	--	--	--
40 - 44	12	11	1	--	--	--	--	--	--	--
	\$90,656	\$89,739	\$100,741	--	--	--	--	--	--	--
45 - 49	8	7	1	--	--	--	--	--	--	--
	\$93,107	\$92,016	\$100,741	--	--	--	--	--	--	--
50 - 54	13	13	--	--	--	--	--	--	--	--
	\$106,921	\$106,921	--	--	--	--	--	--	--	--
55 - 59	6	4	2	--	--	--	--	--	--	--
	\$104,080	\$104,274	\$103,691	--	--	--	--	--	--	--
60 - 64	3	3	--	--	--	--	--	--	--	--
	\$126,578	\$126,578	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	336	308	28	--	--	--	--	--	--	--
	\$90,341	\$89,323	\$101,547	--	--	--	--	--	--	--

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
TOTAL PLAN**

Age	Years of Retirement													
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over					
Under 30	17	6	3	1	2	1	--	--	1	--	--	1	--	--
	\$963	\$165	\$1,253	\$1,468	\$719	\$368	\$1,511	--	\$4,245	--	--	--	--	--
30 - 34	15	7	3	1	2	--	--	--	--	--	--	--	--	--
	\$1,258	\$1,366	\$1,058	\$918	\$1,981	\$624	--	--	--	--	--	--	--	--
35 - 39	18	4	4	2	3	2	2	--	--	--	--	--	--	--
	\$1,948	\$2,577	\$3,752	\$649	\$805	\$1,270	--	--	--	--	--	--	--	--
40 - 44	47	15	11	10	5	4	--	--	1	--	--	1	--	--
	\$2,905	\$3,755	\$3,092	\$3,523	\$682	\$1,199	--	--	\$1,050	--	--	--	--	--
45 - 49	97	37	16	14	8	5	--	--	--	--	--	--	--	--
	\$3,459	\$4,500	\$3,057	\$4,213	\$1,123	\$1,038	--	--	--	--	--	--	--	--
50 - 54	402	293	57	22	8	6	--	--	--	--	--	--	--	--
	\$4,570	\$4,585	\$5,701	\$3,900	\$2,436	\$1,364	--	--	--	--	--	--	--	--
55 - 59	848	378	368	32	21	7	5	--	--	--	--	--	--	--
	\$4,186	\$3,192	\$5,460	\$3,391	\$3,303	\$2,909	\$1,937	--	--	--	--	--	--	--
60 - 64	1,358	441	562	56	26	19	7	4	--	--	--	--	--	--
	\$4,194	\$3,013	\$4,819	\$5,338	\$2,695	\$2,723	\$3,622	\$2,255	\$412	--	--	--	--	--
65 - 69	1,864	397	665	206	50	32	17	6	5	--	--	--	--	--
	\$4,116	\$2,802	\$4,469	\$4,990	\$3,017	\$3,188	\$3,001	\$2,571	\$1,495	--	--	--	--	--
70 - 74	1,927	150	490	541	169	53	36	21	16	--	--	--	--	--
	\$4,258	\$2,225	\$3,919	\$5,004	\$2,732	\$3,424	\$2,950	\$2,856	\$2,727	--	--	--	--	--
75 - 79	1,258	22	139	320	217	120	42	23	11	--	--	--	--	--
	\$3,857	\$1,818	\$2,986	\$3,452	\$4,593	\$3,304	\$3,012	\$2,977	\$3,376	--	--	--	--	--
80 - 84	820	4	22	72	215	163	106	30	15	--	--	--	--	--
	\$3,609	\$1,966	\$2,474	\$2,630	\$4,122	\$4,415	\$2,526	\$3,560	\$3,225	--	--	--	--	--
85 - 89	497	--	2	9	111	127	112	72	37	--	--	--	--	--
	\$3,184	--	\$2,020	\$3,070	\$3,692	\$3,669	\$2,968	\$2,477	\$2,973	--	--	--	--	--
90 & Over	379	--	1	2	3	82	98	100	72	--	--	--	--	--
	\$3,066	--	\$969	\$4,819	\$1,902	\$3,258	\$3,277	\$2,850	\$3,102	--	--	--	--	--
Total	9,547	1,754	2,343	1,765	858	621	423	258	157					
	\$3,986	\$3,202	\$4,487	\$4,579	\$3,643	\$3,586	\$2,932	\$2,823	\$2,996					

Note: Total retired benefit \$38,057,250, average age 70.4, and average years of retirement 14.1. Includes members from terminated employers.

EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
GENERAL TIER 1

Age	Years of Retirement									
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over	
Under 30	1	--	--	--	--	1	--	--	--	--
	\$448	--	--	--	\$448	--	--	--	--	--
30 - 34	5	1	3	--	1	--	--	--	--	--
	\$889	\$824	\$1,058	--	\$448	--	--	--	--	--
35 - 39	2	--	--	--	2	--	--	--	--	--
	\$927	--	--	--	\$927	--	--	--	--	--
40 - 44	7	2	--	--	3	1	--	1	--	1
	\$881	\$1,076	--	--	\$638	\$1,053	--	\$1,050	--	--
45 - 49	5	--	1	--	2	1	--	--	--	--
	\$1,554	--	\$2,014	--	\$1,088	\$1,060	--	--	--	--
50 - 54	28	18	3	3	2	1	--	--	--	--
	\$1,972	\$2,082	\$2,217	\$1,531	\$1,027	\$2,183	--	--	--	--
55 - 59	104	45	37	6	6	2	4	--	--	--
	\$2,538	\$3,417	\$2,012	\$1,562	\$1,817	\$1,540	\$1,347	--	--	--
60 - 64	313	81	155	42	9	7	3	--	--	1
	\$3,821	\$3,328	\$4,785	\$2,421	\$2,956	\$1,888	\$1,750	\$2,019	\$412	--
65 - 69	547	51	210	162	16	19	6	4	--	4
	\$4,314	\$3,435	\$5,517	\$4,377	\$2,942	\$2,815	\$2,103	\$1,934	\$836	--
70 - 74	661	19	86	230	81	22	12	9	--	9
	\$4,538	\$2,502	\$5,753	\$5,845	\$2,156	\$2,422	\$3,043	\$1,950	\$1,851	--
75 - 79	517	1	15	86	113	70	22	16	4	4
	\$4,159	\$3,328	\$6,281	\$5,330	\$3,204	\$2,151	\$2,170	\$2,716	\$1,937	--
80 - 84	453	1	1	14	148	97	80	15	10	10
	\$3,868	\$351	\$264	\$5,331	\$4,523	\$3,110	\$1,908	\$2,683	\$2,843	--
85 - 89	341	--	--	2	73	99	88	51	19	19
	\$3,198	--	--	\$8,607	\$4,575	\$3,770	\$2,391	\$1,637	\$2,140	--
90 & Over	309	--	--	3	10	69	89	85	53	53
	\$2,894	--	--	\$1,902	\$4,240	\$3,618	\$3,020	\$2,288	\$2,516	--
Total	3,293	219	511	544	576	388	304	184	100	100
	\$3,881	\$3,151	\$5,041	\$4,999	\$3,580	\$3,099	\$2,432	\$2,142	\$2,306	\$2,306

Note: Total retired benefit \$12,781,939, average age 75.6, and average years of retirement 19.4. Includes members from terminated employers.

EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
GENERAL TIER 2

Age	Years of Retirement																					
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over													
Under 30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
30 - 34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
35 - 39	2	--	--	1	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$852	--	--	\$1,145	\$560	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
40 - 44	4	--	--	--	2	2	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$964	--	--	--	\$749	\$1,179	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
45 - 49	12	--	--	2	6	4	4	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$1,044	--	--	--	\$798	\$1,135	\$1,032	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
50 - 54	7	2	--	1	--	2	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$906	\$269	--	\$663	--	\$1,303	\$1,266	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
55 - 59	28	16	10	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$476	\$356	\$244	--	--	\$2,596	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
60 - 64	54	17	10	13	6	2	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$800	\$383	\$469	\$762	\$1,622	\$1,554	\$1,512	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
65 - 69	68	9	11	19	21	7	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$903	\$782	\$513	\$837	\$929	\$1,552	\$2,418	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
70 - 74	109	3	12	25	29	32	6	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$960	\$1,017	\$691	\$707	\$974	\$1,032	\$1,812	\$1,749	--	--	--	--	--	--	--	--	--	--	--	--	--	--
75 - 79	101	--	1	15	39	38	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$1,098	--	\$87	\$673	\$1,429	\$1,000	\$925	\$497	--	--	--	--	--	--	--	--	--	--	--	--	--	--
80 - 84	94	--	1	3	39	37	11	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$1,094	--	\$964	\$1,214	\$1,136	\$1,078	\$1,027	\$907	--	--	--	--	--	--	--	--	--	--	--	--	--	--
85 - 89	62	--	--	--	13	30	16	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$1,134	--	--	--	\$1,158	\$1,200	\$1,125	\$418	--	--	--	--	--	--	--	--	--	--	--	--	--	--
90 & Over	25	--	--	--	--	11	12	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$975	--	--	--	--	\$590	\$1,365	\$594	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	566	47	45	76	150	174	63	9	2	--	--	--	--	--	--	--	--	--	--	--	--	--
	\$981	\$486	\$492	\$762	\$1,169	\$1,093	\$1,230	\$942	\$506	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Total retired benefit \$555,382, average age 74.1, and average years of retirement 17.7. Includes members from terminated employers.

EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
GENERAL TIER 3

Age	Years of Retirement										
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over	
Under 30	10	6	3	--	1	--	--	--	--	--	--
	\$547	\$165	\$1,253	--	\$719	--	--	--	--	--	--
30 - 34	7	4	--	--	2	1	--	--	--	--	--
	\$1,037	\$625	--	--	\$1,981	\$800	--	--	--	--	--
35 - 39	5	1	--	3	1	--	--	--	--	--	--
	\$832	\$509	--	\$649	\$1,706	--	--	--	--	--	--
40 - 44	10	2	4	3	1	--	--	--	--	--	--
	\$1,941	\$3,403	\$1,900	\$1,099	\$1,706	--	--	--	--	--	--
45 - 49	14	5	3	2	4	--	--	--	--	--	--
	\$1,513	\$1,976	\$1,741	\$952	\$1,045	--	--	--	--	--	--
50 - 54	109	94	6	7	2	--	--	--	--	--	--
	\$1,751	\$1,681	\$2,625	\$2,107	\$1,179	--	--	--	--	--	--
55 - 59	367	251	105	6	5	--	--	--	--	--	--
	\$2,275	\$2,549	\$1,663	\$2,361	\$1,240	--	--	--	--	--	--
60 - 64	658	319	261	67	11	--	--	--	--	--	--
	\$2,942	\$2,948	\$3,205	\$1,955	\$2,555	--	--	--	--	--	--
65 - 69	912	322	390	165	35	--	--	--	--	--	--
	\$2,958	\$2,708	\$3,505	\$2,481	\$1,417	--	--	--	--	--	--
70 - 74	774	122	376	212	63	1	--	--	--	--	--
	\$3,130	\$2,260	\$3,506	\$3,366	\$1,793	\$2,181	--	--	--	--	--
75 - 79	411	20	117	202	71	--	--	1	--	--	--
	\$2,544	\$1,762	\$2,581	\$2,843	\$1,867	--	--	\$1,558	--	--	--
80 - 84	132	2	17	55	58	--	--	--	--	--	--
	\$1,926	\$2,122	\$2,357	\$2,020	\$1,703	--	--	--	--	--	--
85 - 89	14	--	2	7	5	--	--	--	--	--	--
	\$1,602	--	\$2,020	\$1,489	\$1,593	--	--	--	--	--	--
90 & Over	3	--	1	2	--	--	--	--	--	--	--
	\$3,536	--	\$969	\$4,819	--	--	--	--	--	--	--
Total	3,426	1,148	1,285	731	259	2	1	1	1,558	--	--
	\$2,765	\$2,566	\$3,172	\$2,730	\$1,740	\$1,491	\$1,558	\$1,558	--	--	--

Note: Total retired benefit \$9,472,274, average age 67.6, and average years of retirement 7.6.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
 BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
 GENERAL TIER 5**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	--	--	--	--	--	--	--	--	--	--
50 - 54	1	1	--	--	--	--	--	--	--	--
	\$470	\$470	--	--	--	--	--	--	--	--
55 - 59	3	3	--	--	--	--	--	--	--	--
	\$207	\$207	--	--	--	--	--	--	--	--
60 - 64	1	1	--	--	--	--	--	--	--	--
	\$409	\$409	--	--	--	--	--	--	--	--
65 - 69	3	3	--	--	--	--	--	--	--	--
	\$530	\$530	--	--	--	--	--	--	--	--
70 - 74	3	3	--	--	--	--	--	--	--	--
	\$372	\$372	--	--	--	--	--	--	--	--
75 - 79	--	--	--	--	--	--	--	--	--	--
80 - 84	--	--	--	--	--	--	--	--	--	--
85 - 89	--	--	--	--	--	--	--	--	--	--
90 & Over	--	--	--	--	--	--	--	--	--	--
Total	11	11	--	--	--	--	--	--	--	--
	\$383	\$383	--	--	--	--	--	--	--	--

Note: Total retired benefit \$4,208, average age 64.2, and average years of retirement 0.5.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
SAFETY TIER A AND TIER C**

Age	Years of Retirement													
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over					
Total	6	--	--	3	1	1	1	--	1	--	1	--	--	--
Under 30	\$1,741	--	--	\$1,468	--	\$288	\$1,511	--	\$4,245	--	--	--	--	--
30 - 34	\$2,386	\$3,120	--	\$918	--	--	--	--	--	--	--	--	--	--
35 - 39	9	3	4	--	--	--	2	--	--	--	--	--	--	--
40 - 44	\$3,038	\$3,266	\$3,752	--	--	--	\$1,270	--	--	--	--	--	--	--
45 - 49	26	11	7	--	--	--	1	--	--	--	--	--	--	--
45 - 49	\$4,119	\$4,306	\$3,773	\$4,562	--	--	\$1,382	--	--	--	--	--	--	--
45 - 49	66	32	12	14	--	--	--	--	--	--	--	--	--	--
45 - 49	\$4,455	\$4,894	\$3,473	\$4,800	\$3,571	--	--	--	--	--	--	--	--	--
50 - 54	257	178	48	13	11	4	3	--	--	--	--	--	--	--
50 - 54	\$6,163	\$6,443	\$6,303	\$5,242	\$4,371	\$3,706	\$1,156	--	--	--	--	--	--	--
55 - 59	345	62	216	25	23	13	5	--	--	--	--	--	--	--
55 - 59	\$7,057	\$6,518	\$8,138	\$4,107	\$4,146	\$4,098	\$3,457	\$4,297	--	--	--	--	--	--
60 - 64	332	23	136	120	27	11	10	4	--	--	--	--	--	--
60 - 64	\$7,593	\$4,874	\$8,275	\$8,743	\$5,086	\$3,483	\$3,549	\$5,026	\$2,964	--	--	--	--	--
65 - 69	334	12	54	140	75	27	12	11	2	--	--	--	--	--
65 - 69	\$7,638	\$4,740	\$8,161	\$9,218	\$7,648	\$3,441	\$3,843	\$3,491	\$3,845	\$4,132	--	--	--	--
70 - 74	380	3	16	74	166	55	25	22	12	7	--	--	--	--
70 - 74	\$7,044	\$2,138	\$6,193	\$8,534	\$4,580	\$4,580	\$4,692	\$3,008	\$3,536	\$3,853	--	--	--	--
75 - 79	229	1	6	17	64	66	42	19	7	7	--	--	--	--
75 - 79	\$6,750	\$1,417	\$3,126	\$3,639	\$7,826	\$8,974	\$5,664	\$4,119	\$3,574	\$4,199	--	--	--	--
80 - 84	141	1	3	--	9	30	55	23	15	5	--	--	--	--
80 - 84	\$6,029	\$3,268	\$4,374	--	\$5,702	\$5,897	\$7,392	\$4,888	\$4,437	\$3,989	--	--	--	--
85 - 89	80	--	--	--	8	8	12	22	20	18	--	--	--	--
85 - 89	\$4,993	--	--	--	\$4,976	\$6,223	\$5,508	\$4,722	\$3,852	\$3,852	--	--	--	--
90 & Over	42	--	--	--	--	--	1	8	14	19	--	--	--	--
90 & Over	\$5,538	--	--	--	--	--	\$1,115	\$6,437	\$6,426	\$4,737	--	--	--	--
Total	2,250	328	502	414	383	215	169	110	72	57	72	72	72	57
Total	\$6,774	\$5,949	\$7,651	\$7,991	\$7,493	\$5,863	\$5,594	\$4,476	\$4,629	\$4,206	\$4,629	\$4,629	\$4,629	\$4,206

Note: Total retired benefit \$15,241,288, average age 66.3, and average years of retirement 15.4. Includes members from terminated employers.

EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
SAFETY TIER D AND TIER E

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	--	--	--	--	--	--	--	--	--	--
50 - 54	--	--	--	--	--	--	--	--	--	--
55 - 59	1	1	--	--	--	--	--	--	--	--
	\$2,160	\$2,160	--	--	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 - 74	--	--	--	--	--	--	--	--	--	--
75 - 79	--	--	--	--	--	--	--	--	--	--
80 - 84	--	--	--	--	--	--	--	--	--	--
85 - 89	--	--	--	--	--	--	--	--	--	--
90 & Over	--	--	--	--	--	--	--	--	--	--
Total	1	1	--	--	--	--	--	--	--	--
	\$2,160	\$2,160	--	--	--	--	--	--	--	--

Note: Total retired benefit \$2,160, average age 56.2, and average years of retirement 1.6.

EXHIBIT D – RECONCILIATION OF MEMBER DATA

	Active Members	Inactive Vested Members ⁽¹⁾	Retired Members	Disabled Members	Beneficiaries	Total
Number as of December 31, 2017	10,038	3,327	6,973	896	1,398	22,632
• New members	799	100	0	0	104	1,003
• Terminations – with vested rights	(310)	310	0	0	0	0
• Contribution refunds	(175)	(133)	0	0	0	(308)
• Retirements	(319)	(92)	411	0	0	0
• New disabilities	(33)	(2)	(5)	40	0	0
• Return to work	27	(27)	0	0	0	0
• Died with or without beneficiary	(7)	(6)	(164)	(27)	(71)	(275)
• Data adjustments	<u>1</u>	<u>0</u>	<u>(1)</u>	<u>(1)</u>	<u>(6)</u>	<u>(7)</u>
Number as of December 31, 2018	10,021	3,477	7,214	908	1,425	23,045

⁽¹⁾ Includes inactive members with member contributions on deposit.

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

	Year Ended December 31, 2018	Year Ended December 31, 2017
Net assets at market value at the beginning of the year	\$8,390,581,049	\$7,438,519,504
Contribution income:		
• Employer contributions	\$325,117,103	\$314,836,561
• Member contributions	103,541,529	96,466,906
• Less administrative expenses	<u>(9,337,053)</u>	<u>(9,146,115)</u>
Net contribution income	\$419,321,579	\$402,157,352
Investment income:		
• Interest, dividends and other income	\$122,028,712	\$216,736,117
• Asset appreciation	(271,910,965)	813,544,847
• Less investment fees	<u>(45,148,635)</u>	<u>(42,864,983)</u>
Net investment income	<u>\$(195,030,888)</u>	<u>\$987,415,981</u>
Total income available for benefits	\$224,290,691	\$1,389,573,333
Less benefit payments:		
• Benefits paid	\$(451,371,645)	\$(429,574,195)
• Refunds of contributions	(9,232,894)	(5,980,405)
• Adjustments, transfers or other expenses	<u>(4,281,407)</u>	<u>(1,957,188)</u>
Net benefit payments	<u>\$(464,885,947)</u>	<u>\$(437,511,788)</u>
Change in net assets at market value	\$(240,595,256)	\$952,061,545
Net assets at market value at the end of the year	\$8,149,985,793	\$8,390,581,049

Note: Results may be slightly off due to rounding.

EXHIBIT F – SUMMARY STATEMENT OF PLAN ASSETS

	Year Ended December 31, 2018	Year Ended December 31, 2017
Cash equivalents	\$653,279,987	\$690,793,803
Accounts receivable:		
• Investment trades	\$16,983,472	\$22,462,322
• Investment income	20,229,623	20,293,645
• Employer and member contributions	9,982,077	9,805,486
• Additional contributions	<u>12,317,664</u>	<u>14,367,397</u>
Total accounts receivable	\$59,512,836	\$66,928,850
Investments:		
• Stocks	\$3,202,523,490	\$3,899,074,060
• Bonds	2,611,979,915	2,385,460,866
• Real estate	644,587,626	652,385,617
• Alternative investments and real assets	<u>1,440,993,833</u>	<u>1,216,666,285</u>
Total investments at market value	\$7,900,084,864	\$8,153,586,828
Other assets	<u>500,284</u>	<u>516,754</u>
Total assets	\$8,613,377,971	\$8,911,826,235
Accounts payable:		
• Investment trades	\$(20,576,922)	\$(25,352,546)
• Security lending	(243,358,031)	(294,005,415)
• Employer contributions unearned	(151,748,113)	(155,492,320)
• Other	<u>(47,709,112)</u>	<u>(46,394,905)</u>
Total accounts payable	\$(463,392,178)	\$(521,245,186)
Net assets at market value	\$8,149,985,793	\$8,390,581,049
Net assets at actuarial value	\$8,666,778,056	\$8,195,516,541
Net assets at valuation value	\$8,650,178,226	\$8,179,891,191

Note: Results may be slightly off due to rounding.

EXHIBIT G – SUMMARY OF TOTAL ALLOCATED RESERVES

	December 31, 2018	December 31, 2017
Member Deposits ⁽¹⁾	\$852,464,738	\$795,727,498
Member Cost of Living ⁽¹⁾	449,161,645	420,388,707
Employer Advance ⁽¹⁾⁽²⁾	2,295,152,786	2,063,002,259
Employer Cost of Living ⁽¹⁾⁽²⁾	1,032,587,045	928,964,628
Retired Members ⁽¹⁾⁽²⁾	3,468,067,211	3,363,343,722
Retired Cost of Living ⁽¹⁾⁽²⁾	2,565,742,215	2,444,582,495
Dollar Power Cost of Living Supplement Pre-Funding ⁽¹⁾	2,649,181	3,946,603
Post Retirement Death Benefit ⁽³⁾	15,757,910	15,625,350
Statutory Contingency (one percent) ⁽³⁾	0	0
Additional One Percent Contingency Designation ⁽³⁾	0	0
Contra Tracking Account ⁽¹⁾	(2,014,804,675)	(1,840,064,721)
Total Allocated Reserves	\$8,666,778,056	\$8,195,516,541
Total Deferred Return	(516,792,263)	195,064,508
Net Market Value	\$8,149,985,793	\$8,390,581,049

Note: Results may be slightly off due to rounding.

⁽¹⁾ Included in valuation value of assets.

⁽²⁾ Both December 31, 2018 and December 31, 2017 information reflect a “true-up” of retired reserves.

⁽³⁾ Not included in valuation value of assets.

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

Year Ended December 31	Employer Contributions ⁽¹⁾	Member Contributions ⁽¹⁾	Administrative Expenses ⁽²⁾	Net Investment Return ⁽³⁾	Benefit Payments	Market Value of Assets at Year-End	Valuation Value of Assets at Year-End	Valuation Value as a Percent of Market Value
2009	\$195,613,673	\$66,536,161	N/A	\$736,956,891	\$272,076,007	\$4,476,729,530	\$5,290,114,102	118.2%
2010	183,950,930	64,330,484	N/A	594,637,090	292,490,835	5,027,157,199	5,341,821,711	106.3%
2011	200,388,994	61,575,376	N/A	88,042,268	324,874,379	5,052,289,458	5,426,719,066	107.4%
2012	212,321,325	73,361,712	N/A	668,138,997	351,530,368	5,654,581,124	5,482,257,062	97.0%
2013	235,017,452	72,373,254	N/A	870,984,744	374,638,978	6,458,317,596	5,907,416,432	91.5%
2014	293,760,413	78,257,665	N/A	473,522,261	394,947,705	6,908,910,230	6,557,496,101	94.9%
2015	323,720,270	85,360,637	N/A	65,495,657	406,904,366	6,976,582,428	7,136,801,380	102.3%
2016	307,457,143	89,240,172	\$8,486,463	493,874,242	420,148,018	7,438,519,504	7,606,997,530	102.3%
2017	314,836,561	96,466,906	9,146,115	987,415,981	437,511,788	8,390,581,049	8,179,891,191	97.5%
2018	325,117,103	103,541,529	9,337,053	(195,030,888)	464,885,947	8,149,985,793	8,650,178,226	106.1%

⁽¹⁾ Prior to 2017, employer contributions include "employer subvention of member contributions" and exclude "member subvention of employer contributions".

⁽²⁾ Prior to 2016, administrative expenses were shown as an offset to the net investment return.

⁽³⁾ On a market basis, net of investment fees beginning with the year ended December 31, 2016. Prior to 2016, shown net of investment fees and administrative expenses.

EXHIBIT I – TABLE OF AMORTIZATION BASES

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Groups #1 and #2 – General County and Small Districts						
Restart of Amortization	December 31, 2007	\$785,069,153	15	\$379,529,498	4	\$103,746,644
Actuarial Loss	December 31, 2008	80,033,199	18	60,688,514	8	8,885,623
Actuarial Loss	December 31, 2009	165,041,323	18	132,918,130	9	17,594,180
Assumption Change	December 31, 2009	39,563,826	18	31,863,231	9	4,217,690
Depooling Implementation	December 31, 2009	(74,701,913)	18	(60,162,136)	9	(7,963,575)
Actuarial Loss	December 31, 2010	153,070,543	18	129,349,285	10	15,671,171
Actuarial Loss	December 31, 2011	94,750,078	18	83,177,779	11	9,315,719
Actuarial Loss	December 31, 2012	117,029,116	18	105,855,175	12	11,049,719
Assumption Change	December 31, 2012	288,802,882	18	261,227,980	12	27,268,348
Actuarial Gain	December 31, 2013	(134,810,112)	18	(125,193,021)	13	(12,263,943)
Assumption Change ⁽²⁾	December 31, 2013	(107,553,289)	18	(99,880,647)	13	(9,784,336)
Actuarial Gain	December 31, 2014	(171,898,812)	18	(162,939,617)	14	(15,066,745)
Actuarial Gain	December 31, 2015	(105,003,533)	18	(101,080,296)	15	(8,867,025)
Assumption Change	December 31, 2015	39,814,884	18	38,327,284	15	3,362,169
Actuarial Gain	December 31, 2016	(28,579,026)	18	(27,964,829)	16	(2,337,391)
Actuarial Gain	December 31, 2017	(17,937,638)	18	(17,773,694)	17	(1,420,886)
Actuarial Loss	December 31, 2018	75,264,047	18	75,264,047	18	5,774,195
Assumption Change	December 31, 2018	(6,021,683)	18	(6,021,683)	18	(461,978)
Subtotal – Cost Groups #1 and #2				\$697,184,998		\$148,719,579

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #3 – Central Contra Costa Sanitary District						
Restart of Amortization	December 31, 2007	\$36,185,000	15	\$17,493,077	4	\$4,781,836
Actuarial Loss	December 31, 2008	3,709,835	18	2,813,137	8	411,882
Actuarial Loss	December 31, 2009	10,118,261	18	8,148,870	9	1,078,654
Assumption Change	December 31, 2009	2,003,000	18	1,613,142	9	213,529
Depooling Implementation	December 31, 2009	20,037,235	18	16,137,242	9	2,136,063
Actuarial Loss	December 31, 2010	18,178,489	18	15,361,379	10	1,861,091
Assumption Change ⁽²⁾	December 31, 2010	11,479,648	18	9,700,653	10	1,175,272
Actuarial Loss	December 31, 2011	10,514,535	18	9,230,343	11	1,033,777
Actuarial Loss	December 31, 2012	12,564,241	18	11,364,607	12	1,186,297
Assumption Change	December 31, 2012	22,455,342	18	20,311,306	12	2,120,201
UAAL Prepayment	December 31, 2012	(4,666,477)	18	(4,220,922)	12	(440,602)
Actuarial Loss	December 31, 2013	582,962	18	541,375	13	53,033
Assumption Change ⁽²⁾	December 31, 2013	(14,950,866)	18	(13,884,300)	13	(1,360,110)
UAAL Prepayment	December 31, 2013	(4,662,899)	18	(4,330,257)	13	(424,193)
Actuarial Gain	December 31, 2014	(11,848,823)	18	(11,231,275)	14	(1,038,537)
UAAL Prepayment	December 31, 2014	(2,331,896)	18	(2,210,360)	14	(204,388)
Actuarial Gain	December 31, 2015	(6,504,510)	18	(6,261,483)	15	(549,273)
Assumption Change	December 31, 2015	44,220	18	42,568	15	3,734
Actuarial Gain	December 31, 2016	(1,522,932)	18	(1,490,203)	16	(124,556)
Actuarial Gain	December 31, 2017	(1,621,926)	18	(1,607,103)	17	(128,477)
Actuarial Loss	December 31, 2018	5,331,336	18	5,331,336	18	409,016
Assumption Change	December 31, 2018	1,129,709	18	1,129,709	18	86,670
Subtotal – Cost Group #3				\$73,982,842		\$12,280,919

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #4 – Contra Costa Housing Authority						
Restart of Amortization	December 31, 2007	\$7,770,000	15	\$3,756,286	4	\$1,026,803
Actuarial Loss	December 31, 2008	1,573,513	18	1,193,182	8	174,698
Actuarial Loss	December 31, 2009	1,277,079	18	1,028,512	9	136,143
Assumption Change	December 31, 2009	425,000	18	342,279	9	45,307
Depooling Implementation	December 31, 2009	(189,275)	18	(152,435)	9	(20,178)
Actuarial Loss	December 31, 2010	619,697	18	523,663	10	63,444
Assumption Change ⁽²⁾	December 31, 2010	(920,656)	18	(777,982)	10	(94,256)
Actuarial Loss	December 31, 2011	1,059,328	18	929,947	11	104,152
Actuarial Loss	December 31, 2012	1,912,999	18	1,730,346	12	180,623
Assumption Change	December 31, 2012	3,722,862	18	3,367,403	12	351,507
Actuarial Gain	December 31, 2013	(2,220,704)	18	(2,062,283)	13	(202,022)
Assumption Change ⁽²⁾	December 31, 2013	(1,077,289)	18	(1,000,437)	13	(98,003)
Actuarial Gain	December 31, 2014	(1,360,021)	18	(1,289,138)	14	(119,204)
Actuarial Gain	December 31, 2015	(875,294)	18	(842,591)	15	(73,914)
Assumption Change	December 31, 2015	432,801	18	416,630	15	36,548
Actuarial Gain	December 31, 2016	(297,092)	18	(290,707)	16	(24,298)
Actuarial Loss	December 31, 2017	53,895	18	53,403	17	4,269
Actuarial Loss	December 31, 2018	527,741	18	527,741	18	40,488
Assumption Change	December 31, 2018	86,577	18	86,577	18	6,642
Subtotal – Cost Group #4				\$7,540,395		\$1,538,749

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #5 – Contra Costa County Fire Protection District						
Restart of Amortization	December 31, 2007	\$(1,011,000)	15	\$(488,752)	4	\$(133,603)
Actuarial Loss	December 31, 2008	45,963	18	34,853	8	5,103
Actuarial Loss	December 31, 2009	1,614,180	18	1,300,000	9	172,079
Assumption Change	December 31, 2009	336,000	18	270,602	9	35,819
Depooling Implementation	December 31, 2009	2,142,538	18	1,725,520	9	228,405
Actuarial Loss	December 31, 2010	2,722,306	18	2,300,432	10	278,706
Actuarial Loss	December 31, 2011	1,350,620	18	1,185,662	11	132,791
Actuarial Loss	December 31, 2012	1,787,426	18	1,616,762	12	168,766
Assumption Change	December 31, 2012	3,184,172	18	2,880,147	12	300,645
Actuarial Gain	December 31, 2013	(2,500,665)	18	(2,322,273)	13	(227,490)
Assumption Change ⁽²⁾	December 31, 2013	(985,653)	18	(915,338)	13	(89,667)
Actuarial Gain	December 31, 2014	(2,215,758)	18	(2,100,275)	14	(194,209)
Actuarial Gain	December 31, 2015	(756,551)	18	(728,284)	15	(63,887)
Assumption Change	December 31, 2015	355,946	18	342,647	15	30,058
Actuarial Loss	December 31, 2016	1,591,375	18	1,557,174	16	130,154
Actuarial Loss	December 31, 2017	1,476,313	18	1,462,820	17	116,943
Actuarial Loss	December 31, 2018	1,495,430	18	1,495,430	18	114,728
Assumption Change	December 31, 2018	606,920	18	<u>606,920</u>	18	<u>46,562</u>
Subtotal – Cost Group #5				\$10,224,049		\$1,051,903

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #6 – Small Districts (General Non-Enhanced)						
Actuarial Surplus ⁽²⁾	December 31, 2018	\$(498,374)		<u>\$(498,374)</u>	N/A	<u>\$0</u>
Subtotal – Cost Group #6				\$(498,374)		\$0

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Consistent with CCCERA's Actuarial Funding Policy, all prior UAAL layers are considered fully amortized due to surplus.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Groups #7 and #9 – County Safety						
Restart of Amortization	December 31, 2007	\$127,662,439	15	\$61,716,425	4	\$16,870,552
Actuarial Loss	December 31, 2008	25,619,265	18	19,426,877	8	2,844,359
Actuarial Loss	December 31, 2009	55,134,940	18	44,403,626	9	5,877,644
Assumption Change	December 31, 2009	11,076,665	18	8,920,733	9	1,180,825
Depooling Implementation	December 31, 2009	23,852,078	18	19,209,574	9	2,542,743
Actuarial Loss	December 31, 2010	57,287,975	18	48,410,089	10	5,865,071
Actuarial Loss	December 31, 2011	45,209,350	18	39,687,707	11	4,444,932
Actuarial Loss	December 31, 2012	53,258,503	18	48,173,381	12	5,028,590
Assumption Change	December 31, 2012	138,353,562	18	125,143,562	12	13,063,142
Actuarial Gain	December 31, 2013	(35,024,912)	18	(32,526,304)	13	(3,186,286)
Assumption Change ⁽²⁾	December 31, 2013	(43,771,706)	18	(40,649,118)	13	(3,981,999)
Actuarial Gain	December 31, 2014	(61,815,393)	18	(58,593,636)	14	(5,418,052)
Assumption Change ⁽³⁾	December 31, 2014	(51,701)	18	(49,006)	14	(4,531)
Actuarial Gain	December 31, 2015	(58,489,966)	18	(56,304,611)	15	(4,939,186)
Assumption Change	December 31, 2015	39,291,409	18	37,823,368	15	3,317,964
Actuarial Gain	December 31, 2016	(13,557,811)	18	(13,266,438)	16	(1,108,852)
Actuarial Gain	December 31, 2017	(8,178,240)	18	(8,103,494)	17	(647,819)
Actuarial Loss	December 31, 2018	41,037,406	18	41,037,406	18	3,148,355
Assumption Change	December 31, 2018	(47,713,599)	18	(47,713,599)	18	(3,660,547)
Subtotal – Cost Groups #7 and #9				\$236,746,543		\$41,236,905

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

⁽³⁾ Effective with the December 31, 2014 valuation, leave cashout (terminal pay) assumptions were eliminated for Cost Group #9.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #8 – Contra Costa and East Fire Protection Districts						
Restart of Amortization	December 31, 2007	\$124,138,710	15	\$60,012,933	4	\$16,404,892
Actuarial Loss	December 31, 2008	6,780,436	18	5,141,549	8	752,793
Actuarial Loss	December 31, 2009	27,018,706	18	21,759,859	9	2,880,321
Assumption Change	December 31, 2009	4,945,000	18	3,982,519	9	527,160
Depooling Implementation	December 31, 2009	47,818,666	18	38,511,371	9	5,097,694
Actuarial Loss	December 31, 2010	38,165,445	18	32,250,967	10	3,907,331
Assumption Change ⁽²⁾	December 31, 2010	(1,599,051)	18	(1,351,247)	10	(163,709)
Actuarial Loss	December 31, 2011	26,533,166	18	23,292,539	11	2,608,711
Actuarial Loss	December 31, 2012	31,501,440	18	28,493,682	12	2,974,320
Assumption Change	December 31, 2012	68,193,356	18	61,682,254	12	6,438,717
Actuarial Gain	December 31, 2013	(22,661,640)	18	(21,045,003)	13	(2,061,574)
Assumption Change ⁽²⁾	December 31, 2013	(17,910,676)	18	(16,632,963)	13	(1,629,370)
Actuarial Gain	December 31, 2014	(29,217,962)	18	(27,695,151)	14	(2,560,923)
Actuarial Gain	December 31, 2015	(19,005,510)	18	(18,295,409)	15	(1,604,921)
Assumption Change	December 31, 2015	24,296,846	18	23,389,045	15	2,051,748
Actuarial Gain	December 31, 2016	(8,297,685)	18	(8,119,358)	16	(678,642)
Actuarial Gain	December 31, 2017	(10,658,502)	18	(10,561,087)	17	(844,287)
Actuarial Loss	December 31, 2018	19,301,243	18	19,301,243	18	1,480,775
Assumption Change	December 31, 2018	(23,503,820)	18	(23,503,820)	18	(1,803,193)
Subtotal – Cost Group #8				\$190,613,921		\$33,777,843

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #10 – Moraga-Orinda Fire District						
Restart of Amortization	December 31, 2007	\$(2,591,000)	15	\$(1,252,579)	4	\$(342,400)
Actuarial Loss	December 31, 2008	2,002,150	18	1,518,214	8	222,287
Actuarial Loss	December 31, 2009	5,671,684	18	4,567,763	9	604,628
Assumption Change	December 31, 2009	1,012,000	18	815,027	9	107,884
Depooling Implementation	December 31, 2009	4,873,631	18	3,925,041	9	519,552
Actuarial Loss	December 31, 2010	5,334,964	18	4,508,208	10	546,187
Assumption Change ⁽²⁾	December 31, 2010	806,018	18	681,110	10	82,519
Actuarial Loss	December 31, 2011	6,791,005	18	5,961,586	11	667,684
Actuarial Loss	December 31, 2012	8,924,598	18	8,072,478	12	842,648
Assumption Change	December 31, 2012	12,149,892	18	10,989,820	12	1,147,175
Actuarial Gain	December 31, 2013	(1,027,440)	18	(954,144)	13	(93,468)
Assumption Change ⁽²⁾	December 31, 2013	(3,613,981)	18	(3,356,167)	13	(328,771)
Actuarial Gain	December 31, 2014	(4,813,045)	18	(4,562,193)	14	(421,858)
Actuarial Gain	December 31, 2015	(8,490,806)	18	(8,173,565)	15	(717,006)
Assumption Change	December 31, 2015	3,844,347	18	3,700,711	15	324,636
Actuarial Loss	December 31, 2016	1,028,690	18	1,006,582	16	84,133
Actuarial Gain	December 31, 2017	(422,995)	18	(419,129)	17	(33,506)
Actuarial Loss	December 31, 2018	6,029,055	18	6,029,055	18	462,544
Assumption Change	December 31, 2018	(4,116,542)	18	(4,116,542)	18	(315,818)
Subtotal – Cost Group #10				\$28,941,275		\$3,359,050

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #11 – San Ramon Valley Fire District						
Restart of Amortization	December 31, 2007	\$58,766,000	15	\$28,409,511	4	\$7,765,909
Actuarial Loss	December 31, 2008	10,216,694	18	7,747,235	8	1,134,301
Actuarial Loss	December 31, 2009	9,262,105	18	7,459,354	9	987,384
Assumption Change	December 31, 2009	2,453,000	18	1,975,555	9	261,501
Depooling Implementation	December 31, 2009	(20,174,500)	18	(16,247,790)	9	(2,150,696)
Actuarial Loss	December 31, 2010	6,585,812	18	5,565,212	10	674,247
Assumption Change ⁽²⁾	December 31, 2010	5,093,420	18	4,304,095	10	521,458
Actuarial Loss	December 31, 2011	5,513,071	18	4,839,732	11	542,039
Actuarial Loss	December 31, 2012	14,600,741	18	13,206,662	12	1,378,581
Assumption Change	December 31, 2012	26,672,143	18	24,125,486	12	2,518,345
Actuarial Gain	December 31, 2013	(4,492,900)	18	(4,172,385)	13	(408,728)
Assumption Change ⁽²⁾	December 31, 2013	(12,984,002)	18	(12,057,749)	13	(1,181,180)
Actuarial Gain	December 31, 2014	(13,850,852)	18	(13,128,960)	14	(1,214,012)
Actuarial Gain	December 31, 2015	(9,008,582)	18	(8,671,995)	15	(760,730)
Assumption Change	December 31, 2015	5,533,144	18	5,326,410	15	467,246
Actuarial Loss	December 31, 2016	2,020,042	18	1,976,629	16	165,213
UAAL Prepayment	December 31, 2017	(303,806)	18	(301,029)	17	(24,065)
Actuarial Gain	December 31, 2017	(1,837,378)	18	(1,820,585)	17	(145,543)
UAAL Prepayment	December 31, 2018	(261,501)	18	(261,501)	18	(20,062)
Actuarial Loss	December 31, 2018	11,681,729	18	11,681,729	18	896,212
Assumption Change	December 31, 2018	(9,240,163)	18	(9,240,163)	18	(708,898)
Subtotal – Cost Group #11				\$50,715,454		\$10,698,522

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #12 – Rodeo-Hercules Fire Protection District						
Restart of Amortization	December 31, 2007	\$3,960,000	15	\$1,914,401	4	\$523,313
Actuarial Loss	December 31, 2008	957,150	18	725,799	8	106,267
Actuarial Loss	December 31, 2009	2,872,360	18	2,313,292	9	306,207
Assumption Change	December 31, 2009	1,154,000	18	929,389	9	123,022
Depooling Implementation	December 31, 2009	(1,809,374)	18	(1,457,202)	9	(192,888)
Actuarial Loss	December 31, 2010	1,502,503	18	1,269,661	10	153,824
Assumption Change ⁽²⁾	December 31, 2010	662,085	18	559,482	10	67,783
Actuarial Loss	December 31, 2011	2,067,217	18	1,814,738	11	203,246
Actuarial Loss	December 31, 2012	2,246,131	18	2,031,670	12	212,076
Assumption Change	December 31, 2012	3,018,796	18	2,730,561	12	285,030
Actuarial Loss	December 31, 2013	413,088	18	383,619	13	37,579
Assumption Change ⁽²⁾	December 31, 2013	(1,169,821)	18	(1,086,368)	13	(106,421)
Actuarial Loss	December 31, 2014	315,937	18	299,470	14	27,692
Actuarial Gain	December 31, 2015	(990,379)	18	(953,376)	15	(83,633)
Assumption Change	December 31, 2015	775,874	18	746,885	15	65,519
Actuarial Gain	December 31, 2016	(270,731)	18	(264,913)	16	(22,142)
Actuarial Gain	December 31, 2017	(836,969)	18	(829,319)	17	(66,298)
Actuarial Gain	December 31, 2018	(71,915)	18	(71,915)	18	(5,517)
Assumption Change	December 31, 2018	(985,876)	18	(985,876)	18	(75,636)
Subtotal – Cost Group #12				\$10,069,997		\$1,559,023

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Special Adjustments						
County General POBs	December 31, 2007	\$(453,973,319)	15	\$(219,465,612)	4	\$(59,992,229)
Moraga General POBs	December 31, 2007	(701,412)	15	(339,085)	4	(92,691)
CCCFFD Safety POBs	December 31, 2007	(127,509,711)	15	(61,642,383)	4	(16,850,312)
First Five UAAL Prepayment	December 31, 2011	(1,794,205)	11	(814,898)	4	(233,191)
LAFCO UAAL Prepayment	December 31, 2017	(30,817)	18	(30,535)	17	(2,441)
Subtotal – Special Adjustments				\$(282,292,513)		\$(77,170,864)

Note: Results may be slightly off 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.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
All Cost Groups Combined						
Restart of Amortization	December 31, 2007	\$1,139,949,302	15	\$551,090,799	4	\$150,643,946
County General POBs ⁽²⁾	December 31, 2007	(453,973,319)	15	(219,465,612)	4	(59,992,229)
Moraga General POBs ⁽²⁾	December 31, 2007	(701,412)	15	(339,085)	4	(92,691)
CCCFPD Safety POBs ⁽²⁾	December 31, 2007	(127,509,711)	15	(61,642,383)	4	(16,850,312)
Actuarial Loss	December 31, 2008	130,938,206	18	99,289,360	8	14,537,313
Actuarial Loss	December 31, 2009	278,010,637	18	223,899,405	9	29,637,240
Assumption Change	December 31, 2009	62,968,491	18	50,712,476	9	6,712,737
Depooling Implementation	December 31, 2009	1,849,086	18	1,489,185	9	197,120
Actuarial Loss	December 31, 2010	283,467,735	18	239,538,896	10	29,021,072
Assumption Change ⁽³⁾	December 31, 2010	15,521,464	18	13,116,111	10	1,589,067
Actuarial Loss	December 31, 2011	193,788,371	18	170,120,032	11	19,053,051
First Five UAAL Prepayment ⁽²⁾	December 31, 2011	(1,794,205)	11	(814,898)	4	(233,191)
Actuarial Loss	December 31, 2012	243,825,195	18	220,544,763	12	23,021,620
Assumption Change	December 31, 2012	566,553,007	18	512,458,520	12	53,493,110
Sanitary UAAL Prepayment	December 31, 2012	(4,666,477)	18	(4,220,922)	12	(440,602)
Actuarial Gain	December 31, 2013	(201,742,323)	18	(187,350,419)	13	(18,352,899)
Assumption Change ⁽³⁾	December 31, 2013	(204,017,283)	18	(189,463,087)	13	(18,559,857)
Sanitary UAAL Prepayment	December 31, 2013	(4,662,899)	18	(4,330,257)	13	(424,193)
Actuarial Gain	December 31, 2014	(296,704,729)	18	(281,240,774)	14	(26,005,848)
Assumption Change ⁽⁴⁾	December 31, 2014	(51,701)	18	(49,006)	14	(4,531)
Sanitary UAAL Prepayment	December 31, 2014	(2,331,896)	18	(2,210,360)	14	(204,388)

Note: Results may be slightly off 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⁾ 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.

⁽³⁾ 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⁾ Effective with the December 31, 2014 valuation, leave cashout (terminal pay) assumptions were eliminated for Cost Group #9.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
All Cost Groups Combined (continued)						
Actuarial Gain	December 31, 2015	\$(209,125,132)	18	\$(201,311,609)	15	\$(17,659,575)
Assumption Change	December 31, 2015	114,389,471	18	110,115,548	15	9,659,622
Actuarial Gain	December 31, 2016	(47,885,171)	18	(46,856,063)	16	(3,916,381)
San Ramon UAAL Prepayment	December 31, 2017	(303,806)	18	(301,029)	17	(24,065)
LAFCO UAAL Prepayment ⁽²⁾	December 31, 2017	(30,817)	18	(30,535)	17	(2,441)
Actuarial Gain	December 31, 2017	(39,963,440)	18	(39,598,187)	17	(3,165,604)
San Ramon UAAL Prepayment	December 31, 2018	(261,501)	18	(261,501)	18	(20,062)
Actuarial Loss	December 31, 2018	160,596,072	18	160,596,072	18	12,320,796
Assumption Change	December 31, 2018	(89,758,477)	18	(89,758,477)	18	(6,886,196)
CG #6 Actuarial Surplus ⁽⁵⁾	December 31, 2018	(498,374)	N/A	(498,374)	N/A	0
Subtotal – All Cost Groups				\$1,023,228,588		\$177,051,629
Terminated Employers ⁽⁶⁾				8,736,936		
Total CCCERA				\$1,031,965,524		

Note: Results may be slightly off 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) 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.
- (3) 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) Effective with the December 31, 2014 valuation, leave cashout (terminal pay) assumptions were eliminated for Cost Group #9.
- (5) Consistent with CCCERA's Actuarial Funding Policy, all prior UAAL layers are considered fully amortized due to surplus.
- (6) 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.

EXHIBIT J – PROJECTION OF UAAL BALANCES AND PAYMENTS

Outstanding Balance of \$1,023 Million in Net UAAL as of December 31, 2018

Excludes Terminated Employers

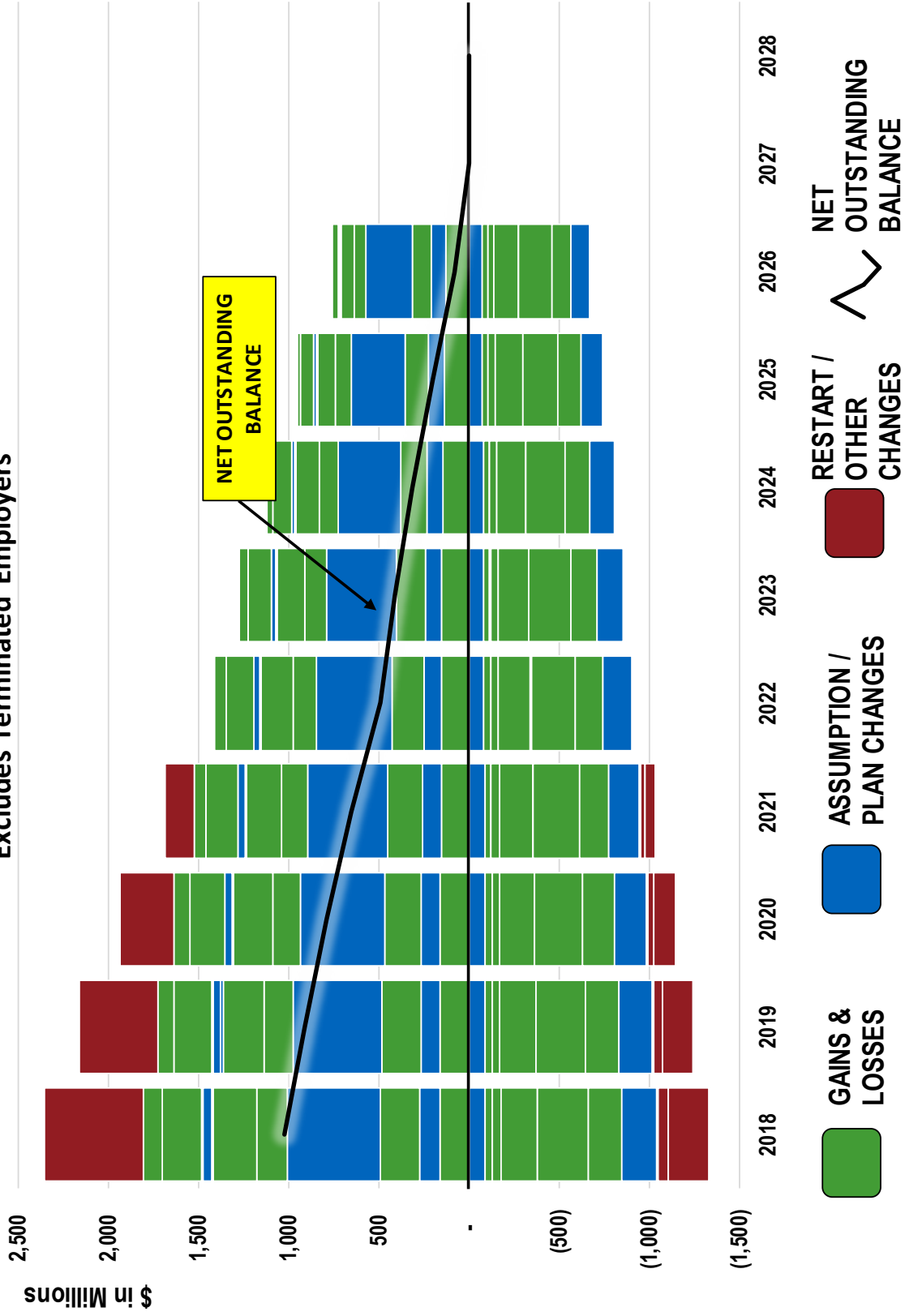


EXHIBIT J – PROJECTION OF UAAL BALANCES AND PAYMENTS (CONTINUED)

Annual Payments Required to Amortize \$1,023 Million in Net UAAL as of December 31, 2018
Excludes Terminated Employers

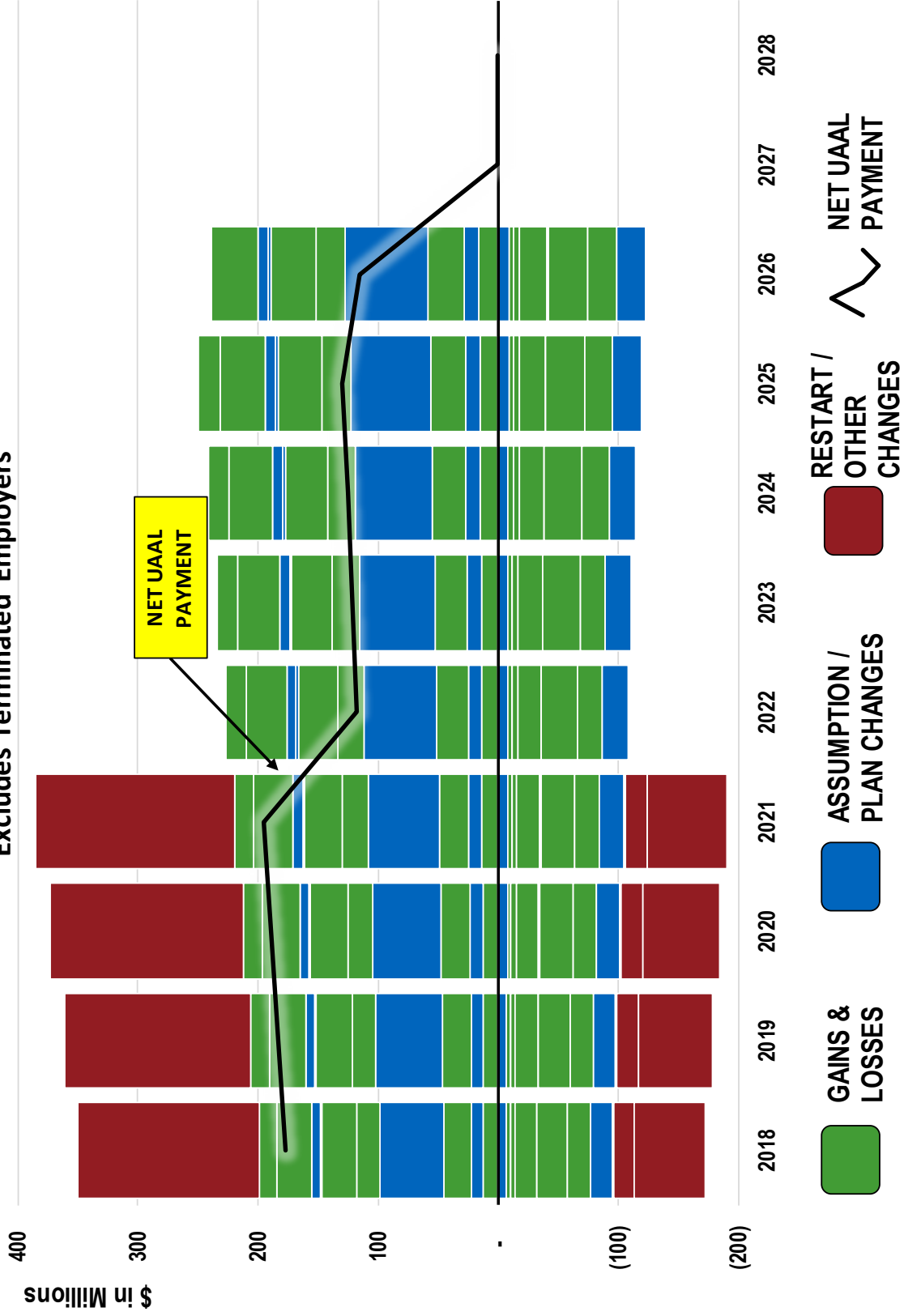


EXHIBIT K – DEFINITION OF PENSION TERMS

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

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated Normal Costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	Actuarial Present Value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the recommended contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected.
Actuarially Equivalent:	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Benefits:

The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation:

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan, as well as Actuarially Determined Contributions.

Actuarial Value of Assets (AVA):

The value of the Plan's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution.

Actuarially Determined:

Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the Plan.

Actuarially Determined Contribution (ADC):

The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the employer Normal Cost and the Amortization Payment.

Amortization Method:

A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment:

The portion of the pension plan contribution, or ADC, that is intended to payoff the Unfunded Actuarial Accrued Liability.

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

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

Section 4: Actuarial Valuation Basis

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND METHODS

Rationale for Assumptions:

The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the January 1, 2015 through December 31, 2017 Actuarial Experience Study report dated April 23, 2019. Unless otherwise noted, all actuarial assumptions and methods shown below apply to all tiers. These assumptions were adopted by the Board.

Economic Assumptions

Net Investment Return: 7.00%; net of investment expenses.

Based on the Actuarial Experience Study referenced above, expected investment expenses represent about 0.65% of the Actuarial Value of Assets.

Administrative Expenses:

1.10% 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.

For the 2018 calendar year, actual administrative expenses were \$9,337,053 and actual payroll was \$850,929,106. This results in the administrative expense assumption of 1.10% of payroll, allocated between employers and members as shown below:

Average Normal Cost Rate		Before Administrative Expense		Weighting		Total Loading	
Average Normal Cost Rate Before Administrative Expense		Weighting		Total Loading			
Employer	15.33%	57.12%	0.63%				
Member	11.51%	42.88%	0.47%				
Total		100.00%	1.10%				

The employer Normal Cost rate is then increased by the same percent of payroll as the basic 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 PEPRAs tiers. The table below shows this allocation.

Allocation of Administrative Expense Load as a % of Payroll

Addition to Employer Basic Normal Cost Rate	0.47%
Addition to Employer Basic UAAL Rate	0.16%
Addition to Member Basic Rate	0.47%
Total Addition to Contribution Rates	1.10%

Employee Contribution Crediting Rate:	7.00%, compounded semi-annually.
Consumer Price Index:	Increases of 2.75% per year. Benefits for General Tier 1, Tier 3 (non-disability), Tier 4 and Tier 5 (non-disability) and Safety Tier A and Tier D are subject to a 3.00% maximum COLA increase due to CPI per year (valued as a 2.75% increase). Benefits for General Tier 2, Tier 3 (disability) and Tier 5 (disability) are subject to a 4.00% maximum change per year (valued as a 2.75% increase). Benefits for General Tier 4 and Tier 5 members covered under certain memoranda of understanding and Safety Tier C and Tier E are subject to a 2.00% maximum change per year (valued as a 2.00% increase). For members that have COLA banks, they are reflected in projected future COLAs. The actual COLA granted by CCCERA on April 1, 2019 has been reflected for nonactive members in the December 31, 2018 valuation.
Payroll Growth:	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
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.

Salary Increases:

The annual rate of compensation increase includes: inflation at 2.75%, plus “across the board” real salary increases of 0.50% per year, plus the following merit and promotion increases:

Merit and Promotion Increases		
Years of Service	Rate (%)	
	General	Safety
Less than 1	12.00	13.00
1 – 2	7.00	8.00
2 – 3	5.25	5.75
3 – 4	3.75	4.75
4 – 5	2.75	2.75
5 – 6	2.25	2.00
6 – 7	1.75	1.75
7 – 8	1.50	1.50
8 – 9	1.40	1.40
9 – 10	1.30	1.30
10 – 11	1.20	1.25
11 – 12	1.10	1.20
12 – 13	1.00	1.15
13 – 14	0.90	1.10
14 – 15	0.80	1.05
15 – 16	0.75	1.00
16 – 17	0.70	1.00
17 – 18	0.65	1.00
18 – 19	0.60	1.00
19 – 20	0.55	1.00
20 & Over	0.50	1.00

The average total assumed salary increase for active members in the December 31, 2018 actuarial valuation is 5.7%.

Demographic Assumptions

Post-Retirement Mortality Rates:

Healthy

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **All Beneficiaries:** Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

The Pub-2010 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

Pre-Retirement Mortality Rates:

- **General Members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.

Age	Rate (%)			
	General ⁽¹⁾		Safety ⁽¹⁾	
	Male	Female	Male	Female
20	0.04	0.01	0.04	0.02
25	0.02	0.01	0.03	0.02
30	0.03	0.01	0.04	0.02
35	0.04	0.02	0.04	0.03
40	0.06	0.03	0.05	0.04
45	0.09	0.05	0.07	0.06
50	0.13	0.08	0.10	0.08
55	0.19	0.11	0.15	0.11
60	0.28	0.17	0.23	0.14
65	0.41	0.27	0.35	0.20
70	0.61	0.44	0.66	0.39

⁽¹⁾ Generational projections beyond the base year (2010) are not reflected in the above mortality rates. All pre-retirement deaths are assumed to be non-service connected.

Mortality Rates for Member Contributions:

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years with the two-dimensional mortality improvement scale MP-2018, weighted 30% male and 70% female.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected 30 years with the two-dimensional mortality improvement scale MP-2018, weighted 85% male and 15% female.

Disability Incidence:

Disability Incidence				
Rate (%)				
Age	General Tier 1 and Tier 4	General Tier 3 and Tier 5	Safety	
20	0.01	0.01	0.02	0.02
25	0.02	0.02	0.16	0.16
30	0.04	0.03	0.32	0.32
35	0.08	0.05	0.46	0.46
40	0.22	0.08	0.56	0.56
45	0.36	0.11	0.90	0.90
50	0.52	0.13	2.54	2.54
55	0.60	0.16	3.80	3.80
60	0.60	0.22	4.30	4.30
65	0.60	0.25	4.50	4.50
70	0.60	0.25	4.50	4.50

60% of General Tier 1 and Tier 4 disabilities are assumed to be service connected disabilities. The other 40% are assumed to be non-service connected disabilities.

30% of General Tier 3 and Tier 5 disabilities are assumed to be service connected disabilities. The other 70% are assumed to be non-service connected disabilities.

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

Termination:

Years of Service	Termination		
	General	Safety	
Less than 1	14.00	12.50	
1 – 2	9.50	10.00	
2 – 3	9.25	8.25	
3 – 4	6.50	5.75	
4 – 5	5.25	5.00	
5 – 6	5.00	4.25	
6 – 7	4.50	3.50	
7 – 8	4.25	3.25	
8 – 9	3.75	3.00	
9 – 10	3.50	2.50	
10 – 11	3.25	2.25	
11 – 12	3.00	2.10	
12 – 13	2.75	2.00	
13 – 14	2.50	1.90	
14 – 15	2.50	1.80	
15 – 16	2.25	1.70	
16 – 17	2.25	1.60	
17 – 18	2.00	1.50	
18 – 19	2.00	1.25	
19 – 20	1.75	1.00	
20 & Over	1.25	0.75	

The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit.

No termination is assumed after a member is first assumed to retire.

Retirement Rates (General):

Age	Retirement Rates (%)					
	Tier 1 Enhanced		Tier 3 Enhanced			
	Less than 30 Years of Service	Over 30 Years of Service	Less than 30 Years of Service	Over 30 Years of Service	Tier 1 Non-Enhanced	PEPRA Tier 4 and Tier 5
50	5.00	9.00	4.00	7.20	3.00	0.00
51	4.00	7.20	3.00	5.40	3.00	0.00
52	4.00	7.20	3.00	5.40	3.00	2.00
53	4.00	7.20	4.00	7.20	3.00	3.00
54	12.00	21.60	6.00	10.80	3.00	3.00
55	15.00	27.00	8.00	14.40	10.00	5.00
56	17.00	30.60	8.00	9.60	10.00	5.00
57	17.00	30.60	9.00	10.80	10.00	6.00
58	17.00	30.60	10.00	12.00	10.00	6.00
59	22.00	26.40	12.00	14.40	10.00	8.00
60	25.00	30.00	13.00	15.60	25.00	8.00
61	30.00	36.00	18.00	21.60	15.00	12.00
62	30.00	36.00	22.00	26.40	40.00	18.00
63	25.00	30.00	22.00	26.40	35.00	18.00
64	25.00	30.00	25.00	30.00	30.00	20.00
65	35.00	35.00	32.00	32.00	40.00	25.00
66	40.00	40.00	32.00	32.00	35.00	25.00
67	40.00	40.00	30.00	30.00	35.00	25.00
68	40.00	40.00	30.00	30.00	35.00	25.00
69	40.00	40.00	30.00	30.00	35.00	25.00
70	35.00	35.00	35.00	35.00	40.00	40.00
71	35.00	35.00	35.00	35.00	40.00	40.00
72	35.00	35.00	35.00	35.00	40.00	40.00
73	35.00	35.00	35.00	35.00	50.00	40.00
74	35.00	35.00	35.00	35.00	50.00	40.00
75 & Over	100.00	100.00	100.00	100.00	100.00	100.00

Retirement Rates (Safety):

Age	Retirement Rates (%)			
	Tier A Enhanced		Tier C Enhanced	Tier A Non-Enhanced and PEPR A Tier D and Tier E
	Less than 30 Years of Service	Over 30 Years of Service		
45	7.00	8.75	2.00	0.00
46	3.00	3.75	1.00	0.00
47	10.00	12.50	4.00	0.00
48	10.00	12.50	4.00	0.00
49	25.00	31.25	12.00	0.00
50	25.00	31.25	18.00	5.00
51	25.00	31.25	18.00	4.00
52	18.00	22.50	15.00	4.00
53	18.00	22.50	15.00	5.00
54	18.00	22.50	15.00	6.00
55	20.00	30.00	18.00	10.00
56	20.00	30.00	15.00	10.00
57	22.00	33.00	15.00	18.00
58	22.00	33.00	25.00	18.00
59	22.00	33.00	25.00	18.00
60	25.00	37.50	25.00	18.00
61	25.00	37.50	25.00	20.00
62	25.00	37.50	25.00	20.00
63	30.00	45.00	30.00	20.00
64	40.00	60.00	35.00	25.00
65 & Over	100.00	100.00	100.00	100.00

Retirement Age and Benefit for Deferred Vested Members:

General: 59
 Safety with Reciprocity: 53
 Safety without Reciprocity: 50

40% of future General and 70% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 3.75% and 4.25% compensation increases are assumed per annum for General and Safety, respectively.

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.																										
Definition of Active Members:	All active members of CCCERA as of the valuation date.																										
Form of Payment:	All active and inactive members are assumed to elect the unmodified option at retirement. There is no explicit assumption for children's benefits.																										
Percent Married:	For all active and inactive members, 65% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement.																										
Age and Gender of Spouse:	For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.																										
Offsets by Other Plans of the Employer for Disability Benefits:	The Plan requires members who retire because of disability from General Tier 3 and General PEPPRA Tier 5 to offset the Plan's disability benefits with other Plans of the employer. We have not assumed any offsets in this valuation.																										
Leave Cashout Assumptions:	<p>The following assumptions for leave cashouts as a percentage of final average pay are used:</p> <p><i>General Tiers 1, 2 and 3 Safety Tiers A and C</i></p> <table border="0"> <tr> <td>Cost Group 1</td> <td>1.00%</td> </tr> <tr> <td>Cost Group 2</td> <td>0.50% for Tier 2 0.75% for Tier 3</td> </tr> <tr> <td>Cost Group 3</td> <td>4.75%</td> </tr> <tr> <td>Cost Group 4</td> <td>0.50%</td> </tr> <tr> <td>Cost Group 5</td> <td>1.25%</td> </tr> <tr> <td>Cost Group 6</td> <td>0.25%</td> </tr> <tr> <td>Cost Group 7</td> <td>0.75%</td> </tr> <tr> <td>Cost Group 8</td> <td>0.50%</td> </tr> <tr> <td>Cost Group 9</td> <td>0.00%</td> </tr> <tr> <td>Cost Group 10</td> <td>0.50%</td> </tr> <tr> <td>Cost Group 11</td> <td>2.50%</td> </tr> <tr> <td>Cost Group 12</td> <td>2.00%</td> </tr> <tr> <td>Terminated Employers</td> <td>0.00%</td> </tr> </table> <p><i>General PEPPRA Tiers 4 and 5 Safety PEPPRA Tiers D and E</i></p> <p>None</p>	Cost Group 1	1.00%	Cost Group 2	0.50% for Tier 2 0.75% for Tier 3	Cost Group 3	4.75%	Cost Group 4	0.50%	Cost Group 5	1.25%	Cost Group 6	0.25%	Cost Group 7	0.75%	Cost Group 8	0.50%	Cost Group 9	0.00%	Cost Group 10	0.50%	Cost Group 11	2.50%	Cost Group 12	2.00%	Terminated Employers	0.00%
Cost Group 1	1.00%																										
Cost Group 2	0.50% for Tier 2 0.75% for Tier 3																										
Cost Group 3	4.75%																										
Cost Group 4	0.50%																										
Cost Group 5	1.25%																										
Cost Group 6	0.25%																										
Cost Group 7	0.75%																										
Cost Group 8	0.50%																										
Cost Group 9	0.00%																										
Cost Group 10	0.50%																										
Cost Group 11	2.50%																										
Cost Group 12	2.00%																										
Terminated Employers	0.00%																										

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: 1.10%
- Safety: 1.80%

Disability Retirements:

- General: 0.06%
- Safety: 1.20%

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 Funding Policy

Actuarial Cost Method:

Entry Age Actuarial Cost Method. Entry Age is the age on the valuation date minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percentage of compensation, as if the current benefit formula for each individual has always been in effect (i.e., "replacement life within a tier").

Actuarial Value of Assets:

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

Valuation Value of Assets:

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

Amortization Policy:

The UAAL 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.

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 VVA exceeds the AAL, so that the total of all UAAL amortization layers becomes 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.

Other Actuarial Methods

Employer Contributions:

Employer contributions consist of two components:

Normal Cost

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

Contribution to the Unfunded Actuarial Accrued Liability (UAAL)

The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the Association) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase at the annual rate of 3.25% (i.e., 2.75% inflation plus 0.50% “across the board” salary increase).

The amortization policy is described on the previous page.

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

General Tier 4 (2% COLA)

The General Tier 4 (2% COLA) in Cost Group #1 continues to not have any actual members as of December 31, 2018. 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 PEPRAs 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.

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 member's basic contribution rate is determined so that, if paid annually from a member's first year of membership through the prescribed retirement age, would accumulate to the amount necessary to fund an annuity that 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 members
- 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 nonrefundable basis. Members also pay 50% of the cost-of-living benefit. For most Safety Tier A employees, Safety members also subvent a portion of the employer rate, currently up to 9% of compensation (depending on their MOU).

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.

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.

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

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 in *Section 4, Exhibit V*. 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. 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.

Additional Contribution Rate Adjustments:

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, 2018 are as follows:

	County General	Moraga General	First Five General	LAFCO General	CCCFPD Safety
Basic	\$121,836,665	\$214,558	\$463,954	\$22,200	\$34,971,530
COL	\$97,628,947	\$124,527	\$350,944	\$8,335	\$26,670,852

**Internal Revenue Code
Section 415:**

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

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

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$225,000 for 2019. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions.

Non-PEPRA 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.

Changed Actuarial Assumptions: The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Administrative Expenses:

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.

**Changed Actuarial Assumptions
(continued):**

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Salary Increases:

The annual rate of compensation increase includes: inflation at 2.75%, plus “across the board” salary increases of 0.50% per year, plus the following merit and promotion increases:

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

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Post-Retirement Mortality Rates:

Healthy

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional scale MP-2015.
 - **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back three years, projected generationally with the two-dimensional scale MP-2015.
 - **All Beneficiaries:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional scale MP-2015.
- Disabled*
- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward eight years, projected generationally with the two-dimensional scale MP-2015.
 - **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward three years, projected generationally with the two-dimensional scale MP-2015.

Pre-Retirement Mortality Rates:

- **General and Safety Members:** Headcount-Weighted RP-2014 Employee Mortality Table multiplied by 75%, projected generationally with the two-dimensional scale MP-2015.

Age	Rate (%)			
	General ⁽¹⁾		Safety ⁽¹⁾	
	Male	Female	Male	Female
25	0.05	0.02	0.05	0.02
30	0.05	0.02	0.05	0.02
35	0.05	0.03	0.05	0.03
40	0.06	0.04	0.06	0.04
45	0.09	0.06	0.09	0.06
50	0.16	0.10	0.16	0.10
55	0.26	0.16	0.26	0.16
60	0.42	0.23	0.42	0.23
65	0.73	0.33	0.73	0.33

⁽¹⁾ Generational projections beyond the base year (2014) are not reflected in the above mortality rates. All pre-retirement deaths are assumed to be non-service connected.

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Mortality Rates for Member Contributions:

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

Disability Incidence:

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

65% of General Tier 1 and Tier 4 disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected disabilities.

30% of General Tier 3 and Tier 5 disabilities are assumed to be service connected disabilities. The other 70% are assumed to be non-service connected disabilities.

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

**Changed Actuarial Assumptions
(continued):**

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Termination:

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

The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit.

No termination is assumed after a member is first assumed to retire.

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Retirement Rates (General):

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

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Retirement Rates (Safety):

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

Retirement Age and Benefit for Deferred Vested Members:

General: 59
 Safety: 54

40% of future General and 65% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 4.75% compensation increases are assumed per annum for both General and Safety.

Percent Married:

For all active and inactive members, 75% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement.

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

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%
Terminated Employers	0.00%

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

None

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.

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

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

Plan Year:	January 1 through December 31
Membership Eligibility:	
<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>General PEPRA 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>General PEPRA 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 Tier A and Tier 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>Safety PEPRA Tier D and Tier 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.
Final Compensation for Benefit Determination:	
<i>General Tier 1 and Tier 3 (non-disability), Safety Tier A</i>	Highest consecutive 12 months of compensation earnable. (§31462.1) (FAS1)
<i>General Tier 2 and Tier 3 (disability), Safety Tier C</i>	Highest consecutive 36 months of compensation earnable. (§31462) (FAS3)
<i>General Tier 4 and Tier 5, Safety Tier D and Tier E</i>	Highest consecutive 36 months of pensionable compensation. (§7522.10(c), §7522.32 and §7522.34) (FAS3)

Compensation Limit:	General Tier 1, Tier 2 and Tier 3, Safety Tier A and Tier C	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 \$280,000 for calendar year 2019. The limit is indexed for inflation on an annual basis.												
	General Tier 4 and Tier 5, Safety Tier D and Tier E	Pensionable Compensation is limited to \$124,180 for 2019 (\$149,016, if not enrolled in Social Security). The limit is indexed for inflation on an annual basis.												
Social Security Primary Insurance Amount:	General Tier 2	Estimated Social Security award at age 62 assuming level future earnings. (PIA)												
Service:	All Tiers	Years of service (Yrs) are generally based on a member's employment during a period of time for which deductions are made from their compensation. Includes accumulated sick leave as of the date of retirement. (\$31641.01)												
	General Tier 2	Maximum of 30 years (Yrs30).												
Service Retirement Eligibility:	General Tier 1, Tier 2, and Tier 3	Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years of service regardless of age. (\$31672)												
	General Tier 4 and Tier 5	Age 52 with 5 years of service or age 70 regardless of service. (\$7522.20(a) and \$31672.3)												
	Safety Tier A and Tier C	Age 50 with 10 years of service, or age 70 regardless of service, or after 20 years of service regardless of age. (\$31663.25)												
	Safety Tier D and Tier E	Age 50 with 5 years of service or age 70 regardless of service. (\$7522.25(a)) and \$31672.3)												
Benefit Formula:	General Tier 1 and Tier 3 (Non-Enhanced) (\$31676.11)	The offsets shown in all benefit formulas only apply to members integrated with Social Security.												
		<table border="1"> <thead> <tr> <th data-bbox="1088 157 1120 315">Retirement Age</th> <th data-bbox="1088 157 1120 315">Benefit Formula</th> </tr> </thead> <tbody> <tr> <td data-bbox="1128 157 1161 315">50</td> <td data-bbox="1128 157 1161 315">1.24% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td data-bbox="1177 157 1209 315">55</td> <td data-bbox="1177 157 1209 315">1.67% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td data-bbox="1226 157 1258 315">60</td> <td data-bbox="1226 157 1258 315">2.18% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td data-bbox="1274 157 1307 315">62</td> <td data-bbox="1274 157 1307 315">2.35% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td data-bbox="1323 157 1356 315">65 & Over</td> <td data-bbox="1323 157 1356 315">2.61% x (FAS1 – \$1,400) x Yrs</td> </tr> </tbody> </table>	Retirement Age	Benefit Formula	50	1.24% x (FAS1 – \$1,400) x Yrs	55	1.67% x (FAS1 – \$1,400) x Yrs	60	2.18% x (FAS1 – \$1,400) x Yrs	62	2.35% x (FAS1 – \$1,400) x Yrs	65 & Over	2.61% x (FAS1 – \$1,400) x Yrs
Retirement Age	Benefit Formula													
50	1.24% x (FAS1 – \$1,400) x Yrs													
55	1.67% x (FAS1 – \$1,400) x Yrs													
60	2.18% x (FAS1 – \$1,400) x Yrs													
62	2.35% x (FAS1 – \$1,400) x Yrs													
65 & Over	2.61% x (FAS1 – \$1,400) x Yrs													

**General Tier 1 and Tier 3
(Enhanced) (\$31676.16)**

Retirement Age	Benefit Formula
50	1.43% x (FAS1 – \$1,400) x Yrs
55	2.00% x (FAS1 – \$1,400) x Yrs
60	2.26% x (FAS1 – \$1,400) x Yrs
62	2.37% x (FAS1 – \$1,400) x Yrs
65 & Over	2.42% x (FAS1 – \$1,400) x 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.

General Tier 2 (\$31752)

Retirement Age	Benefit Formula
50	0.83% x FAS3 x Yrs – 0.57% x Yrs30 x PIA
55	1.13% x FAS3 x Yrs – 0.87% x Yrs30 x PIA
60	1.43% x FAS3 x Yrs – 1.37% x Yrs30 x PIA
62	1.55% x FAS3 x Yrs – 1.67% x Yrs30 x PIA
65 & Over	1.73% x FAS3 x Yrs – 1.67% x Yrs30 x PIA

**General Tier 4 and Tier 5
(\$7522.20(a))**

Retirement Age	Benefit Formula
52	1.00% x FAS3 x Yrs
55	1.30% x FAS3 x Yrs
60	1.80% x FAS3 x Yrs
62	2.00% x FAS3 x Yrs
65	2.30% x FAS3 x Yrs
67 & Over	2.50% x FAS3 x Yrs

**Safety Tier A (Non-Enhanced)
(\$31664)**

Retirement Age	Benefit Formula
50	2.00% x FAS1 x Yrs
55 & Over	2.62% x FAS1 x Yrs

**Safety Tier A (Enhanced)
(\$31664.1)**

Retirement Age	Benefit Formula
50 & Over	3.00% x FAS1 x Yrs

<i>Safety Tier C (Enhanced)</i> (§31664.1)	Retirement Age 50 & Over	Benefit Formula 3.00% x FAS3 x Yrs
<i>Safety Tier D and Tier E</i> (§7522.25(d))	Retirement Age 50 55 57 & Over	Benefit Formula 2.00% x FAS3 x Yrs 2.50% x FAS3 x Yrs 2.70% x FAS3 x Yrs
Maximum Benefit:		
<i>General Tier 1 and Tier 3, Safety Tier 1 and Tier C</i>		100% of Final Compensation. (§31676.11, §31676.16, §31664, §31664.1)
<i>General Tier 2, Tier 4 and Tier 5, Safety Tier D and Tier E</i>		None.
Non-Service Connected Disability:		
<i>General Tier 1 and Tier 4</i>		
<i>Eligibility</i>		Five years of service. (§31720)
<i>Benefit Formula</i>		1.5% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to age 65, but the total projected benefit cannot be more than one-third of Final Compensation. (§31727)
<i>General Tier 2, Tier 3 and Tier 5</i>		
<i>Eligibility</i>		Ten years of service. (§31720.1)
<i>Benefit Formula</i>		40% of Final Compensation plus 10% of Final Compensation used in the benefit determination for each minor child (maximum of three). (§31727.01)
<i>Offset</i>		Disability benefits are offset by other plans of the employer except Workers Compensation and Social Security.
<i>Safety</i>		
<i>Eligibility</i>		Five years of service (§31720).
<i>Benefit Formula</i>		1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to age 55, but the total projected benefit cannot be more than one-third of Final Compensation. (§31727.2)

Service Connected Disability:

*General Tier 1 and Tier 4,
Safety*

Eligibility

No age or service requirements. (§31720)

Benefit Formula

50% of the Final Compensation. (§31727.4)

General Tier 2, Tier 3, and Tier 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.

Pre-Retirement Death:

*General Tier 1, Tier 3, Tier 4,
and Tier 5,
Safety*

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).

Eligibility – B

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

Benefit – B

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

Death in line of duty

50% of Final Compensation payable to spouse. (§31787)

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);

Eligibility – B

Ten years of service.

Benefit – B

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

Death in line of duty

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.

Death After Retirement:

General Tier 1, Tier 3, Tier 4, and Tier 5, Safety

Service Retirement or Non-Service Connected Disability Retirement

Unless another option was selected at retirement, 60% of member's unmodified allowance continues to eligible spouse. An eligible spouse is a surviving spouse who was married to the member at least one year prior to the 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)

Service Connected Disability

Unless another option was selected at retirement, 100% of member's 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 Retirement or Non-Service Connected Disability Retirement

Unless another option was selected at retirement, 60% of member's unmodified allowance continues to eligible spouse plus 20% of allowance to each minor child. (§31789.11) Maximum benefit is 100% of allowance. An additional lump sum benefit of \$5,000 (§31789.5) plus \$2,000 less any Social Security lump sum payment (§31789.01) are payable to the member's beneficiary.

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)

Post-Retirement Cost-of-Living Benefits:

General Tier 1, Tier 3 (non-disability), Tier 4, and Tier 5, Safety Tier A and Tier D

Future changes based on Consumer Price Index to a maximum of 3% per year, excess "banked."

General Tier 2, Tier 3 (disability) and Tier 5 (disability)

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

General Tier 4 and Tier 5 (under certain MOUs), Safety Tier C and Tier E

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

Member Contributions:	Please refer to <i>Section 4, Exhibit III</i> for specific rates.
<i>General Tier 1 and Tier 3 (Non-Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for one-half of the §31676.11 benefit payable at age 55.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>General Tier 1 and Tier 3 (Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/120 of FAS1.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs. 50% of the total Normal Cost rate.
<i>General Tier 4 and Tier 5</i>	
<i>Safety Tier A (Non-Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for one-half of the §31664 benefit payable at age 50.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Safety Tier A (Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/100 of FAS1.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Safety Tier C (Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/100 of FAS3.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs. 50% of the total Normal Cost rate.
Other Information:	Transfers from Tier 1 to Tier 2 were made on an individual voluntary irrevocable basis. Credit is given under Tier 2 for future service only. The Cost-of-Living maximum is 4% only for the credit under Tier 2. Transferred Tier 2 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.
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.
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

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

EXHIBIT III – MEMBER CONTRIBUTION RATES

General Cost Group #1 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013							
Entry Age	Basic			COLA			Total
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350	Over \$350
15	3.69%	5.30%	1.67%	2.51%	5.36%	7.81%	
16	3.75%	5.39%	1.71%	2.56%	5.46%	7.95%	
17	3.82%	5.49%	1.74%	2.61%	5.56%	8.10%	
18	3.88%	5.59%	1.78%	2.67%	5.66%	8.26%	
19	3.95%	5.69%	1.81%	2.72%	5.76%	8.41%	
20	4.02%	5.79%	1.85%	2.77%	5.87%	8.56%	
21	4.08%	5.89%	1.88%	2.82%	5.96%	8.71%	
22	4.15%	5.99%	1.91%	2.87%	6.06%	8.86%	
23	4.22%	6.10%	1.95%	2.93%	6.17%	9.03%	
24	4.30%	6.21%	1.99%	2.99%	6.29%	9.20%	
25	4.37%	6.32%	2.03%	3.05%	6.40%	9.37%	
26	4.44%	6.43%	2.07%	3.10%	6.51%	9.53%	
27	4.52%	6.55%	2.11%	3.17%	6.63%	9.72%	
28	4.60%	6.66%	2.15%	3.22%	6.75%	9.88%	
29	4.68%	6.78%	2.19%	3.29%	6.87%	10.07%	
30	4.76%	6.90%	2.23%	3.35%	6.99%	10.25%	
31	4.84%	7.03%	2.28%	3.42%	7.12%	10.45%	
32	4.92%	7.15%	2.32%	3.48%	7.24%	10.63%	
33	5.01%	7.28%	2.37%	3.55%	7.38%	10.83%	
34	5.10%	7.42%	2.41%	3.62%	7.51%	11.04%	
35	5.19%	7.55%	2.46%	3.69%	7.65%	11.24%	
36	5.28%	7.69%	2.51%	3.76%	7.79%	11.45%	
37	5.38%	7.83%	2.55%	3.83%	7.93%	11.66%	
38	5.47%	7.97%	2.61%	3.91%	8.08%	11.88%	
39	5.57%	8.12%	2.65%	3.98%	8.22%	12.10%	

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #1 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)								
Entry Age	Basic			COLA			Total	
	First \$350	Over \$350	Over \$350	First \$350	Over \$350	Over \$350	First \$350	Over \$350
40	5.67%	8.27%	2.71%	2.71%	4.06%	4.06%	8.38%	12.33%
41	5.78%	8.43%	2.76%	2.76%	4.14%	4.14%	8.54%	12.57%
42	5.88%	8.58%	2.81%	2.81%	4.22%	4.22%	8.69%	12.80%
43	5.98%	8.73%	2.87%	2.87%	4.30%	4.30%	8.85%	13.03%
44	6.08%	8.88%	2.92%	2.92%	4.38%	4.38%	9.00%	13.26%
45	6.18%	9.04%	2.97%	2.97%	4.46%	4.46%	9.15%	13.50%
46	6.29%	9.20%	3.03%	3.03%	4.55%	4.55%	9.32%	13.75%
47	6.40%	9.36%	3.09%	3.09%	4.63%	4.63%	9.49%	13.99%
48	6.50%	9.51%	3.14%	3.14%	4.71%	4.71%	9.64%	14.22%
49	6.60%	9.66%	3.19%	3.19%	4.79%	4.79%	9.79%	14.45%
50	6.70%	9.82%	3.25%	3.25%	4.87%	4.87%	9.95%	14.69%
51	6.81%	9.98%	3.30%	3.30%	4.95%	4.95%	10.11%	14.93%
52	6.92%	10.14%	3.36%	3.36%	5.04%	5.04%	10.28%	15.18%
53	7.02%	10.30%	3.41%	3.41%	5.12%	5.12%	10.43%	15.42%
54	7.13%	10.46%	3.47%	3.47%	5.20%	5.20%	10.60%	15.66%
55	7.23%	10.61%	3.52%	3.52%	5.28%	5.28%	10.75%	15.89%
56	7.28%	10.68%	3.55%	3.55%	5.32%	5.32%	10.83%	16.00%
57	7.26%	10.65%	3.53%	3.53%	5.30%	5.30%	10.79%	15.95%
58	7.24%	10.62%	3.53%	3.53%	5.29%	5.29%	10.77%	15.91%
59 & Over	7.03%	10.31%	3.41%	3.41%	5.12%	5.12%	10.44%	15.43%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 1.00%
COLA Loading Factor: 52.07%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #2 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013									
Entry Age	Basic			COLA			Total		
	First \$350	Over \$350	Over \$350	First \$350	Over \$350	Over \$350	First \$350	Over \$350	Over \$350
15	3.68%	5.29%	1.56%	1.56%	2.34%	2.34%	5.24%	5.24%	7.63%
16	3.74%	5.38%	1.59%	1.59%	2.38%	2.38%	5.33%	5.33%	7.76%
17	3.81%	5.48%	1.62%	1.62%	2.43%	2.43%	5.43%	5.43%	7.91%
18	3.87%	5.57%	1.65%	1.65%	2.47%	2.47%	5.52%	5.52%	8.04%
19	3.94%	5.67%	1.68%	1.68%	2.52%	2.52%	5.62%	5.62%	8.19%
20	4.00%	5.77%	1.71%	1.71%	2.57%	2.57%	5.71%	5.71%	8.34%
21	4.08%	5.88%	1.75%	1.75%	2.62%	2.62%	5.83%	5.83%	8.50%
22	4.14%	5.98%	1.78%	1.78%	2.67%	2.67%	5.92%	5.92%	8.65%
23	4.22%	6.09%	1.81%	1.81%	2.72%	2.72%	6.03%	6.03%	8.81%
24	4.29%	6.20%	1.85%	1.85%	2.78%	2.78%	6.14%	6.14%	8.98%
25	4.36%	6.31%	1.89%	1.89%	2.83%	2.83%	6.25%	6.25%	9.14%
26	4.44%	6.42%	1.92%	1.92%	2.88%	2.88%	6.36%	6.36%	9.30%
27	4.51%	6.53%	1.96%	1.96%	2.94%	2.94%	6.47%	6.47%	9.47%
28	4.59%	6.65%	2.00%	2.00%	3.00%	3.00%	6.59%	6.59%	9.65%
29	4.67%	6.77%	2.03%	2.03%	3.05%	3.05%	6.70%	6.70%	9.82%
30	4.75%	6.89%	2.07%	2.07%	3.11%	3.11%	6.82%	6.82%	10.00%
31	4.83%	7.01%	2.11%	2.11%	3.17%	3.17%	6.94%	6.94%	10.18%
32	4.92%	7.14%	2.15%	2.15%	3.23%	3.23%	7.07%	7.07%	10.37%
33	5.00%	7.27%	2.20%	2.20%	3.30%	3.30%	7.20%	7.20%	10.57%
34	5.09%	7.40%	2.24%	2.24%	3.36%	3.36%	7.33%	7.33%	10.76%
35	5.18%	7.53%	2.28%	2.28%	3.42%	3.42%	7.46%	7.46%	10.95%
36	5.27%	7.67%	2.33%	2.33%	3.49%	3.49%	7.60%	7.60%	11.16%
37	5.36%	7.81%	2.37%	2.37%	3.56%	3.56%	7.73%	7.73%	11.37%
38	5.46%	7.96%	2.42%	2.42%	3.63%	3.63%	7.88%	7.88%	11.59%
39	5.56%	8.11%	2.47%	2.47%	3.70%	3.70%	8.03%	8.03%	11.81%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #2 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)						
Entry Age	Basic			COLA		Total
	First \$350	Over \$350	Over \$350	First \$350	Over \$350	Over \$350
40	5.66%	8.25%	2.51%	3.77%	8.17%	12.02%
41	5.76%	8.40%	2.56%	3.84%	8.32%	12.24%
42	5.86%	8.56%	2.61%	3.92%	8.47%	12.48%
43	5.96%	8.71%	2.66%	3.99%	8.62%	12.70%
44	6.06%	8.86%	2.71%	4.07%	8.77%	12.93%
45	6.17%	9.02%	2.77%	4.15%	8.94%	13.17%
46	6.28%	9.18%	2.81%	4.22%	9.09%	13.40%
47	6.38%	9.34%	2.87%	4.30%	9.25%	13.64%
48	6.48%	9.48%	2.91%	4.37%	9.39%	13.85%
49	6.59%	9.65%	2.97%	4.45%	9.56%	14.10%
50	6.69%	9.80%	3.01%	4.52%	9.70%	14.32%
51	6.80%	9.96%	3.07%	4.60%	9.87%	14.56%
52	6.90%	10.12%	3.12%	4.68%	10.02%	14.80%
53	7.03%	10.31%	3.18%	4.77%	10.21%	15.08%
54	7.11%	10.43%	3.22%	4.83%	10.33%	15.26%
55	7.20%	10.57%	3.27%	4.90%	10.47%	15.47%
56	7.28%	10.68%	3.30%	4.95%	10.58%	15.63%
57	7.26%	10.66%	3.29%	4.94%	10.55%	15.60%
58	7.25%	10.64%	3.29%	4.93%	10.54%	15.57%
59 & Over	6.84%	10.03%	3.09%	4.63%	9.93%	14.66%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.75%
COLA Loading Factor: 48.48%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #3 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	5.48%	2.64%	8.12%
16	5.57%	2.69%	8.26%
17	5.67%	2.74%	8.41%
18	5.77%	2.79%	8.56%
19	5.88%	2.85%	8.73%
20	5.98%	2.90%	8.88%
21	6.09%	2.96%	9.05%
22	6.20%	3.02%	9.22%
23	6.31%	3.08%	9.39%
24	6.42%	3.14%	9.56%
25	6.53%	3.19%	9.72%
26	6.65%	3.26%	9.91%
27	6.77%	3.32%	10.09%
28	6.89%	3.38%	10.27%
29	7.01%	3.45%	10.46%
30	7.14%	3.52%	10.66%
31	7.27%	3.58%	10.85%
32	7.40%	3.65%	11.05%
33	7.53%	3.72%	11.25%
34	7.66%	3.79%	11.45%
35	7.80%	3.86%	11.66%
36	7.95%	3.94%	11.89%
37	8.09%	4.02%	12.11%
38	8.24%	4.09%	12.33%
39	8.40%	4.18%	12.58%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #3 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	8.55%	4.26%	12.81%
41	8.71%	4.34%	13.05%
42	8.86%	4.42%	13.28%
43	9.02%	4.51%	13.53%
44	9.18%	4.59%	13.77%
45	9.35%	4.68%	14.03%
46	9.50%	4.76%	14.26%
47	9.66%	4.84%	14.50%
48	9.82%	4.93%	14.75%
49	9.98%	5.01%	14.99%
50	10.14%	5.10%	15.24%
51	10.30%	5.18%	15.48%
52	10.47%	5.27%	15.74%
53	10.63%	5.35%	15.98%
54	10.77%	5.43%	16.20%
55	10.87%	5.48%	16.35%
56	10.98%	5.54%	16.52%
57	10.94%	5.52%	16.46%
58	10.70%	5.39%	16.09%
59 & Over	10.26%	5.16%	15.42%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 4.75%
COLA Loading Factor: 52.70%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #4 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013									
Entry Age	Basic			COLA			Total		
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350	Over \$350
15	3.67%	5.27%	1.67%	2.51%	5.34%	7.78%			
16	3.74%	5.37%	1.71%	2.56%	5.45%	7.93%			
17	3.80%	5.46%	1.74%	2.61%	5.54%	8.07%			
18	3.86%	5.56%	1.77%	2.66%	5.63%	8.22%			
19	3.93%	5.66%	1.81%	2.71%	5.74%	8.37%			
20	4.00%	5.76%	1.85%	2.77%	5.85%	8.53%			
21	4.06%	5.86%	1.88%	2.82%	5.94%	8.68%			
22	4.14%	5.97%	1.91%	2.87%	6.05%	8.84%			
23	4.20%	6.07%	1.95%	2.93%	6.15%	9.00%			
24	4.28%	6.18%	1.99%	2.98%	6.27%	9.16%			
25	4.35%	6.29%	2.03%	3.04%	6.38%	9.33%			
26	4.42%	6.40%	2.07%	3.10%	6.49%	9.50%			
27	4.50%	6.52%	2.11%	3.16%	6.61%	9.68%			
28	4.58%	6.63%	2.15%	3.22%	6.73%	9.85%			
29	4.66%	6.75%	2.19%	3.28%	6.85%	10.03%			
30	4.74%	6.87%	2.23%	3.35%	6.97%	10.22%			
31	4.82%	7.00%	2.27%	3.41%	7.09%	10.41%			
32	4.90%	7.12%	2.32%	3.48%	7.22%	10.60%			
33	4.99%	7.25%	2.36%	3.54%	7.35%	10.79%			
34	5.08%	7.38%	2.41%	3.61%	7.49%	10.99%			
35	5.17%	7.52%	2.46%	3.69%	7.63%	11.21%			
36	5.26%	7.65%	2.50%	3.75%	7.76%	11.40%			
37	5.35%	7.79%	2.55%	3.83%	7.90%	11.62%			
38	5.45%	7.94%	2.60%	3.90%	8.05%	11.84%			
39	5.55%	8.09%	2.65%	3.98%	8.20%	12.07%			

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #4 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)								
Entry Age	Basic			COLA			Total	
	First \$350	Over \$350	Over \$350	First \$350	Over \$350	Over \$350	First \$350	Over \$350
40	5.65%	8.24%	2.71%	2.71%	4.06%	4.06%	8.36%	12.30%
41	5.75%	8.39%	2.76%	2.76%	4.14%	4.14%	8.51%	12.53%
42	5.85%	8.54%	2.81%	2.81%	4.22%	4.22%	8.66%	12.76%
43	5.95%	8.69%	2.87%	2.87%	4.30%	4.30%	8.82%	12.99%
44	6.05%	8.84%	2.91%	2.91%	4.37%	4.37%	8.96%	13.21%
45	6.16%	9.01%	2.97%	2.97%	4.46%	4.46%	9.13%	13.47%
46	6.26%	9.16%	3.03%	3.03%	4.54%	4.54%	9.29%	13.70%
47	6.36%	9.31%	3.08%	3.08%	4.62%	4.62%	9.44%	13.93%
48	6.46%	9.46%	3.13%	3.13%	4.70%	4.70%	9.59%	14.16%
49	6.58%	9.63%	3.19%	3.19%	4.79%	4.79%	9.77%	14.42%
50	6.67%	9.77%	3.24%	3.24%	4.86%	4.86%	9.91%	14.63%
51	6.78%	9.94%	3.30%	3.30%	4.95%	4.95%	10.08%	14.89%
52	6.89%	10.10%	3.35%	3.35%	5.03%	5.03%	10.24%	15.13%
53	7.01%	10.28%	3.42%	3.42%	5.13%	5.13%	10.43%	15.41%
54	7.11%	10.43%	3.47%	3.47%	5.21%	5.21%	10.58%	15.64%
55	7.20%	10.57%	3.52%	3.52%	5.28%	5.28%	10.72%	15.85%
56	7.24%	10.63%	3.54%	3.54%	5.31%	5.31%	10.78%	15.94%
57	7.27%	10.67%	3.55%	3.55%	5.33%	5.33%	10.82%	16.00%
58	7.16%	10.51%	3.50%	3.50%	5.25%	5.25%	10.66%	15.76%
59 & Over	6.86%	10.05%	3.34%	3.34%	5.01%	5.01%	10.20%	15.06%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.50%
COLA Loading Factor: 52.27%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #5 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	5.31%	2.55%	7.86%
16	5.40%	2.60%	8.00%
17	5.50%	2.65%	8.15%
18	5.60%	2.70%	8.30%
19	5.70%	2.76%	8.46%
20	5.80%	2.81%	8.61%
21	5.90%	2.86%	8.76%
22	6.01%	2.92%	8.93%
23	6.11%	2.97%	9.08%
24	6.22%	3.03%	9.25%
25	6.33%	3.09%	9.42%
26	6.45%	3.15%	9.60%
27	6.56%	3.21%	9.77%
28	6.68%	3.27%	9.95%
29	6.80%	3.34%	10.14%
30	6.92%	3.40%	10.32%
31	7.04%	3.46%	10.50%
32	7.17%	3.53%	10.70%
33	7.30%	3.60%	10.90%
34	7.43%	3.67%	11.10%
35	7.57%	3.74%	11.31%
36	7.70%	3.81%	11.51%
37	7.85%	3.89%	11.74%
38	7.99%	3.96%	11.95%
39	8.14%	4.04%	12.18%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #5 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	8.29%	4.12%	12.41%
41	8.45%	4.20%	12.65%
42	8.60%	4.28%	12.88%
43	8.75%	4.36%	13.11%
44	8.90%	4.44%	13.34%
45	9.06%	4.53%	13.59%
46	9.22%	4.61%	13.83%
47	9.38%	4.69%	14.07%
48	9.53%	4.77%	14.30%
49	9.69%	4.86%	14.55%
50	9.85%	4.94%	14.79%
51	10.01%	5.03%	15.04%
52	10.16%	5.11%	15.27%
53	10.33%	5.20%	15.53%
54	10.49%	5.28%	15.77%
55	10.60%	5.34%	15.94%
56	10.67%	5.37%	16.04%
57	10.73%	5.41%	16.14%
58	10.61%	5.34%	15.95%
59 & Over	10.29%	5.17%	15.46%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 1.25%
COLA Loading Factor: 52.69%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #6 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013								
Entry Age	Basic			COLA			Total	
	First \$350	Over \$350	Over \$350	First \$350	Over \$350	Over \$350	First \$350	Over \$350
15	4.18%	6.03%	1.62%	1.62%	2.43%	2.43%	5.80%	8.46%
16	4.25%	6.14%	1.65%	1.65%	2.48%	2.48%	5.90%	8.62%
17	4.32%	6.24%	1.69%	1.69%	2.53%	2.53%	6.01%	8.77%
18	4.40%	6.36%	1.72%	1.72%	2.58%	2.58%	6.12%	8.94%
19	4.47%	6.47%	1.75%	1.75%	2.63%	2.63%	6.22%	9.10%
20	4.55%	6.59%	1.79%	1.79%	2.68%	2.68%	6.34%	9.27%
21	4.62%	6.70%	1.82%	1.82%	2.73%	2.73%	6.44%	9.43%
22	4.70%	6.82%	1.85%	1.85%	2.78%	2.78%	6.55%	9.60%
23	4.78%	6.94%	1.89%	1.89%	2.83%	2.83%	6.67%	9.77%
24	4.87%	7.07%	1.93%	1.93%	2.89%	2.89%	6.80%	9.96%
25	4.96%	7.20%	1.97%	1.97%	2.95%	2.95%	6.93%	10.15%
26	5.04%	7.33%	2.00%	2.00%	3.00%	3.00%	7.04%	10.33%
27	5.13%	7.46%	2.04%	2.04%	3.06%	3.06%	7.17%	10.52%
28	5.22%	7.59%	2.08%	2.08%	3.12%	3.12%	7.30%	10.71%
29	5.31%	7.73%	2.12%	2.12%	3.18%	3.18%	7.43%	10.91%
30	5.40%	7.87%	2.16%	2.16%	3.24%	3.24%	7.56%	11.11%
31	5.50%	8.01%	2.20%	2.20%	3.30%	3.30%	7.70%	11.31%
32	5.60%	8.17%	2.25%	2.25%	3.37%	3.37%	7.85%	11.54%
33	5.70%	8.31%	2.29%	2.29%	3.43%	3.43%	7.99%	11.74%
34	5.80%	8.47%	2.33%	2.33%	3.50%	3.50%	8.13%	11.97%
35	5.91%	8.63%	2.38%	2.38%	3.57%	3.57%	8.29%	12.20%
36	6.02%	8.79%	2.43%	2.43%	3.64%	3.64%	8.45%	12.43%
37	6.12%	8.95%	2.47%	2.47%	3.71%	3.71%	8.59%	12.66%
38	6.23%	9.11%	2.52%	2.52%	3.78%	3.78%	8.75%	12.89%
39	6.34%	9.27%	2.57%	2.57%	3.85%	3.85%	8.91%	13.12%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #6 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)						
Entry Age	Basic			COLA		Total
	First \$350	Over \$350	Over \$350	First \$350	Over \$350	Over \$350
40	6.45%	9.44%	2.62%	3.93%	9.07%	13.37%
41	6.56%	9.60%	2.67%	4.00%	9.23%	13.60%
42	6.66%	9.76%	2.71%	4.07%	9.37%	13.83%
43	6.78%	9.93%	2.76%	4.14%	9.54%	14.07%
44	6.88%	10.09%	2.81%	4.21%	9.69%	14.30%
45	6.99%	10.25%	2.85%	4.28%	9.84%	14.53%
46	7.11%	10.43%	2.91%	4.36%	10.02%	14.79%
47	7.22%	10.59%	2.95%	4.43%	10.17%	15.02%
48	7.34%	10.78%	3.01%	4.51%	10.35%	15.29%
49	7.44%	10.93%	3.05%	4.58%	10.49%	15.51%
50	7.54%	11.07%	3.09%	4.64%	10.63%	15.71%
51	7.61%	11.18%	3.13%	4.69%	10.74%	15.87%
52	7.58%	11.13%	3.11%	4.67%	10.69%	15.80%
53	7.52%	11.05%	3.09%	4.63%	10.61%	15.68%
54 & Over	7.22%	10.59%	2.95%	4.43%	10.17%	15.02%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.25%
COLA Loading Factor: 43.77%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #7 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.46%	6.27%	15.73%
16	9.46%	6.27%	15.73%
17	9.46%	6.27%	15.73%
18	9.46%	6.27%	15.73%
19	9.46%	6.27%	15.73%
20	9.46%	6.27%	15.73%
21	9.46%	6.27%	15.73%
22	9.60%	6.37%	15.97%
23	9.74%	6.47%	16.21%
24	9.89%	6.57%	16.46%
25	10.04%	6.68%	16.72%
26	10.19%	6.78%	16.97%
27	10.35%	6.89%	17.24%
28	10.50%	7.00%	17.50%
29	10.66%	7.11%	17.77%
30	10.83%	7.23%	18.06%
31	11.00%	7.34%	18.34%
32	11.17%	7.46%	18.63%
33	11.35%	7.59%	18.94%
34	11.53%	7.71%	19.24%
35	11.72%	7.85%	19.57%
36	11.91%	7.98%	19.89%
37	12.10%	8.11%	20.21%
38	12.29%	8.24%	20.53%
39	12.50%	8.39%	20.89%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #7 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.72%	8.54%	21.26%
41	12.93%	8.69%	21.62%
42	13.16%	8.85%	22.01%
43	13.39%	9.01%	22.40%
44	13.65%	9.19%	22.84%
45	13.87%	9.35%	23.22%
46	13.89%	9.36%	23.25%
47	13.92%	9.38%	23.30%
48	13.73%	9.25%	22.98%
49 & Over	13.21%	8.89%	22.10%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.75%
COLA Loading Factor: 69.75%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #8 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.44%	6.41%	15.85%
16	9.44%	6.41%	15.85%
17	9.44%	6.41%	15.85%
18	9.44%	6.41%	15.85%
19	9.44%	6.41%	15.85%
20	9.44%	6.41%	15.85%
21	9.44%	6.41%	15.85%
22	9.58%	6.51%	16.09%
23	9.72%	6.61%	16.33%
24	9.87%	6.72%	16.59%
25	10.02%	6.83%	16.85%
26	10.17%	6.94%	17.11%
27	10.32%	7.04%	17.36%
28	10.48%	7.16%	17.64%
29	10.64%	7.27%	17.91%
30	10.80%	7.39%	18.19%
31	10.97%	7.51%	18.48%
32	11.15%	7.64%	18.79%
33	11.32%	7.76%	19.08%
34	11.51%	7.89%	19.40%
35	11.70%	8.03%	19.73%
36	11.88%	8.16%	20.04%
37	12.08%	8.30%	20.38%
38	12.27%	8.44%	20.71%
39	12.47%	8.58%	21.05%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #8 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.69%	8.74%	21.43%
41	12.91%	8.90%	21.81%
42	13.14%	9.06%	22.20%
43	13.37%	9.22%	22.59%
44	13.62%	9.40%	23.02%
45	13.83%	9.55%	23.38%
46	13.90%	9.60%	23.50%
47	13.84%	9.56%	23.40%
48	13.75%	9.50%	23.25%
49 & Over	13.24%	9.13%	22.37%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.50%
COLA Loading Factor: 71.51%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #9 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.04%	3.86%	12.90%
16	9.04%	3.86%	12.90%
17	9.04%	3.86%	12.90%
18	9.04%	3.86%	12.90%
19	9.04%	3.86%	12.90%
20	9.04%	3.86%	12.90%
21	9.04%	3.86%	12.90%
22	9.17%	3.92%	13.09%
23	9.31%	3.99%	13.30%
24	9.45%	4.05%	13.50%
25	9.59%	4.11%	13.70%
26	9.73%	4.18%	13.91%
27	9.88%	4.24%	14.12%
28	10.03%	4.31%	14.34%
29	10.18%	4.38%	14.56%
30	10.34%	4.45%	14.79%
31	10.50%	4.52%	15.02%
32	10.67%	4.60%	15.27%
33	10.84%	4.68%	15.52%
34	11.01%	4.75%	15.76%
35	11.18%	4.83%	16.01%
36	11.36%	4.91%	16.27%
37	11.54%	4.99%	16.53%
38	11.71%	5.07%	16.78%
39	11.91%	5.16%	17.07%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #9 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.10%	5.24%	17.34%
41	12.29%	5.33%	17.62%
42	12.49%	5.42%	17.91%
43	12.66%	5.50%	18.16%
44	12.76%	5.54%	18.30%
45	12.77%	5.55%	18.32%
46	12.65%	5.49%	18.14%
47	12.39%	5.37%	17.76%
48	12.72%	5.52%	18.24%
49 & Over	13.30%	5.79%	19.09%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.00%
COLA Loading Factor: 45.09%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #10 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.44%	6.15%	15.59%
16	9.44%	6.15%	15.59%
17	9.44%	6.15%	15.59%
18	9.44%	6.15%	15.59%
19	9.44%	6.15%	15.59%
20	9.44%	6.15%	15.59%
21	9.44%	6.15%	15.59%
22	9.58%	6.24%	15.82%
23	9.72%	6.34%	16.06%
24	9.87%	6.44%	16.31%
25	10.02%	6.54%	16.56%
26	10.17%	6.65%	16.82%
27	10.32%	6.75%	17.07%
28	10.48%	6.86%	17.34%
29	10.64%	6.97%	17.61%
30	10.80%	7.08%	17.88%
31	10.97%	7.19%	18.16%
32	11.15%	7.32%	18.47%
33	11.32%	7.43%	18.75%
34	11.51%	7.56%	19.07%
35	11.70%	7.69%	19.39%
36	11.88%	7.82%	19.70%
37	12.08%	7.96%	20.04%
38	12.27%	8.09%	20.36%
39	12.47%	8.22%	20.69%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #10 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.69%	8.37%	21.06%
41	12.91%	8.52%	21.43%
42	13.14%	8.68%	21.82%
43	13.37%	8.84%	22.21%
44	13.62%	9.01%	22.63%
45	13.83%	9.15%	22.98%
46	13.90%	9.20%	23.10%
47	13.84%	9.16%	23.00%
48	13.75%	9.10%	22.85%
49 & Over	13.24%	8.75%	21.99%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.50%
COLA Loading Factor: 68.52%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #11 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.61%	6.55%	16.16%
16	9.61%	6.55%	16.16%
17	9.61%	6.55%	16.16%
18	9.61%	6.55%	16.16%
19	9.61%	6.55%	16.16%
20	9.61%	6.55%	16.16%
21	9.61%	6.55%	16.16%
22	9.76%	6.66%	16.42%
23	9.90%	6.76%	16.66%
24	10.05%	6.86%	16.91%
25	10.20%	6.97%	17.17%
26	10.36%	7.09%	17.45%
27	10.51%	7.19%	17.70%
28	10.67%	7.31%	17.98%
29	10.83%	7.42%	18.25%
30	11.00%	7.54%	18.54%
31	11.17%	7.67%	18.84%
32	11.35%	7.80%	19.15%
33	11.53%	7.92%	19.45%
34	11.72%	8.06%	19.78%
35	11.90%	8.19%	20.09%
36	12.09%	8.33%	20.42%
37	12.29%	8.47%	20.76%
38	12.49%	8.61%	21.10%
39	12.69%	8.76%	21.45%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #11 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.90%	8.91%	21.81%
41	13.12%	9.06%	22.18%
42	13.35%	9.23%	22.58%
43	13.59%	9.40%	22.99%
44	13.82%	9.57%	23.39%
45	14.05%	9.73%	23.78%
46	14.08%	9.75%	23.83%
47	14.02%	9.71%	23.73%
48	13.76%	9.52%	23.28%
49 & Over	12.99%	8.97%	21.96%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 2.50%
COLA Loading Factor: 71.65%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #12 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.57%	4.61%	14.18%
16	9.57%	4.61%	14.18%
17	9.57%	4.61%	14.18%
18	9.57%	4.61%	14.18%
19	9.57%	4.61%	14.18%
20	9.57%	4.61%	14.18%
21	9.57%	4.61%	14.18%
22	9.71%	4.68%	14.39%
23	9.86%	4.76%	14.62%
24	10.00%	4.83%	14.83%
25	10.16%	4.91%	15.07%
26	10.31%	4.99%	15.30%
27	10.46%	5.06%	15.52%
28	10.62%	5.14%	15.76%
29	10.78%	5.22%	16.00%
30	10.95%	5.31%	16.26%
31	11.12%	5.40%	16.52%
32	11.30%	5.49%	16.79%
33	11.47%	5.57%	17.04%
34	11.66%	5.67%	17.33%
35	11.86%	5.77%	17.63%
36	12.04%	5.86%	17.90%
37	12.23%	5.96%	18.19%
38	12.43%	6.06%	18.49%
39	12.64%	6.17%	18.81%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #12 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.86%	6.28%	19.14%
41	13.07%	6.38%	19.45%
42	13.31%	6.51%	19.82%
43	13.54%	6.62%	20.16%
44	13.76%	6.73%	20.49%
45	13.97%	6.84%	20.81%
46	14.03%	6.87%	20.90%
47	13.95%	6.83%	20.78%
48	13.79%	6.75%	20.54%
49 & Over	13.05%	6.37%	19.42%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 2.00%
COLA Loading Factor: 50.67%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates On or After January 1, 2013			
	Basic	COLA	Total
Cost Group #1 – PEPR A Tier 4 (2% COLA)	8.68%	1.99%	10.67%
Cost Group #1 – PEPR A Tier 4 (3% COLA)	8.80%	2.96%	11.76%
Cost Group #2 - PEPR A Tier 5 (2% COLA)	8.16%	1.84%	10.00%
Cost Group #2 - PEPR A Tier 5 (3%/4% COLA)	8.39%	2.76%	11.15%
Cost Group #3 - PEPR A Tier 4 (3% COLA)	8.23%	2.83%	11.06%
Cost Group #4 - PEPR A Tier 4 (3% COLA)	8.96%	3.02%	11.98%
Cost Group #5 - PEPR A Tier 4 (2% COLA)	10.07%	2.27%	12.34%
Cost Group #5 - PEPR A Tier 4 (3% COLA)	11.38%	3.79%	15.17%
Cost Group #6 - PEPR A Tier 4 (3% COLA)	9.39%	3.21%	12.60%

The PEPR A 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 PEPR A formulas, the maximum compensation that can be taken into account for 2019 is equal to \$124,180; for an employer that is not enrolled in Social Security, the maximum amount is \$149,016. (§7522.10) These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (§7522.10(d))

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates On or After January 1, 2013			
	Basic	COLA	Total
Cost Group #7 - PEPR A Tier D	14.31%	5.73%	20.04%
Cost Group #8 - PEPR A Tier D	13.05%	5.35%	18.40%
Cost Group #8 - PEPR A Tier E	12.09%	3.32%	15.41%
Cost Group #9 - PEPR A Tier E	13.17%	3.57%	16.74%
Cost Group #10 - PEPR A Tier D	12.70%	5.23%	17.93%
Cost Group #11 - PEPR A Tier D	11.44%	4.71%	16.15%
Cost Group #12 - PEPR A Tier D	11.65%	4.82%	16.47%

The PEPR A 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 PEPR A formulas, the maximum compensation that can be taken into account for 2019 is equal to \$124,180; for an employer that is not enrolled in Social Security, the maximum amount is \$149,016. (§7522.10) These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (§7522.10(d))

EXHIBIT IV – REFUNDABILITY FACTORS

	December 31, 2018		December 31, 2017	
	Legacy Tiers	PEPRA Tiers	Legacy Tiers	PEPRA Tiers
General				
Cost Group #1 – County and Small Districts (Tier 1)	0.9577		0.9602	
PEPRA Tier 4 (2% COLA)		0.9574		0.9605
PEPRA Tier 4 (3% COLA)		0.9582		0.9613
Cost Group #2 – County and Small Districts (Tier 3)	0.9540		0.9576	
PEPRA Tier 5 (2% COLA)		0.9580		0.9611
PEPRA Tier 5 (3%/4% COLA)		0.9604		0.9631
Cost Group #3 – Central Contra Costa Sanitary District	0.9560		0.9588	
Cost Group #4 – Contra Costa Housing Authority	0.9536		0.9571	
Cost Group #5 – Contra Costa County Fire Protection District	0.9563		0.9591	
PEPRA Tier 4 (2% COLA)		0.9568		0.9630
PEPRA Tier 4 (3% COLA)		0.9585		0.9606
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	0.9512		0.9556	
Safety				
Cost Group #7 – County (Tier A and D)	0.9599		0.9657	
Cost Group #8 – Contra Costa and East Fire Protection Districts	0.9606		0.9666	
PEPRA Tier D (3% COLA)		0.9732		0.9770
PEPRA Tier E (2% COLA)		0.9719		0.9748
Cost Group #9 – County (Tier C and E)	0.9613		0.9670	
Cost Group #10 – Moraga-Orinda Fire District	0.9639		0.9688	
Cost Group #11 – San Ramon Valley Fire District	0.9618		0.9665	
Cost Group #12 – Rodeo-Hercules Fire Protection District	0.9667		0.9718	

EXHIBIT V – SUMMARY OF COST GROUPS AND EMPLOYERS

General			
Cost Group	Employer Name	Benefit Structure	Special Adjustment
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	

EXHIBIT V – SUMMARY OF COST GROUPS AND EMPLOYERS (CONTINUED)

Safety			
Cost Group	Employer Name	Benefit Structure	Special Adjustment
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	

Note: 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 119.

EXHIBIT VI – ALLOCATION OF VALUATION VALUE OF ASSETS AS OF DECEMBER 31, 2018

	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 Employees	
1	Allocated Valuation Value of Assets as of Beginning of Year	\$4,583,679,028	\$317,188,761	\$53,424,568	\$48,484,690	\$6,780,593	\$56,542,068
2	Contributions: ⁽¹⁾						
a.	Total Member Contributions	\$69,698,402	\$3,876,989	\$610,154	\$610,915	\$118,751	\$0
b.	Employer Contributions - Excludes POB and other Special Contributions	177,742,805	17,520,615	2,254,454	1,693,621	241,046	0
c.	Employer Contributions - Special (POB, Termination, etc.)	0	0	0	0	0	1,089,680
d.	Total Contributions	\$247,441,207	\$21,397,604	\$2,864,608	\$2,304,536	\$359,797	\$1,089,680
3	Total Payments Excluding Post- Retirement Death	255,207,702	20,041,187	3,141,084	3,233,923	366,995	5,347,734
4	Administrative Expenses ⁽²⁾	7,068,136	372,658	60,569	55,815	9,229	0
5	Subtotal (1 + 2d - 3 - 4)	\$4,568,844,397	\$318,172,520	\$53,087,523	\$47,499,488	\$6,764,166	\$52,284,014
6	Weighted Average Fund Balance	4,576,261,710	317,680,641	53,256,046	47,992,089	6,772,380	54,254,963
7	Earnings Allocated in Proportion to (6)	289,341,885	20,085,896	3,367,204	3,034,381	428,195	3,430,362
8	Allocated Valuation Value of Assets As of End of Year (5 + 7)	\$4,858,186,282	\$338,258,416	\$56,454,727	\$50,533,869	\$7,192,361	\$55,714,376
9	Adjustment for Pre-Paid Contributions	0	0	0	0	0	0
10	Final Valuation Value of Assets As of End of Year (8 + 9)	\$4,858,186,282	\$338,258,416	\$56,454,727	\$50,533,869	\$7,192,361	\$55,714,376

Note: Results may be slightly off due to rounding.

(1) Employer contributions include "member subvention of employer contributions" and exclude "employer subvention of member contributions".

(2) Allocated based on expected administrative expenses from the prior valuation.

EXHIBIT VI – ALLOCATION OF VALUATION VALUE OF ASSETS AS OF DECEMBER 31, 2018

	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	Total
1	Allocated Valuation Value of Assets as of Beginning of Year	\$1,678,768,488	\$879,830,504	\$160,248,990	\$362,597,496	\$8,179,891,191
2	Contributions: ⁽¹⁾					
a.	Total Member Contributions	\$17,149,125	\$6,563,206	\$1,346,450	\$3,264,050	\$103,541,529
b.	Employer Contributions - Excludes POB and other Special Contributions	69,392,785	29,841,817	5,164,011	16,936,767	323,773,423
c.	Employer Contributions - Special (POB, Termination, etc.)	0	0	0	254,000	1,343,680
d.	Total Contributions	\$86,541,910	\$36,405,023	\$6,510,461	\$20,454,817	\$428,658,632
3	Total Payments Excluding Post-Retirement Death	90,478,168	56,930,942	10,320,442	17,018,641	463,958,947
4	Administrative Expenses ⁽²⁾	1,046,093	387,293	79,770	233,712	9,337,053
5	Subtotal (1 + 2d - 3 - 4)	\$1,673,786,137	\$858,917,292	\$156,359,239	\$365,799,960	\$8,135,253,823
6	Weighted Average Fund Balance	1,676,277,313	869,373,898	158,304,115	364,198,728	8,157,414,429
7	Earnings Allocated in Proportion to (6)	105,985,468	54,967,635	10,009,045	23,027,081	515,766,323
8	Allocated Valuation Value of Assets As of End of Year (5 + 7)	\$1,779,771,605	\$913,884,927	\$166,368,284	\$388,827,041	\$8,651,020,146
9	Adjustment for Pre-Paid Contributions ⁽³⁾	0	0	0	(841,920)	(841,920)
10	Final Valuation Value of Assets As of End of Year (8 + 9)	\$1,779,771,605	\$913,884,927	\$166,368,284	\$388,827,041	\$8,650,178,226

Note: Results may be slightly off due to rounding.

⁽¹⁾ Employer contributions include "member subvention of employer contributions" and exclude "employer subvention of member contributions".

⁽²⁾ Allocated based on expected administrative expenses from the prior valuation.

⁽³⁾ This adjustment is to exclude 6 months of contributions made by Rodeo-Hercules Fire Protection District during the 2018 calendar year that were pre-paid for the 2019 calendar year. These contributions will be reflected in the next valuation.

5587004v3/05337.002



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John W. Monroe, ASA, MAAA, EA
Vice President & Actuary
jmonroe@segalco.com

October 1, 2019

Ms. Gail Strohl
Chief Executive Officer
Contra Costa County Employees' Retirement Association
1200 Concord Avenue, Suite 300
Concord, CA 94520

**Re: Contra Costa County Employees' Retirement Association
Contribution Rate Packet for the Period from July 1, 2020 through June 30, 2021**

Dear Gail:

As requested, we have prepared the enclosed contribution rate packet that contains the employer and member contribution rates for the period from July 1, 2020 through June 30, 2021.

The following documents are enclosed:

- Contribution Rate Packet Cover Page
- Contribution Rate Packet Table of Contents
- Contribution Rate Packet Cover Memo
- Board of Supervisors Resolution
- Employer Contribution Rates (Exhibits A and B)
- Member Contribution Rates (Exhibits C through O)
- Examples for Subvention and Employee Cost Sharing
- Prepayment Discount Factor for 2020-2021

The information enclosed is based on the December 31, 2018 actuarial valuation results including the participant data and actuarial assumptions on which that valuation was based. That valuation was completed under the supervision of John Monroe, ASA, MAAA, EA.

Ms. Gail Strohl
October 1, 2019
Page 2

We will also send these documents to you electronically. Please let us know if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "John Monroe". The signature is written in a cursive, slightly slanted style.

John Monroe

EK/gxk
Enclosures (5598969)



**CONTRA COSTA COUNTY
EMPLOYEES' RETIREMENT ASSOCIATION**

**CONTRIBUTION RATE PACKET FOR
JULY 1, 2020 through JUNE 30, 2021**

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

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20	Examples for Subvention and Employee Cost Sharing
21	Prepayment Discount Factor for 2020-21



MEMORANDUM

Date: October __, 2019

To: Interested Parties and Participating Employers

From: Gail Strohl, Chief Executive Officer

Subject: Contribution Rates Effective July 1, 2020

At its October 9, 2019 meeting, the Retirement Board reviewed the actuary's valuation report for the year ending December 31, 2018. The Board also adopted the recommended employer and employee contribution rates, which will become effective on July 1, 2020. A copy of the December 31, 2018 Actuarial Valuation can be found on CCCERA's website at www.cccera.org under the Actuarial Valuations link.

Enclosed are the employer and employee contribution rates to be used effective July 1, 2020 through June 30, 2021.

Please note the following:

- ✓ **The rates are effective July 1, 2020 through June 30, 2021 and have not yet been adopted by the County Board of Supervisors.**
- ✓ **The rates are BEFORE ANY EMPLOYER SUBVENTION of the employee contribution.** The rates quoted here are the employer required rates without taking into consideration any employer subvention of employee contributions. A convenient methodology for adding subvention is included for your use on page 20. Note that subvention is not always permitted for PEPRAs members.
- ✓ **The rates are BEFORE ANY INCREASE IN EMPLOYEE RATE to pay a portion of the employer contribution.** If an employee's rate needs to be increased to pay a portion of the employer contribution, both employee and employer rates would need to be adjusted accordingly. A convenient methodology for adding subvention is included for your use on page 20.

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

Adopted this Order on _____, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

SUBJECT: Approving Contribution Rates to be charged Resolution No. _____
by the Contra Costa County
Employees' Retirement Association.

Pursuant to Government Code Section 31454 and on recommendation of the Board of the Contra Costa County Employees' Retirement Association,
BE IT RESOLVED that the following contribution rates are approved to be effective for the period July 1, 2020 through June 30, 2021.

I. Employer Contribution Rates for Basic and Cost-of-Living Components and Non-refundability Discount Factors

- A. For General Members (Sec. 31676.11, Sec. 31676.16 and Sec. 7522.20(a))
See attached Exhibit A
- B. For Safety Members (Sec. 31664, Sec. 31664.1 and Sec. 7522.25(d))
See attached Exhibit B

II. Employee Contribution Rates for Basic and Cost-of-Living Components

See attached Exhibits C through O

The Pension Obligation Bonds (POB) issued by the County in March 1994 and April 2003, affected contribution rates for certain County employers. The following non-County employers who participate in the Retirement Association are referred to as "Districts".

- Bethel Island Municipal Improvement District
- Byron, Brentwood Knightsen Union Cemetery District
- Central Contra Costa Sanitary District
- Contra Costa County Employees' Retirement Association
- Contra Costa Housing Authority
- Contra Costa Mosquito and Vector Control District
- Local Agency Formation Commission (LAFCO)
- Rodeo Sanitary District
- In-Home Supportive Services Authority
- First 5 - Children & Families Commission
- Contra Costa County Fire Protection District
- East Contra Costa Fire Protection District
- Moraga-Orinda Fire Protection District
- Rodeo-Hercules Fire Protection District
- San Ramon Valley Fire Protection District

All other departments/employers are referred to as "County" including the Superior Court of California, Contra Costa County.

Contra Costa County Fire Protection District and Moraga-Orinda Fire Protection District issued Pension Obligation Bonds in 2005 which affected contribution rates for these two employers. Subsequently, Contra Costa County Fire Protection District has made additional payments to CCCERA for its UAAL in 2006 and 2007.

First 5 - Children & Families Commission made a UAAL prepayment in 2013 which affected contribution rates for that employer.

Central Contra Costa Sanitary District made a UAAL prepayment in 2013, 2014 and 2015 which affected contribution rates for that employer.

Local Agency Formation Commission made a UAAL prepayment in 2017 which affected contribution rates for that employer.

San Ramon Valley Fire Protection District made a UAAL prepayment in 2017 and 2018 which affected contribution rates for that employer.

Exhibit A - 1

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EMPLOYER CONTRIBUTION RATES EFFECTIVE FOR JULY 1, 2020 THROUGH JUNE 30, 2021 for General Tier 1 and 3 Legacy Members**

		Cost Group #1			Cost Group #3		Cost Group #4		Cost Group #5
		Moraga-Orinda Fire District	First 5	LAFCO	Districts without POB	Central Contra Costa Sanitary District	Contra Costa Housing Authority	Contra Costa County Fire Protection District	
County	15.28%	N/A	15.44%	18.16%	18.62%	N/A	19.86%	N/A	
County	22.91%	N/A	23.15%	27.24%	27.93%	N/A	29.79%	N/A	
	22.91%	20.62%	N/A	N/A	27.93%	35.59%	N/A	22.28%	
County	3.60%	N/A	3.87%	6.15%	6.32%	N/A	9.68%	N/A	
County	5.41%	N/A	5.82%	9.23%	9.48%	N/A	14.51%	N/A	
	5.41%	5.31%	N/A	N/A	9.48%	15.25%	N/A	11.38%	
County	0.9577	0.9577	0.9577	0.9577	0.9577	0.9560	0.9536	0.9563	

GENERAL TIERS - ENHANCED

Tier 1 BASIC Enhanced

First \$350 monthly & in Social Security
Excess of \$350 monthly & in Social Security

All Eligible \$ if NOT in Social Security

Tier 1 COL Enhanced

First \$350 monthly
Excess of \$350 monthly

All Eligible \$ if NOT in Social Security

Non-Refundability Factor

		Cost Group #2
		Districts without POB
County	15.51%	18.92%
County	23.27%	28.39%
	N/A	28.39%
County	3.59%	6.33%
County	5.38%	9.49%
	N/A	9.49%
County	0.9540	0.9540

Tier 3 BASIC Enhanced

First \$350 monthly
Excess of \$350 monthly

All Eligible \$ if NOT in Social Security

Tier 3 COL Enhanced

First \$350 monthly
Excess of \$350 monthly

All Eligible \$ if NOT in Social Security

Non-Refundability Factor

		Cost Group #6
		Districts without POB
County	8.62%	
County	12.92%	
	N/A	
County	2.59%	
County	3.89%	
	N/A	
County	0.9512	

GENERAL TIER NON-ENHANCED

Tier 1 BASIC NON-Enhanced

First \$350 monthly
Excess of \$350 monthly

All Eligible \$ if NOT in Social Security

Tier 1 COL NON-Enhanced

First \$350 monthly
Excess of \$350 monthly

All Eligible \$ if NOT in Social Security

Non-Refundability Factor

Employer Name
County General
LAFCO
CC Mosquito & Vector Control District
Bethel Island Municipal Improvement District
First 5 - Children and Families Commission
Contra Costa County Employees' Retirement Association
Superior Court

Cost Group #1
Cost Group #1

Tier
Tier 1 Enhanced (2% @ 55)

Cost Group #2
Cost Group #2

Cost Group #2
Cost Group #2

Tier
Tier 3 Enhanced (2% @ 55)

Cost Group #3
Cost Group #3

Cost Group #3
Cost Group #3

Tier
Tier 1 Enhanced (2% @ 55)

Cost Group #4
Cost Group #4

Cost Group #4
Cost Group #4

Tier
Tier 1 Enhanced (2% @ 55)

Cost Group #5
Cost Group #5

Cost Group #5
Cost Group #5

Tier
Tier 1 Enhanced (2% @ 55)

Cost Group #6
Cost Group #6

Cost Group #6
Cost Group #6

Tier
Tier 1 Non-enhanced (1.67% @ 55)

Basic rates shown include an administrative expense load of 0.63% of payroll. This load has been integrated and adjusted as appropriate into the first \$350 and excess of \$350 monthly rates shown.

Exhibit A - 2

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EMPLOYER CONTRIBUTION RATES EFFECTIVE FOR JULY 1, 2020 THROUGH JUNE 30, 2021 for General Tier 4 and 5 PEPRA Members with 2% Maximum COLA**

GENERAL PEPRA TIERS		Cost Group #1		Districts without POB	Cost Group #3	Cost Group #4	Cost Group #5
Tier 4 BASIC	Moraga-Orinda Fire District	First 5	LAFCO		Central Contra Costa Sanitary District	Contra Costa Housing Authority	Contra Costa County Fire Protection District
All Eligible \$	N/A	N/A	N/A	N/A	N/A	N/A	20.60%
Tier 4 COL	N/A	N/A	N/A	N/A	N/A	N/A	10.20%
All Eligible \$	N/A	N/A	N/A	N/A	N/A	N/A	0.9568

Non-Refundability Factor

Cost Group #2	
County	Districts without POB
19.24%	24.29%
3.79%	7.84%
0.9580	0.9580

Tier 5 BASIC

All Eligible \$

Tier 5 COL

All Eligible \$

Non-Refundability Factor

Cost Group	Employer Name	Tier
Cost Group #1	County General	Tier 4 (2.5% @ 67)
	LAFCO	
	CC Mosquito & Vector Control District	
	Bethel Island Municipal Improvement District	
	First 5 - Children and Families Commission	
	Contra Costa County Employees' Retirement Association	
	Superior Court	
	East Contra Costa Fire Protection District	
	Moraga-Orinda Fire Protection District	
	Rodeo-Hercules Fire Protection District	
	San Ramon Valley Fire Protection District	
Cost Group #2	County General	Tier 5 (2.5% @ 67)
	In-Home Supportive Services	
	CC Mosquito & Vector Control District	
	Superior Court	
Cost Group #3	Central Contra Costa Sanitary District	Tier 4 (2.5% @ 67)
Cost Group #4	Contra Costa Housing Authority	Tier 4 (2.5% @ 67)
Cost Group #5	Contra Costa County Fire Protection District	Tier 4 (2.5% @ 67)
Cost Group #6	Rodeo Sanitary District	Tier 4 (2.5% @ 67)
	Byron Brentwood Cemetery District	

Some tiers are not applicable to employers as shown above in the rate table.

Basic rates shown include an administrative expense load of 0.63% of payroll.

Exhibit A - 3

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
 EMPLOYER CONTRIBUTION RATES EFFECTIVE FOR JULY 1, 2020 THROUGH JUNE 30, 2021 for General Tier 4 and 5 PEPRA Members with 3% Maximum COLA

GENERAL PEPRA TIERS		Cost Group #1			Cost Group #3	Cost Group #4	Cost Group #5	Cost Group #6
County	Moraga-Orinda Fire District	First 5	LAFCO	Districts without POB	Central Contra Costa Sanitary District	Contra Costa Housing Authority	Contra Costa County Fire Protection District	Districts without POB
19.88%	17.87%	20.11%	24.18%	24.93%	31.46%	25.40%	21.91%	9.55%
4.91%	4.87%	5.31%	8.68%	8.96%	14.41%	13.59%	11.72%	3.21%
0.9582	0.9582	0.9582	0.9582	0.9582	0.9661	0.9643	0.9585	0.9647

Non-Refundability Factor

Cost Group #2	
County	Districts without POB
19.47%	24.52%
4.71%	8.76%
0.9604	0.9604

Tier 5 BASIC
All Eligible \$

Tier 5 COLA
All Eligible \$

Non-Refundability Factor

Cost Group	Employer Name	Tier
Cost Group #1	County General	Tier 4 (2.5% @ 67)
	LAFCO	
	CC Mosquito & Vector Control District	
	Belthel Island Municipal Improvement District	
	First 5 - Children and Families Commission	
	Contra Costa County Employees' Retirement Association Superior Court	
	East Contra Costa Fire Protection District	
	Moraga-Orinda Fire Protection District	
	Rodeo-Hercules Fire Protection District	
	San Ramon Valley Fire Protection District	
Cost Group #2	County General	Tier 5 (2.5% @ 67)
	In-Home Supportive Services	
	CC Mosquito & Vector Control District Superior Court	
Cost Group #3	Central Contra Costa Sanitary District	Tier 4 (2.5% @ 67)
Cost Group #4	Contra Costa Housing Authority	Tier 4 (2.5% @ 67)
Cost Group #5	Contra Costa County Fire Protection District	Tier 4 (2.5% @ 67)
Cost Group #6	Rodeo Sanitary District Byron Brentwood Cemetery District	Tier 4 (2.5% @ 67)

Basic rates shown include an administrative expense load of 0.63% of payroll.

Exhibit B - 1

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EMPLOYER CONTRIBUTION RATES EFFECTIVE FOR JULY 1, 2020 THROUGH JUNE 30, 2021 for Safety Tier A and C Legacy Members**

SAFETY TIERS ENHANCED

Safety A BASIC Enhanced

All eligible \$

Safety A COL Enhanced

All eligible \$

Non-Refundability Factor

Cost Group #7	Cost Group #8	Cost Group #10	Cost Group #11
Contra Costa County Fire Protection District	East Contra Costa Fire Protection District	Moraga-Orinda Fire Protection District	San Ramon Valley Fire Protection District
44.37%	59.76%	34.41%	51.39%
33.85%	53.30%	38.16%	26.84%
0.9599	0.9606	0.9639	0.9618

Safety C BASIC Enhanced

All eligible \$

Safety C COL Enhanced

All eligible \$

Non-Refundability Factor

Cost Group #9	Cost Group #7	Employer Name	Tier
County	County Safety	County Safety	Tier A Enhanced (3% @ 50)
42.49%	Contra Costa County Fire Protection District	Contra Costa County Fire Protection District	Tier A Enhanced (3% @ 50)
23.85%	East Contra Costa Fire Protection District	East Contra Costa Fire Protection District	Tier C Enhanced (3% @ 50)
0.9613	County Safety	County Safety	Tier A Enhanced (3% @ 50)

SAFETY TIER NON-ENHANCED

Safety A BASIC NON-Enhanced

All eligible \$

Monthly Contribution Towards UAAL

Safety A COL NON-Enhanced

All eligible \$

Monthly Contribution Towards UAAL

Non-Refundability Factor

Cost Group #12	Cost Group #10	Employer Name	Tier
Rodeo-Hercules Fire Protection District	Moraga-Orinda Fire Protection District	Moraga-Orinda Fire Protection District	Tier A Enhanced (3% @ 50)
14.30%	San Ramon Valley Fire Protection District	San Ramon Valley Fire Protection District	Tier A Enhanced (3% @ 50)
\$61,554	Rodeo Hercules Fire Protection District	Rodeo Hercules Fire Protection District	Tier A Non-enhanced (2% @ 50)
4.99%			
\$44,511			
0.9667			

Basic rates shown include an administrative expense load of 0.63% of payroll.

Exhibit B - 2

**CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
EMPLOYER CONTRIBUTION RATES EFFECTIVE FOR JULY 1, 2020 THROUGH JUNE 30, 2021 for Safety Tier D and E PEPRA Members**

SAFETY PEPRA TIERS

Safety D BASIC (3% Maximum COLA)

All eligible \$
Monthly Contribution Towards UAAL

Safety D COL (3% Maximum COLA)

All eligible \$
Monthly Contribution Towards UAAL

Non-Refundability Factor

Cost Group #7	Cost Group #8	Cost Group #10	Cost Group #11	Cost Group #12
County 36.32% N/A	Contra Costa County Fire Protection District 24.96% N/A	Moraga-Orinda Fire Protection District 26.75% N/A	San Ramon Valley Fire Protection District 41.19% N/A	Rodeo-Hercules Fire Protection District 11.65% \$17,745
25.20% N/A	50.87% N/A	36.64% N/A	24.63% N/A	4.82% \$12,832
0.9716	0.9732	0.9733	0.9735	0.9769

Cost Group #8	Cost Group #9
Contra Costa County Fire Protection District 24.00%	County 35.18%
29.85%	23.04%
0.9719	0.9703

Safety E BASIC (2% Maximum COLA)
All eligible \$

Safety E COL (2% Maximum COLA)
All eligible \$

Non-Refundability Factor

Cost Group	Employer Name	Tier
Cost Group # 7	County Safety	Tier D (2.7% @ 57)
Cost Group # 8	Contra Costa County Fire Protection District East Contra Costa Fire Protection District	Tier D (2.7% @ 57)
Cost Group # 9	Contra Costa County Fire Protection District County Safety	Tier E (2.7% @ 57)
Cost Group # 10	Moraga-Orinda Fire Protection District	Tier D (2.7% @ 57)
Cost Group # 11	San Ramon Valley Fire Protection District	Tier D (2.7% @ 57)
Cost Group # 12	Rodeo Hercules Fire Protection District	Tier D (2.7% @ 57)

Basic rates shown include an administrative expense load of 0.63% of payroll.

Exhibit C

GENERAL Cost Group #1 Non-PEPRA Member Contribution Rates

Membership Date before January 1, 2013

Effective 7/1/20 - 6/30/21

Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic not in Social Security</u>	<u>Basic in Social Security*</u>	<u>COLA</u>	<u>Total not in Social Security</u>	<u>Total in Social Security*</u>
15	5.30%	5.31%	2.51%	7.81%	7.82%
16	5.39%	5.40%	2.56%	7.95%	7.96%
17	5.49%	5.50%	2.61%	8.10%	8.11%
18	5.59%	5.60%	2.67%	8.26%	8.27%
19	5.69%	5.70%	2.72%	8.41%	8.42%
20	5.79%	5.80%	2.77%	8.56%	8.57%
21	5.89%	5.90%	2.82%	8.71%	8.72%
22	5.99%	6.00%	2.87%	8.86%	8.87%
23	6.10%	6.11%	2.93%	9.03%	9.04%
24	6.21%	6.22%	2.99%	9.20%	9.21%
25	6.32%	6.33%	3.05%	9.37%	9.38%
26	6.43%	6.44%	3.10%	9.53%	9.54%
27	6.55%	6.56%	3.17%	9.72%	9.73%
28	6.66%	6.67%	3.22%	9.88%	9.89%
29	6.78%	6.79%	3.29%	10.07%	10.08%
30	6.90%	6.91%	3.35%	10.25%	10.26%
31	7.03%	7.04%	3.42%	10.45%	10.46%
32	7.15%	7.16%	3.48%	10.63%	10.64%
33	7.28%	7.29%	3.55%	10.83%	10.84%
34	7.42%	7.43%	3.62%	11.04%	11.05%
35	7.55%	7.56%	3.69%	11.24%	11.25%
36	7.69%	7.70%	3.76%	11.45%	11.46%
37	7.83%	7.84%	3.83%	11.66%	11.67%
38	7.97%	7.98%	3.91%	11.88%	11.89%
39	8.12%	8.13%	3.98%	12.10%	12.11%
40	8.27%	8.28%	4.06%	12.33%	12.34%
41	8.43%	8.44%	4.14%	12.57%	12.58%
42	8.58%	8.59%	4.22%	12.80%	12.81%
43	8.73%	8.74%	4.30%	13.03%	13.04%
44	8.88%	8.89%	4.38%	13.26%	13.27%
45	9.04%	9.05%	4.46%	13.50%	13.51%
46	9.20%	9.21%	4.55%	13.75%	13.76%
47	9.36%	9.37%	4.63%	13.99%	14.00%
48	9.51%	9.52%	4.71%	14.22%	14.23%
49	9.66%	9.67%	4.79%	14.45%	14.46%
50	9.82%	9.83%	4.87%	14.69%	14.70%
51	9.98%	9.99%	4.95%	14.93%	14.94%
52	10.14%	10.15%	5.04%	15.18%	15.19%
53	10.30%	10.31%	5.12%	15.42%	15.43%
54	10.46%	10.47%	5.20%	15.66%	15.67%
55	10.61%	10.62%	5.28%	15.89%	15.90%
56	10.68%	10.69%	5.32%	16.00%	16.01%
57	10.65%	10.66%	5.30%	15.95%	15.96%
58	10.62%	10.63%	5.29%	15.91%	15.92%
59	10.31%	10.32%	5.12%	15.43%	15.44%
60 and over	10.31%	10.32%	5.12%	15.43%	15.44%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 52.07% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE:** For members in Social Security, the rate should only be applied to monthly compensation in excess of \$116.67.
The rate should be applied to compensation up to the annual IRC 401(a)(17) compensation limit.

Exhibit D

GENERAL Cost Group #2 Non-PEPRA Member Contribution Rates

Membership Date before January 1, 2013

Effective 7/1/20 - 6/30/21

Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic not in Social Security</u>	<u>Basic in Social Security*</u>	<u>COLA</u>	<u>Total not in Social Security</u>	<u>Total in Social Security*</u>
15	5.29%	5.30%	2.34%	7.63%	7.64%
16	5.38%	5.39%	2.38%	7.76%	7.77%
17	5.48%	5.49%	2.43%	7.91%	7.92%
18	5.57%	5.58%	2.47%	8.04%	8.05%
19	5.67%	5.68%	2.52%	8.19%	8.20%
20	5.77%	5.78%	2.57%	8.34%	8.35%
21	5.88%	5.89%	2.62%	8.50%	8.51%
22	5.98%	5.99%	2.67%	8.65%	8.66%
23	6.09%	6.10%	2.72%	8.81%	8.82%
24	6.20%	6.21%	2.78%	8.98%	8.99%
25	6.31%	6.32%	2.83%	9.14%	9.15%
26	6.42%	6.43%	2.88%	9.30%	9.31%
27	6.53%	6.54%	2.94%	9.47%	9.48%
28	6.65%	6.66%	3.00%	9.65%	9.66%
29	6.77%	6.78%	3.05%	9.82%	9.83%
30	6.89%	6.90%	3.11%	10.00%	10.01%
31	7.01%	7.02%	3.17%	10.18%	10.19%
32	7.14%	7.15%	3.23%	10.37%	10.38%
33	7.27%	7.28%	3.30%	10.57%	10.58%
34	7.40%	7.41%	3.36%	10.76%	10.77%
35	7.53%	7.54%	3.42%	10.95%	10.96%
36	7.67%	7.68%	3.49%	11.16%	11.17%
37	7.81%	7.82%	3.56%	11.37%	11.38%
38	7.96%	7.97%	3.63%	11.59%	11.60%
39	8.11%	8.12%	3.70%	11.81%	11.82%
40	8.25%	8.26%	3.77%	12.02%	12.03%
41	8.40%	8.41%	3.84%	12.24%	12.25%
42	8.56%	8.57%	3.92%	12.48%	12.49%
43	8.71%	8.72%	3.99%	12.70%	12.71%
44	8.86%	8.87%	4.07%	12.93%	12.94%
45	9.02%	9.03%	4.15%	13.17%	13.18%
46	9.18%	9.19%	4.22%	13.40%	13.41%
47	9.34%	9.35%	4.30%	13.64%	13.65%
48	9.48%	9.49%	4.37%	13.85%	13.86%
49	9.65%	9.66%	4.45%	14.10%	14.11%
50	9.80%	9.81%	4.52%	14.32%	14.33%
51	9.96%	9.97%	4.60%	14.56%	14.57%
52	10.12%	10.13%	4.68%	14.80%	14.81%
53	10.31%	10.32%	4.77%	15.08%	15.09%
54	10.43%	10.44%	4.83%	15.26%	15.27%
55	10.57%	10.58%	4.90%	15.47%	15.48%
56	10.68%	10.69%	4.95%	15.63%	15.64%
57	10.66%	10.67%	4.94%	15.60%	15.61%
58	10.64%	10.65%	4.93%	15.57%	15.58%
59	10.03%	10.04%	4.63%	14.66%	14.67%
60 and over	10.03%	10.04%	4.63%	14.66%	14.67%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 48.48% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE:** For members in Social Security, the rate should only be applied to monthly compensation in excess of \$116.67.
The rate should be applied to compensation up to the annual IRC 401(a)(17) compensation limit.

Exhibit E
GENERAL Cost Group #3 Non-PEPRA Member Contribution Rates
Membership Date before January 1, 2013
Effective 7/1/20 - 6/30/21
Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	5.48%	2.64%	8.12%
16	5.57%	2.69%	8.26%
17	5.67%	2.74%	8.41%
18	5.77%	2.79%	8.56%
19	5.88%	2.85%	8.73%
20	5.98%	2.90%	8.88%
21	6.09%	2.96%	9.05%
22	6.20%	3.02%	9.22%
23	6.31%	3.08%	9.39%
24	6.42%	3.14%	9.56%
25	6.53%	3.19%	9.72%
26	6.65%	3.26%	9.91%
27	6.77%	3.32%	10.09%
28	6.89%	3.38%	10.27%
29	7.01%	3.45%	10.46%
30	7.14%	3.52%	10.66%
31	7.27%	3.58%	10.85%
32	7.40%	3.65%	11.05%
33	7.53%	3.72%	11.25%
34	7.66%	3.79%	11.45%
35	7.80%	3.86%	11.66%
36	7.95%	3.94%	11.89%
37	8.09%	4.02%	12.11%
38	8.24%	4.09%	12.33%
39	8.40%	4.18%	12.58%
40	8.55%	4.26%	12.81%
41	8.71%	4.34%	13.05%
42	8.86%	4.42%	13.28%
43	9.02%	4.51%	13.53%
44	9.18%	4.59%	13.77%
45	9.35%	4.68%	14.03%
46	9.50%	4.76%	14.26%
47	9.66%	4.84%	14.50%
48	9.82%	4.93%	14.75%
49	9.98%	5.01%	14.99%
50	10.14%	5.10%	15.24%
51	10.30%	5.18%	15.48%
52	10.47%	5.27%	15.74%
53	10.63%	5.35%	15.98%
54	10.77%	5.43%	16.20%
55	10.87%	5.48%	16.35%
56	10.98%	5.54%	16.52%
57	10.94%	5.52%	16.46%
58	10.70%	5.39%	16.09%
59	10.26%	5.16%	15.42%
60 and over	10.26%	5.16%	15.42%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 52.70% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE:** The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.

Exhibit F

GENERAL Cost Group #4 Non-PEPRA Member Contribution Rates

Membership Date before January 1, 2013

Effective 7/1/20 - 6/30/21

Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic not in Social Security</u>	<u>Basic in Social Security*</u>	<u>COLA</u>	<u>Total not in Social Security</u>	<u>Total in Social Security*</u>
15	5.27%	5.28%	2.51%	7.78%	7.79%
16	5.37%	5.38%	2.56%	7.93%	7.94%
17	5.46%	5.47%	2.61%	8.07%	8.08%
18	5.56%	5.57%	2.66%	8.22%	8.23%
19	5.66%	5.67%	2.71%	8.37%	8.38%
20	5.76%	5.77%	2.77%	8.53%	8.54%
21	5.86%	5.87%	2.82%	8.68%	8.69%
22	5.97%	5.98%	2.87%	8.84%	8.85%
23	6.07%	6.08%	2.93%	9.00%	9.01%
24	6.18%	6.19%	2.98%	9.16%	9.17%
25	6.29%	6.30%	3.04%	9.33%	9.34%
26	6.40%	6.41%	3.10%	9.50%	9.51%
27	6.52%	6.53%	3.16%	9.68%	9.69%
28	6.63%	6.64%	3.22%	9.85%	9.86%
29	6.75%	6.76%	3.28%	10.03%	10.04%
30	6.87%	6.88%	3.35%	10.22%	10.23%
31	7.00%	7.01%	3.41%	10.41%	10.42%
32	7.12%	7.13%	3.48%	10.60%	10.61%
33	7.25%	7.26%	3.54%	10.79%	10.80%
34	7.38%	7.39%	3.61%	10.99%	11.00%
35	7.52%	7.53%	3.69%	11.21%	11.22%
36	7.65%	7.66%	3.75%	11.40%	11.41%
37	7.79%	7.80%	3.83%	11.62%	11.63%
38	7.94%	7.95%	3.90%	11.84%	11.85%
39	8.09%	8.10%	3.98%	12.07%	12.08%
40	8.24%	8.25%	4.06%	12.30%	12.31%
41	8.39%	8.40%	4.14%	12.53%	12.54%
42	8.54%	8.55%	4.22%	12.76%	12.77%
43	8.69%	8.70%	4.30%	12.99%	13.00%
44	8.84%	8.85%	4.37%	13.21%	13.22%
45	9.01%	9.02%	4.46%	13.47%	13.48%
46	9.16%	9.17%	4.54%	13.70%	13.71%
47	9.31%	9.32%	4.62%	13.93%	13.94%
48	9.46%	9.47%	4.70%	14.16%	14.17%
49	9.63%	9.64%	4.79%	14.42%	14.43%
50	9.77%	9.78%	4.86%	14.63%	14.64%
51	9.94%	9.95%	4.95%	14.89%	14.90%
52	10.10%	10.11%	5.03%	15.13%	15.14%
53	10.28%	10.29%	5.13%	15.41%	15.42%
54	10.43%	10.44%	5.21%	15.64%	15.65%
55	10.57%	10.58%	5.28%	15.85%	15.86%
56	10.63%	10.64%	5.31%	15.94%	15.95%
57	10.67%	10.68%	5.33%	16.00%	16.01%
58	10.51%	10.52%	5.25%	15.76%	15.77%
59	10.05%	10.06%	5.01%	15.06%	15.07%
60 and over	10.05%	10.06%	5.01%	15.06%	15.07%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 52.27% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE:** For members in Social Security, the rate should only be applied to monthly compensation in excess of \$116.67.
The rate should be applied to compensation up to the annual IRC 401(a)(17) compensation limit.

Exhibit G
GENERAL Cost Group #5 Non-PEPRA Member Contribution Rates
Membership Date before January 1, 2013
Effective 7/1/20 - 6/30/21
Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	5.31%	2.55%	7.86%
16	5.40%	2.60%	8.00%
17	5.50%	2.65%	8.15%
18	5.60%	2.70%	8.30%
19	5.70%	2.76%	8.46%
20	5.80%	2.81%	8.61%
21	5.90%	2.86%	8.76%
22	6.01%	2.92%	8.93%
23	6.11%	2.97%	9.08%
24	6.22%	3.03%	9.25%
25	6.33%	3.09%	9.42%
26	6.45%	3.15%	9.60%
27	6.56%	3.21%	9.77%
28	6.68%	3.27%	9.95%
29	6.80%	3.34%	10.14%
30	6.92%	3.40%	10.32%
31	7.04%	3.46%	10.50%
32	7.17%	3.53%	10.70%
33	7.30%	3.60%	10.90%
34	7.43%	3.67%	11.10%
35	7.57%	3.74%	11.31%
36	7.70%	3.81%	11.51%
37	7.85%	3.89%	11.74%
38	7.99%	3.96%	11.95%
39	8.14%	4.04%	12.18%
40	8.29%	4.12%	12.41%
41	8.45%	4.20%	12.65%
42	8.60%	4.28%	12.88%
43	8.75%	4.36%	13.11%
44	8.90%	4.44%	13.34%
45	9.06%	4.53%	13.59%
46	9.22%	4.61%	13.83%
47	9.38%	4.69%	14.07%
48	9.53%	4.77%	14.30%
49	9.69%	4.86%	14.55%
50	9.85%	4.94%	14.79%
51	10.01%	5.03%	15.04%
52	10.16%	5.11%	15.27%
53	10.33%	5.20%	15.53%
54	10.49%	5.28%	15.77%
55	10.60%	5.34%	15.94%
56	10.67%	5.37%	16.04%
57	10.73%	5.41%	16.14%
58	10.61%	5.34%	15.95%
59	10.29%	5.17%	15.46%
60 and over	10.29%	5.17%	15.46%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 52.69% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE: The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.**

Exhibit H
GENERAL Cost Group #6 Non-PEPRA Member Contribution Rates
Membership Date before January 1, 2013
Effective 7/1/20 - 6/30/21
Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic not in Social Security</u>	<u>Basic in Social Security*</u>	<u>COLA</u>	<u>Total not in Social Security</u>	<u>Total in Social Security*</u>
15	6.03%	6.04%	2.43%	8.46%	8.47%
16	6.14%	6.15%	2.48%	8.62%	8.63%
17	6.24%	6.25%	2.53%	8.77%	8.78%
18	6.36%	6.37%	2.58%	8.94%	8.95%
19	6.47%	6.48%	2.63%	9.10%	9.11%
20	6.59%	6.60%	2.68%	9.27%	9.28%
21	6.70%	6.71%	2.73%	9.43%	9.44%
22	6.82%	6.83%	2.78%	9.60%	9.61%
23	6.94%	6.95%	2.83%	9.77%	9.78%
24	7.07%	7.08%	2.89%	9.96%	9.97%
25	7.20%	7.21%	2.95%	10.15%	10.16%
26	7.33%	7.34%	3.00%	10.33%	10.34%
27	7.46%	7.47%	3.06%	10.52%	10.53%
28	7.59%	7.60%	3.12%	10.71%	10.72%
29	7.73%	7.74%	3.18%	10.91%	10.92%
30	7.87%	7.88%	3.24%	11.11%	11.12%
31	8.01%	8.02%	3.30%	11.31%	11.32%
32	8.17%	8.18%	3.37%	11.54%	11.55%
33	8.31%	8.32%	3.43%	11.74%	11.75%
34	8.47%	8.48%	3.50%	11.97%	11.98%
35	8.63%	8.64%	3.57%	12.20%	12.21%
36	8.79%	8.80%	3.64%	12.43%	12.44%
37	8.95%	8.96%	3.71%	12.66%	12.67%
38	9.11%	9.12%	3.78%	12.89%	12.90%
39	9.27%	9.28%	3.85%	13.12%	13.13%
40	9.44%	9.45%	3.93%	13.37%	13.38%
41	9.60%	9.61%	4.00%	13.60%	13.61%
42	9.76%	9.77%	4.07%	13.83%	13.84%
43	9.93%	9.94%	4.14%	14.07%	14.08%
44	10.09%	10.10%	4.21%	14.30%	14.31%
45	10.25%	10.26%	4.28%	14.53%	14.54%
46	10.43%	10.44%	4.36%	14.79%	14.80%
47	10.59%	10.60%	4.43%	15.02%	15.03%
48	10.78%	10.79%	4.51%	15.29%	15.30%
49	10.93%	10.94%	4.58%	15.51%	15.52%
50	11.07%	11.08%	4.64%	15.71%	15.72%
51	11.18%	11.19%	4.69%	15.87%	15.88%
52	11.13%	11.14%	4.67%	15.80%	15.81%
53	11.05%	11.06%	4.63%	15.68%	15.69%
54	10.59%	10.60%	4.43%	15.02%	15.03%
55	10.59%	10.60%	4.43%	15.02%	15.03%
56	10.59%	10.60%	4.43%	15.02%	15.03%
57	10.59%	10.60%	4.43%	15.02%	15.03%
58	10.59%	10.60%	4.43%	15.02%	15.03%
59	10.59%	10.60%	4.43%	15.02%	15.03%
60 and over	10.59%	10.60%	4.43%	15.02%	15.03%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 43.77% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE:** For members in Social Security, the rate should only be applied to monthly compensation in excess of \$116.67.
The rate should be applied to compensation up to the annual IRC 401(a)(17) compensation limit.

Exhibit I
SAFETY Cost Group #7 Non-PEPRA Member Contribution Rates
Membership Date before January 1, 2013
Effective 7/1/20 - 6/30/21
Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	9.46%	6.27%	15.73%
16	9.46%	6.27%	15.73%
17	9.46%	6.27%	15.73%
18	9.46%	6.27%	15.73%
19	9.46%	6.27%	15.73%
20	9.46%	6.27%	15.73%
21	9.46%	6.27%	15.73%
22	9.60%	6.37%	15.97%
23	9.74%	6.47%	16.21%
24	9.89%	6.57%	16.46%
25	10.04%	6.68%	16.72%
26	10.19%	6.78%	16.97%
27	10.35%	6.89%	17.24%
28	10.50%	7.00%	17.50%
29	10.66%	7.11%	17.77%
30	10.83%	7.23%	18.06%
31	11.00%	7.34%	18.34%
32	11.17%	7.46%	18.63%
33	11.35%	7.59%	18.94%
34	11.53%	7.71%	19.24%
35	11.72%	7.85%	19.57%
36	11.91%	7.98%	19.89%
37	12.10%	8.11%	20.21%
38	12.29%	8.24%	20.53%
39	12.50%	8.39%	20.89%
40	12.72%	8.54%	21.26%
41	12.93%	8.69%	21.62%
42	13.16%	8.85%	22.01%
43	13.39%	9.01%	22.40%
44	13.65%	9.19%	22.84%
45	13.87%	9.35%	23.22%
46	13.89%	9.36%	23.25%
47	13.92%	9.38%	23.30%
48	13.73%	9.25%	22.98%
49 and over	13.21%	8.89%	22.10%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 69.75% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE: The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.**

Exhibit J

SAFETY Cost Group #8 Non-PEPRA Member Contribution Rates

Membership Date before January 1, 2013

Effective 7/1/20 - 6/30/21

Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	9.44%	6.41%	15.85%
16	9.44%	6.41%	15.85%
17	9.44%	6.41%	15.85%
18	9.44%	6.41%	15.85%
19	9.44%	6.41%	15.85%
20	9.44%	6.41%	15.85%
21	9.44%	6.41%	15.85%
22	9.58%	6.51%	16.09%
23	9.72%	6.61%	16.33%
24	9.87%	6.72%	16.59%
25	10.02%	6.83%	16.85%
26	10.17%	6.94%	17.11%
27	10.32%	7.04%	17.36%
28	10.48%	7.16%	17.64%
29	10.64%	7.27%	17.91%
30	10.80%	7.39%	18.19%
31	10.97%	7.51%	18.48%
32	11.15%	7.64%	18.79%
33	11.32%	7.76%	19.08%
34	11.51%	7.89%	19.40%
35	11.70%	8.03%	19.73%
36	11.88%	8.16%	20.04%
37	12.08%	8.30%	20.38%
38	12.27%	8.44%	20.71%
39	12.47%	8.58%	21.05%
40	12.69%	8.74%	21.43%
41	12.91%	8.90%	21.81%
42	13.14%	9.06%	22.20%
43	13.37%	9.22%	22.59%
44	13.62%	9.40%	23.02%
45	13.83%	9.55%	23.38%
46	13.90%	9.60%	23.50%
47	13.84%	9.56%	23.40%
48	13.75%	9.50%	23.25%
49 and over	13.24%	9.13%	22.37%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 71.51% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE:** The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.

Exhibit K
SAFETY Cost Group #9 Non-PEPRA Member Contribution Rates
Membership Date before January 1, 2013
Effective 7/1/20 - 6/30/21
Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	9.04%	3.86%	12.90%
16	9.04%	3.86%	12.90%
17	9.04%	3.86%	12.90%
18	9.04%	3.86%	12.90%
19	9.04%	3.86%	12.90%
20	9.04%	3.86%	12.90%
21	9.04%	3.86%	12.90%
22	9.17%	3.92%	13.09%
23	9.31%	3.99%	13.30%
24	9.45%	4.05%	13.50%
25	9.59%	4.11%	13.70%
26	9.73%	4.18%	13.91%
27	9.88%	4.24%	14.12%
28	10.03%	4.31%	14.34%
29	10.18%	4.38%	14.56%
30	10.34%	4.45%	14.79%
31	10.50%	4.52%	15.02%
32	10.67%	4.60%	15.27%
33	10.84%	4.68%	15.52%
34	11.01%	4.75%	15.76%
35	11.18%	4.83%	16.01%
36	11.36%	4.91%	16.27%
37	11.54%	4.99%	16.53%
38	11.71%	5.07%	16.78%
39	11.91%	5.16%	17.07%
40	12.10%	5.24%	17.34%
41	12.29%	5.33%	17.62%
42	12.49%	5.42%	17.91%
43	12.66%	5.50%	18.16%
44	12.76%	5.54%	18.30%
45	12.77%	5.55%	18.32%
46	12.65%	5.49%	18.14%
47	12.39%	5.37%	17.76%
48	12.72%	5.52%	18.24%
49 and over	13.30%	5.79%	19.09%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 45.09% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE: The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.**

Exhibit L

SAFETY Cost Group #10 Non-PEPRA Member Contribution Rates

Membership Date before January 1, 2013

Effective 7/1/20 - 6/30/21

Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	9.44%	6.15%	15.59%
16	9.44%	6.15%	15.59%
17	9.44%	6.15%	15.59%
18	9.44%	6.15%	15.59%
19	9.44%	6.15%	15.59%
20	9.44%	6.15%	15.59%
21	9.44%	6.15%	15.59%
22	9.58%	6.24%	15.82%
23	9.72%	6.34%	16.06%
24	9.87%	6.44%	16.31%
25	10.02%	6.54%	16.56%
26	10.17%	6.65%	16.82%
27	10.32%	6.75%	17.07%
28	10.48%	6.86%	17.34%
29	10.64%	6.97%	17.61%
30	10.80%	7.08%	17.88%
31	10.97%	7.19%	18.16%
32	11.15%	7.32%	18.47%
33	11.32%	7.43%	18.75%
34	11.51%	7.56%	19.07%
35	11.70%	7.69%	19.39%
36	11.88%	7.82%	19.70%
37	12.08%	7.96%	20.04%
38	12.27%	8.09%	20.36%
39	12.47%	8.22%	20.69%
40	12.69%	8.37%	21.06%
41	12.91%	8.52%	21.43%
42	13.14%	8.68%	21.82%
43	13.37%	8.84%	22.21%
44	13.62%	9.01%	22.63%
45	13.83%	9.15%	22.98%
46	13.90%	9.20%	23.10%
47	13.84%	9.16%	23.00%
48	13.75%	9.10%	22.85%
49 and over	13.24%	8.75%	21.99%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 68.52% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE: The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.**

Exhibit M
SAFETY Cost Group #11 Non-PEPRA Member Contribution Rates
Membership Date before January 1, 2013
Effective 7/1/20 - 6/30/21
Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	9.61%	6.55%	16.16%
16	9.61%	6.55%	16.16%
17	9.61%	6.55%	16.16%
18	9.61%	6.55%	16.16%
19	9.61%	6.55%	16.16%
20	9.61%	6.55%	16.16%
21	9.61%	6.55%	16.16%
22	9.76%	6.66%	16.42%
23	9.90%	6.76%	16.66%
24	10.05%	6.86%	16.91%
25	10.20%	6.97%	17.17%
26	10.36%	7.09%	17.45%
27	10.51%	7.19%	17.70%
28	10.67%	7.31%	17.98%
29	10.83%	7.42%	18.25%
30	11.00%	7.54%	18.54%
31	11.17%	7.67%	18.84%
32	11.35%	7.80%	19.15%
33	11.53%	7.92%	19.45%
34	11.72%	8.06%	19.78%
35	11.90%	8.19%	20.09%
36	12.09%	8.33%	20.42%
37	12.29%	8.47%	20.76%
38	12.49%	8.61%	21.10%
39	12.69%	8.76%	21.45%
40	12.90%	8.91%	21.81%
41	13.12%	9.06%	22.18%
42	13.35%	9.23%	22.58%
43	13.59%	9.40%	22.99%
44	13.82%	9.57%	23.39%
45	14.05%	9.73%	23.78%
46	14.08%	9.75%	23.83%
47	14.02%	9.71%	23.73%
48	13.76%	9.52%	23.28%
49 and over	12.99%	8.97%	21.96%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 71.65% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE: The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.**

Exhibit N

SAFETY Cost Group #12 Non-PEPRA Member Contribution Rates

Membership Date before January 1, 2013

Effective 7/1/20 - 6/30/21

Expressed as a Percentage of Monthly Payroll*

<u>Entry Age</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
15	9.57%	4.61%	14.18%
16	9.57%	4.61%	14.18%
17	9.57%	4.61%	14.18%
18	9.57%	4.61%	14.18%
19	9.57%	4.61%	14.18%
20	9.57%	4.61%	14.18%
21	9.57%	4.61%	14.18%
22	9.71%	4.68%	14.39%
23	9.86%	4.76%	14.62%
24	10.00%	4.83%	14.83%
25	10.16%	4.91%	15.07%
26	10.31%	4.99%	15.30%
27	10.46%	5.06%	15.52%
28	10.62%	5.14%	15.76%
29	10.78%	5.22%	16.00%
30	10.95%	5.31%	16.26%
31	11.12%	5.40%	16.52%
32	11.30%	5.49%	16.79%
33	11.47%	5.57%	17.04%
34	11.66%	5.67%	17.33%
35	11.86%	5.77%	17.63%
36	12.04%	5.86%	17.90%
37	12.23%	5.96%	18.19%
38	12.43%	6.06%	18.49%
39	12.64%	6.17%	18.81%
40	12.86%	6.28%	19.14%
41	13.07%	6.38%	19.45%
42	13.31%	6.51%	19.82%
43	13.54%	6.62%	20.16%
44	13.76%	6.73%	20.49%
45	13.97%	6.84%	20.81%
46	14.03%	6.87%	20.90%
47	13.95%	6.83%	20.78%
48	13.79%	6.75%	20.54%
49 and over	13.05%	6.37%	19.42%

Administrative Expense: 0.47% of payroll added to Basic rates.

COLA Loading: 50.67% applied to Basic rates prior to adjustment for administrative expenses.

***NOTE:** The rate should be applied to all compensation up to the annual IRC 401(a)(17) compensation limit.

Exhibit O
PEPRA Tiers Member Contribution Rates
Membership Date on or after January 1, 2013
Effective 7/1/20 - 6/30/21
Expressed as a Percentage of Monthly Payroll*

<u>General Tiers</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
Cost Group #1 – PEPRA Tier 4 (2% COLA)	8.68%	1.99%	10.67%
Cost Group #1 – PEPRA Tier 4 (3% COLA)	8.80%	2.96%	11.76%
Cost Group #2 - PEPRA Tier 5 (2% COLA)	8.16%	1.84%	10.00%
Cost Group #2 - PEPRA Tier 5 (3%/4% COLA)	8.39%	2.76%	11.15%
Cost Group #3 - PEPRA Tier 4 (3% COLA)	8.23%	2.83%	11.06%
Cost Group #4 - PEPRA Tier 4 (3% COLA)	8.96%	3.02%	11.98%
Cost Group #5 - PEPRA Tier 4 (2% COLA)	10.07%	2.27%	12.34%
Cost Group #5 - PEPRA Tier 4 (3% COLA)	11.38%	3.79%	15.17%
Cost Group #6 - PEPRA Tier 4 (3% COLA)	9.39%	3.21%	12.60%

<u>Safety Tiers</u>	<u>Basic</u>	<u>COLA</u>	<u>Total</u>
Cost Group #7 - PEPRA Tier D	14.31%	5.73%	20.04%
Cost Group #8 - PEPRA Tier D	13.05%	5.35%	18.40%
Cost Group #8 - PEPRA Tier E	12.09%	3.32%	15.41%
Cost Group #9 - PEPRA Tier E	13.17%	3.57%	16.74%
Cost Group #10 - PEPRA Tier D	12.70%	5.23%	17.93%
Cost Group #11 - PEPRA Tier D	11.44%	4.71%	16.15%
Cost Group #12 - PEPRA Tier D	11.65%	4.82%	16.47%

The Basic rates shown above also include an administrative expense load of 0.47% of payroll.

***NOTE:** The rate should be applied to all compensation (whether or not in Social Security) up to the applicable annual Gov. Code 7522.10(d) compensation limit.

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

SUBVENTION

All rates are shown as a percent of payroll.

Employee contribution rates vary depending upon their tier and age at entry. To compute the exact subvention percent for each employee, do the following:

Employee rate – Decrease the employee's rate by the subvention percent (i.e. 25%, 50%, etc.).

Employer rate – Increase the employer's rate by a **percent** of the employee's decrease using the applicable refundability factor (found on Exhibits A and B):

EXAMPLE FOR COST GROUP #3 LEGACY MEMBERS:

If the subvention percent is 25%, and
the employee's rate is 6.00%,

Employee rates should be decreased by 1.50% ($25\% \times 6.00\%$)
The employer rate should be increased by 1.4340% ($1.50\% \times 0.9560$)

Please note that for PEPRA members, subvention is generally not permitted. The standard under Gov. Code §7522.30(a) is that employees pay at least 50 percent of normal costs and that employers not pay any of the required employee contribution, but there are some exceptions. Gov. Code §7522.30(f) allows the terms (regarding the employee's required contribution) of a contract, including a memorandum of understanding, that is in effect on January 1, 2013, to continue through the length of a contract. This means that it is possible that an employer will subvent a portion of a PEPRA member's required contribution until the expiration date of the current contract, so long as it has been determined that the contract has been impaired.

CAUTION – these rates are for employer **subvention** of up to one-half the member contribution under Gov. Code §31581.1, NOT employer **pick-up** of employee contribution rates. When an employer subvents, the contribution subvented is not placed in the member's account and is therefore not available to the member as a refund. For this reason, the employer pays the contribution at a discount (i.e. "Refundability Factor").

Employer **pick-ups** of employee contributions are those made under Gov. Code §31581.2 and Internal Revenue Code §414 (h)(2) for the sole purpose of deferring income tax. These contributions are added to the member's account, are available to the member as a refund and are considered by CCCERA as part of the member's compensation for retirement purposes.

EMPLOYEE PAYMENT OF EMPLOYER COST

There are several reasons why the attached contribution rates may need to be adjusted to increase the employee portion including the following:

Gov. Code §31631 allows for members to pay all or part of the employer contributions.

Gov. Code §31639.95 allows for Safety members to pay a portion of the employer cost for the "3% at 50" enhanced benefit.

Gov. Code §7522.30(c) requires that an employee's contribution rate be at least equal to that of similarly situated employees.

Gov. Code §7522.30(e) allows the employee contributions to be more than one-half of the normal cost rate if the increase has been agreed to through the collective bargaining process.

If you need to increase the employee contribution rate for any reason, you will need to adjust both employee and employer rates as follows:

Employee rate – Increase the employee’s rate by the desired percent of payroll.

Employer rate – Decrease the employer’s rate by a **percent** of the cost-sharing percent of payroll using the applicable refundability factor:

EXAMPLE FOR COST GROUP #11 LEGACY MEMBERS:

If the required increase in the employee rate is 8.0% ,

Employee rates should be increased by 8.0% .

The employer rate should be decreased by 7.6944% (8.0% × 0.9618)

PREPAYMENT DISCOUNT FACTOR FOR 2020-21

Employer Contribution Prepayment Program & Discount Factor for 2020-21 is **0.9696**

If you are currently participating in the prepayment program and wish to continue, you do not need to do anything other than prepay the July 1, 2020 through June 30, 2021 contributions on or before July 31, 2020. If you wish to start participating, please contact the Accounting Department at CCCERA by March 31, 2020.

The discount factor is calculated assuming the prepayment will be received on July 31 in accordance with Gov. Code §31582(b) in lieu of 12 equal payments due at the end of each month in accordance with Gov. Code §31582(a). The discount factor for the fiscal year July 1, 2020 through June 30, 2021 will be **0.9696** based on the interest assumption of 7.00% per annum. It is calculated by discounting each of the 12 equal payments back to the date that the prepayment is made and is the sum of the discount factors shown in the table below divided by 12. Each of the discount factors below is based on how many months early the payment is made.

Payment Number	Number of Months Payment is Made Early	Discount Factor
1	0	1.0000
2	1	0.9944
3	2	0.9888
4	3	0.9832
5	4	0.9777
6	5	0.9722
7	6	0.9667
8	7	0.9613
9	8	0.9559
10	9	0.9505
11	10	0.9452
12	11	0.9399
Sum of Discount Factors Divided by 12:		0.9696

Presentation on mental health conditions

Meeting Date
10/09/19
Agenda Item
#8

Dr. Baumbacher has worked with the Sonoma County Employee Retirement Association, the Mendocino County retirement board, and the San Francisco City and County carve out program for First Responders providing assessments. He has a background in academic medicine, clinical practice and medical legal assessment. He completed medical school at Northwestern University, completed residency training at the University of California Medical center in San Francisco, and completed an additional year as chief resident. He then joined the faculty at the University of California San Francisco where he was involved in teaching and research for the next 20 years. He is a graduate of the San Francisco Psychoanalytic Institute and had also served on the faculty there. His current practice focuses on developmental issues, psychopharmacology, and neuromodulation technology for treatment of resistant depression.

Different Types of Disorders

- Major depression
- Bipolar
- Post Traumatic Stress Disorder
- Hidden trauma (Post Traumatic Stress Disorder)
- Anxiety Disorders

Depression

- Depression is a systemic illness
- Onset often young adult to mid life
- Not rare, affects 3% of population at any one time (5.7 million people) & 6-7% life time incidence.
- 40% relapse rate
- Significant genetic contribution, 1/3 no causal connection

Bipolar Disorder

- Incidence 2.6% of population
- Strong genetic component: 1 parent, 10-15%; 2 parents, 30-40 % incidence; Identical twin, 40-70%.
- Successful treatment, 80%
- Relapse rate 73% over 5 years
- 18-25 % mortality rate

Economic costs of Major Depression and Bipolar Disorder

- Major Depression:
 - Annual Cost: \$210 billion
 - Lost work: \$63 billion
 - Disability payments: \$25 billion
- Bipolar Disorder:
 - Annual Cost: \$45 billion

Post Traumatic Stress disorder

- A mental health condition triggered by a terrifying event followed by particular constellation of symptoms.
- May have delayed onset, in some cases appearing only decades after the event.
- Developmental Trauma

Anxiety Disorders

- Subjective experience and symptoms are like fear but no identifiable threat
- Six types: GAD, Social Anxiety, Specific Phobia, Panic disorder, Obsessive Compulsive Disorder, Post Traumatic Disorder

Evolution of the Brain

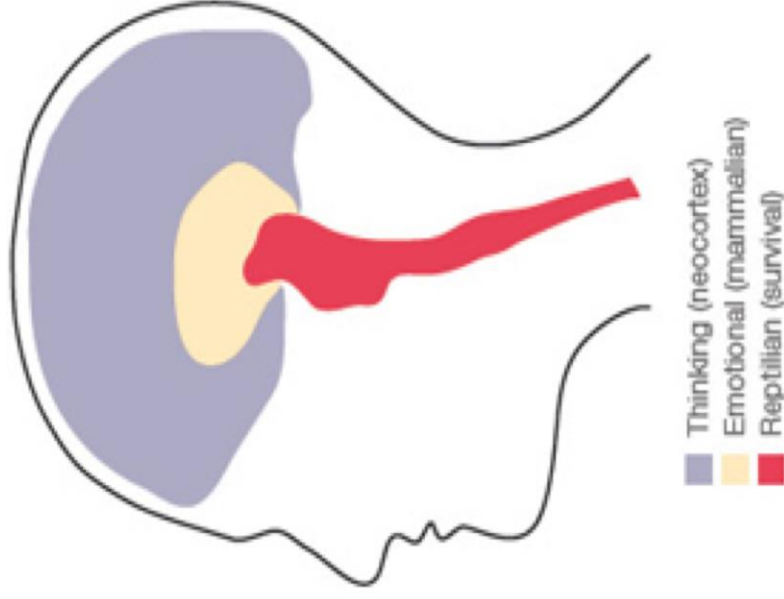
- Reptiles emerged 310 million years ago. The brain was mainly a **brain stem**.
- Mammals emerged 200 million years ago. The brain contained a developing mid brain with beginning **Lymbic system**.
- The **neocortex** developed, separating mammals from earlier ancestors 90-100 million years ago.

Emotions

- Emotions Are Hard Wired
- Fear, Anger, Surprise, Happiness,
- Sadness, disgust

Biology/Psychology





■ Introduction

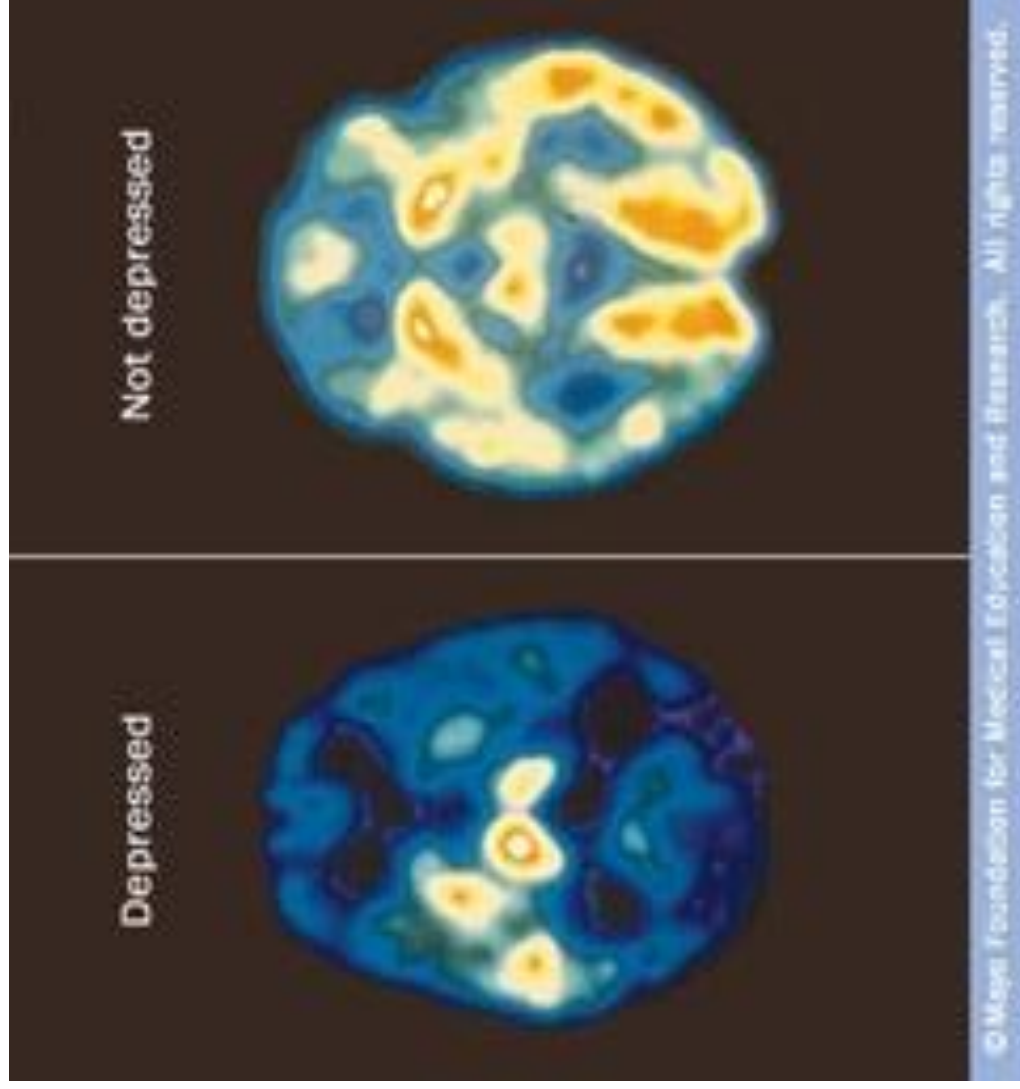
The term “reptilian” refers to our primitive, instinctive brain function that is shared by all reptiles and mammals, including humans. It is the most powerful and oldest of our coping brain functions since without it we would not be alive.

1. Instinctive survival
2. Attack or hide response
3. Aggression
4. Anger display
5. Fear
6. Revenge

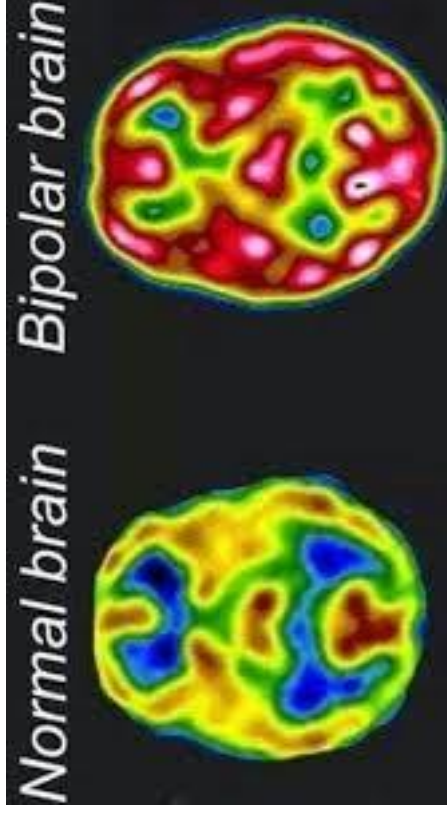
Brain three Parts



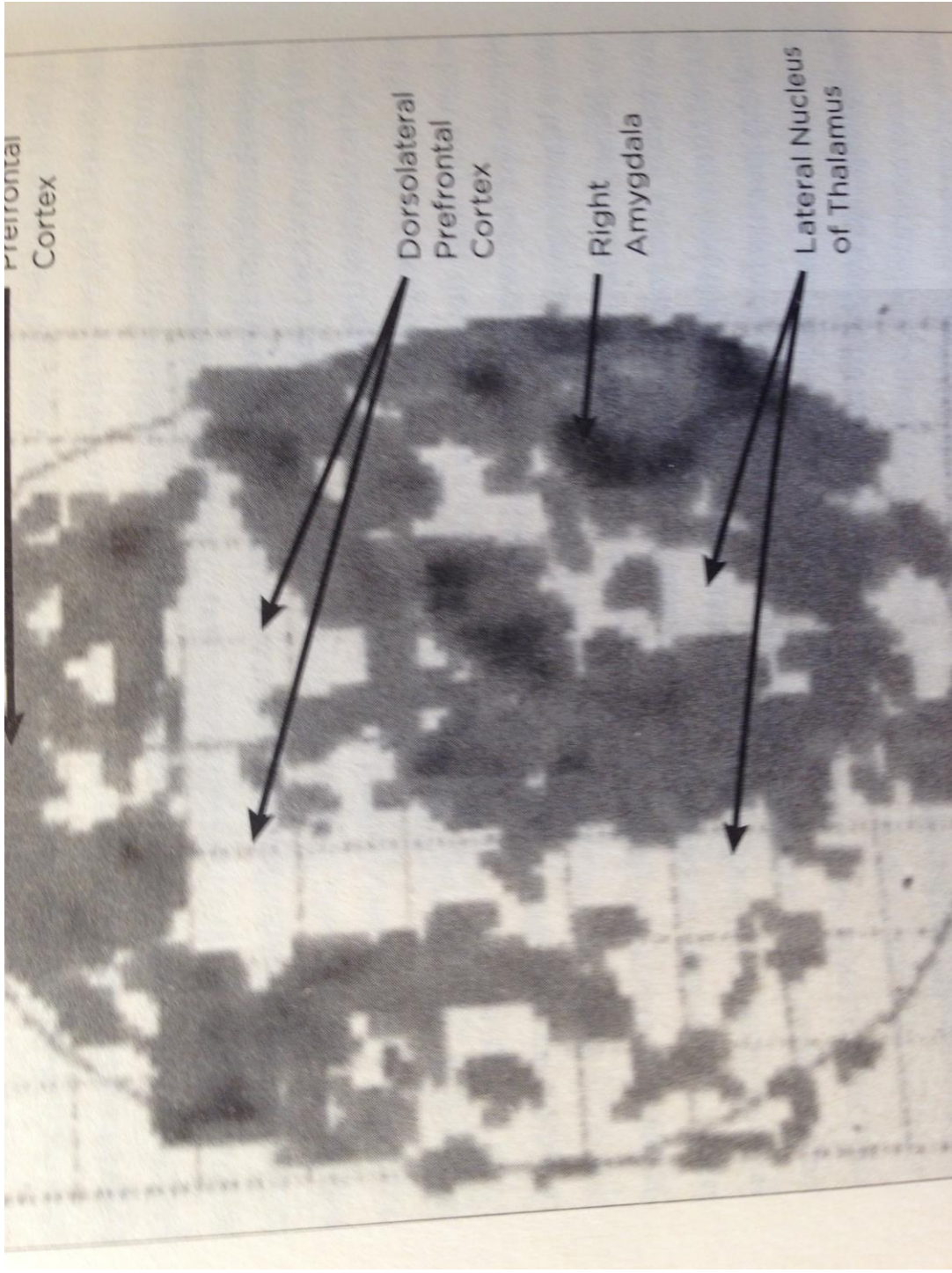
Pet Scan in depression



Functional Imaging in Bipolar Mania



Brain during a flashback



TRUSTEES' ROUNDTABLE

Friday, October 25, 2019
Hilton Oakland Airport
1 Hegenberger Road, Oakland, CA

AGENDA

- 8:30 a.m. Registration & Continental Breakfast
- 9:00 a.m. Welcome & Introductions
- 9:15 a.m. Special Guest Kevin Parker from Sustainable Insight Capital Management (SICM). Evolving themes in Environmental, Social and Governance (ESG) investing.
- 10:15 a.m. Break
- 10:30 a.m. Speaker Kevin Parker: ESG performance and integration.
- 12:00 p.m. Lunch Buffet
- 1:00 p.m. Speaker Kevin Parker: Inside ESG, screening metrics, performance, opportunities and investment vehicles.
- 2:00 p.m. Speaker Kevin Parker: Practical matters of ESG including innovations and integration.
- 3:00 p.m. Select chair (or co-chairs) for next Roundtable.
- 3:15 p.m. Adjourn

The next Trustees' Roundtable will be in 2020. Details will be posted to the CALAPRS website and emailed to you as soon as they are available.