SUBMITTAL TO THE BOARD OF SUPERVISORS
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
MAY 9, 1893

ITEM: 3.9
(ID # 18415)
MEETING DATE:
Tuesday, March 01, 2022

FROM : EXECUTIVE OFFICE:

SUBJECT: EXECUTIVE OFFICE: Pension Advisory Review Committee (PARC) 2022 Annual Report, All Districts. [$0]

RECOMMENDED MOTION: That the Board of Supervisors:

1. Receive and file the PARC 2022 Annual Report.

2. Direct staff and PARC to report back with any additional updates or recommendations on the County's pension plans, Other Post-Employment Benefits (OPEB), or any other item as noted in Board Policy B-25 including pension debt reduction strategies.

3. Direct staff to review the annual CalPERS unfunded liability pre-payment for FY 22/23 and to have such recommendations presented in conjunction with either the approval of the annual Tax and Revenue Anticipation Notes (TRANs) cash flow financing, or, with the FY 22/23 budget.

ACTION:

Don Kent, Director of Finance 2/18/2022

MINUTES OF THE BOARD OF SUPERVISORS

On motion of Supervisor Washington seconded by Supervisor Spiegel and duly carried by unanimous vote, IT WAS ORDERED that the above matter is approved as recommended.

Ayes:	Jeffries, Spiegel, Washington, Perez and Hewitt
Nays:	None
Absent:	None
Date:	March 1, 2022
xc:	E.O.

Kecia R. Harper
Clerk of the Board
By: Deputy

SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

FINANCIAL DATA	Current Fiscal Year:	Next Fiscal Year:	Total Cost:	Ongoing Cost
COST	$ 0	$ 0	$ 0	$ 0
NET COUNTY COST	$ 0	$ 0	$ 0	$ 0
SOURCE OF FUNDS: N/A			Budget Adjustment:	No
			For Fiscal Year:	21/22

C.E.O. RECOMMENDATION: Approve

BACKGROUND:

Summary

Established in 2003 to guide policy decisions about the County's defined benefit pension plans and make recommendations to the Board, PARC is a Brown Act committee which consists of the County Executive Office (Chair), Treasurer-Tax Collector, Assistant County Executive Officer/Human Resources Director, County Auditor-Controller, and a local safety member department representative (the County Undersheriff).

Board Policy B-25, Pension Management and Other Post-Employment Benefits (OPEB), requires PARC to prepare an annual public report regarding the status of the County's defined benefit pension plans with CalPERS, OPEB, the Temporary and Part-Time Employees' Retirement Plan and the County's Section 115 Pension Trust. Also included are other noteworthy items as shown in the Executive Summary.

Key components of the report include updated funded status and projected cost increases or decreases. In addition, PARC reviews the annual CalPERS unfunded liability pre-payment for which the County receives a discount if it pays a lump sum at the beginning of the fiscal year.

The report shows that there is substantial change in the trajectory of projected contributions. In a break from prior years, nominally increasing employer contribution rates are now projected for the next two fiscal years, decreasing thereafter through FY 27/28, with modest increases peaking in the early 2030's as unfunded liability is being paid down. In addition, the funded status is showing significant improvement, an indicator of overall pension health.

If the projections are realized, the middle part of this decade may present opportunities for further accumulation of assets in the Section 115 Pension and OPEB Trusts, as well as additional discretionary payments to CalPERS allowing for further progress in the paydown of unfunded liability. This will be tempered by year-to-year financial market performance, especially given the current backdrop of the U.S economy as the Federal Reserve is preparing to combat rising inflation through elimination of open-market bond purchases, as well as short-term interest rate increases. Also, it will likely mean that CalPERS' investment returns are not as robust in the near future.

Staff and PARC will keep the Board updated with strategic options in the future in the management of the County's pension and related liabilities. Highlights are summarized below.

Budgetary Impact - The total year-over-year rate increase for FY 22/23 (including CalPERS, pension obligation bonds (POBs) debt service and OPEB contributions) as a percentage of payroll for the Miscellaneous Plan is approximately 1.82%, while the Safety Plan increase is

1.59%. These nominal rate increases are an additional payroll expense to the budgets of all County departments.

Additional Discretionary Payment (ADP) - At its January 20, 2022 meeting, PARC recommended making an ADP to CalPERS in the amount of $2,344,574 to eliminate negative amortization. Funded by recurring bi-weekly payroll contributions into the Liability Management Fund, this payment was made on January 27, 2022 and will save nearly $800,000 in interest. This ADP is in addition to the annual UAAL pre-payment as shown below.

Annual Pre-Payment - For FY 22/23, CalPERS will offer an early payment discount of 3.3% on the $213 million unfunded liability portion due for the fiscal year, thereby reducing the total amount owed by over $7 million. This is in lieu of periodic payments that coincide with payroll disbursements. In order to fund the initial payment, the County typically includes a substantial portion of the pre-payment amount as part of the annual Tax and Revenue Anticipation Notes (TRANs) cash flow financing. A final recommendation regarding the pre-payment will be made in conjunction with the FY 22/23 TRANs.

Status of the County's Miscellaneous and Safety Plans (Combined) - For the annual valuation report ended June 30, 2020, there is a $1.1 billion increase in MVA, $536 million decrease in UAAL, and a corresponding 5.4% increase in funded status to 76.4% with CalPERS. As a result, the County is moving closer to the 80% minimum funding level as specified in Board Policy B-25.

The results of the annual valuation report ending June 30, 2021, to be presented in next year's PARC 2023 Annual Report will show a substantial projected gain in MVA, drop in UAAL and increase in funded status due to the 21.3% investment return earned by CalPERS. Reflected in these figures will be the first full-year earnings on the 2020 POBs proceeds invested with CalPERS, estimated at $151 million.

Employer Contribution Rate Outlook - The FY 22/23 employer contribution rate as a percent of pay for the Miscellaneous Plan is 28.00% (an increase of 0.4% from prior year) and the Safety Plan is 47.2% (an increase of 1.00%). These rates include POBs debt service.

Pension Obligation Bonds (POBs) – For the Series 2005 A POBs, Bartel Associates analysis is projecting that as of February 15, 2022 there will be $227.1 million in net estimated gains as a result of the sale of the bonds, with an outstanding balance owed of $160.5 million. The POBs still maintain a relatively low break-even rate of 4.91% versus CalPERS' current rate of 7%, (a spread of 2.09%).

For the Series 2020 POBs, the projection is that there will be $143 million in net estimated gains as a result of the sale of the bonds, with an outstanding balance owed of $659.5 million. This series of POBs has an even lower break-even rate of 3.53% vs. CalPERS' interest cost on the unfunded liability of 7% (a spread of 3.47%).

Section 115 Pension Trusts - As of June 30, 2021, the balance in the 2016 Trust account was $41.82 million, (an increase of $11.9 million from prior year) with an annual net rate of return of 19.93%. The annualized net rate of return since 2016 inception is 9.00%.

The balance in the 2020 Trust account, established to capture the $231 million in savings attributable to the issuance of the 2020 POBs, was $13.95 million and includes investment earnings of $840,000. This first full-year savings in the 2020 Trust experienced an annual net rate of return of 14.39%.

Over time these assets will become more significant as they accumulate in the Trusts and have the potential to provide two significant benefits to the County. The first is the accumulation of assets to pay down the liability with CalPERS, while the second is to serve as a rate stabilization fund in the event of a dramatic increase in CalPERS rates. Within five years there will be in excess of $100 million in contributions made to the 2016 and 2020 Trust accounts combined, and within ten years, in excess of $175 million.

Status of OPEB - As of June 30, 2021, there is a $15 million increase in the smoothed value of assets to $68 million, a $10 million decrease in UAAL to $76 million, and a 9.00% corresponding increase in funded status to 47.2%. The OPEB Trust had a balance of $73 million (an increase of $20 million from prior year), an annual net rate of return of 19.6%, and an annualized net rate of return since 2007 inception of 7.53%.

County staff requested a review from AON of a multi-year plan to achieve an 80% funded status for the retiree benefit portion of the OPEB liability. The current actuarial schedule projects 80%, excluding implicit subsidy, would be reached in 2025 (two years earlier than projected in the 2021 PARC Annual Report) if approximately $16.9 million were to be charged to departments for FY 22/23, the same as FY 21/22. As a percentage of payroll, this amounts to approximately 1.1%. At its December 16, 2021 meeting, PARC unanimously approved the recommendation to continue to stay on target with the aforementioned amount.

Status of the Temporary and Part-Time Employees' Retirement Plan (TAP) - As of July 1, 2021, there is a $7.5 million increase in the smoothed value of assets to $52.9 million, a $1.1 million decrease in UAAL to $12 million, and a 3.80% corresponding increase in funded status to 81.5%. The Plan's investment account had a balance of $61.4 million (an increase of $16 million from prior year), an annual net rate of return of 30.81%, and an annualized net rate of return since 2010 inception of 8.11%.

Although AON projects an 87.2% funded status by June 30, 2022, at its December 16, 2021 meeting, PARC unanimously approved the recommendation to continue to stay on target with the current year employer rate of approximately 5.58% as a percentage of payroll for FY 22/23, the same as FY 21/22.

Status of the Special Districts Plans - For the annual valuation reports ended June 30, 2020, The Riverside County Regional Park and Open-Space District funded status of Tier I was 71.9%, Tier II was 96.6%, and Tier III was 96.7%. The Riverside County Flood Control and Water Conservation District shows a funded status of 65.9%. The Riverside County Waste Resources Management District shows a funded status of 68.5%.

As part next year's annual report, the funded status will show significant improvement due to all three of the Districts making ADPs, as well as CalPERS' 21.3% investment return on the invested assets. In addition, all are taking advantage of the annual UAAL pre-payment option thereby receiving the discount offered by CalPERS. More details are found in the report.

SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

Impact on Citizens and Businesses:

Pension and related costs have budgetary impacts across all the departments, and, as a result, have impacts on the costs of services that are provided to citizens and residents of the County. Since PARC's inception, recommendations adopted by the Board have resulted in a substantial amount of savings over time that likely would not have otherwise materialized.

ATTACHMENTS:

1. Pension Advisory Review Committee 2022 Annual Report
2. County of Riverside - CalPERS Miscellaneous and Safety Plans
   Independent Actuarial Report - 6/30/20 Valuation, Bartel Associates, LLC.
3. CalPERS - Miscellaneous Plan - County of Riverside Annual Valuation Report as of June 30, 2020
4. CalPERS - Safety Plan - County of Riverside Annual Valuation Report as of June 30, 2020
5. Actuarial Valuation Report - County of Riverside Postretirement Benefits Plan as of June 30, 2021 - AON
6. Actuarial Valuation Report - County of Riverside Part-time and Temporary Employees' Retirement Plan as of July 1, 2021 – AON

Michael Ambolo

Michael Ambolo, Chief Finance Officer 2/22/2022

Maxwell, Sue

From:	cob@rivco.org
Sent:	Tuesday, March 1, 2022 9:08 AM
To:	COB; mbredding@bartel-associates.com
Subject:	Board comments web submission

CAUTION: This email originated externally from the **Riverside County** email system. **DO NOT** click links or open attachments unless you recognize the sender and know the content is safe.

First Name:	Mary Beth
Last Name:	Redding
Address (Street, City and Zip):	411 Borel Ave #602, San Mateo, CA 94402
Phone:	626-808-2157
Email:	mbredding@bartel-associates.com
Agenda Date:	03/01/2022
Agenda Item # or Public Comment:	3.9
Comments:	Will speak only if requested by Don Kent on this Item #3.9

Thank you for submitting your request to speak. The Clerk of the Board office has received your request and will be prepared to allow you to speak when your item is called. To attend the meeting, please call (669) 900-6833 and use Meeting ID # 864 4411 6015 . Password is 20220301 . You will be muted until your item is pulled and your name is called. Please dial in at 9:00 am am with the phone number you provided in the form so you can be identified during the meeting.

3/1/22 3.9

Maxwell, Sue

From: cob@rivco.org
Sent: Tuesday, March 1, 2022 9:30 AM
To: COB; brad.au@aon.com
Subject: Board comments web submission

CAUTION: This email originated externally from the **Riverside County** email system. **DO NOT** click links or open attachments unless you recognize the sender and know the content is safe.

First Name:	Bradley
Last Name:	Au
Address (Street, City and Zip):	22 Covered Wagon Lane, Rolling Hills Estates, CA 90274
Phone:	213-361-0717
Email:	brad.au@aon.com
Agenda Date:	03/01/2022
Agenda Item # or Public Comment:	Agenda Item #3.9
State your position below:	Neutral
Comments:	Will speak only if requested by Don Kent on this Item #3.9

Thank you for submitting your request to speak. The Clerk of the Board office has received your request and will be prepared to allow you to speak when your item is called. To attend the meeting, please call (669) 900-6833 and use Meeting ID # 864 4411 6015 . Password is 20220301 . You will be muted until your item is pulled and your name is called. Please dial in at 9:00 am am with the phone number you provided in the form so you can be identified during the meeting.

3/1/22 3.9

Pension Advisory Review Committee

2022

Annual Report

March 1, 2022

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EXECUTIVE SUMMARY

In accordance with Board of Supervisors Policy B-25, this annual report contains detailed information about the County's Miscellaneous and Safety defined benefit pension plans administered by the California Public Employees' Retirement System (CalPERS) as well as other areas, with independent analysis provided by Bartel Associates, LLC, (see Attachment 1) AON, and Fieldman, Rolapp & Associates. Included are the most recent CalPERS annual valuation reports (Attachments 2 & 3).

A few updates to the format have been made to further assist the reader with a better understanding of activity since last year. New tables with the most current information as well as graphs vs. prior year have been added for year-over-year comparison, and a brief highlights section below.

Highlights – for the reporting period ended June 30, 2020 there is a:

- ✓ **5.4% combined *increase* in CalPERS funded status from 71% to 76.4%**
- ✓ **$13.9 million *additional investment* in Section 115 Pension Trust from Series 2020 POBs savings** (1)
- ✓ **$143 million first full-year *net estimated gain* on Series 2020 POBs** (2)
- ✓ **$536 million combined *decrease* in CalPERS unfunded actuarial accrued liability (UAAL)**
- ✓ **$1.1 billion combined *increase* in the CalPERS market value of assets (MVA)**

This report also addresses other areas including status on the:

- Series 2005 A and Series 2020 Pension Obligation Bonds (POBs) (2)
  - ✓ **Combined POB proceeds net estimated gain of $370 million ($210 million YoY increase)**
- Section 115 Trusts (3)
  - ✓ **$56 million in combined Pension Trust balances ($25.8 million YoY increase)**
  - ✓ **$73 million OPEB Trust balance ($20 million YoY increase)**
- Other Post-Employment Benefits (OPEB) (Attachment 4) (3)
  - ✓ **47% funded status (9% YoY increase)**
- Part-time and Temporary Employees' Retirement Plan (Attachment 5) (4)
  - ✓ **82% funded status (4% YoY increase)**
- Special District Plans found in the latter portion of this report

FY 22/23 Budgetary Impact – ***The total year-over-year rate increase for FY 22/23 as a percentage of payroll for the Miscellaneous and Safety Plans, which includes CalPERS rates, POBs debt service, and OPEB contributions is shown below:***

Year-over-Year Increase

For the fiscal year	FY 21/22	**FY 22/23**
Miscellaneous Plan	2.20%	**1.82%**
Safety Plan	1.62%	**1.59%**

Although lesser than FY 21/22, ***the nominal rate increases for FY 22/23*** are an additional payroll expense to the budgets across all County departments.

<u>The modest decline in the rate of growth</u> is primarily due to two factors attributable to CalPERS: (1) a reduction in the normal cost of the plans, and (2) the unfunded liability payment is reduced due to the payoff of certain amortization bases (separate payment schedules) from the proceeds of the Series 2020 Pension Obligation Bonds.

(1) First full-year savings attributable to the issuance of Series 2020 POBs for the period ended 6/30/21. Includes investment earnings of $840,000.

(2) Projected as of the next POBs interest payment due date, 2/15/22. Source: Attachment 1, Slide #65 & #68. County of Riverside - CalPERS Miscellaneous and Safety Plans. Independent Actuarial Report - 6/30/20 Valuation, Bartel Associates, LLC. Last year net estimated gain was $13.5 million. Year-to-year performance will vary based on CalPERS' investment return.

(3) Actual, as of June 30, 2021.

(4) Actual, as of July 1, 2021.

Additional Discretionary Payment (ADP) - ***At its January 20, 2022 meeting, PARC recommended making an ADP to CalPERS in the amount of $2,344,574 to eliminate negative amortization.*** Funded by recurring bi-weekly payroll contributions into the Liability Management Fund, ***this payment was made on January 27, 2022*** **and will save nearly $800,000 in interest**. Negative amortization occurs if the minimum UAAL payment were split between interest and principal, the principal portion would be negative. In this case, the minimum required contribution is less than interest on the UAAL. This ADP is in addition to the annual UAAL pre-payment as shown below.

Annual Pre-Payment – ***For FY 22/23, CalPERS will offer an early payment discount of 3.3%*** on the $213 million unfunded liability portion due for the fiscal year, thereby ***reducing the total amount owed by over $7 million***. This is in lieu of periodic payments that coincide with payroll disbursements.

In order to fund the initial payment, the County typically includes a substantial portion of the pre-payment amount as part of the annual Tax and Revenue Anticipation Notes (TRANs) cash flow financing. The other alternative would be to borrow internally by drawing down General Fund cash. The TRAN financing typically carries a lower cost. ***A final recommendation regarding the pre-payment will be made in conjunction with the FY 22/23 TRANs.***

CalPERS - recent news of interest:

- **July 12, 2021** – CalPERS ***reports investment returns of 21.3% for FY 20/21,*** triggering a reduction in the discount rate to 6.8% under the Funding Risk Mitigation policy approved in 2015.
- **November 15, 2021** – After nearly a year long review of the Asset Liability Management process, CalPERS Board selects new asset allocation mix for the investment portfolio which includes adding 5% leverage; takes effect July 2022. Discount rate to remain unchanged at 6.8% impacting contribution rates beginning in FY 23/24.
- **December 28, 2021** – CalPERS surpasses $500 billion in assets.

Conclusion - ***In a break from prior years, nominally increasing employer contribution rates are now projected for the next two fiscal years, decreasing thereafter through FY 27/28, with modest increases peaking in the early 2030's as unfunded liability is being paid down. In addition, the funded status is showing significant improvement, an indicator of overall pension health*** (see graph on page 5).

If the projections are realized, the middle part of this decade may present opportunities for further accumulation of assets in the Section 115 Pension and OPEB Trusts, as well as additional discretionary payments to CalPERS allowing for further progress in the paydown of unfunded liability. This will be tempered by year-to-year financial market performance, especially given the current backdrop of the U.S economy. With the Federal Reserve preparing to combat rising inflation through elimination of open-market bond purchases, as well as short-term rate increases, reduced liquidity should dampen demand for equities. This will likely mean that CalPERS' investment returns are not as robust in the near future.

Staff and PARC will keep the Board updated with strategic options in the future in the management of the County's pension and related liabilities.

RECOMMENDATIONS

1. Receive and file the 2022 PARC Annual Report.
2. Direct staff and PARC to report back with any additional updates or recommendations on the County's pension plans, Other Post-Employment Benefits (OPEB), any other item as noted in Board Policy B-25 including pension debt reduction strategies.
3. Direct staff to review the annual CalPERS unfunded liability pre-payment for FY 22/23 and to have such recommendations presented in conjunction with either the approval of the annual Tax and Revenue Anticipation Notes (TRANs) cash flow financing, or, with the FY 22/23 budget.

STATUS OF THE COUNTY'S MISCELLANEOUS AND SAFETY PLANS - COMBINED

For the annual valuation report ended June 30, 2020, the $1.1 billion increase in MVA, $536 million decrease in UAAL, and, corresponding 5.4% increase in funded status to 76.4% (1) with CalPERS is due to a combination of the deposit of the 2020 POB proceeds, and CalPERS' investment performance. There is an offset to the corresponding debt owed to bondholders as shown in the net Funded Status, albeit at a substantially lower interest cost.

		Actual	Projected	
For the annual valuation report ended 6/30	2019	**2020**	2021	2022
Total actuarial accrued liability (AAL)	$12.46	**$13.03**	$14.12	$14.88
Total market value of assets (MVA)	$8.84	**$9.96**	$12.08	$12.90
Total unfunded actuarial accrued liability (UAAL)	$3.62	**$3.08**	$2.04	$1.98
Funded Status – gross	71.0%	**76.4%** (1)	85.6%	86.7%
Funded Status – net	69.0%	**69.2%** (2)	79.3%	81.2%

(1) Does not include POBs. Miscellaneous Plan is 75%, Safety Plan is 79.4%.
(2) Includes POBs. Miscellaneous Plan is 69%, Safety Plan is 69.7%.
Dollars in billions.

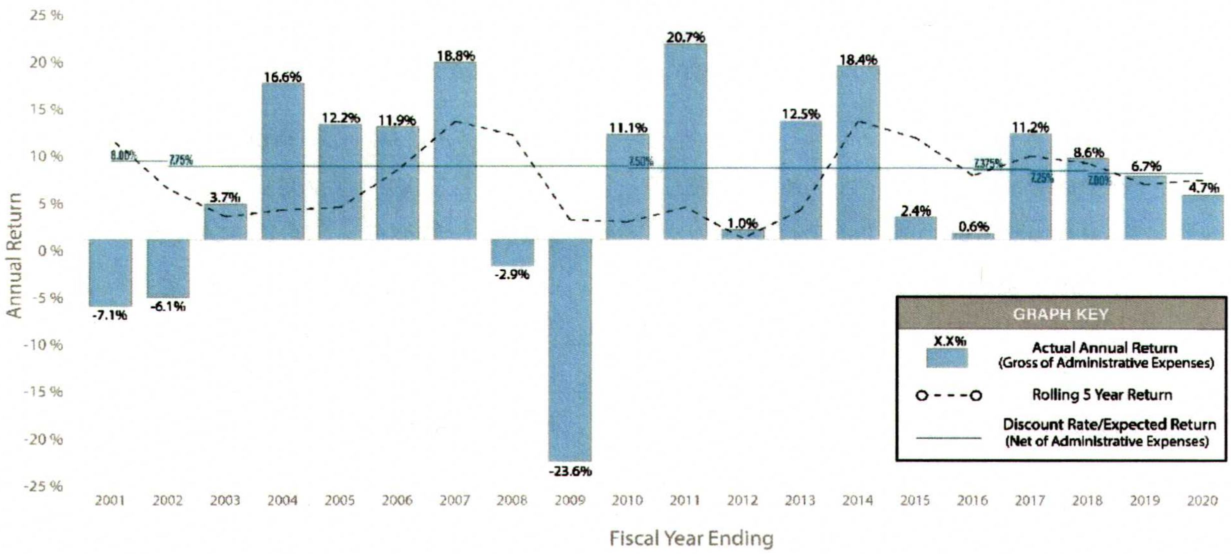
For the annual valuation report ending June 30, 2021, the substantial projected gain in MVA, drop in UAAL and increase in funded status is the result of the 21.3% investment return earned by CalPERS. Reflected in these figures are the first full-year earnings on the 2020 POBs proceeds invested with CalPERS, estimated at $151 million.

The CalPERS valuation reports have a one-year lag. For the period ending June 30, 2021, Bartel & Associates rolls forward the report with actual investment performance data as published by CalPERS. For the period ending June 30, 2022, the projection is based on CalPERS' 7% assumed rate of return. This will be further updated after the close of the fiscal year when the next report is produced.

INVESTMENT RETURNS

The primary driver of the rate formula is CalPERS' investment performance. Actuarial and demographic assumptions impact the rate, but far less than performance. Poor investment performance following the 2008 - 2009 financial crisis significantly increased the County's unfunded liability, driving up the required payments. Likewise, strong investment performance such as CalPERS' 21.3% return for the period ended June 30, 2021 (the highest level in over twenty years) is projected to have a substantial positive impact on the County's MVA, UAAL and funded status which will show up in next years' annual valuation report and 2023 PARC Annual Report. Per CalPERS, there will be a five-year phase-in of the FY 20/21 investment return. The graph below (page 6) illustrates the 20-year historical annual returns each fiscal year ending June 30.

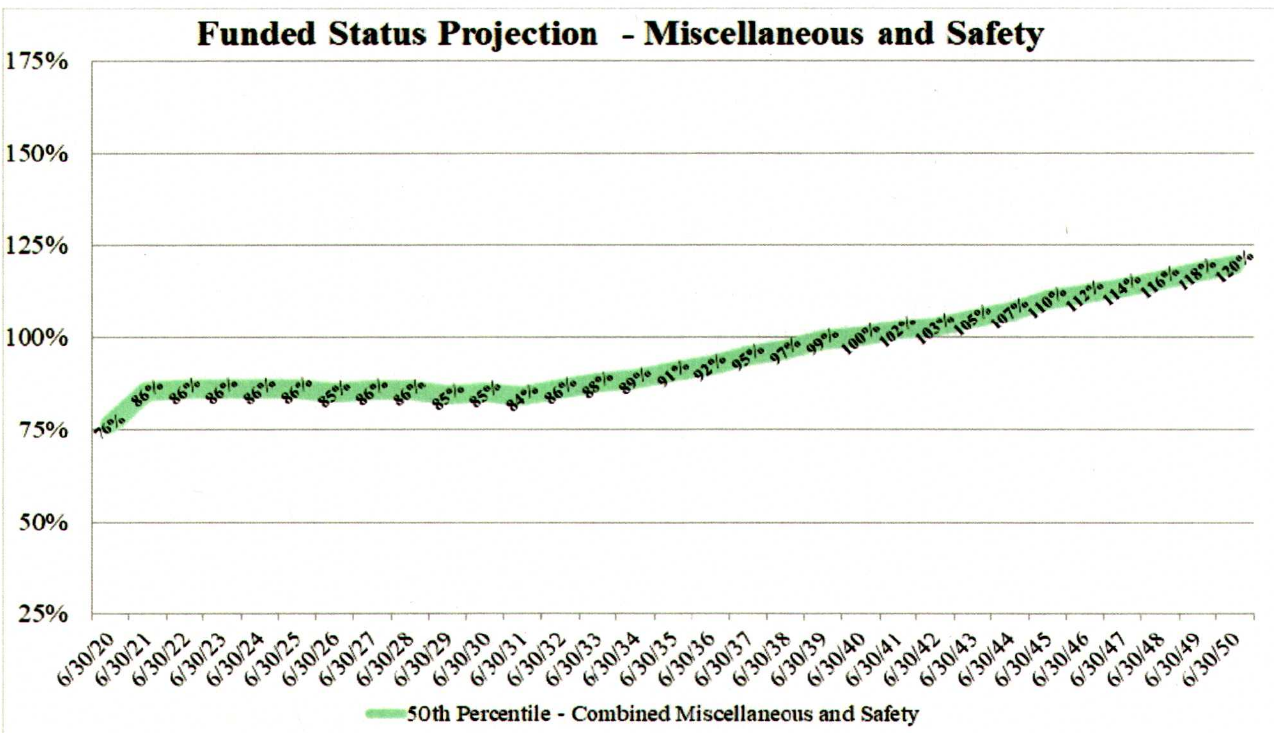
History of Investment Returns (2001 - 2020)



Source: CalPERS Annual Valuation Report as of June 30, 2020.

FUNDED STATUS

The current trajectory as shown below suggests achievement of the 80% funded status (a stated level in Board Policy B-25), on a gross basis, in the near term. The trajectory is the same on a net basis as POB debt service declines every single year through final maturity in 2038. Based upon these projections, the Plans would reach 100% funding in 2040, while maintaining a very strong funding position until that point.



Source: Attachment 1, Slide #60. County of Riverside - CalPERS Miscellaneous and Safety Plans.
Independent Actuarial Report - 6/30/20 Valuation, Bartel Associates, LLC.
50th percentile assumes CalPERS earns 7% through 6/30/23, 6.80% beginning 7/1/23 and gradually declining to 6% within twenty years.

EMPLOYER CONTRIBUTION RATE OUTLOOK

The FY 22/23 employer contribution rate as a percent of pay for the Miscellaneous Plan is 28.00% (a 0.40% increase from prior year), ***while the Safety Plan is 47.2%*** (a 1.00% increase from prior year) as shown in the table below. ***Note the significant projected reduction in rates vs. the prior PARC Report for the period FY 22/23 – FY 31/32.***

Graphical representation of these rates for both plans follow on pages 9 - 14.

	Miscellaneous Plan			Safety Plan		
FY	**Rate [1]**	**Change from prior FY (+/-)**	**Difference from 2021 PARC Report projection**	**Rate [2]**	**Change from prior FY (+/-)**	**Difference from 2021 PARC Report projection**
17/18	19.40% [3]	0.30%	N/A	30.30% [3]	1.50%	N/A
18/19	21.20% [3]	1.80%	N/A	33.70% [3]	3.40%	N/A
19/20	23.9% [3]	2.70%	N/A	39.7% [3]	6.00%	N/A
20/21	26.3% [3]	2.40%	0.00%	43.4% [3]	3.70%	0.00%
21/22	27.6% [3]	1.30%	0.00%	46.2 % [3]	2.80%	0.00%
22/23	**28.00%**	**0.40%**	**-1.00%**	**47.20%**	**1.00%**	**-1.30%**
23/24	28.10%	0.10%	-2.00%	47.10%	-0.10%	-3.10%
24/25	26.70%	-1.40%	-3.60%	45.00%	-2.10%	-6.30%
25/26	25.00%	-1.70%	-5.10%	43.00%	-2.00%	-8.90%
26/27	24.70%	-0.30%	-6.20%	42.40%	-0.60%	-11.10%
27/28	24.10%	-0.60%	-7.30%	41.60%	-0.80%	-12.80%
28/29	25.00%	0.90%	-6.80%	43.30%	1.70%	-11.60%
29/30	25.80%	0.80%	-6.70%	44.60%	1.30%	-11.70%
30/31	26.80%	1.00%	-6.40%	46.10%	1.50%	-11.40%
31/32	27.30%	0.50%	-5.50%	47.90%	1.80%	-9.50%
32/33	28.00%	0.70%	N/A	49.00%	1.10%	N/A

(1) Includes Miscellaneous Plan POBs debt service which ranges from 2.3% to 5.0% of the total rate from FY 21/22 to FY 32/33.
(2) Includes Safety Plan POBs debt service which ranges from 7.1% to 10.9% of the total rate from FY 21/22 to FY 32/33.
(3) Actual rates shown for FY 17/18 through FY 22/23.

EMPLOYER CONTRIBUTION RATE OUTLOOK (continued)

For the Miscellaneous and Safety plans, the following pages show a comparison of the most recent valuation report, 2020 vs. prior year 2019 for:

- projected employer contribution rates expressed as a percentage with the three components that comprise the total amount (POBs debt service, normal cost and unfunded liability), over the next decade
- projected employer contribution rates with a longer-term view of thirty years
- projected employer contributions expressed in dollars over the next decade

In all instances of comparisons vs. prior year, there is substantial change in the trajectory of projected contributions. The strong investment return of 21.3% by CalPERS in FY 20/21, as well as the $716 million infusion from 2020 POB proceeds are having a positive impact. As shown on page 14, for the period of FY 22/23 through FY 31/32, the cumulative Miscellaneous and Safety payments are projected to decrease by $1.06 billion.

The projections of CalPERS rates going forward are based upon Bartel Associates' model which incorporates the expected return, a less than expected return, and an above average return. In all of the 2020 contribution rate charts, 50th percentile (bold green line) assumes CalPERS earns 7% through 6/30/23, 6.80% (which is the new discount rate) beginning 7/1/23, and gradually declines to 6% within twenty years. All include both 2005 and 2020 POB proceeds invested with CalPERS, as well as the POBs associated debt service. Note, that even with very poor investment returns (represented in the 25th percentile on pages 10 & 13) the projected rates exhibit a long-term decline which begins in the early 2030's. These long-term projections reflect the increasing impact of the changes made to the benefit formulas in the last decade, as more of the employee population becomes subject to Tier III Public Employees' Pension Reform Act (PEPRA).

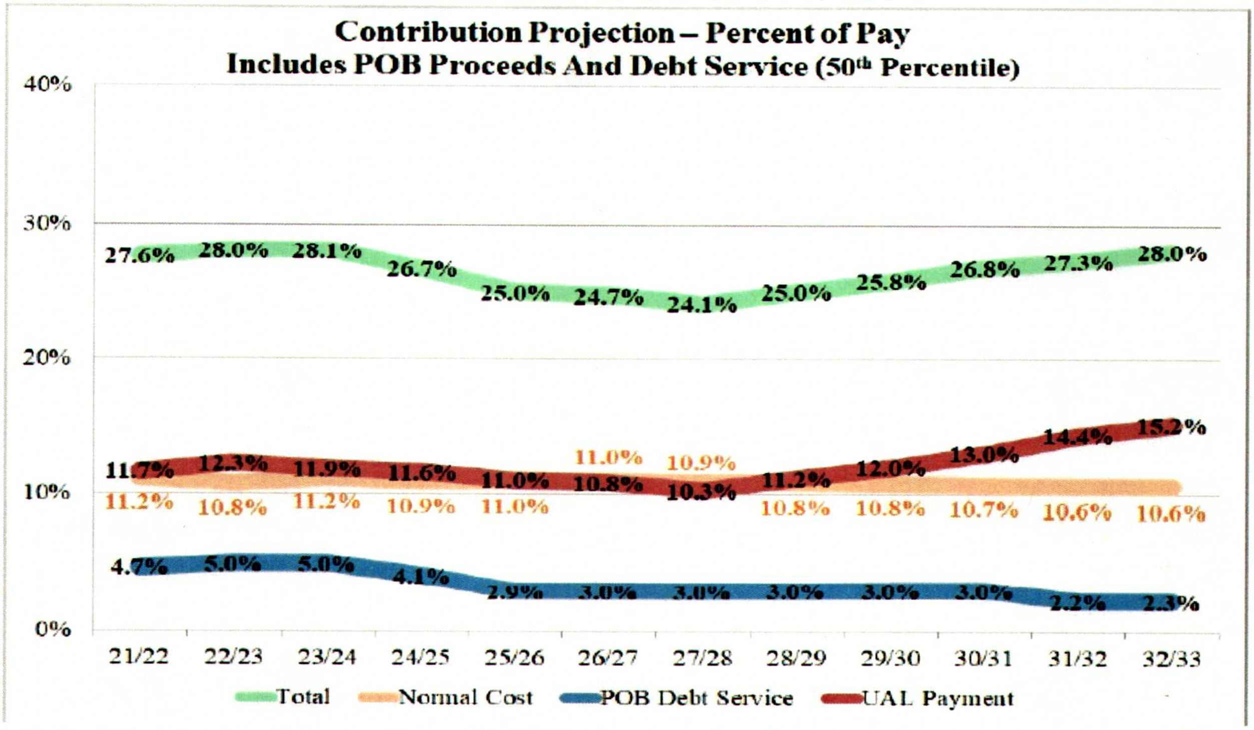
In analyzing the trends, it is helpful to focus on the three components of the rate: debt service on the POBs, the normal cost, and the UAAL payment. The POB debt service is derived from a fixed schedule and shows declines over the period with final maturities of 2035 and 2038 reflected in the thirty-year projection. Debt service of both series of bonds is also incorporated in the charts on pages 9 & 12. The normal cost is relatively constant with modest declines reflecting the transition to a greater number of lower benefit Tier III employees. Currently, the UAAL reflects scheduled payments to amortize net losses (which are a combination of investment gains and losses), and any demographic changes which resulted in a gain or loss. At the end of each year, CalPERS 'trues up" it actual versus projected performance, and books gains or losses which are then amortized over time.

Miscellaneous Rates

Short-term - Over the decade the employer rate is projected to average 26.3% with a low of 24.1% in 2028, and a peak of 28% in 2032 (as shown on page 9). Comparing the current year with last year's rates, the difference is in the much lower projected UAAL cost, which is primarily attributable to the substantial excess investment return realized in FY 20/21.

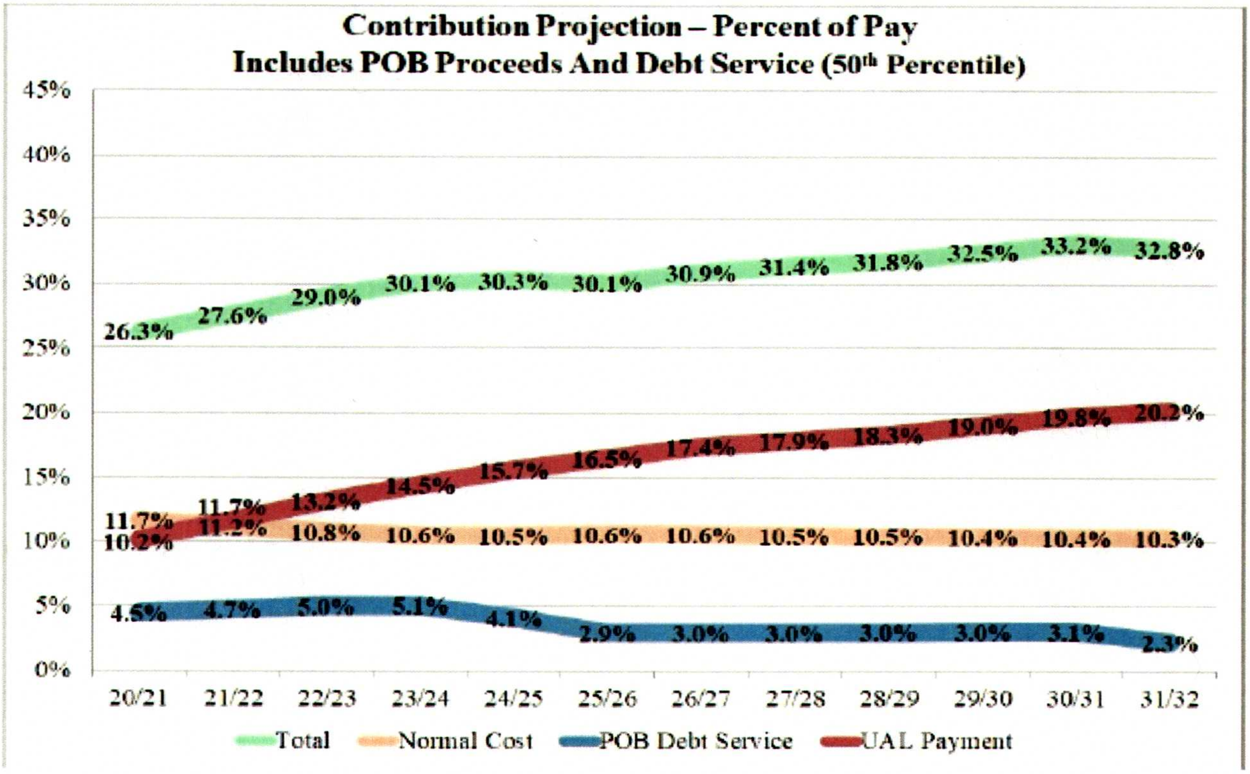
Long-term - In looking at the long-term forecast as shown on page 10, we see a substantial drop in rates beginning thirteen years out under all three return scenarios. Even under the 25th percentile (poor performance scenario), rates peak at approximately 39.4% in 2034 and then decline thereafter to reach approximately 28.5% in 2045. This is due to three factors. The first is the final repayments of POBs in 2035 and 2038. The second is the amortization (paydown) of the exiting UAAL schedules over the next thirty years. In the poor performance scenario, the old UAAL is replaced by a new UAAL to reflect future CalPERS investment underperformance. The third is the ultimate retirement of the higher cost Tier I employees and their replacement with much lower cost Tier III employees. For the expected return scenario (50th percentile), the rate will be relatively flat until 2035 at which point, they begin a rapid decline until stabilizing in 2042. At that point, the rate is comprised of only the normal cost of approximately 10% since all of the POBs have been retired, and the UAAL has been fully amortized.

Miscellaneous Plan – 2020 (as of February 2022)



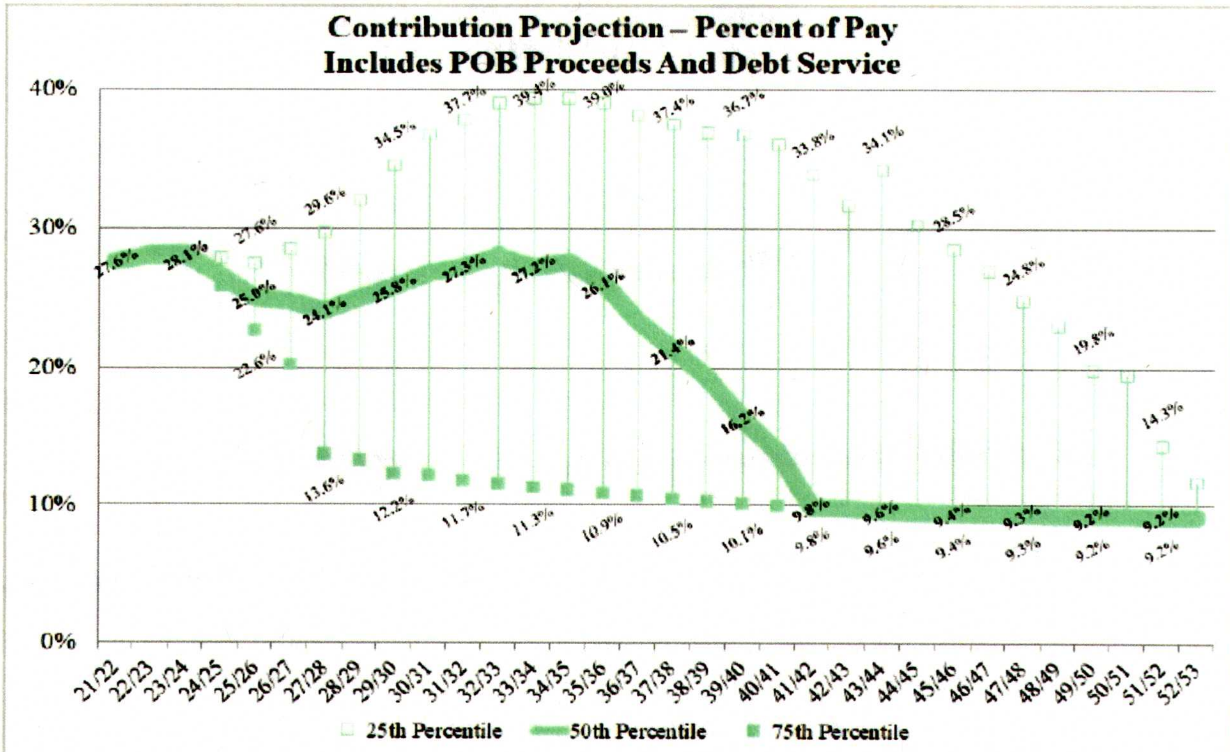
Source: Attachment 1, Slide #31. County of Riverside - CalPERS Miscellaneous and Safety Plans
Independent Actuarial Report - 6/30/20 Valuation, Bartel Associates, LLC.

Miscellaneous Plan – 2019 (as of February 2022)



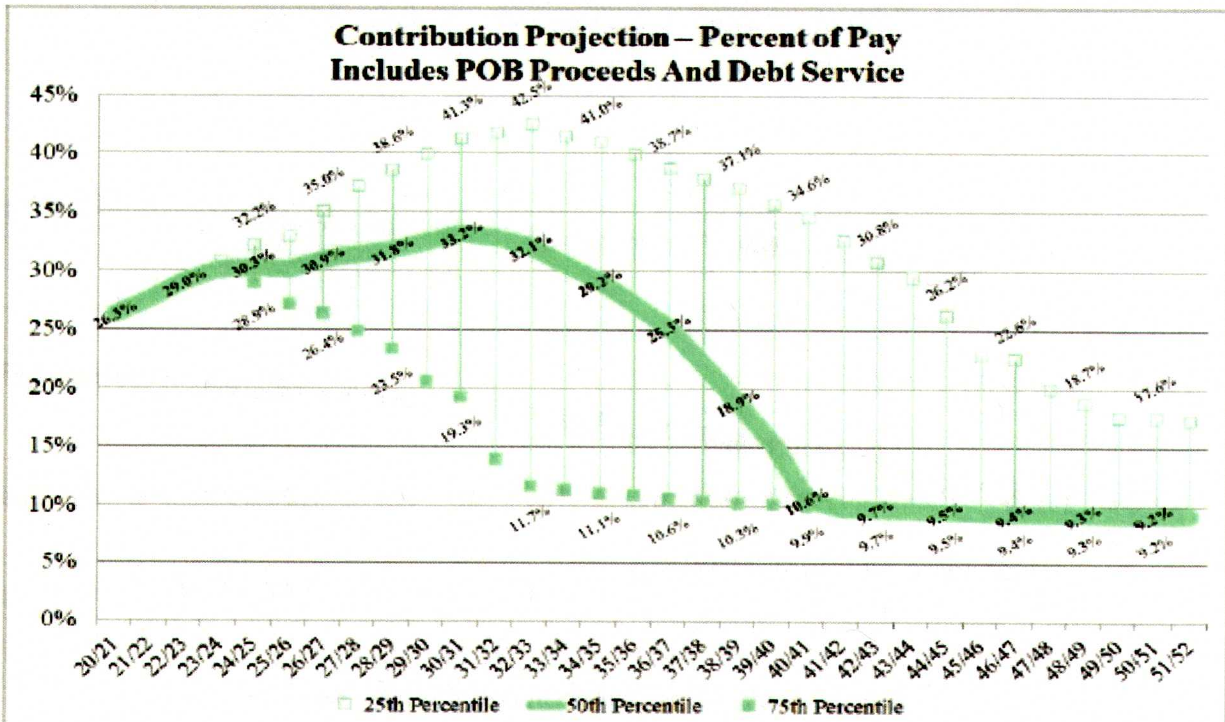
Source: Slide #31. County of Riverside - CalPERS Miscellaneous and Safety Plans
CalPERS Actuarial Issues - 6/30/19 Valuation, Bartel Associates, LLC. December 23, 2020.

Miscellaneous Plan – 2020 (as of February 2022)



Source: Attachment 1, Slide #30. County of Riverside - CalPERS Miscellaneous and Safety Plans
Independent Actuarial Report - 6/30/20 Valuation, Bartel Associates, LLC.

Miscellaneous Plan – 2019 (as of February 2022)



Source: Slide #30. County of Riverside - CalPERS Miscellaneous and Safety Plans
CalPERS Actuarial Issues - 6/30/19 Valuation, Bartel Associates, LLC. December 23, 2020.

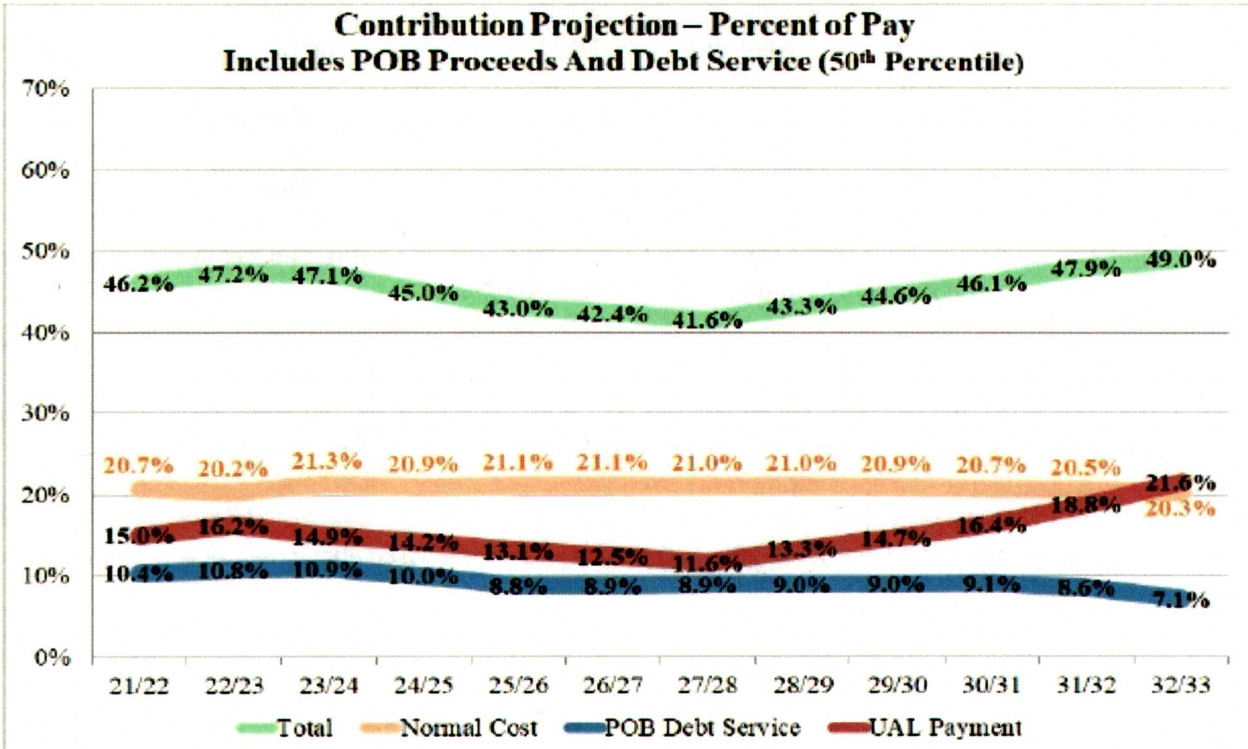
Safety Rates

Short-term – As shown on page 12, over the next decade, Safety rates exhibit a similar pattern to Miscellaneous rates. While averaging close to the current rate of 47.2%, Safety rates are projected to dip a little later than Miscellaneous to a low of 41.6%, and then increase slightly over the current rate prior to trending down again in the long-term. In comparing the year-over-year projections, as seen in the two charts which follow, the major difference is in the UAL payment. Instead of peaking at 29.2% in 2033 (as shown in the red line - bottom chart), the UAAL peaks at 21.6%. ***The difference in UAL impact is greater for Safety than Miscellaneous in part because the amount of the Series 2020 POB proceeds allocated to Safety was a much greater percentage of the Plan. It is important to note here that a greater share of the Safety Plan costs are borne as a Net County Cost, and so it will be particularly helpful when any projected savings do materialize.***

Long-term - As shown on page 13, longer term Safety rates show the same downward trend as the Miscellaneous Plan under all performance scenarios, although coming from a higher peak. As is the case with Miscellaneous, even in the poor performance (25th percentile) scenario, after rates peak in 2033, they begin a steady decline returning to the current rate of approximately 43% in 2044 and continuing to fall thereafter.

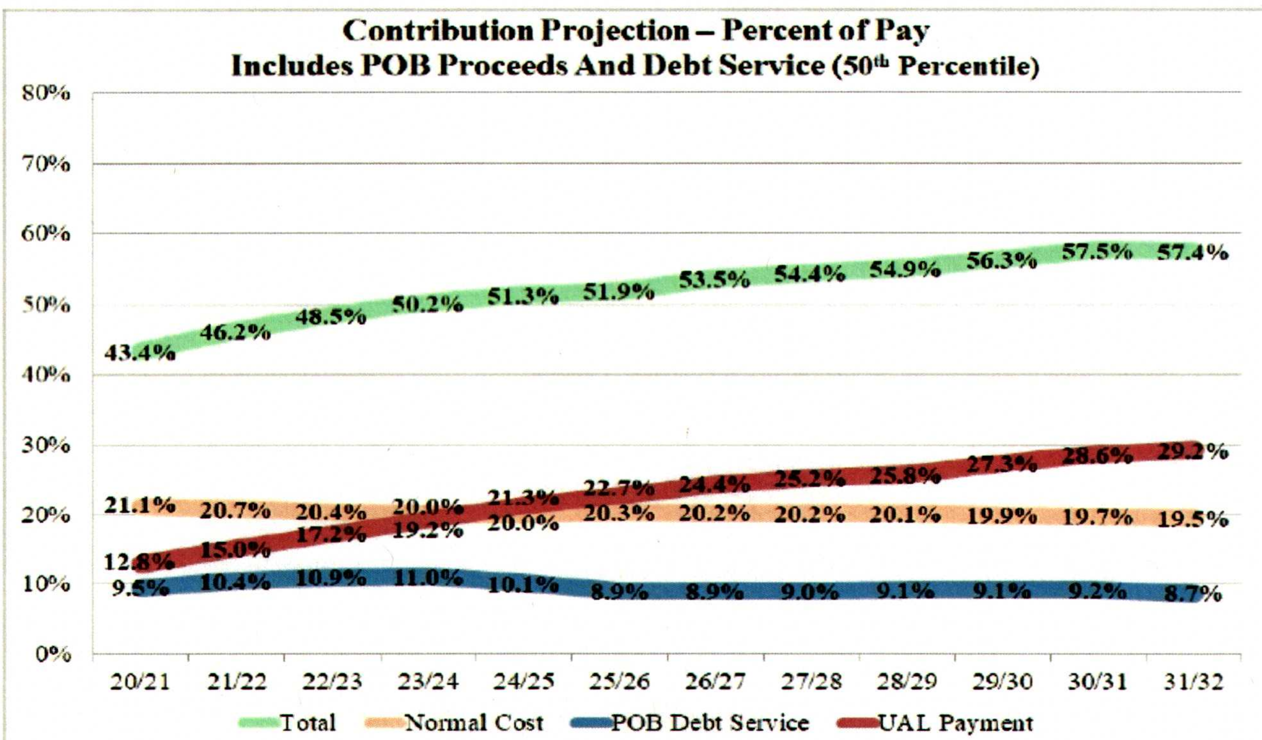
Under the expected performance (50th percentile) ***rates peak at 47.9% in 2032 and fall steadily to under 20% (less than half of the current rate) in 2041***, due to the same factors discussed above regarding the Miscellaneous Plan.

Safety Plan – 2020 (as of February 2022)



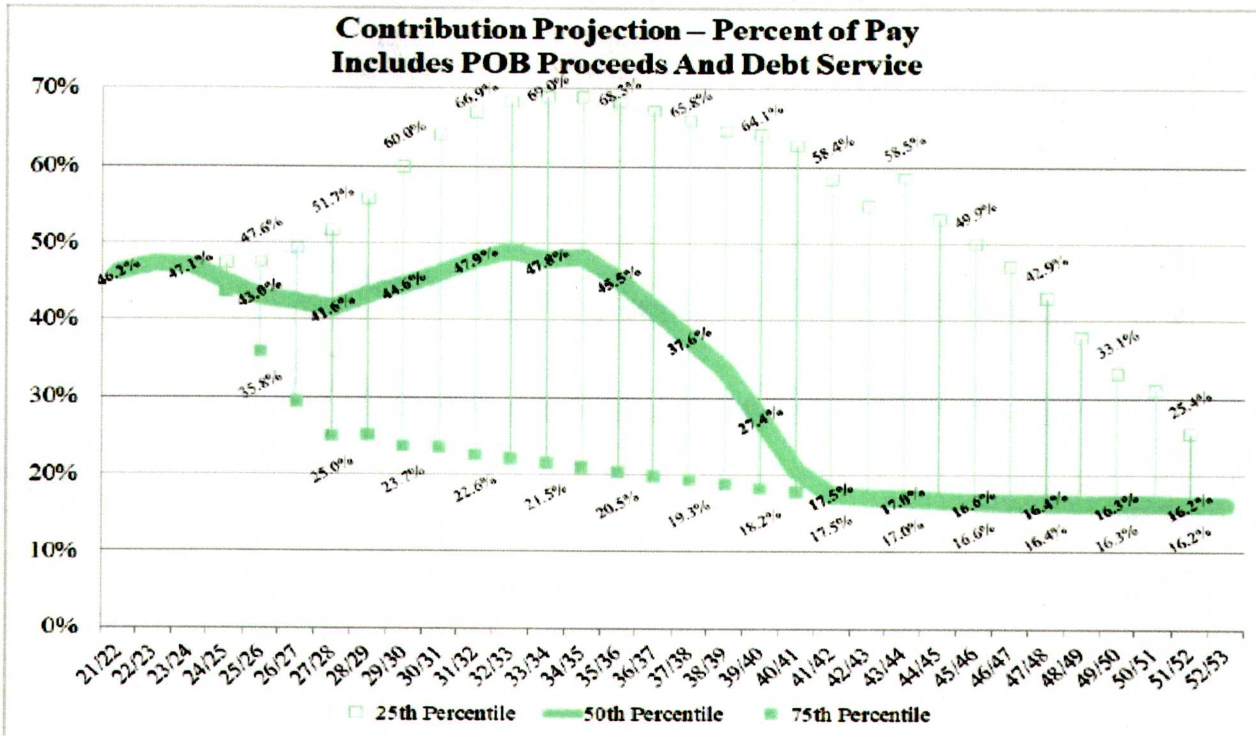
Source: Attachment 1, Slide #53. County of Riverside - CalPERS Miscellaneous and Safety Plans
Independent Actuarial Report - 6/30/20 Valuation, Bartel Associates, LLC.

Safety Plan – 2019 (as of February 2022)



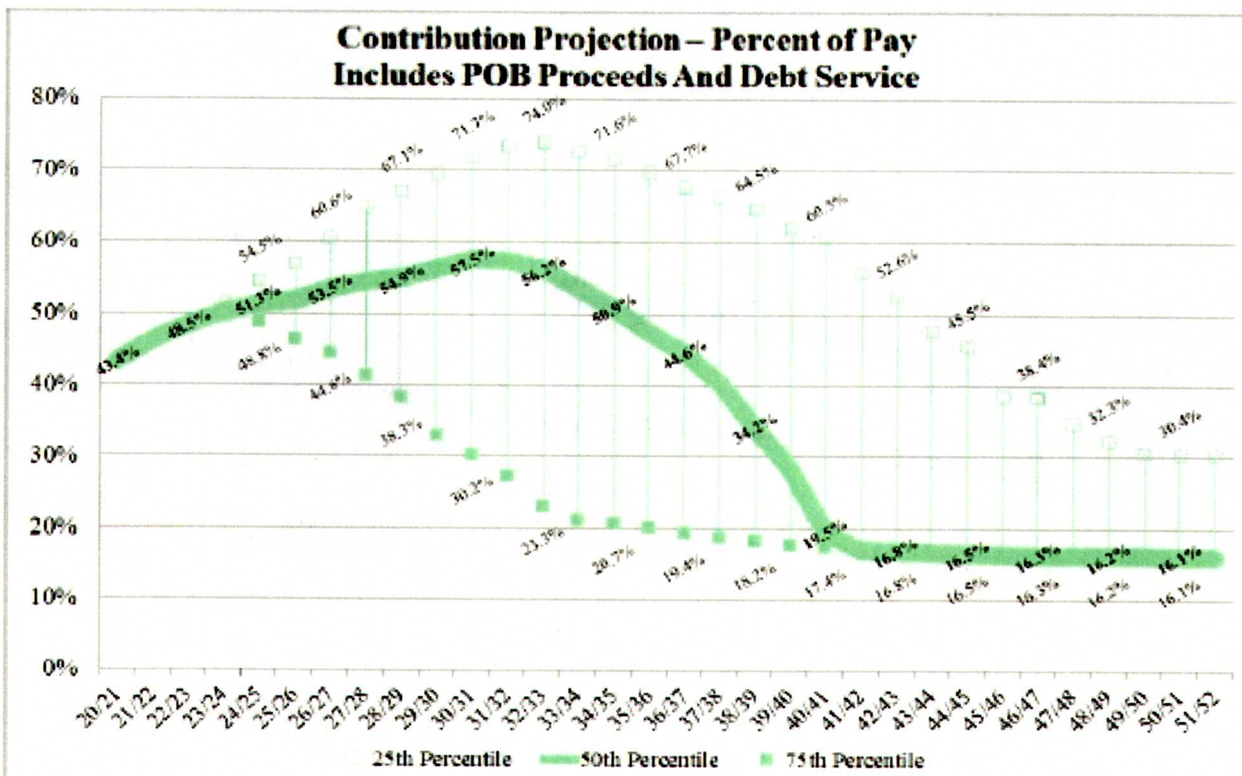
Source: Slide #53. County of Riverside - CalPERS Miscellaneous and Safety Plans
CalPERS Actuarial Issues - 6/30/19 Valuation, Bartel Associates, LLC. December 23, 2020.

Safety Plan – 2020 (as of February 2022)



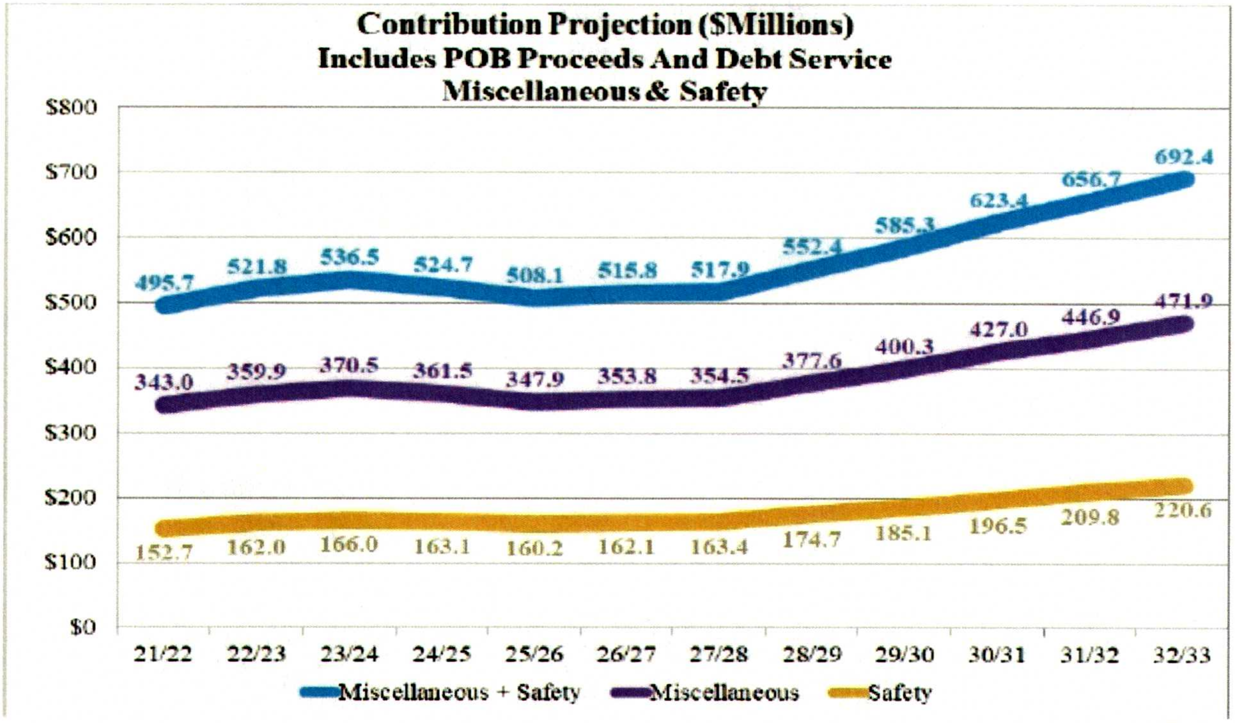
Source: Attachment 1, Slide #31. County of Riverside - CalPERS Miscellaneous and Safety Plans
Independent Actuarial Report - 6/30/20 Valuation, Preliminary Results, Bartel Associates, LLC.

Safety Plan – 2019 (as of February 2022)



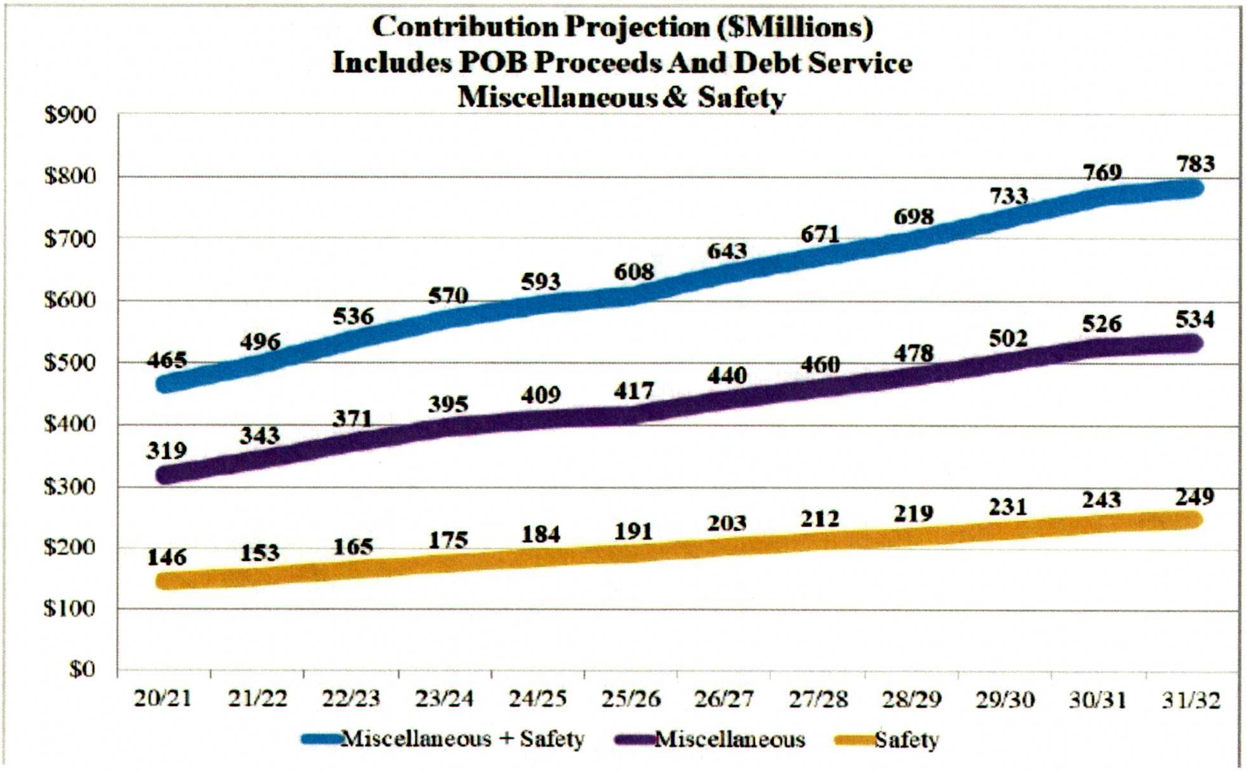
Source: Slide #53. County of Riverside - CalPERS Miscellaneous and Safety Plans
CalPERS Actuarial Issues - 6/30/19 Valuation, Bartel Associates, LLC. December 23, 2020.

Combined – 2020 (as of February 2022)



Source: Attachment 1, Slide #57. County of Riverside - CalPERS Miscellaneous and Safety Plans Independent Actuarial Report - 6/30/20 Valuation, Preliminary Results, Bartel Associates, LLC.

Combined – 2019 (as of February 2022)



Source: Slide #57. County of Riverside - CalPERS Miscellaneous and Safety Plans CalPERS Actuarial Issues - 6/30/19 Valuation, Bartel Associates, LLC. December 23, 2020.

PENSION OBLIGATION BONDS (POBs)

Series 2005 A – In February 2005, the County issued its Series 2005 A POBs in the principal amount of $400 million to lock in an all-in borrowing cost of 4.91%, refinancing its prior unfunded liability, which was then carrying a 7.5% rate (a spread of 2.59%). At the same time, the County converted its repayment schedule from a rolling thirty-year amortization to a fixed amortization of thirty and twenty-five years for the Miscellaneous and Safety Plans. This further reduces interest cost as a result of paying down the debt faster. Upon deposit of the bond proceeds with CalPERS, the County's rate on that portion of its liability was reduced and replaced by the lower amount of the bond's debt service.

The POBs still maintain a relatively low break-even rate of 4.91% versus CalPERS' current rate of 7%, (a spread of 2.09%). Even if CalPERS were to earn a rate slightly below the POBs rate for the remaining term to maturity of 2035, the County can still expect to show net estimated gains.

Bartel Associates analysis is projecting that as of February 15, 2022 (2) there will be $227.1 million in net estimated gains as a result of the sale of the bonds, with an outstanding balance owed of $160.5 million.

Series 2020 – In April 2020, the efforts to reduce interest cost on a portion of the unfunded liability continued with the Board of Supervisors authorizing a second POB issuance in the amount of $720 million at an all-in borrowing cost of 3.53%. The bond proceeds ($716 million, net of the cost of issuance) were used to refund up to approximately 20% of the total unfunded liability, split between the Miscellaneous and Safety Plans.

The County prepaid $371.5 million to CalPERS for deposit to the Miscellaneous Plan, and, $344.2 million for the Safety Plan which reflected a discount for prepayment of the selected bases. These bond proceeds served as a one-time additional discretionary payment into the plans. To be clear, the $716 million that was owed to CalPERS is now owed to bondholders, albeit at a much-reduced rate, generating the savings which per Board direction is now flowing into the 2020 Section 115 Pension Trust (discussed below).

This series of POBs has an even lower break-even rate of 3.53% vs. CalPERS' interest cost on the unfunded liability of 7% (a spread of 3.47%). This results in payment reductions (savings) of nearly $231 million through 2038. To capture the savings through the eighteen-year life of the POBs, a dedicated Section 115 Pension Trust account was established.

Bartel Associates analysis is projecting that as of February 15, 2022 (2) there will be $143 million in net estimated gains as a result of the sale of the bonds, with an outstanding balance owed of $659.5 million.

Shown in the table below are estimated gains through February 15, 2022 on both series of POBs which includes the next interest payments.

Status of POBs	**Projected**		
Estimated gains through 2/15/22	**Series 2005A**	**Series 2020**	**Total**
CalPERS investment earnings on POB proceeds (1)	**$500.7**	**$187.5**	**$688.2**
POB payments (2)	**$270.5**	**$40.4**	**$310.9**
Cost of issuance	**$3.1**	**$4.1**	**$7.2**
Net estimated gains	**$227.1**	**$143.0**	**$370.1**

(1) Accumulated earnings since issuance based on actual CalPERS investment return for each year.
(2) Includes POB interest payments to date.
Dollars in millions.

SECTION 115 PENSION TRUSTS

The first Section 115 Pension Trust was established in 2016 to help the County independently mitigate CalPERS' contribution rate volatility and act as a buffer in the future for budgeting purposes as funds accumulate.

Excess funds from the Liability Management Fund (LMF) and the Other Post-Employment Benefits (OPEB) Trust were placed in the Section 115 Pension Trust to fund the initial deposit. Additionally, funds collected as a result of the difference between CalPERS' multi-year projected payroll, based on actuarial assumptions, and, the County's actual payroll, are restricted and invested in the County Treasurer's Pooled Investment Fund (TPIF). Funds are then dollar-cost averaged from the TPIF and placed into the Trust.

The second Section 115 Pension Trust, as mentioned above, was established with the 2020 POBs. The Trusts are administered by Public Agency Retirement Services (PARS), with HighMark Capital Management serving as investment manager. The current investment strategy is Moderate Index PLUS (Active) which has an approximate 52% equity/48% fixed income allocation mix.

Unlike assets in the CalPERS defined benefit plans, funds in the Trust can be managed in a manner consistent with a risk profile of the County's choosing in a combination of equity investments, fixed income and cash.

Status of 2016 Section 115 Pension Trust

For the investment report period ended 6/30	2020	2021
Account balance	$29.92	**$41.82**
Total accumulated investment earnings to date	$3.80	**$10.80**
Annual rate of return	4.48%	**19.93%**
Annualized rate of return since inception (1)	6.20%	**9.00%**

(1) Inception date November 2016.
Dollars in millions.

Status of 2020 Section 115 Pension Trust

For the investment report period ended 6/30	2021
Account balance	**$13.95**
Total accumulated investment earnings to date	**$0.84**
Annual rate of return	**N/A**
Annualized rate of return since inception (1)	**14.39%**

(1) Inception date October 2020.
Dollars in millions.

Over time these assets will become more significant as they accumulate in the account and cannot be used for any other purposes except for making additional discretionary payments directly to CalPERS to pay down a portion of the unfunded liability, or for reimbursing the County for CalPERS contributions. ***Within five years there will be more than $100 million in contributions made to the 2016 and 2020 Trust accounts combined, and within ten years, more than $175 million.***

These Trusts have the potential to provide two significant benefits to the County. The first is the accumulation of assets to pay down the liability with CalPERS. The second is to serve as a "rate stabilization fund" in the event of a dramatic increase in CalPERS rates. Should the long-term projections come to fruition with employer rates peaking in the next decade, the County could accumulate a much larger balance by capturing a portion of the decline and deposit additional funds into the Trusts. This could allow for faster amortization of the County's unfunded liability. On the other hand, should CalPERS' long-term performance come close to projections, full funding could be reached within twenty years.

A downside to full funding is that under current rules the County would be required to make its full required payment, albeit at a fraction of the current rate. In such a case, funds in the 115 Trusts could be drawn upon to make a portion of the required payment, mitigating the impact of excess funding.

OTHER POST-EMPLOYMENT BENEFITS (OPEB)

Background – OPEB are benefits other than pensions provided to retired employees. In the County's case, this is a monthly contribution to retirees for health care. The Governmental Accounting Standards Board (GASB) Statement No. 45, released in 2004, substantially modified the reporting requirements for OPEB provided by state and local governments.

In summary, GASB 45 dictated that the present value of these benefits should be quantified and reported in the Supplementary Information section of County's Annual Comprehensive Financial Report (ACFR). This reporting requirement did not trigger a funding requirement. Per GASB 45, the County's liability is comprised of two components; the present value of the amount payable for retirees and the amount attributable to the "implicit subsidy." The implicit subsidy is defined as the difference between the true cost of coverage for the retiree medical plan and the actual rate paid. Such a difference arises if retirees and active employees are in the same rate class.

The County's Response – The initial calculation of the County's retirement health liability was $390 million as of January 1, 2005. Upon the recommendation of PARC, the County took two steps to reduce this liability over time. The first step was to establish an OPEB Trust in 2007 which reduced the actual and nominal liability. The second step was to virtually eliminate the implicit subsidy by revamping the County's healthcare rate structure to separate pre-Medicare retirees from active employees.

GASB 75 – In June 2015, GASB released Statement No. 75, which was initially effective for the fiscal year ending June 30, 2018. GASB 75 addresses accounting and financial reporting issues by government employers, previously covered by GASB 45. Per GASB 75, employers are now required to disclose the total OPEB liability on the balance sheet (Statement of Net Position) alongside its other long-term liabilities (i.e., bond debt, lease obligations, pension liabilities, etc.). This change now highlights the liability.

The Move to CalPERS Health Plans – In 2019 the County embarked upon a multi-year process to restructure its health care offerings with an eye towards controlling costs and providing a fuller range of plan options for employees and retirees alike. The OPEB impacts of the move to CalPERS include a return of the implicit subsidy which did not exist under the County's own rate structure as an increase of the actual benefit paid to certain retirees, and a greater number of retirees now purchasing their insurance through the County since the offerings are more attractive.

Under CalPERS health plans, retirees receive the benefit of the implicit subsidy prior to age 65 by paying premiums that are developed by blending active and retiree costs. For example, in 2022 under the Blue Shield Access Plus option, the estimated true cost for an age 60 retiree is $1,023 per month, while the required premium is only $780 per month. This had the effect of bringing the implicit subsidy back into the equation.

In aggregate those savings would largely offset the implicit subsidy. Based on the AON - County of Riverside Actuarial Valuation Report Postretirement Benefits Plan as of June 30, 2021 (Attachment 4, page ii), the value of that benefit to employees is $115.8 million (actuarial accrued liability, or AAL). Nevertheless, inclusion of implicit subsidy in the total net OPEB liability without any offset is specifically required.

An additional financial implication of transferring to the CalPERS health plans is the requirement under the Public Employees' Medical and Hospital Care Act (PEMHCA) to provide a minimum monthly contribution for retiree health premiums, currently $149 (which increases annually with medical CPI). This requirement has an effect of increasing the monthly benefit and the cost to the County for those employees whose negotiated or non-represented benefit is less than $149. The monthly amount is either $149 or $256 and is based on the employee's representation at the time of retirement.

This increase in the monthly cost to provide the benefit is currently paid by departments on a pay-as-you-go basis and increases the OPEB liability. In addition to the PEMHCA effect, the County is expecting higher participation rates in its plans by retirees which will increase the expected and actual payout for those enrolled in a health plan. To the extent retirees have better options, such as paid spousal coverage from another employer, they receive no monthly benefit from the County and no liability is recorded.

In contrast to the CalPERS defined benefit pension plan liability, there is no direct connection between the implicit subsidy portion of the OPEB liability and the County's cost of providing the retiree healthcare benefit, thus the County does not directly pay for the implicit subsidy. It is for this reason that many employers have chosen not to fund this portion of their liability since it is not owed to retirees unlike the monthly benefit payment. Recognizing this, the Board adopted Policy B-25, Section III (A) Other Post-Employment Benefits (OPEB) which states, "the County seeks to maintain a minimum funding level of 80% in its OPEB plan, excluding any implicit subsidy liability." There could be some advantages to taking steps to funding a portion of the implicit subsidy in the future; staff and PARC will monitor the issue and bring any recommendations to the Board.

Status of OPEB

For the annual valuation report period ended 6/30	2020	**2021**
AAL - excluding implicit subsidy (1)	$139	**$144**
Smoothed value of plan assets (MVA) (2)	$53	**$68**
Total unfunded actuarial accrued liability (UAAL)	$86	**$76**
Funded Status (3)	38.20%	**47.20%**
Market value of plan assets	$53	**$73**
Annual net rate of return	5.48%	**19.60%**
Annualized net rate of return inception to date (4)	6.31%	**7.53%**

(1) Total AAL is the retiree health care liability comprised of the retiree benefit amount and implicit subsidy. Implicit subsidy is the difference between the true cost of coverage for the retiree medical plan and the actual rate paid.
(2) Asset smoothing recognizes market gains and losses gradually overs several years.
(3) Funded status is calculated by dividing the smoothed value of plan assets by AAL (excluding implicit subsidy). Source of (1) and (2) above: Attachment #4, page iv. Actuarial Valuation Report - County of Riverside Postretirement Benefits Plan as of June 30, 2021 – AON.
(4) Inception date November 2007.
Dollars in millions.

County staff requested a review from AON of a multi-year plan to achieve an 80% funded status for the retiree benefit portion of the OPEB liability. ***The current actuarial schedule projects 80%, excluding implicit subsidy, would be reached in 2025 (two years earlier than projected in the 2021 PARC Annual Report) if approximately $16.9 million were to be charged to departments for FY 22/23, the same as FY 21/22. As a percentage of payroll, this amounts to approximately 1.1%.***

At its December 16, 2021 meeting, PARC unanimously approved the recommendation to continue to stay on target with the aforementioned amount.

PART-TIME AND TEMPORARY EMPLOYEES' RETIREMENT PLAN

Background – The County of Riverside established the Part-Time and Temporary Employees' Retirement Plan (TAP), April 1, 1999, to provide retirement benefits to eligible employees as a substitute for benefits under Social Security, as allowed under Omnibus Budget Reconciliation Act of 1990 (OBRA '90). The Plan is an IRS Section 401(a) defined benefit plan. The Plan actuary calculates the minimum recommended employer contribution rate through preparation of an actuarial valuation report. Participants are required to contribute 3.75% of their compensation to the Plan.

As of September 1, 2010, the investments have been managed in a balanced account strategy with an expected rate of return of 6%. Overall, the Plan's funded status improved and net pension liability decreased from 2020 primarily due to the very favorable investment return of 30.81% in FY 20-21, vs. 6% assumed.

Status of Part-time and Temporary Employees' Retirement Plan

For the annual valuation report period ended 7/1	2020	**2021**
Total actuarial accrued liability (AAL)	$58.5	**$64.9**
Smoothed value of plan assets (MVA) (1)	$45.4	**$52.9**
Total unfunded actuarial accrued liability (UAAL)	$13.1	**$12.0**
Funded Status (2)	77.7%	**81.5%**
Market value of plan assets	$45.4	**$61.4**
Annual net rate of return	3.72%	**30.81%**
Annualized net rate of return inception to date (3)	6.02%	**8.11%**

(1) Asset smoothing recognizes market gains and losses gradually overs several years.
(2) Source: Attachment #5, page ii. Actuarial Valuation Report - County of Riverside Part-time and Temporary Employees' Retirement Plan as of July 1, 2021 – AON
(3) Inception date September 2010.
Dollars in millions.

Although AON projects an 87.2% funded status by June 30, 2022, at its December 16, 2021 meeting, PARC unanimously approved the recommendation to continue to stay on target with the current year employer rate of approximately 5.58% as a percentage of payroll for FY 22/23, the same as FY 21/22.

SPECIAL DISTRICT PLANS

The County's Regional Park and Open-Space District and Waste Resources Management District participate in what CalPERS refers to as the Risk Pool, designed to accommodate smaller employers whose size is not enough to develop individual actuarial assumptions with participation occurring if a rate plan has less than 100 active members on any valuation date. The process involves combining assets and liabilities across employers to produce large, risk sharing pools that reduce or eliminate large fluctuations in an employer's retirement contribution rate caused by unexpected demographic events.

Although the desired 80% minimum funded status for the Special Districts are not specifically mentioned in Board Policy B-25, as is the case with the County's defined benefit pension plans, that is a prudent target for them (see below additional information for each District). Similar to the County's Miscellaneous and Safety Plans, additional discretionary payments would be required to increase the funded status, thereby having budgetary impacts on the Districts (Parks and Flood), as well as the Department of Waste Resources, that may, or may not be feasible at this time.

Highlights – for the reporting period ended June 30, 2020:

- ✓ **Riverside County Regional Park and Open-Space District**
  - 71.9% funded status Tier I (1.6% YoY increase)
  - 96.6% funded status Tier II (6.7% YoY increase)
  - 96.7% funded status Tier III (6.7% YoY increase)
- ✓ **Riverside County Flood Control and Water Conservation District**
  - 65.9% funded status (2.2% YoY increase)
- ✓ **Riverside County Waste Resources Management District**
  - 68.5% funded status (1.6% YoY decrease)

The Riverside County Regional Park and Open-Space District has three rate plans. As of the annual valuation report(s) for June 30, 2020, the funded status of Tier I was 71.9%, Tier II was 96.6%, and Tier III was 96.7% (see tables below for additional details).

Status of Tier I

For the annual valuation report ended 6/30	2019	**2020**
Total actuarial accrued liability (AAL)	$46.9	**$48.2**
Total market value of assets (MVA)	$34.5	**$34.6**
Total unfunded accrued liability (UAAL)	$12.4	**$13.6**
Funded Status	73.5%	**71.9%**

Dollars in millions.

Status of Tier II

For the annual valuation report ended 6/30	2019	**2020**
Total actuarial accrued liability (AAL)	$398,743	**$459,277**
Total market value of assets (MVA)	$358,502	**$443,835**
Total unfunded accrued liability (UAAL)	$40,241	**$15,442**
Funded Status	89.9%	**96.6%**

Status of Tier III

For the annual valuation report ended 6/30	2019	**2020**
Total actuarial accrued liability (AAL)	$1.40	**$1.85**
Total market value of assets (MVA)	$1.30	**$1.78**
Total unfunded accrued liability (UAAL)	$0.14	**$0.07**
Funded Status	90.0%	**96.7%**

Dollars in millions.

To date, the District remains cautious as the pandemic continues to present uncertainty, however, does anticipate improvements in realized revenues as school tours and events increase in 2022. ***Starting in FY 22/23, the District plans to make additional discretionary payments of $200,000 to address its Tier I funding status, which is below 80%.*** In addition, it will continue making the annual UAAL prepayment option for all three tiers, thereby receiving an early payment discount from CalPERS.

The Riverside County Flood Control and Water Conservation District's annual valuation report for June 30, 2020, shows a funded status of 65.9% (see table below for additional details).

Status of Riverside County Flood Control and Water Conservation District

For the annual valuation report ended 6/30	2019	**2020**
Total actuarial accrued liability (AAL)	$213.9	**$220.7**
Total market value of assets (MVA)	$136.3	**$145.4**
Total unfunded accrued liability (UAAL)	$77.6	**$75.3**
Funded Status	63.7%	**65.9%**

Dollars in millions.

The District has developed a long-term plan that includes making additional discretionary payments to CalPERS in an effort to bring the funded status at or above 80% by fiscal year 2025, assuming all other factors remain constant. ***An additional discretionary payment of $6.7 million was paid in FY 19/20, which allowed for the 2.2% increase in funded status as reflected on the June 30, 2020 valuation report. An additional discretionary payment of $12.6 million was paid in FY 20/21. According to CalPERS, this payment will be reflected in the June 30, 2021 valuation report when the District is projected to reach a funded status of 72.6% (an increase of 6.7% from the June 30, 2020 valuation report). The District intends to continue making additional discretionary payments based on its ongoing assessment of its fiscal outlook for future years.*** The District will also continue making the annual UAAL prepayment option, thereby receiving an early payment discount from CalPERS.

The Riverside County Waste Resources Management District was dissolved in 1998, with the exception of existing employees at that time electing to maintain their District status. All new hires or transfers are designated as County employees; no new District employees have been added since 1998. The District's annual valuation report for June 30, 2020, shows a funded status of 68.5% (see table below for additional details).

Status of Riverside County Waste Resources Management District

For the annual valuation report ended 6/30	2019	**2020**
Total actuarial accrued liability (AAL)	$53.4	**$54.5**
Total market value of assets (MVA)	$37.5	**$37.3**
Total unfunded accrued liability (UAAL)	$15.9	**$17.2**
Funded Status	70.1%	**68.5%**

Dollars in millions.

The District has developed a long-term plan that includes making additional discretionary payments to CalPERS in an effort to bring the funded status at or above 80% by fiscal year 2025, assuming all other factors remain constant.

An additional discretionary payment of $3.3 million was paid in FY 20/21. According to CalPERS, this payment will be reflected in the June 30, 2021 valuation report when the District is projected to reach a funded status of 78% (an increase of 9.5% from the June 30, 2020 valuation report). The District intends to continue making additional discretionary payments based on its ongoing assessment of its fiscal outlook for future years. The District will also continue making the annual UAAL prepayment option, thereby receiving an early payment discount from CalPERS.

MANAGEMENT OF PENSION AND OTHER LIABILITIES

County's Response - Several steps have been taken to address the management of its liabilities over the last two decades:

- ✓ In 2003 the Pension Advisory Review Committee (PARC) was formed to guide policy decisions regarding retirement benefits.

- ✓ In 2004 PARC first recommended taking advantage of CalPERS' early payment discount in lieu of periodic payments.

- ✓ In 2005 the County issued $400 million in POBs reducing the all-in true interest cost to 4.91%, increased its funding status and created the Liability Management Fund (LMF), whereby some of the excess savings has been sent to CalPERS to reduce the unfunded liability. The current practice has been to send a portion of the savings to the Section 115 Pension Trust, and that will continue.

- ✓ In 2007 in an effort to reduce its OPEB liability over time, the County established its Section 115 OPEB Trust with the California Public Employers' Retirement Benefit Trust (CERBT) with CalPERS.

- ✓ In 2012, the County took the lead in initiating pension reform with its bargaining units in advance of any action by the state. As a result of collective bargaining, employees agreed to pay their own member contributions eliminating the Employer Paid Member Contribution (EPMC). Additionally, Tier II was implemented with a lower benefit formula, which became effective on August 24, 2012.

County Plan		Retirement Formula	Employee Contribution	Earliest Retirement Age	Number of Actives 6/30/2021	Percentage (%) of Employees in each Tier 6/30/2021	PEPRA Compensation Limits (1)	Final Compensation Period	Effective Date
Tier I	Miscellaneous	3.0% at 60	8.00%	50	8,527	**48%**	N/A	12 months	7/11/2002
	Safety	3.0% at 50	9.00%	50	2,143	**62%**	N/A	12 months	6/28/2001
Tier II	Miscellaneous	2.0% at 60	7.00%	50	664	**4%**	N/A	36 months	8/24/2012
	Safety	2.0% at 50	9.00%	50	149	**4%**	N/A	36 months	8/24/2012
Tier III - PEPRA	Miscellaneous	2.0% at 62	7.25%	52	8,537	**48%**	$134,974	36 months	1/1/2013
	Safety	2.7% at 57	12.50%	50	1,162	**34%**	$161,969	36 months	1/1/2013

(1) 2022 Compensation Limits are indexed annually.

The passage of Assembly Bill 340 on September 12, 2012 created the Public Employees' Pension Reform Act (PEPRA), implementing a new lower retirement benefit formula (Tier III), which became effective January 1, 2013. Since that time, there have not been any significant updates on the pension reform front worthy of note.

In September 2020, however, the Governor signed into law Assembly Bill 2967 which prevents cities and counties from excluding groups of employees from CalPERS defined benefit pension plans when they are offered for other groups, thereby effectively blocking the ability to offer a hybrid style or deferred compensation only plan.

Staff and PARC continue to monitor any developments in this area and will bring any items of significance that would lead to cost reduction to the Board's attention on a timely basis.

- ✓ In February 2020 the Board approved agenda Item 3.15, Pension Debt Reduction Strategies. Two actions have occurred since that time, as seen below:

- In April 2020 the Board authorized a second POB issuance of $720 million, reducing the all-in true interest cost to 3.53%, vs. the 7% that would have been paid to CalPERS on the unfunded liability portion.

  Per Board direction, the resulting payment reductions (savings) of nearly $231 million through 2038, are being captured through the eighteen-year life of the POBs in a dedicated Section 115 Pension Trust account. For the period ended June 30, 2021, $13.1 million in first-year 2020 POB savings earned 14.39% for a total of $840,000, resulting in an ending balance of $13.9 million.

- In December 2020, the Board of Supervisors approved agenda Item 3.1, amending and restating the agreement for services between the Western Riverside County Regional Conservation Authority (RCA) and the County of Riverside.

  Effective January 1, 2021, the Riverside County Transportation Commission began to provide the staffing and management agency role for RCA. As a result, a lump sum payment of $3.9 million was received from RCA as a pro-rata share of their unfunded pension liability obligation as well as any amounts owed for OPEB and the Replacement Benefit Plan. The payoff of $2.6 million for the unfunded liability portion was made to CalPERS on January 20, 2021.

Summary - ***Staff and PARC will continue to look for strategic options for managing its long-term costs of the County's pensions and related liabilities.*** Based upon several factors, the long-term pension outlook is favorable, with sharp increases in pension rates experienced over the past decade projected to moderate. This will be tempered, however, by year-to-year financial market performance. ***The funded status of the County's Miscellaneous and Safety Plans with CalPERS is projected to be more than 80% by this time next year, an indicator of overall pension health.***

ATTACHMENTS

1. County of Riverside - CalPERS Miscellaneous and Safety Plans
   Independent Actuarial Report - 6/30/20 Valuation, Bartel Associates, LLC.
2. CalPERS - Miscellaneous Plan - County of Riverside Annual Valuation Report as of June 30, 2020
3. CalPERS - Safety Plan - County of Riverside Annual Valuation Report as of June 30, 2020
4. Actuarial Valuation Report - County of Riverside Postretirement Benefits Plan as of June 30, 2021 - AON
5. Actuarial Valuation Report - County of Riverside Part-time and Temporary Employees' Retirement Plan as of July 1, 2021 – AON

COUNTY OF RIVERSIDE
CALPERS MISCELLANEOUS AND SAFETY PLANS

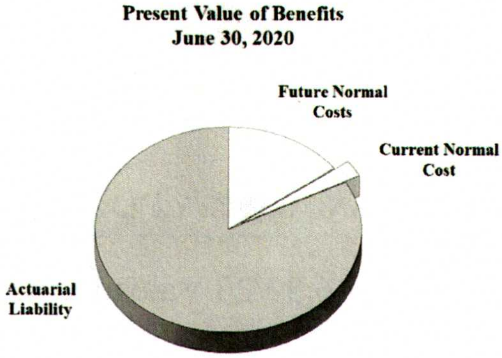
Independent Actuarial Report – 6/30/20 Valuation

Mary Elizabeth Redding, Vice President
Bianca Lin, Assistant Vice President
Matthew Childs, Actuarial Analyst
Bartel Associates, LLC

December 20, 2021

Contents

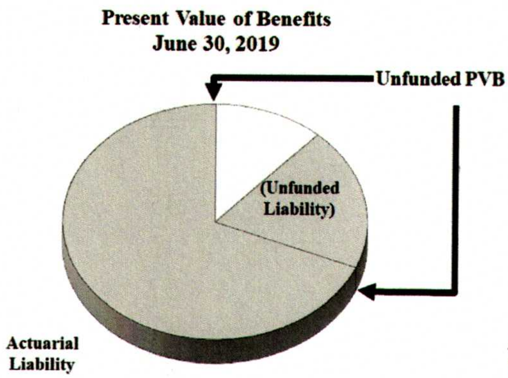
DEFINITIONS

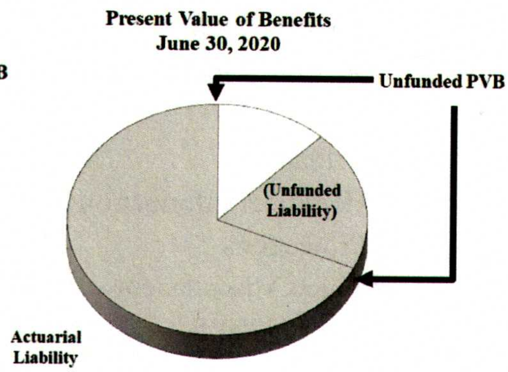


- **PVB - Present Value of all Projected Benefits:**
  - The value now of amounts due to be paid in the future
  - Discounted value (at valuation date - 6/30/20), of all future expected benefit payments based on various (actuarial) assumptions

- **Current Normal Cost (NC):**
  - Portion of PVB allocated to (or "earned" during) current year
  - Value of employee and employer current service benefit
- **Actuarial Liability (AAL):**
  - Discounted value (at valuation date) of benefits earned through valuation date [value of past service benefit]
  - Portion of PVB "earned" at measurement

DEFINITIONS



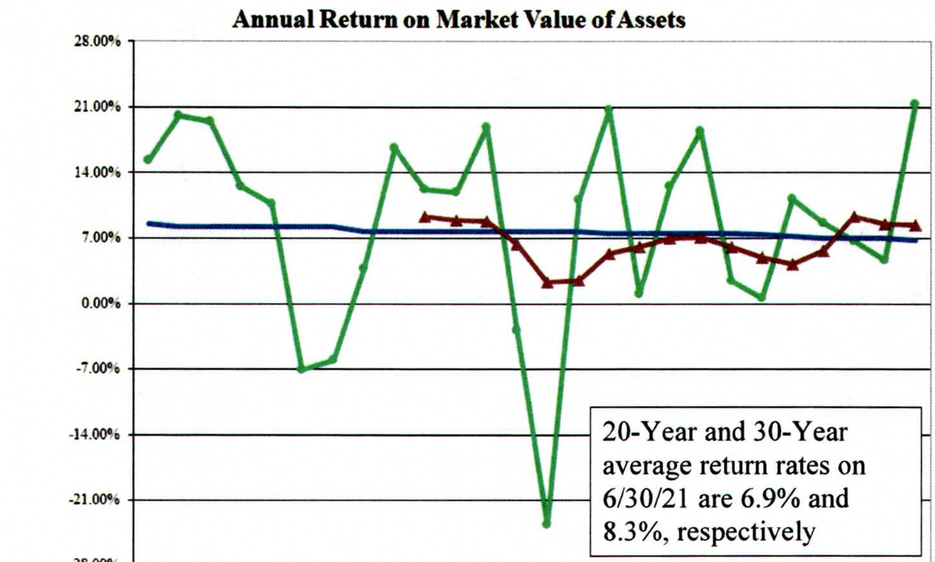


- **Target -** Have money in the bank to cover Actuarial Liability (past service)
- **Unfunded Liability (UAAL or UAL) -** Money short of target at valuation date
  - If all actuarial assumptions were always exactly met, then the plan assets would always equal AAL
  - Any difference is the unfunded (or overfunded) AAL
  - Every year, the actuary calculates the difference between the expected UAAL and Actual UAAL. This is a new layer or amortization base
  - Each new layer gets amortized (paid off) over a period of time as part of the contribution [rate]

How We Got Here

- Investment Losses
- CalPERS Contribution Policy
- Enhanced Benefits
- Demographics

How We Got Here – Investment Return



	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08
Rate of Return	15.3%	20.1%	19.5%	12.5%	10.7%	-7.1%	-6.1%	3.7%	16.6%	12.2%	11.9%	18.8%	-2.9%
Discount Rate	8.50%	8.25%	8.25%	8.25%	8.25%	8.25%	8.25%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%
10-Year Rolling Average										9.3%	9.0%	8.9%	6.4%

	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
Rate of Return	-23.6%	11.1%	20.7%	1.0%	12.5%	18.4%	2.4%	0.6%	11.2%	8.6%	6.70%	4.70%	21.3%
Discount Rate	7.75%	7.75%	7.50%	7.50%	7.50%	7.50%	7.50%	7.375%	7.25%	7.00%	7.00%	7.00%	6.80%
10-Year Rolling Average	2.3%	2.6%	5.4%	6.1%	7.0%	7.1%	6.1%	5.0%	4.3%	5.7%	9.3%	8.5%	8.5%

Returns (after 2001) shown are gross returns, unreduced for administrative expenses, from CalPERS valuation reports, when available. The discount rate is based on expected returns net of administrative expenses.

How We Got Here – Old Contribution Policy

- Effective with 2003 valuations:
  - Slow (15 year) recognition of investment losses into funded status
  - Rolling 30 year amortization of all (primarily investment) losses
- Designed to:
  - First smooth rates and
  - Second pay off UAL
- Mitigated contribution volatility

How We Got Here – Enhanced Benefits

- At CalPERS, Enhanced Benefits implemented using all (future & prior) service
- Typically not negotiated with cost sharing
- County of Riverside

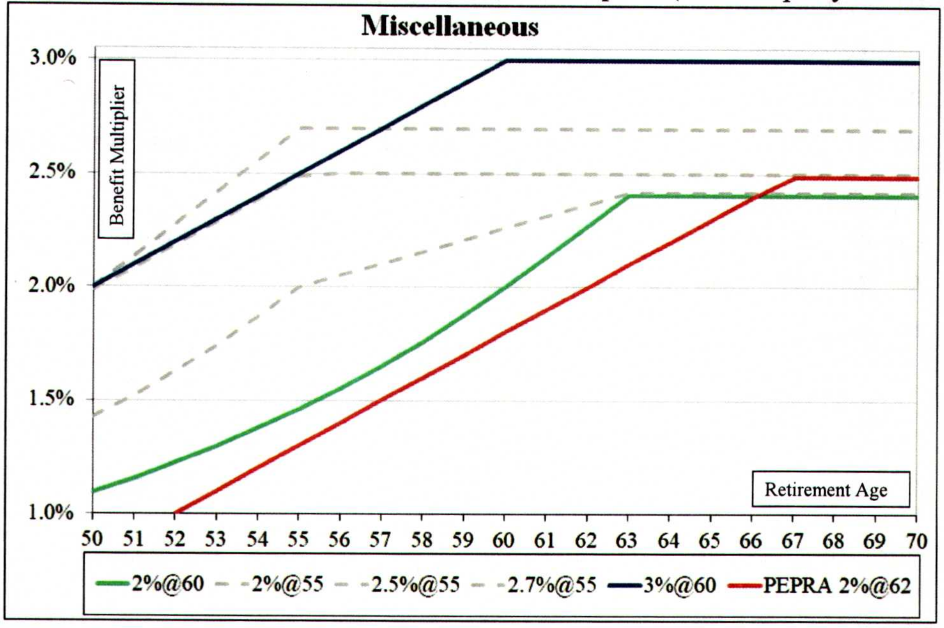
	Tier 1	Tier 2	PEPRA
● Miscellaneous	3%@60 FAE1	2%@60 FAE3	2%@62 FAE3
● Safety[1]	3%@50 FAE1	2%@50 FAE3	2.7%@57 FAE3

  - Note:
    - ☐ FAE1 is highest one year (typically final) average earnings
    - ☐ FAE3 is highest three years (typically final three) average earnings
- PEPRA tier implemented for new employees hired after 1/1/13
  - Employee pays half of total normal cost
  - 2022 Compensation limit
    - ☐ Social Security participants: $134,974
    - ☐ Non-Social Security participants: $161,969

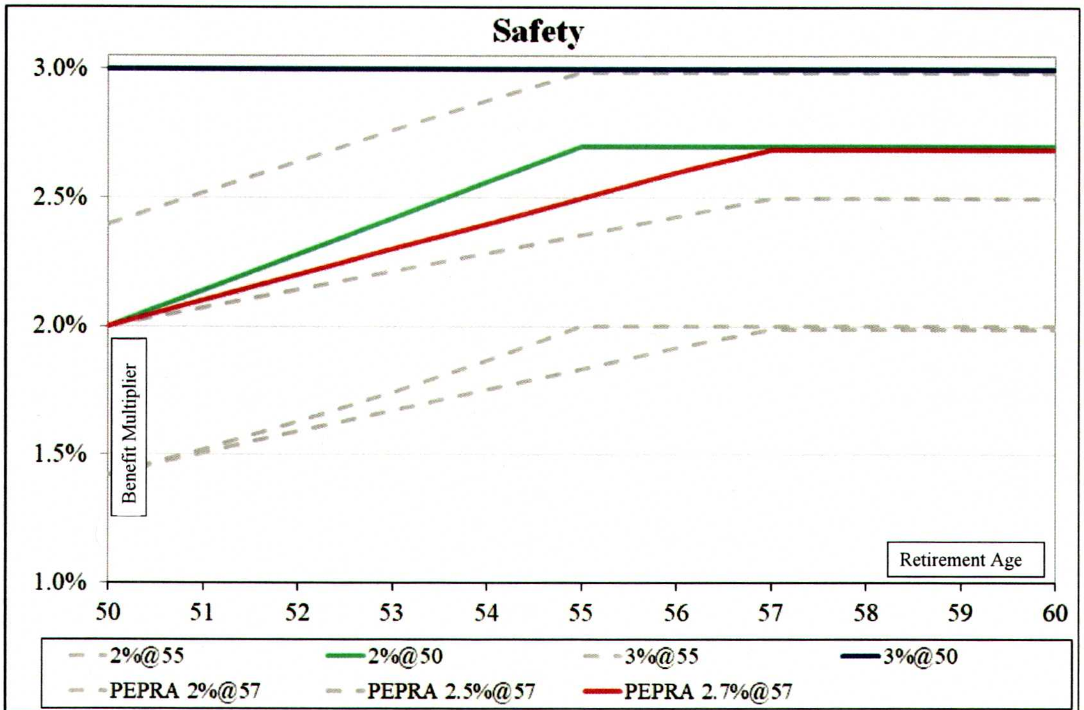
[1] Fire and Peace Officer members are combined in this group.

HOW WE GOT HERE – ENHANCED BENEFITS

- Available CalPERS Benefit formulas. County of Riverside formulas shown in red.
- For any retirement age, chart shows benefit multiplier (% FAE per year of service)



HOW WE GOT HERE – ENHANCED BENEFITS



HOW WE GOT HERE – DEMOGRAPHIC

- Around the State
  - Large retiree liability compared to actives
    - State average: 56% for Miscellaneous, 65% for Safety
  - Declining active population and increasing number of retirees
  - Higher percentage of retiree liability increases contribution volatility

- County of Riverside percentage of liability belonging to retirees:
  - Miscellaneous 50%
  - Safety 57%

CALPERS CHANGES

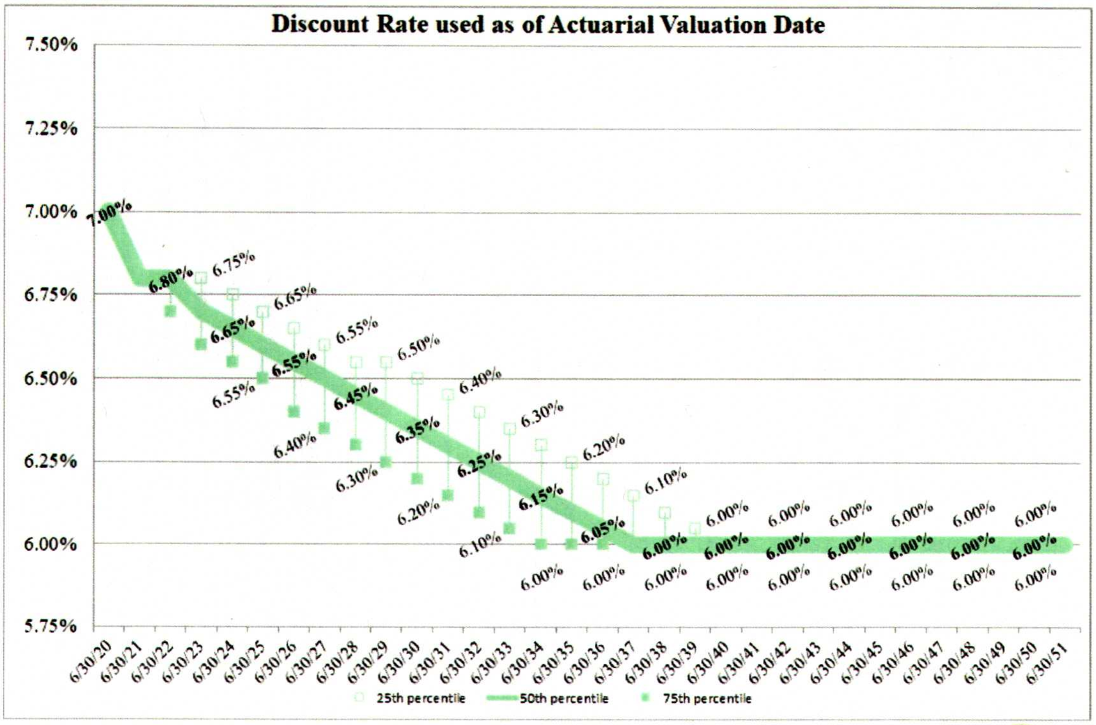
- Recent contribution policy changes:
  - No asset smoothing
  - No rolling amortization
  - 5-year ramp up
- February 2018: CalPERS adopted new amortization policy
  - Applies only to newly established amortization bases
    - Fixed dollar (level) amortization rather than % pay (escalating)
    - Amortize gains/losses over 20 rather than 30 years
    - 5-year ramp up (not down) for investment gains and losses
    - No ramp up/down for other amortization bases
  - Minimizes total interest paid over time and pays off UAL faster
  - Effective June 30, 2019 valuation for 2021/22 contributions
- CalPERS Board changed the discount rate:

	Rate	Initial Impact	Full Impact
• 6/30/16 valuation	7.375%	18/19	22/23
• 6/30/17 valuation	7.25%	19/20	23/24
• 6/30/18 valuation	7.00%	20/21	24/25

CalPERS Changes

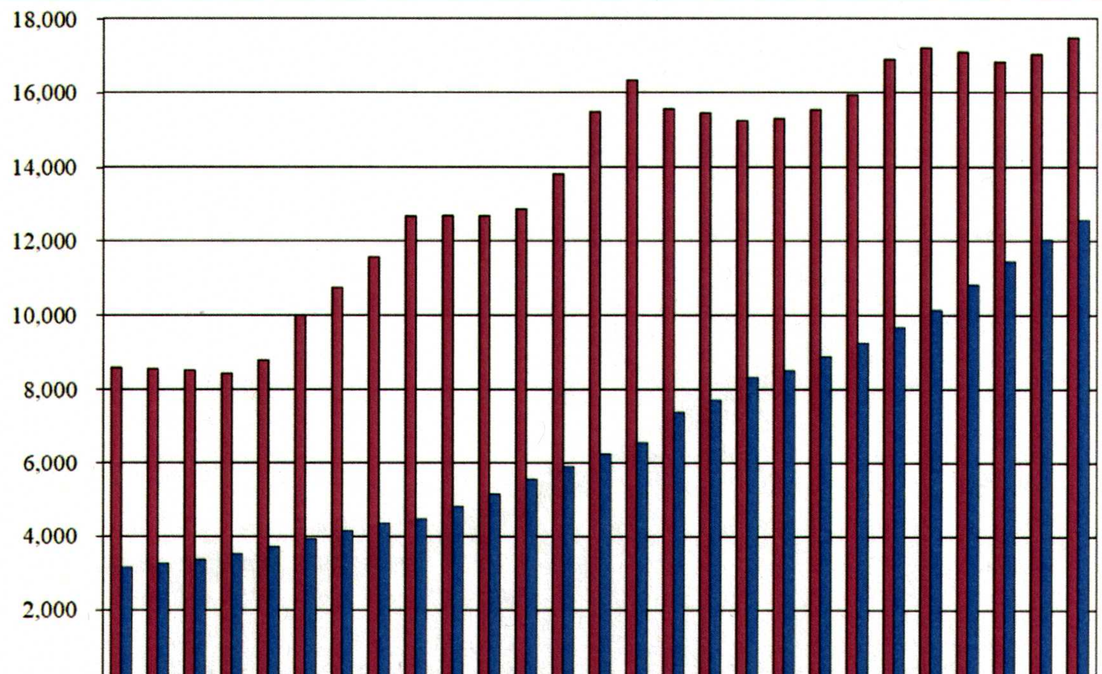
- Risk Mitigation Strategy
  - Move to more conservative investments over time to reduce volatility
    - ☐ Only when investment return is better than expected
    - ☐ Lower discount rate in concert
    - ☐ Essentially use ≈50% of investment gains to pay for cost increases
  - Likely get to 6.0% discount rate over 20+ years
    - ☐ Risk mitigation suspended from 6/30/16 to 6/30/18 valuation
    - ☐ Did not trigger for 6/30/19 or 6/30/20 valuations
    - ☐ Will trigger for 6/30/21 valuation – 6.8% discount rate
- In the November 2021 meeting, CalPERS Board adopted new
  - Capital market assumptions
  - 6.8% Discount Rate
  - Higher risk asset allocation, including leverage
  - Experience study (demographic assumptions)
  - First impact is on FY23/24 contribution rates.

CalPERS Changes



	2000	2010	2019	2020
Actives				
■ Counts	10,739	15,446	17,024	17,467
■ Average				
• Age	43	43	44	44
• County Service	8	8	10	10
• PERSable Wages	$ 38,100	$ 55,400	$ 67,300	$ 67,700
■ Total PERSable Wages	408,900,000	854,900,000	1,145,600,000	1,182,900,000
Inactive Members				
■ Counts				
• Transferred	2,373	3,434	4,012	4,066
• Separated	1,951	6,334	9,990	10,518
• Retired				
□ Service	3,143	6,336	10,324	10,812
□ Disability	508	585	674	687
□ Beneficiaries	496	789	1,024	1,058
□ Total	4,147	7,710	12,022	12,557
■ Average Annual County Provided Benefit for Service Retirees[2]	$ 9,500	$ 20,600	$ 29,700	$ 30,700

[2] Average County-provided pensions are based on County service & County benefit formula, and are not representative of benefits for long-service employees.



	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
■Active	8,585	8,555	8,515	8,432	8,783	9,998	10,739	11,562	12,656	12,671	12,664	12,847	13,806
■Receiving Payments	3,155	3,259	3,365	3,518	3,716	3,935	4,147	4,356	4,467	4,815	5,146	5,544	5,892

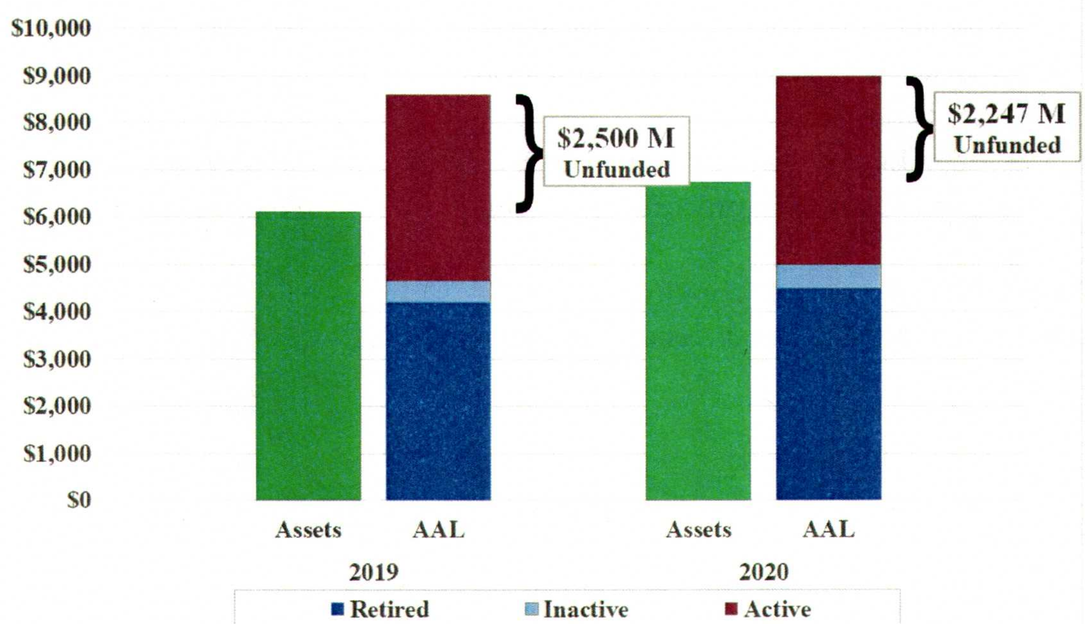
	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20
■Active	15,474	16,322	15,550	15,446	15,243	15,298	15,530	15,934	16,891	17,201	17,083	16,817	17,024	17,467
■Receiving Payments	6,239	6,554	7,385	7,710	8,318	8,504	8,880	9,247	9,667	10,132	10,821	11,438	12,022	12,557

PLAN FUNDED STATUS - MISCELLANEOUS

	June 30, 2019	June 30, 2020
Actuarial Accrued Liability		
• Active	$3,951,700,000	$4,004,800,000
• Retiree	4,199,900,000	4,509,500,000
• Inactive	451,300,000	478,400,000
• Total	8,602,900,000	8,992,700,000
Assets	6,103,200,000	6,746,100,000
Unfunded Liability	2,499,700,000	2,246,600,000
Funded Ratio	70.9%	75.0%
Average funded ratio for CalPERS Public Agency Miscellaneous Plans	72.2%	72.3%

PLAN FUNDED STATUS - MISCELLANEOUS

County CalPERS Assets and Actuarial Liability ($Millions)



Discount Rate Sensitivity

June 30, 2020

	Discount Rate		
	7.00%	**6.50%[3]**	**6.00%**
AAL	$8,992,700,000	$9,636,700,000	$10,280,700,000
Assets	6,746,100,000	6,746,100,000	6,746,100,000
Unfunded Liability	2,246,600,000	2,890,600,000	3,534,600,000
Funded Ratio	75.0%	70.0%	65.6%

[3] Estimated by Bartel Associates.

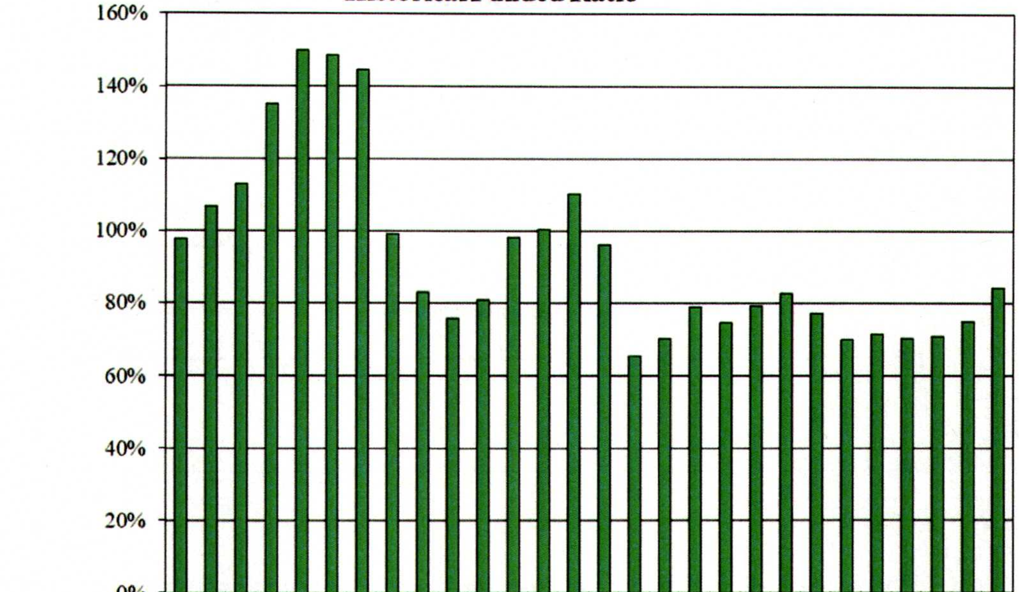
Unfunded Accrued Liability Changes

■ **Unfunded Accrued Liability on 6/30/19**		$2,499,700,000
■ **Expected 6/30/20 Unfunded Accrued Liability[4]**		2,174,100,000
■ **Other Changes**		
• Asset Loss (Gain) (4.6% return for FY 2020)	160,200,000	
• Contribution & Experience Loss (Gain)	(87,700,000)	
• Total		72,500,000
■ **Unfunded Accrued Liability on 6/30/20**		2,246,600,000
■ **Projected Unfunded Accrued Liability on 6/30/21**		1,529,000,000

[4] Reflected $371.6 million POB proceeds transferred to CalPERS in May 2020.

FUNDED RATIO - MISCELLANEOUS

Historical Funded Ratio

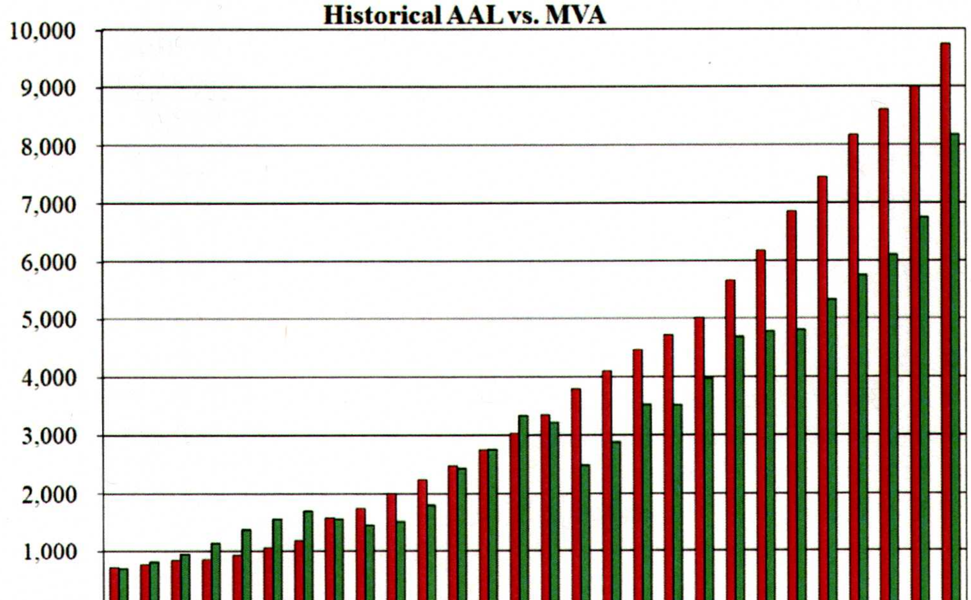


	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
Funded Ratio - MVA/AAL	98%	107	113	135	150	149	144	99%	83%	76%	81%	98%	100	110	96%	65%	70%	79%	75%	79%	83%	77%	70%	72%	70%	71%	75%	84%

6/30/21 funded status estimated

FUNDED STATUS (THOUSANDS) - MISCELLANEOUS

Historical AAL vs. MVA

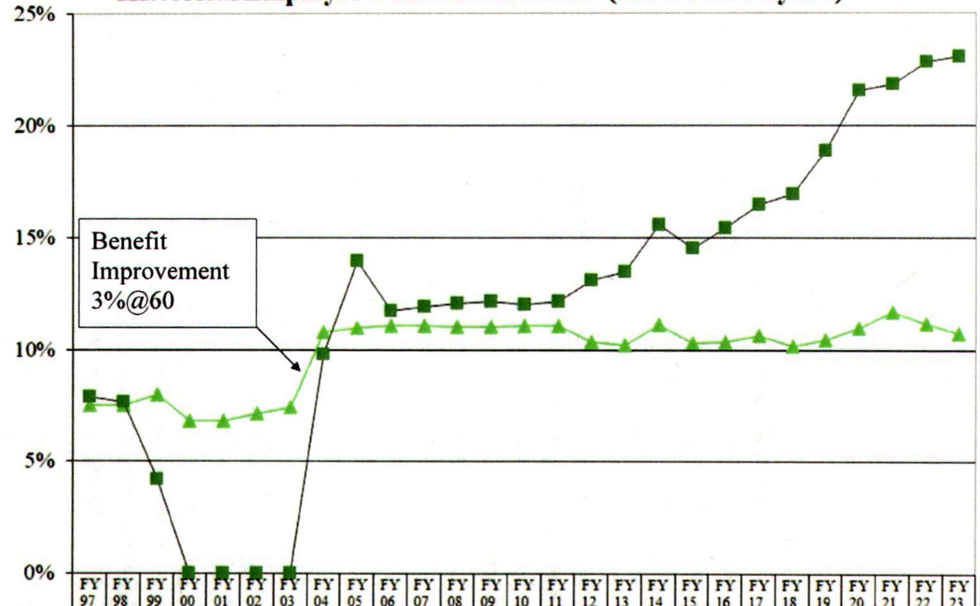


	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
AAL	704	757	831	844	920	1,053	1,178	1,577	1,750	1,999	2,232	2,472	2,742	3,029	3,350	3,790	4,097	4,462	4,709	5,009	5,656	6,174	6,850	7,441	8,166	8,603	8,993	9,739
Assets	688	808	939	1,140	1,379	1,564	1,702	1,564	1,454	1,517	1,807	2,429	2,754	3,342	3,229	2,482	2,882	3,526	3,520	3,974	4,683	4,775	4,800	5,326	5,749	6,103	6,746	8,175

6/30/21 funded status estimated

CONTRIBUTION RATES - MISCELLANEOUS

Historical Employer Contribution Rates (Percent of Payroll)



	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23
Normal Cost	7.5%	7.5%	8.0%	6.8%	6.8%	7.1%	7.4%	10.8	11.0	11.1	11.1	11.0	11.0	11.1	11.1	10.4	10.2	11.1	10.3	10.4	10.7	10.2	10.5	11.0	11.7	11.2	10.8
Total Rate	7.8%	7.6%	4.2%	0.0%	0.0%	0.0%	0.0%	9.8%	13.9	11.8	11.9	12.1	12.2	12.0	12.2	13.1	13.5	15.6	14.5	15.4	16.5	16.9	18.9	21.6	21.8	22.9	23.0

CONTRIBUTION RATES - MISCELLANEOUS

	6/30/19 2021/2022	6/30/20 2022/2023
■ Total Normal Cost	18.8%	18.3%
■ Employee Normal Cost	7.6%	7.6%
■ Employer Normal Cost	11.2%	10.8%
■ Amortization Payments	11.7%	12.3%[5]
■ Total Employer Contribution Rate	22.9%	23.0%

■ 2021/22 Employer Contribution Rate	22.9%
● Payroll > Expected	(0.1%)
● 6/30/17 Discount Rate & Inflation (3rd Year)	0.2%
● 6/30/18 Discount Rate change (2nd Year)	0.4%
● Other (Gains)/Losses	(0.4%)
■ 2022/23 Employer Contribution Rate	23.0%

[5] Equivalent to 6.9% of UAL. One year, 7% interest on the UAL is 12.5% of payroll. $2.1 million additional payment in 2022/23 needed to avoid negative amortization. Note that CalPERS combined 2017 and 2018 non-investment gain amortization bases with the 2015 and 2016 actuarial loss bases. This will reduce county-paid interest over time, but lowered the FY22/23 payment by $3.1 million.

CONTRIBUTION PROJECTIONS - MISCELLANEOUS

- Market Value Investment Return:
  - June 30, 2021 21.3%[6]
  - Future returns based on stochastic analysis using 1,000 trials

Single Year Returns at[7]	25th Percentile	50th Percentile	75th Percentile
Current investment mix – first 10 years	**-2.1%**	**5.9%**	**14.6%**
Ultimate mix after risk mitigation	**TBD**	**TBD**	**TBD**

  - Assumes investment returns will generally be lower over the next 10 years and higher beyond that.
- Discount Rate decreases due to Risk Mitigation policy
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection
- Impact of Risk Mitigation Policy:
  - Combined impact of investment gain and discount rate change amortized over 20 years with 5 year ramp up

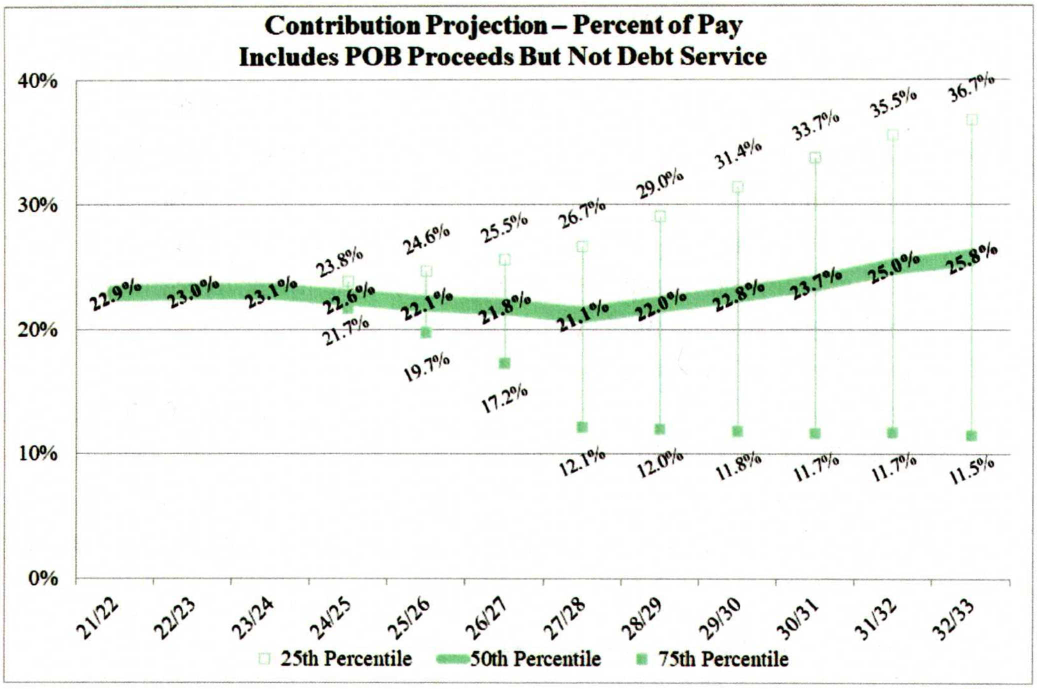
[6] Gross return based on July 2021 CalPERS press release.
[7] Nth percentile means N percentage of our trials result in returns lower than the indicated rates.

CONTRIBUTION PROJECTIONS - MISCELLANEOUS

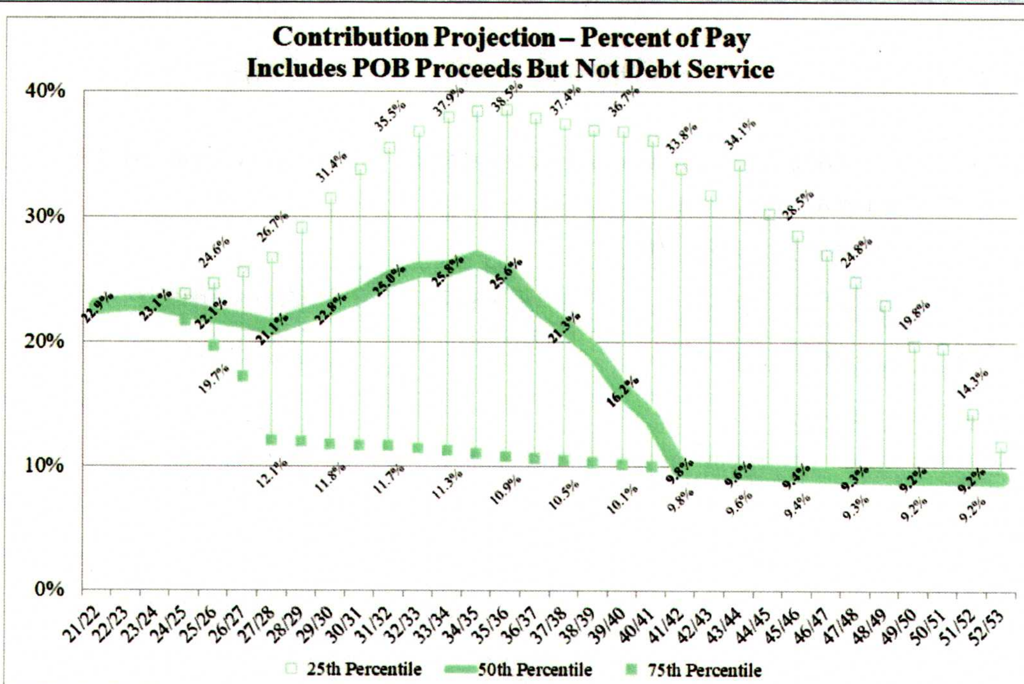
- New hire assumptions:
  - 97.5% of 2021/22 new hires are PEPRA members and 2.5% are Classic members
  - Percentage of PEPRA member future hires to increase from 97.5% to 100% beginning next year
- 6/30/20 employee distribution:

Benefit Tier	Count	6/30/20 Payroll
• 3%@60 FAE1	8,739	$690,507,000
• 2%@60 FAE3	727	51,931,500
• 2%@62 FAE3 (PEPRA)	8,001	440,422,000

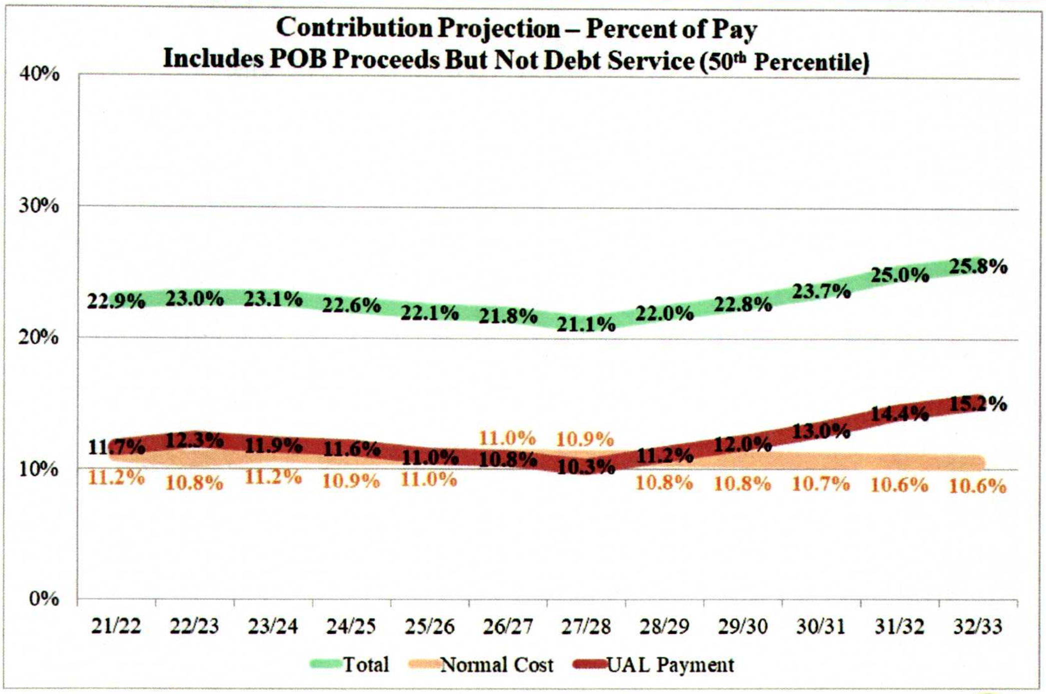
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



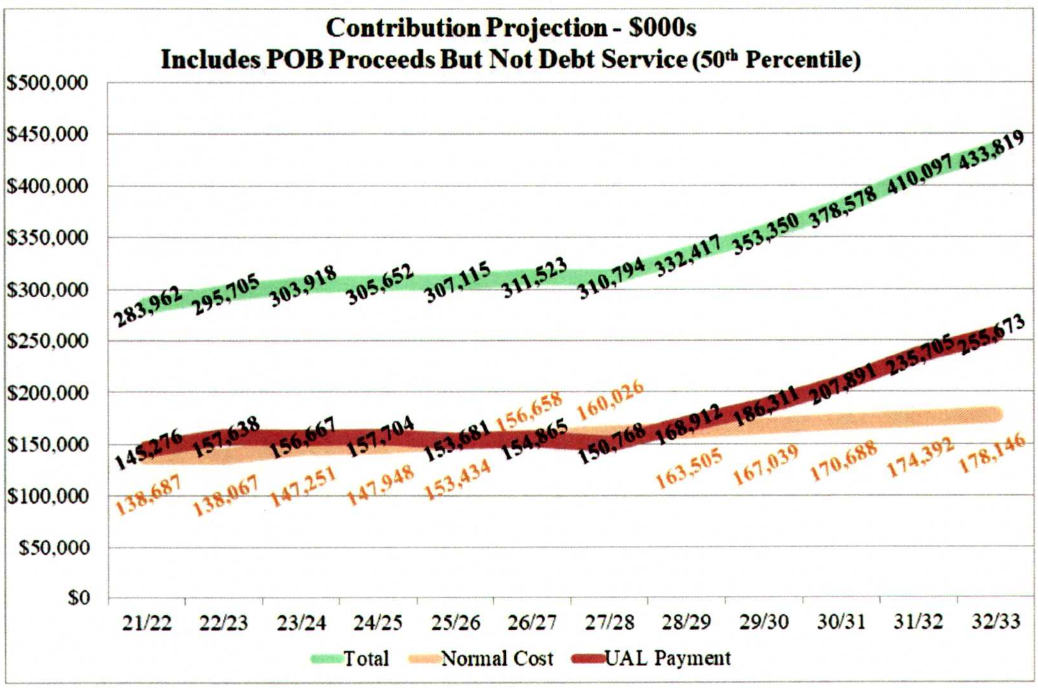
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



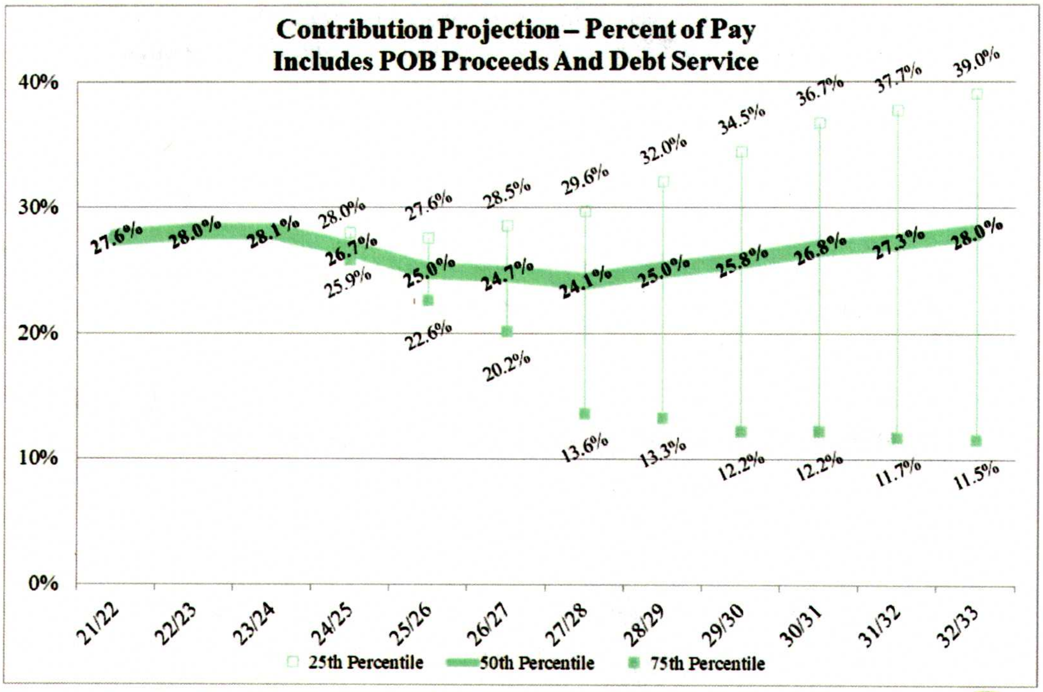
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



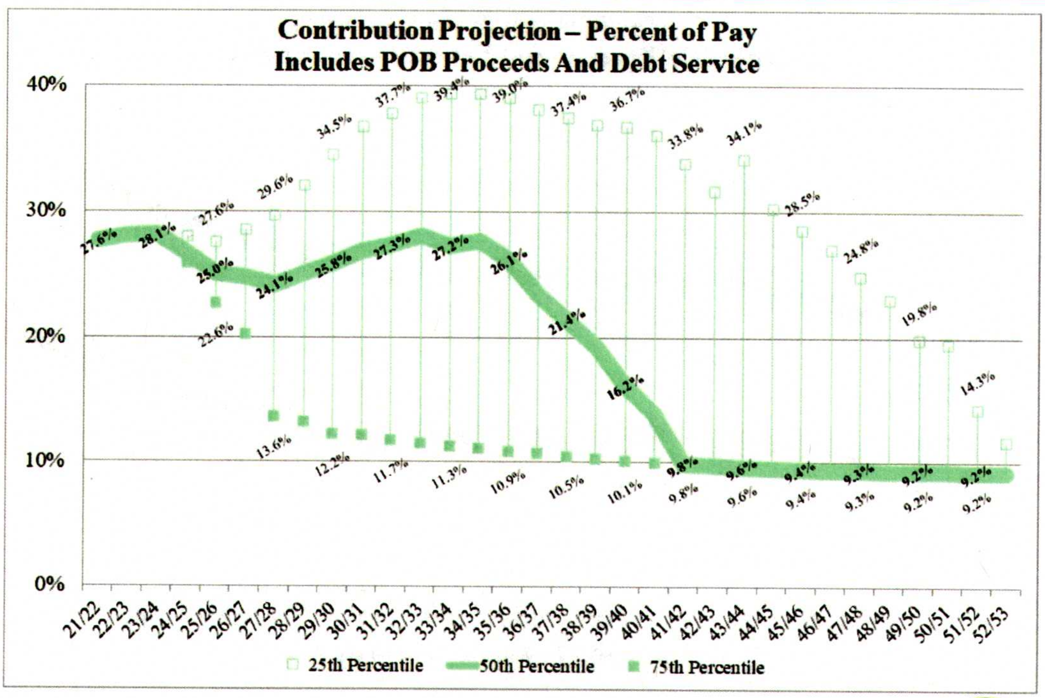
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



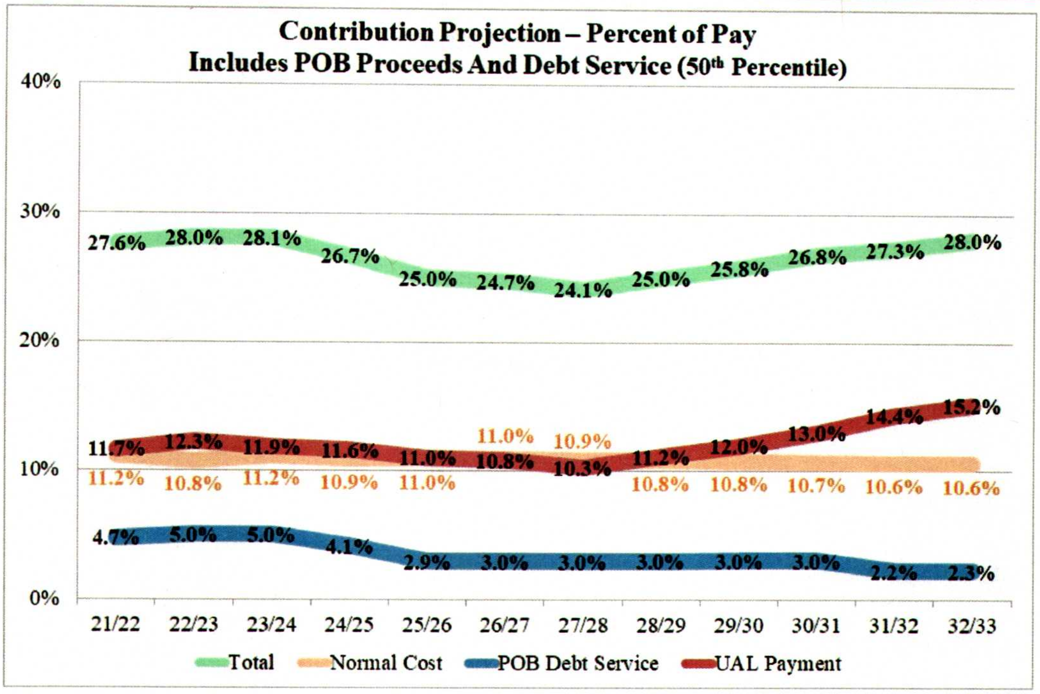
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



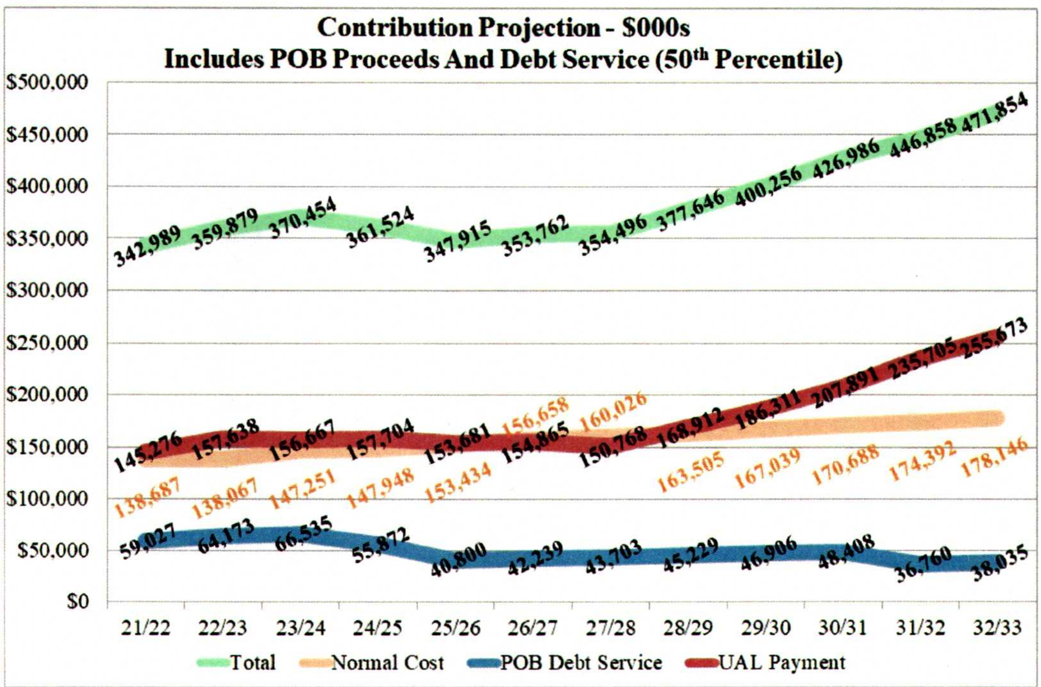
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



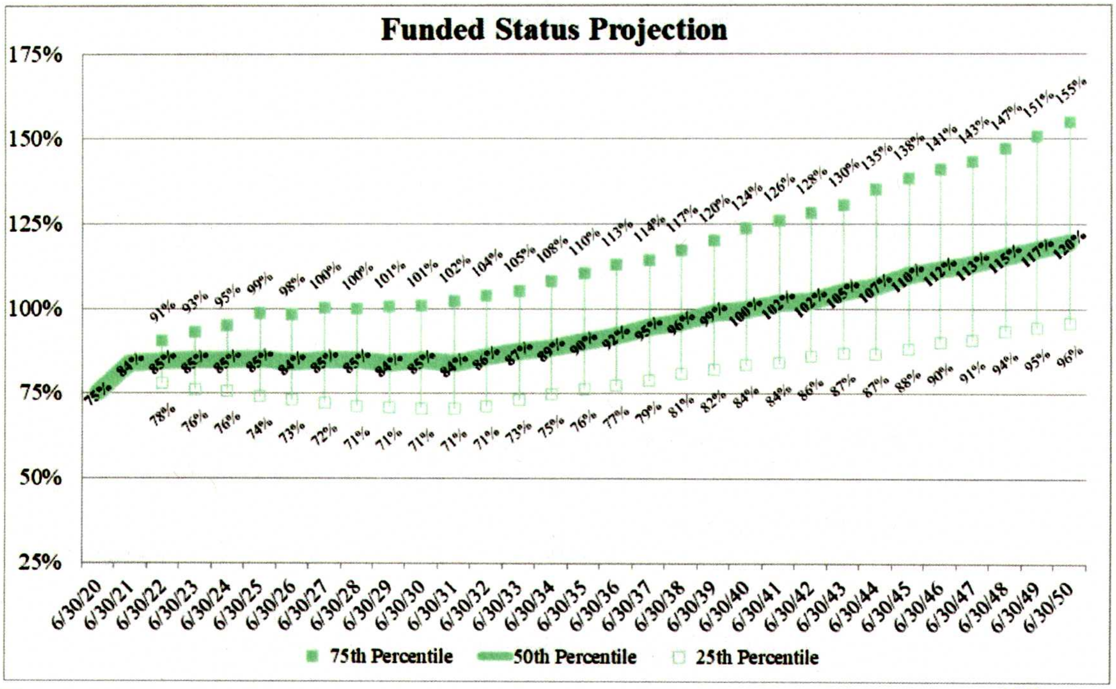
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



CONTRIBUTION PROJECTIONS - MISCELLANEOUS



FUNDED STATUS - MISCELLANEOUS



FUNDED STATUS - MISCELLANEOUS

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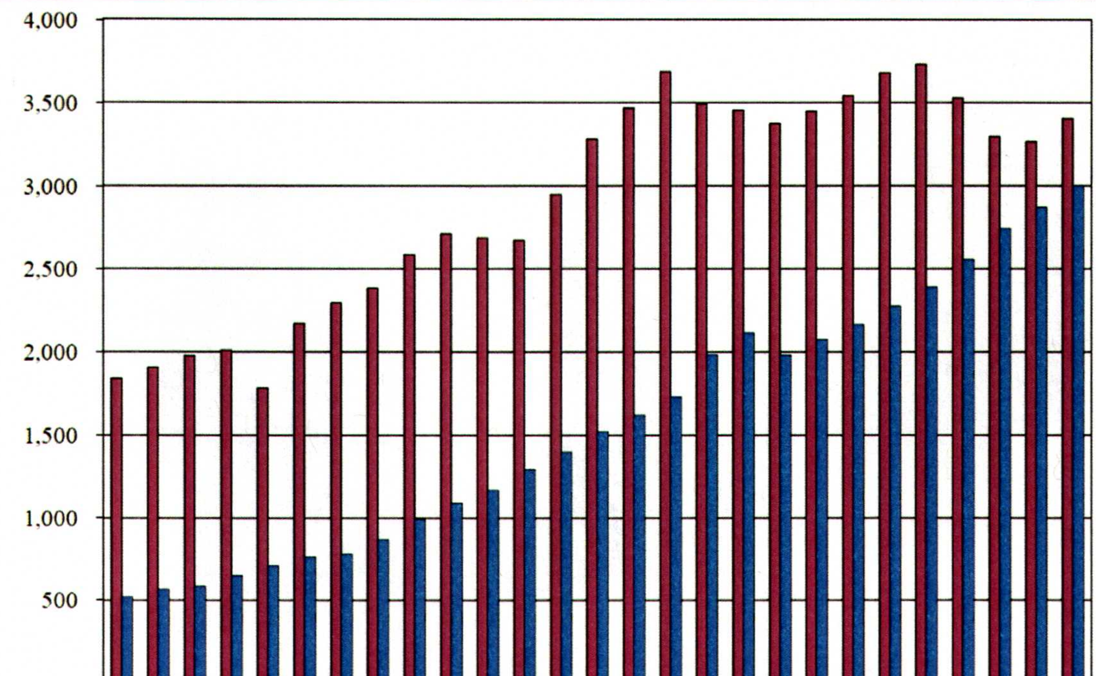
SUMMARY OF DEMOGRAPHIC INFORMATION - SAFETY

	2000	2010	2019	2020
Actives				
■ Counts	2,296	3,490	3,265	3,404
■ Average				
• Age	39	38	40	40
• County Service	9	9	11	11
• PERSable Wages	$ 52,100	$ 76,000	$ 93,300	$ 92,900
■ Total PERSable Wages	119,600,000	265,200,000	304,700,000	316,200,000
Inactive Members				
■ Counts				
• Transferred	378	564	694	701
• Separated	217	544	673	717
• Retired				
☐ Service	300	1,302	1,969	2,047
☐ Disability	393	522	627	661
☐ Beneficiaries	92	158	272	291
☐ Total	785	1,982	2,868	2,999
■ Average Annual County Provided Benefit for Service Retirees[8]	$ 24,100	$ 39,000	$ 61,300	$ 62,700

[8] Average County-provided pensions are based on County service & County benefit formula, and are not representative of benefits for long-service employees.

SUMMARY OF DEMOGRAPHIC INFORMATION - SAFETY

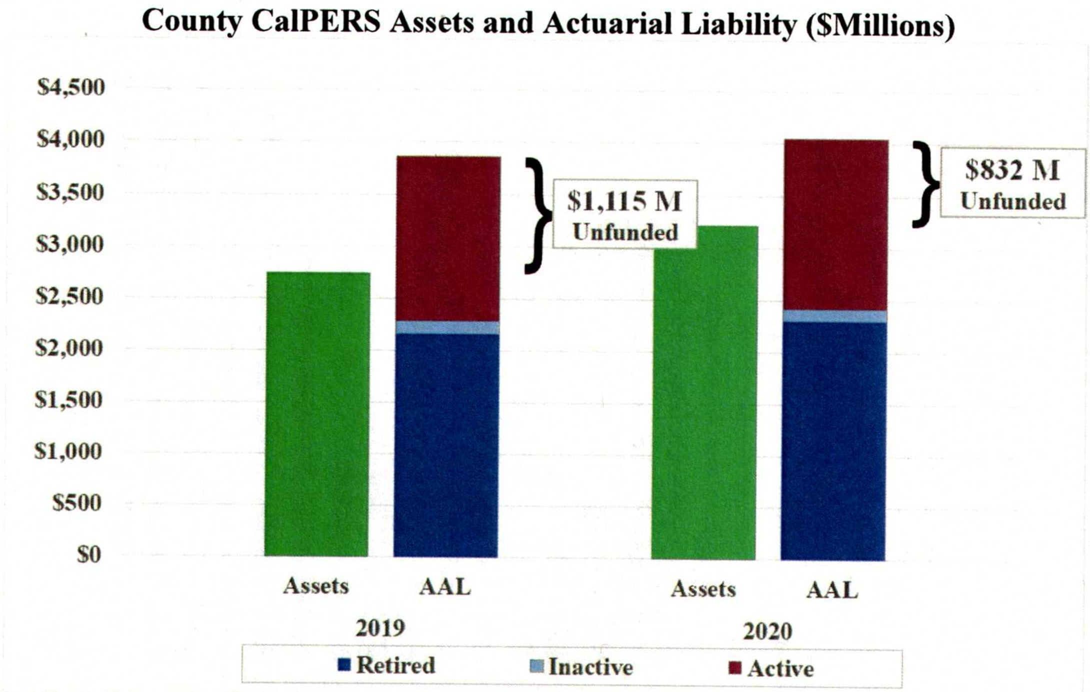


	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20
■ Active	1,839	1,906	1,976	2,010	1,782	2,172	2,296	2,385	2,581	2,708	2,684	2,670	2,947	3,282	3,467	3,687	3,490	3,455	3,374	3,448	3,541	3,680	3,731	3,527	3,296	3,265	3,404
■ Receiving Payments	520	567	586	651	711	767	785	872	993	1,090	1,168	1,292	1,398	1,521	1,619	1,728	1,982	2,112	1,980	2,073	2,164	2,275	2,391	2,554	2,739	2,868	2,999

Plan Funded Status - Safety

	June 30, 2019	June 30, 2020
■ **Actuarial Accrued Liability**		
● Active	$ 1,575,900,000	$ 1,625,000,000
● Retiree	2,161,300,000	2,301,500,000
● Inactive	120,600,000	119,400,000
● Total	3,857,800,000	4,045,900,000
■ **Assets**	2,742,700,000	3,213,700,000
■ **Unfunded Liability**	1,115,100,000	832,200,000
■ **Funded Ratio**	71.1%	79.4%
■ **Average funded ratio for CalPERS Public Agency Safety Plans**	68.6%	69.2%

Plan Funded Status - Safety



PLAN FUNDED STATUS - SAFETY

Discount Rate Sensitivity
June 30, 2020

	Discount Rate		
	7.00%	6.50%[9]	6.00%
AAL	$4,045,900,000	$4,350,000,000	$4,654,000,000
Assets	3,213,700,000	3,213,700,000	3,213,700,000
Unfunded Liability	832,200,000	1,136,300,000	1,440,300,000
Funded Ratio	79.4%	73.9%	69.1%

[9] Estimated by Bartel Associates.

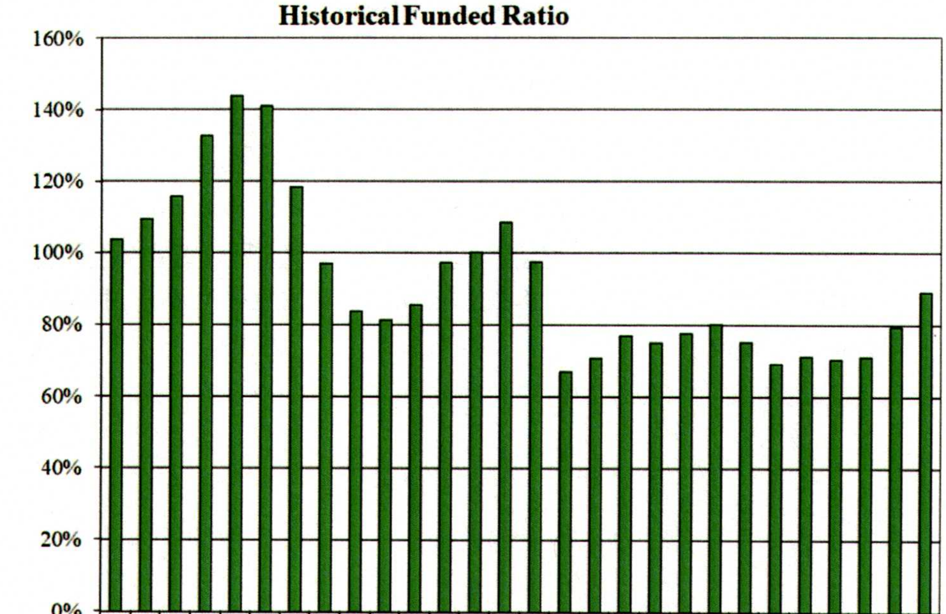
PLAN FUNDED STATUS - SAFETY

Unfunded Accrued Liability Changes

■ **Unfunded Accrued Liability on 6/30/19**		$1,115,100,000
■ **Expected 6/30/20 Unfunded Accrued Liability[10]**		784,900,000
■ **Other Changes**		
• Asset Loss (Gain) (4.6% return for FY 2020)	77,300,000	
• Contribution & Experience Loss (Gain)	(30,000,000)	
• Total		47,300,000
■ **Unfunded Accrued Liability on 6/30/20**		832,200,000
■ **Projected Unfunded Accrued Liability on 6/30/21**		476,100,000

[10] Reflected $344.3 million POB proceeds transferred to CalPERS in May 2020.

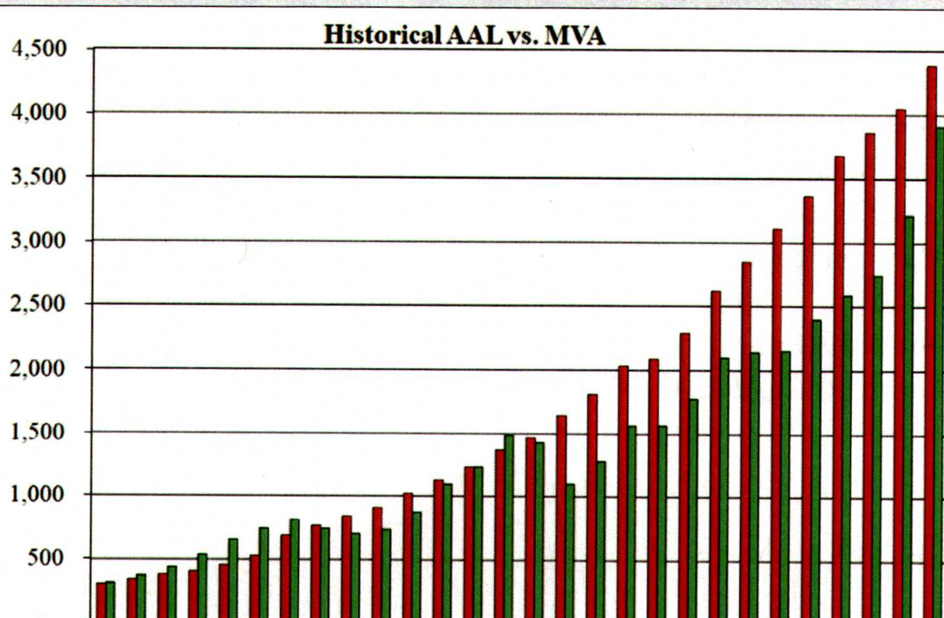
FUNDED RATIO - SAFETY



	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
Funded Ratio - MVA/AAL	104	109	116	133	144	141	118	97%	84%	81%	86%	97%	100	109	97%	67%	71%	77%	75%	78%	80%	75%	69%	71%	70%	71%	79%	89%

6/30/21 funded status estimated

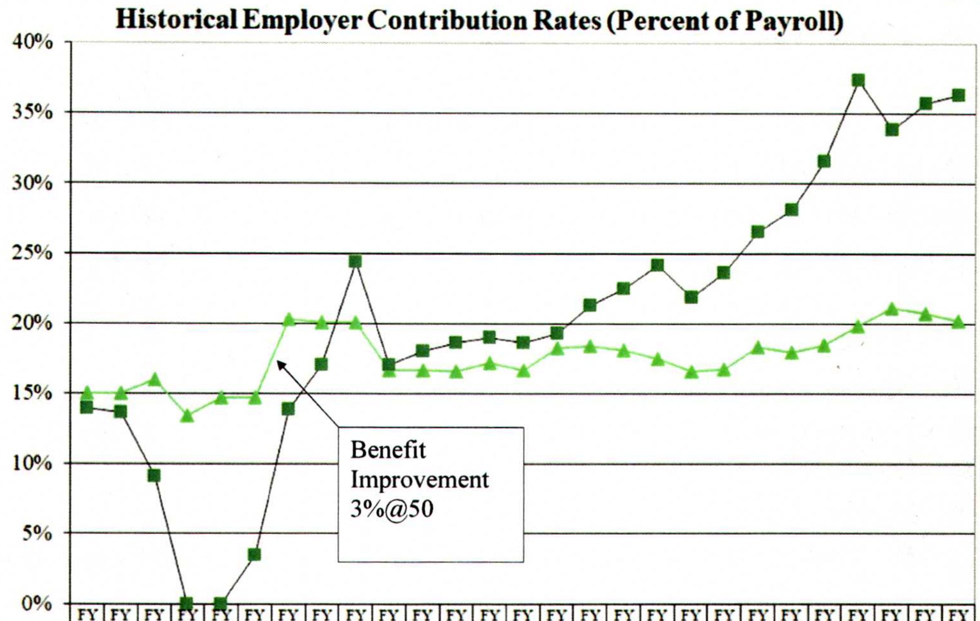
FUNDED STATUS (THOUSANDS) - SAFETY



	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
AAL	303	342	381	407	457	529	686	768	840	907	1,021	1,127	1,232	1,370	1,469	1,648	1,809	2,032	2,086	2,286	2,616	2,846	3,110	3,362	3,677	3,858	4,046	4,385
Assets	314	374	441	540	657	746	812	748	704	738	874	1,097	1,234	1,487	1,432	1,100	1,280	1,566	1,567	1,776	2,098	2,141	2,152	2,396	2,587	2,748	3,214	3,909

6/30/21 funded status estimated

Contribution Rates - Safety



	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Normal Cost	15.0	15.0	16.0	13.4	14.7	14.7	20.3	20.1	20.1	16.7	16.7	16.6	17.2
Total Rate	14.0	13.6	9.1%	0.0%	0.0%	3.4%	13.8	17.0	24.4	17.0	18.0	18.6	19.0

	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23
Normal Cost	16.6	18.2	18.4	18.1	17.5	16.6	16.7	18.3	17.9	18.5	19.9	21.1	20.7	20.2
Total Rate	18.6	19.3	21.3	22.5	24.1	21.9	23.6	26.6	28.2	31.6	37.4	33.9	35.8	36.4

Contribution Rates - Safety

	6/30/19 2021/2022	6/30/20 2022/2023
■ Total Normal Cost	30.4%	30.0%
■ Employee Normal Cost	9.6%	9.8%
■ Employer Normal Cost	20.7%	20.2%
■ Amortization Payments	15.0%	16.2%[11]
■ Total Employer Contribution Rate	35.8%	36.4%

■ 2021/22 Employer Contribution Rate	35.8%
● Payroll higher than Expected	(0.1%)
● 6/30/17 Discount Rate & Inflation (3rd Year)	0.4%
● 6/30/18 Discount Rate change (2nd Year)	0.8%
● Other (Gains)/Losses	(0.5%)
■ 2022/23 Employer Contribution Rate	36.4%

[11] Equivalent to 6.5% of UAL. One year, 7% interest on the UAL is 17.4% of payroll. $4.3 million additional payment in 2022/23 needed to avoid negative amortization.

CONTRIBUTION PROJECTIONS - SAFETY

- Market Value Investment Return:
  - June 30, 2021 21.3%[12]
  - Future returns based on stochastic analysis using 1,000 trials

Single Year Returns at[13]	25th Percentile	50th Percentile	75th Percentile
Current investment mix – first 10 years	**-2.1%**	**5.9%**	**14.6%**
Ultimate mix after risk mitigation	**TBD**	**TBD**	**TBD**

  - Assumes investment returns will generally be lower over the next 10 years and higher beyond that.
- Discount Rate decreases due to Risk Mitigation policy
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection
- Impact of Risk Mitigation Policy:
  - Combined impact of investment gain and discount rate change amortized over 20 years with 5 year ramp up

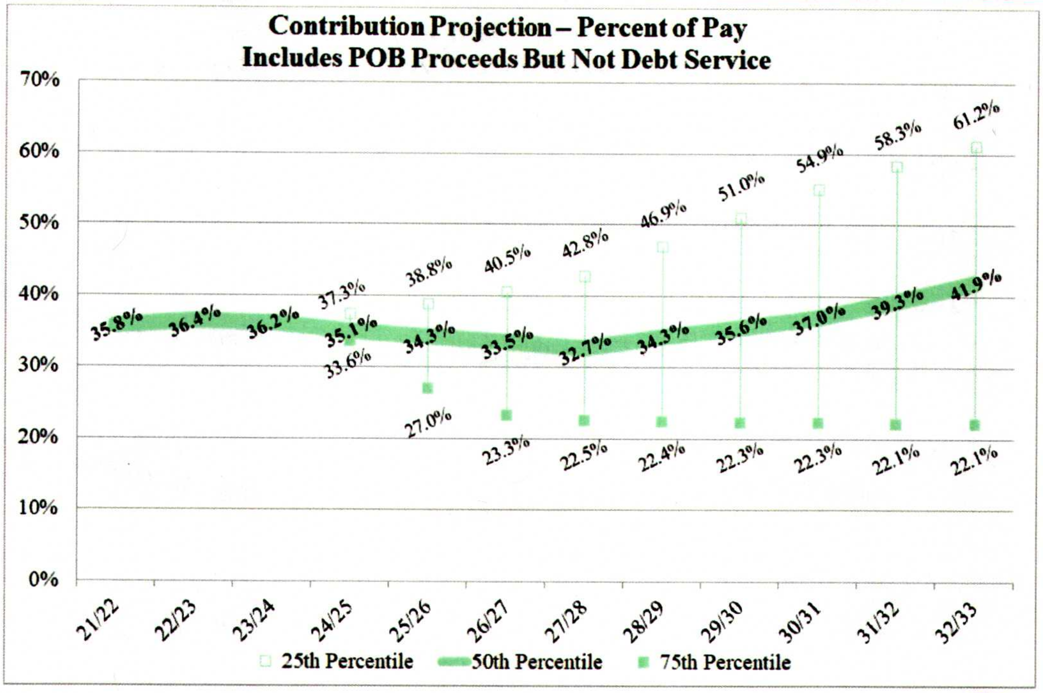
12 Gross return based on July 2021 CalPERS press release.
13 Nth percentile means N percentage of our trials result in returns lower than the indicated rates.

CONTRIBUTION PROJECTIONS - SAFETY

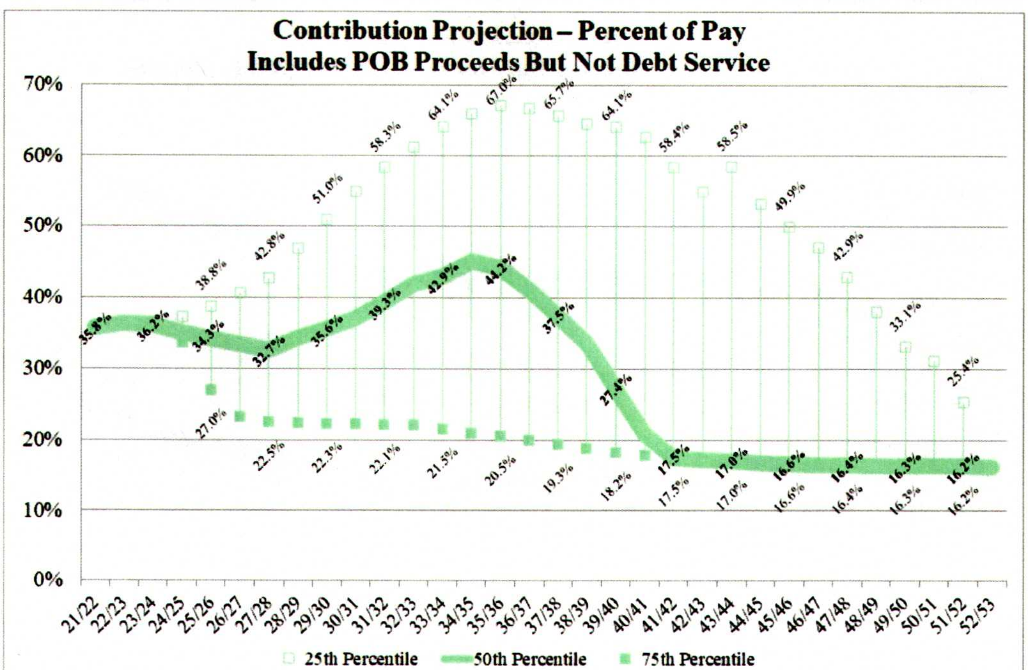
- New hire assumptions:
  - 97.5% of 2021/22 new hires are PEPRA members and 2.5% are Classic members
  - Percentage of PEPRA member future hires to increase from 97.5% to 100% in last year
- 6/30/20 employee distribution:

Benefit Tier	Count	6/30/20 Payroll
• 3%@50 FAE1	2,179	$232,916,000
• 2%@50 FAE3	136	12,099,100
• 2.7%@57 FAE3 (PEPRA)	1,089	71,190,700

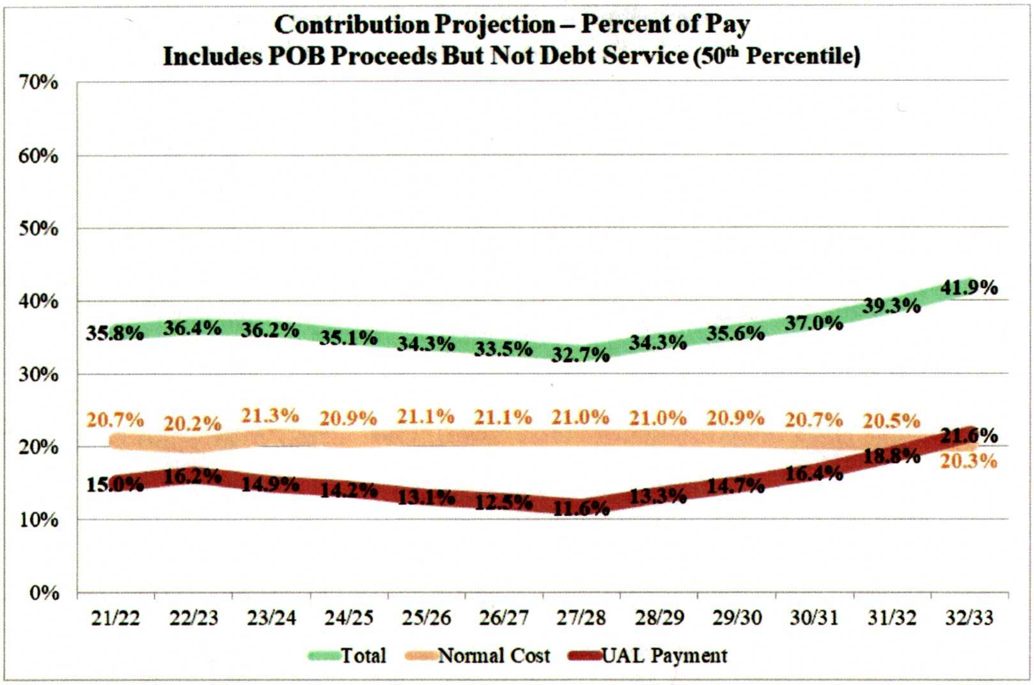
CONTRIBUTION PROJECTIONS - SAFETY



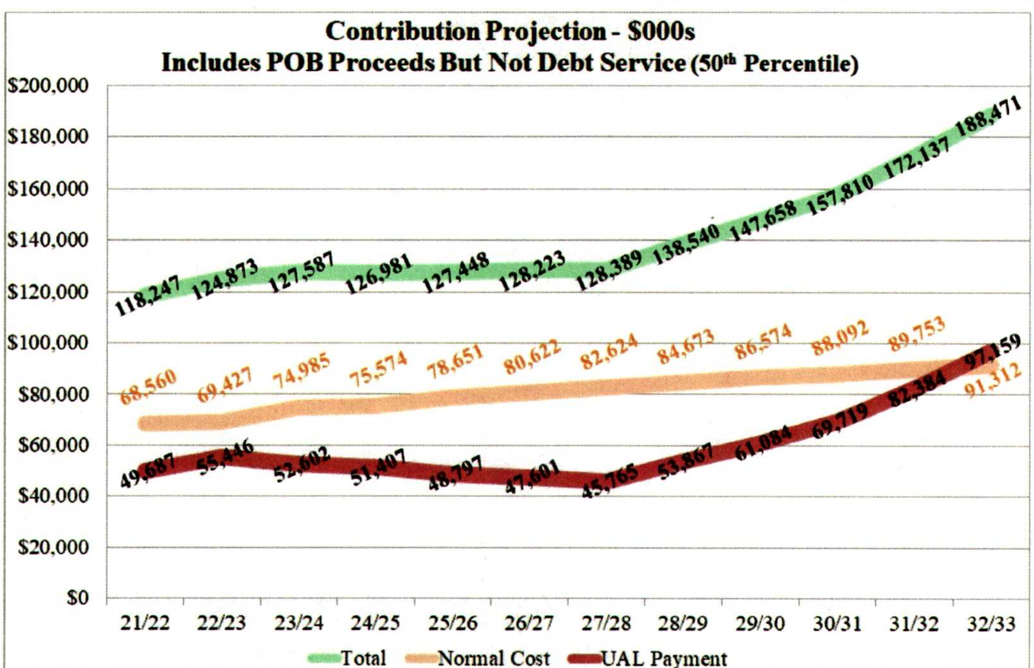
CONTRIBUTION PROJECTIONS - SAFETY



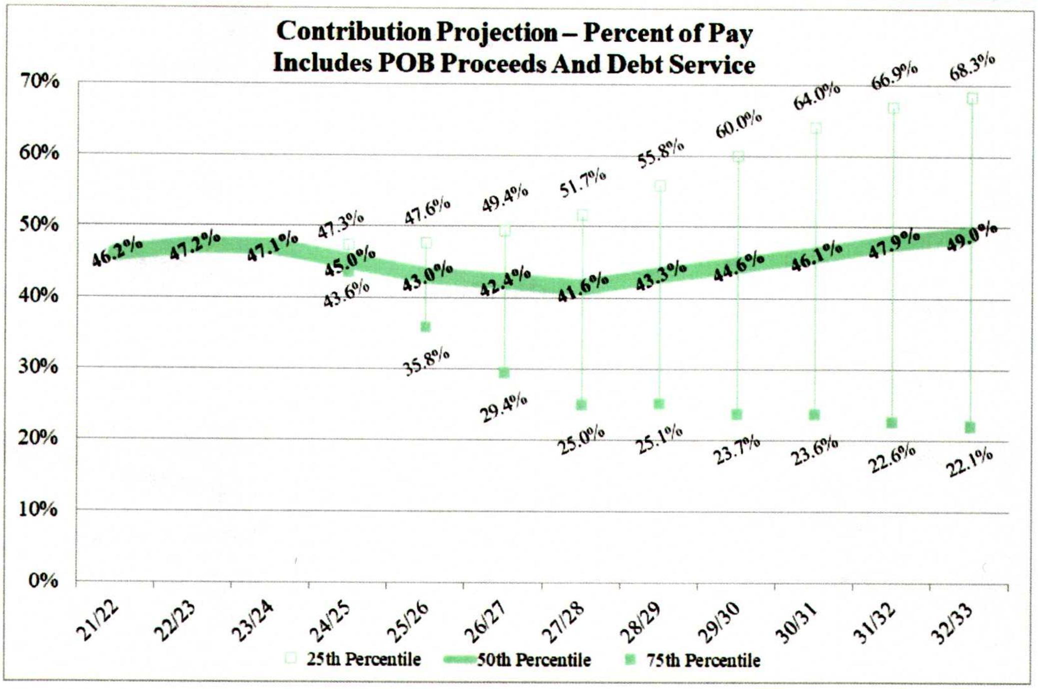
CONTRIBUTION PROJECTIONS - SAFETY



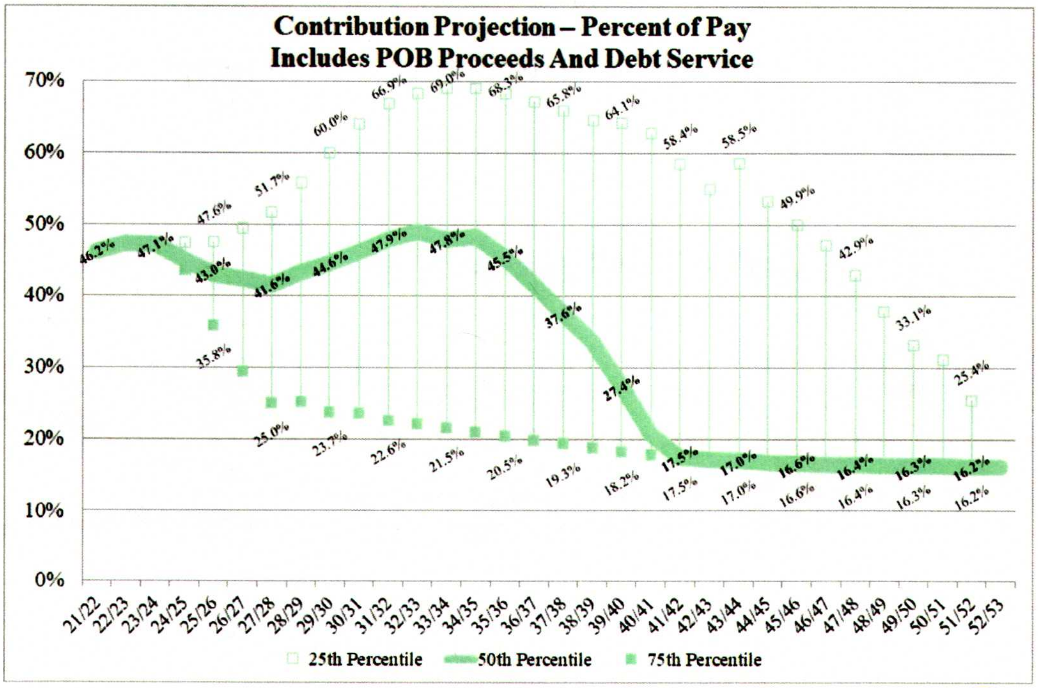
CONTRIBUTION PROJECTIONS - SAFETY



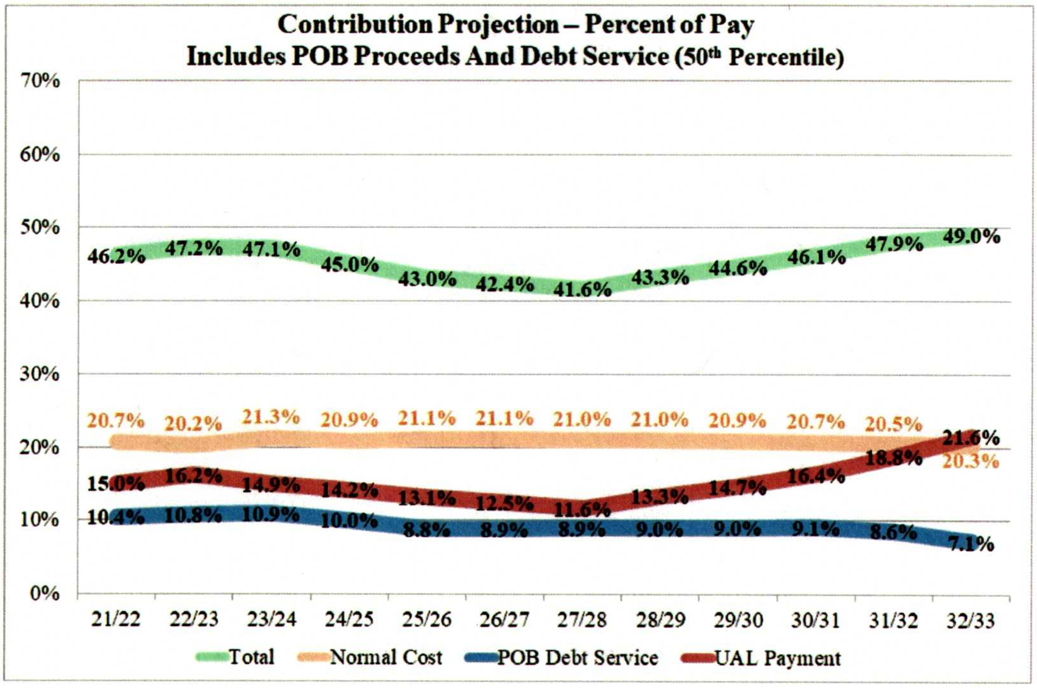
Contribution Projections - Safety



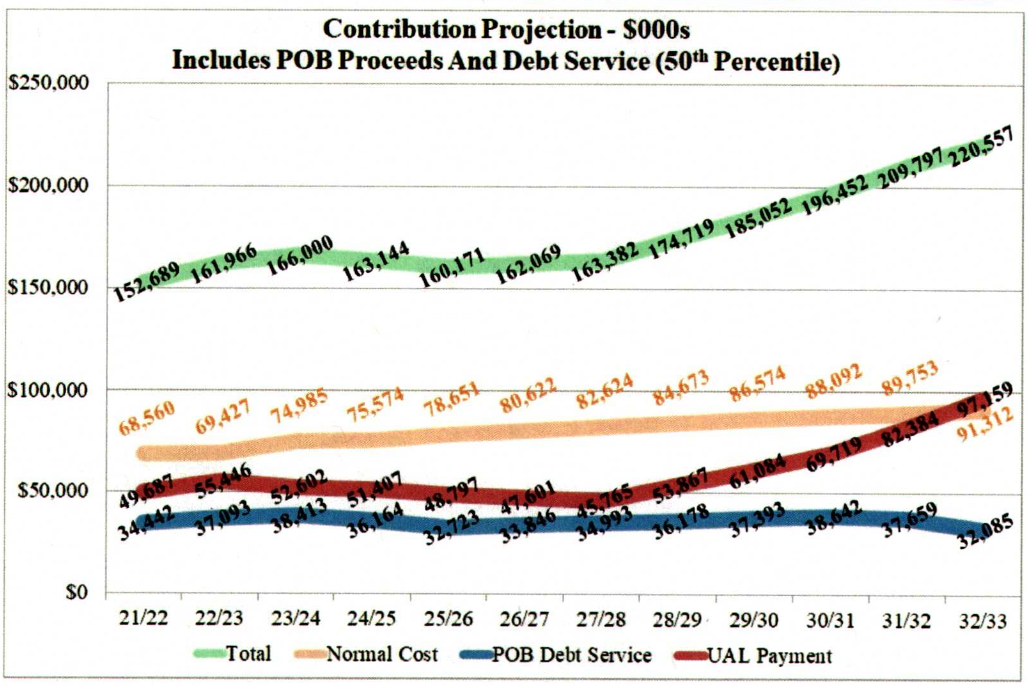
Contribution Projections - Safety



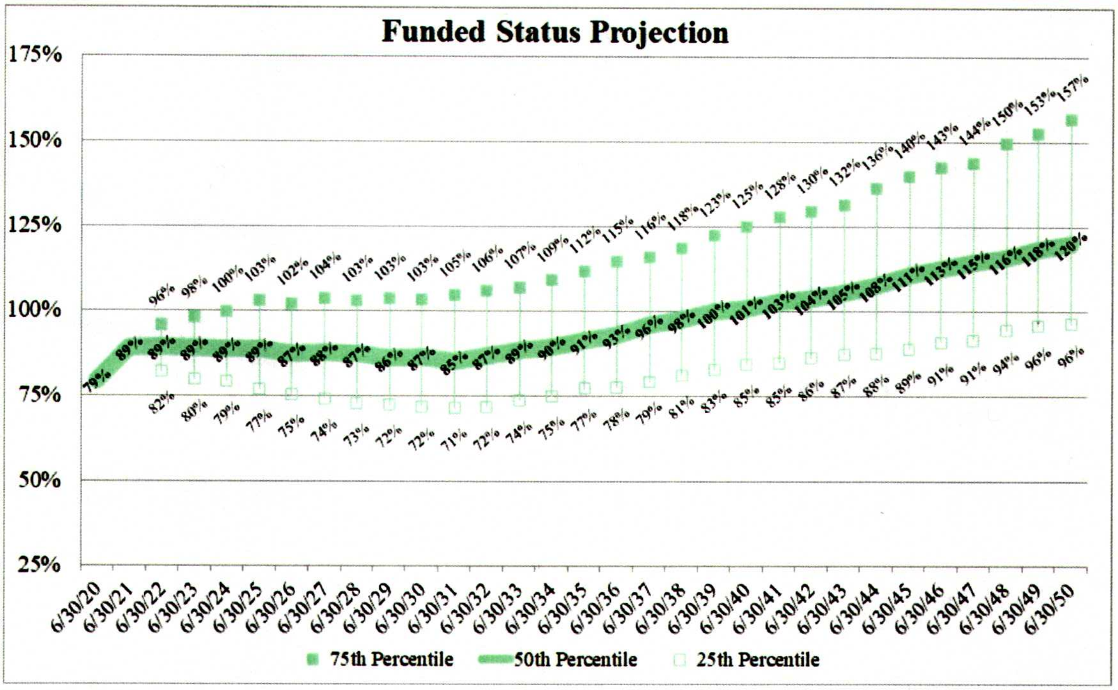
Contribution Projections - Safety



Contribution Projections - Safety



FUNDED STATUS - SAFETY



FUNDED STATUS - SAFETY

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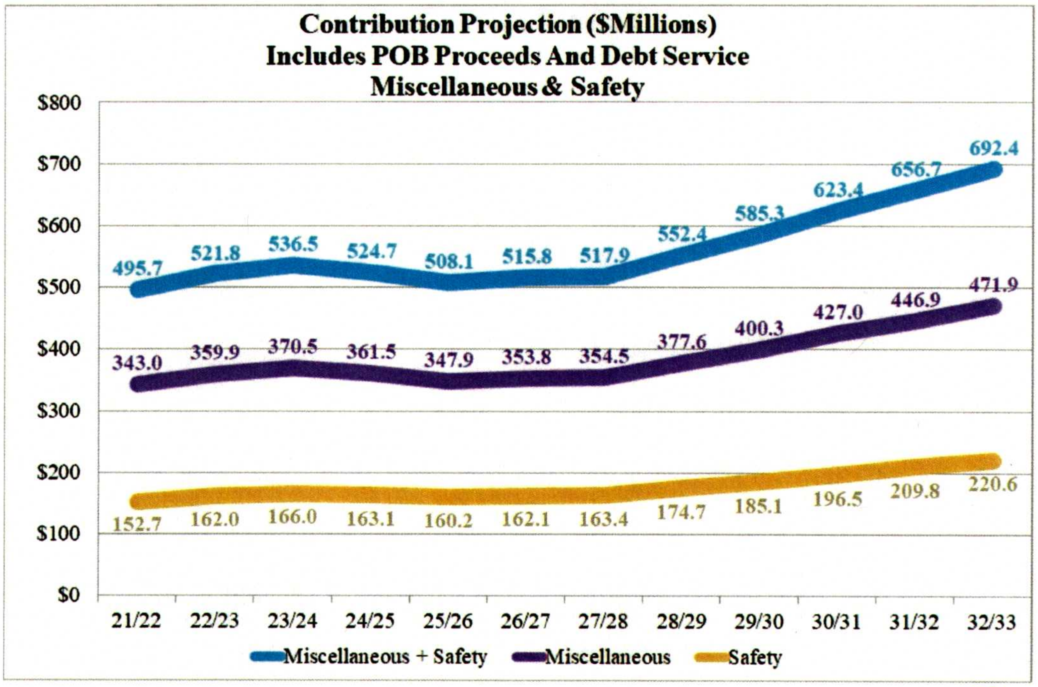
Combined Miscellaneous and Safety



Combined Miscellaneous and Safety

Funded Status Summary on June 30, 2020
(Amounts in $Millions)

	Miscellaneous	Safety	Total
■ AAL	$ 8,993	$ 4,046	$ 13,039
■ Assets	6,746	3,214	9,960
■ Unfunded AAL	2,247	832	3,079
■ Funded Ratio	75.0%	79.4%	76.4%

COMBINED MISCELLANEOUS AND SAFETY

Payroll Projections

($000s)

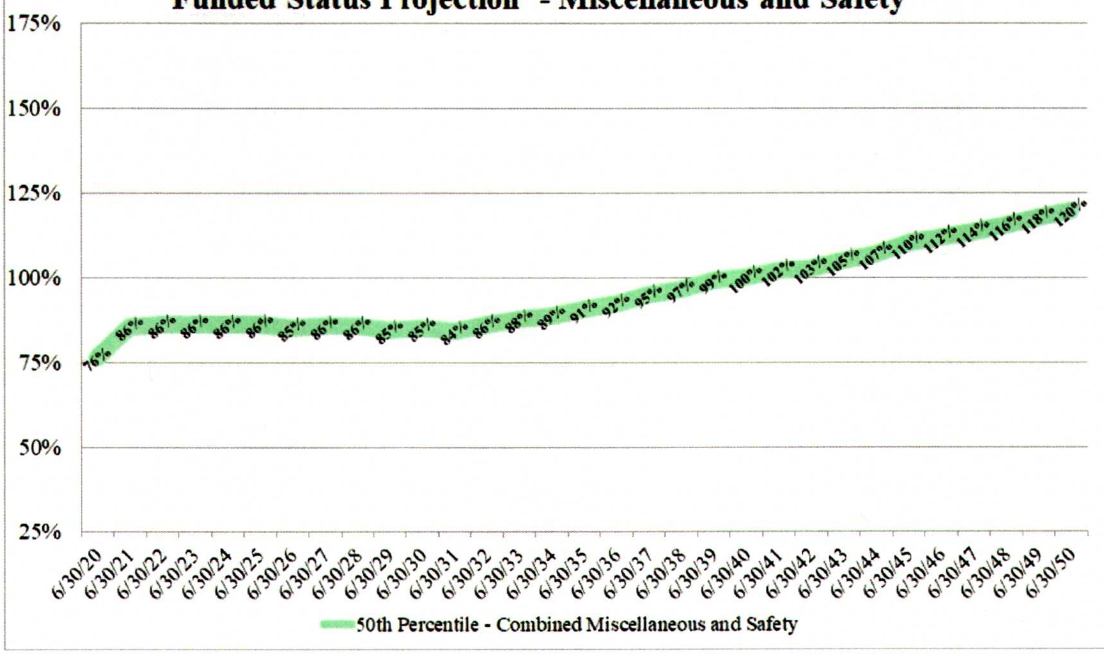
FY	21/22	22/23	23/24	24/25	25/26
Miscellaneous	$1,242,712	$1,283,155	$1,318,441	$1,354,698	$1,391,953
Safety	330,571	343,017	352,450	362,142	372,101
Total	1,573,283	1,626,171	1,670,891	1,716,841	1,764,054

FY	26/27	27/28	28/29	29/30	30/31
Miscellaneous	$1,430,231	$1,469,563	$1,509,976	$1,551,500	$1,594,166
Safety	382,334	392,848	403,651	414,752	426,157
Total	1,812,565	1,862,411	1,913,627	1,966,252	2,020,324

FY	31/32	32/33
Miscellaneous	$1,638,006	$1,683,051
Safety	437,877	449,918
Total	2,075,882	2,132,969

COMBINED MISCELLANEOUS AND SAFETY

Funded Status Projection - Miscellaneous and Safety



LEAVING CALPERS

- Participation in CalPERS is governed by State law and CalPERS rules
- The following are considered "withdrawing" from CalPERS:
  - Exclude new hires from CalPERS & giving them a different pension
  - Stop accruing benefits for current employees
- "Withdrawal" from CalPERS:
  - Treated as plan termination
  - Liability increased for conservative investments
  - Liability increased for future demographic fluctuations
  - Liability must be funded immediately by withdrawing agency
  - Otherwise, retiree benefits are cut

LEAVING CALPERS

CalPERS Termination Estimates on June 30, 2020 (Amounts in Millions)

Discount Rate	**Ongoing Plan 7.00%**	**Termination Basis 0.75%**	**2.50%**
Miscellaneous			
Actuarial Accrued Liability	$ 8,993	$21,556	$15,845
Assets	6,746	6,746	6,746
Unfunded AAL (UAAL)	2,247	14,810	9,099
Safety			
Actuarial Accrued Liability	$ 4,046	$10,327	$7,438
Assets	3,214	3,214	3,214
Unfunded AAL (UAAL)	832	7,113	4,224
Total			
Unfunded AAL (UAAL)	$3,079	$21,923	$13,323
Funded Ratio	76.4%	31.2%	42.8%

2005 POB Proceeds Balance (Millions)

	Safety	Misc.	Total
■ POB @ **2/16/05**	**$ 85.7**	**$ 311.2**	**$ 396.9**
■ Accumulated earnings through 6/30/21	103.7	376.5	480.2
■ Accumulated amortization payments through 6/30/21	(86.8)	(315.2)	(402.0)
■ **Balance @ 6/30/21**	**102.6**	**372.5**	**475.1**
■ Earnings 7/1/21 - 2/15/22[14]	4.4	16.1	20.5
■ Amortization payment through 2/15/22[15]	(4.5)	(16.2)	(20.7)
■ **Balance @ 2/15/22**	**102.6**	**372.3**	**474.9**

[14] Based on assumed return from 7/1/21 to 2/15/22.
[15] Based on a 22 year closed amortization.

2005 POB Outstanding Balance (Millions)

	Payments			
	Principal	Interest	Total	Balance
■ 2/17/05	n/a	n/a	n/a	$400.0
■ 8/15/05	n/a	$9.4	$9.4	400.0
. . . . .				
■ 2/15/2021	$27.7	5.4	33.1	191.1
■ 8/15/2021	0.0	4.7	4.7	191.1
■ 2/15/2022	30.6	4.7	35.3	160.5

2005 POB Net Estimated Gains (Millions)

- Estimated Gains through February 15, 2022:

A. CalPERS Estimated Balance of Bond Proceeds (slide 62)	$ 474.9
B. Outstanding Bond Balance (slide 63)	(160.5)
C. Cash Flow Savings/(Deficit) [Payments that would have been paid to CalPERS less POB debt service]	(87.3)
D. Net [(A) + (B) + (C)]	**227.1**

- Estimated Gains through February 15, 2022:

E. CalPERS Investment Earnings[16]	$ 500.7
F. POB Interest Payments	(270.5)
G. Cost of Issuance	(3.1)
H. Net [(E) + (F) + (G)]	**227.1**

- Above estimates based on market rate of return.

[16] Accumulated earnings since issuance based on actual CalPERS investment return for each year

2020 POB Proceeds Balance (Millions)

	Safety	Misc.	Total
Total issued	**$ 346.3**	**$ 373.7**	**$ 720.0**
Cost of issuance	2.0	2.1	4.1
POB Deposited with CalPERS@ 5/6/20	**$ 344.3**	**$ 371.6**	**$ 715.9**
Accumulated earnings through 6/30/21	73.7	79.6	153.3
Accumulated amortization payments through 6/30/21	(37.0)	(39.9)	(76.9)
Balance @ 6/30/21	**381.0**	**411.2**	**792.2**
Earning 7/1/21 - 2/15/22[17]	16.5	17.8	34.2
Amortization payment through 2/15/22[18]	(22.3)	(24.0)	(46.3)
Balance @ 2/15/22	**375.2**	**404.9**	**780.1**

[17] Based on assumed return from 7/1/21 to 2/15/22.
[18] Based on a 19 year closed level dollar amortization.

2020 POB Outstanding Balance (Millions)

	Payments			
	Principal	**Interest**	**Total**	**Balance**
5/6/2020	n/a	n/a	n/a	$720.0
8/15/2020	n/a	$ 6.4	$ 6.4	720.0
2/15/2021	$29.5	11.6	41.1	690.5
8/15/2021	0.0	11.2	11.2	690.5
2/15/2022	30.9	11.2	42.2	659.5

2020 POB Net Estimated Gains (Millions)

- Estimated Gains through February 15, 2022:

A.	CalPERS Estimated Balance (slide 65)	$780.1
B.	Bond Proceeds Balance (slide 66)	(659.5)
C.	Cash Flow Savings/(Deficit) [Payments that would have been paid to CalPERS less POB debt service]	22.4
D.	**Net [(A) + (B) + (C)]**	**143.0**

- Estimated Gains through February 15, 2022:

E.	CalPERS Investment Earnings	$187.5
F.	POB Interest Payments	(40.4)
G.	Cost of Issuance	(4.1)
H.	**Net [(E) + (F) + (G)]**	**143.0**

- Above estimates based on market rate of return.

NET FUNDED RATIO (MILLIONS)

	Safety 6/30/19	Safety 6/30/20	Safety Proj. 6/30/21	Safety Proj. 6/30/22[19]
(1) AAL	$3,858	$4,046	$4,385	$4,618
(2) MVA	2,743	3,216	3,909	4,159
(3) UAAL [(1) - (2)]	1,115	832	476	460
(4) Funding Ratio [(2)/(1)]	71.1%	79.4%	89.1%	90.0%
(5) POB Balance	$53	$394	$373	$352
(6) Net MVA [(2) - (5)]	2,690	2,820	3,535	3,807
(7) Net Funding Ratio [(6)/(1)]	69.7%	69.7%	80.6%	82.4%

19 Projected 6/30/21 MVA based on assumed returns for 2021/22.

NET FUNDED RATIO (MILLIONS)

	Miscellaneous 6/30/19	Miscellaneous 6/30/20	Miscellaneous Proj. 6/30/21	Miscellaneous Proj. 6/30/22[20]
(1) AAL	$8,603	$8,993	$9,739	$10,260
(2) MVA	6,103	6,746	8,175	8,742
(3) UAAL [(1) - (2)]	2,500	2,247	1,564	1,518
(4) Funding Ratio [(2)/(1)]	70.9%	75.0%	83.9%	85.2%
(5) POB Balance	$191	$545	$508	$468
(6) Net MVA [(2) - (5)]	5,912	6,201	7,666	8,274
(7) Net Funding Ratio [(6)/(1)]	68.7%	69.0%	78.7%	80.6%

20 Projected 6/30/21 MVA based on assumed returns for 2020/21.

NET FUNDED RATIO (MILLIONS)

	Total 6/30/19	6/30/20	Proj. 6/30/21	Proj. 6/30/22[21]
(1) AAL	$12,461	$13,039	$14,124	$14,879
(2) MVA	8,846	9,960	12,083	12,901
(3) UAAL [(1) - (2)]	3,615	3,079	2,041	1,978
(4) Funding Ratio [(2)/(1)]	71.0%	76.4%	85.6%	86.7%
(5) POB Balance	$244	$939	$882	$820
(6) Net MVA [(2) - (5)]	8,602	9,021	11,202	12,080
(7) Net Funding Ratio [(6)/(1)]	69.0%	69.2%	79.3%	81.2%

21 Projected 6/30/21 MVA based on assumed returns for 2020/21.

NET FUNDED RATIO (MILLIONS)

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PEPRA Cost Sharing

- Target of 50% of total normal cost paid by all employees
- *PEPRA members* must pay greater of 50% of total normal cost or bargained amount if higher
- Employer cannot pay any part of *PEPRA member* required employee contributions
- Employer may impose current employees pay 50% of total normal cost (limited to 8% of pay for Miscellaneous and 12% for Safety) if not agreed through collective bargaining
- Miscellaneous Plan 2022/23:

	Classic Members		New Members
	Tier 1 3%@60 FAE1	**Tier 2 2%@60 FAE3**	**PEPRA 2%@62 FAE3**
• Employer Normal Cost	12.8%	10.2%	7.44%
• Member Normal Cost	8.0%	7.0%	7.25%
• Total Normal Cost	20.8%	17.2%	14.69%
• 50% Target	10.4%	8.6%	7.35%

PEPRA Cost Sharing

- Safety Plan 2022/23:

	Classic Members		New Members
	Tier 1 3%@50 FAE1	**Tier 2 3%@55 FAE3**	**PEPRA 2.7%@57 FAE3**
• Employer Normal Cost	22.4%	20.2%	13.43%
• Member Normal Cost	9.0%	9.0%	12.50%
• Total Normal Cost	31.4%	29.2%	25.93%
• 50% Target	15.7%	14.6%	12.97%

- PEPRA Member Contributions:

	2021/22		2022/23			
Group	**Total NC (Basis)**	**Member Rate**	**Total Normal Cost**	**Change**	**Member Rate**	**Method**
Miscellaneous	14.67%	7.25%	14.69%	0.02%	7.25%	PEPRA Members
Safety	24.96%	12.50%	25.93%	0.97%	12.50%	PEPRA Members

Paying Down the Unfunded Liability & Rate Stabilization

- Where do you get the money from?
- How do you use the money?

Where Do You Get the Money From?

- POB:
  - Usually thought of as interest arbitrage between expected earnings and rate paid on POB
  - No guaranteed savings
  - PEPRA prevents contributions from dropping below normal cost
    - Savings offset when investment return is good
  - GFOA Advisory
- Borrow from General Fund similar to State
- One time payments
  - Governing body resolution to use a portion of one time money, e.g.
    - 1/3 to one time projects
    - 1/3 to replenish reserves and
    - 1/3 to pay down unfunded liability

How Do You Use the Money?

- Internal Service Fund
  - Typically used for rate stabilization
  - Restricted investments:
    - Likely low (0.5%-1.0%) investment returns
    - Short term/high quality, designed for preservation of principal
  - Assets can be used by governing body for other purposes
  - Does not reduce Unfunded Liability

How Do You Use the Money?

- Make payments directly to CalPERS:
  - Likely best long-term investment return
  - Must be considered an irrevocable decision
    - Extra payments cannot be used as future "credit"
    - PEPRA prevents contributions from dropping below normal cost
  - Option #1: Request shorter amortization period (Fresh Start):
    - Higher short term payments
    - Less interest and lower long term payments
    - Likely cannot revert to old amortization schedule
      - Savings offset when investment return is good (PEPRA)

How Do You Use the Money?

- Make payments directly to CalPERS (continued):
  - Option #2: Target specific amortization bases:
    - ☐ Extra contribution's impact muted by reduced future contributions
      - ○ CalPERS can't track the "would have been" contribution
    - ☐ No guaranteed savings
      - ○ Larger asset pool means larger loss (or gain) opportunity
    - ☐ Paying off shorter amortization bases: larger contribution savings over shorter period:
      - ○ e.g. 10 year base reduces contribution 11.9¢ for $1
      - ○ Less interest savings vs paying off longer amortization bases
    - ☐ Paying off longer amortization bases: smaller contribution savings over longer period:
      - ○ e.g. 25 year base reduces contribution 6.2¢ for $1
      - ○ More interest savings vs paying off shorter amortization bases
    - ☐ Maintaining the current payment schedule – not letting payments reduce due to extra payment – gives the greatest long-term savings

Irrevocable Supplemental (§115) Pension Trust

- Can only be used to:
  - Reimburse County for CalPERS contributions
  - Make payments directly to CalPERS
- Investments significantly less restricted than County investment funds
  - Fiduciary rules govern Trust investments
  - Usually, designed for long term returns
- Assets don't count for GASB accounting
  - Are considered Employer assets
- Over 100 trusts established, mostly since 2015
  - Trust providers: PARS, PFM, Keenan
  - California Employers' Pension Prefunding Trust (CEPPT) effective July 2019
    - ☐ Strategy 1: 48% stocks / 52% bonds
    - ☐ Strategy 2: 22% stocks / 78% bonds

IRREVOCABLE SUPPLEMENTAL (§115) PENSION TRUST

- More flexibility than paying CalPERS directly
  - County decides if and when and how much money to put into Trust
  - County decides if and when and how much to withdraw to pay CalPERS or reimburse Agency
- Funding strategies typically focus on
  - Reducing the unfunded liability
    - Fund enough to make total CalPERS UAL = 0
    - Make PEPRA required payments from Trust when overfunded
  - Stabilizing contribution rates
    - Mitigate expected contribution rates to better manage budget
  - Combination
    - Use funds for rate stabilization/budget predictability
    - Target increasing fund balance to pay off UAL sooner

IRREVOCABLE SUPPLEMENTAL (§115) PENSION TRUST

- Consider:
  - How much can you put into Trust?
    - Initial seed money?
    - Additional amounts in future years?
  - When do you take money out?
    - Target budget rate?
    - Year target budget rate kicks in?
      - Before or after CalPERS rate exceeds budgeted rate?

Comparison of Options

- **Supplemental Trust**
  - Flexible
  - Likely lower long-term return
  - Investment strategy choice
  - Does not reduce net pension liability for GASB reporting
  - More visible
- **CalPERS**
  - Locked In
  - Likely higher long-term return
  - No investment choice
  - Reduces net pension liability for GASB reporting
  - More restricted

Actuarial Certification

This report presents analysis of the County of Riverside's CalPERS pension plans. The purpose of this report is to provide the County:

- Historical perspective on the plan investment returns, assets, funded status and contributions.
- Projections of likely future contributions and the impact of investment volatility

The calculations and projections in this report are based on information contained in the County's June 30, 2020 and earlier CalPERS actuarial valuation reports. We reviewed this information for reasonableness, but do not make any representation on the accuracy of the CalPERS reports.

Future investment returns and volatility are based on Bartel Associates Capital Market model which results in long term returns summarized on pages 23 and 45.

Future results may differ from our projections due to differences in actual experience as well as changes in plan provisions, CalPERS actuarial assumptions or methodology. Other than variations in investment return, this study does not analyze these.

To the best of our knowledge, this report is complete and accurate and has been conducted using generally accepted actuarial principles and practices. As members of the American Academy of Actuaries meeting the Academy Qualification Standards, we certify the actuarial results and opinions herein.

Respectfully submitted,

Mary Elizabeth Redding

Mary Elizabeth Redding, FSA, EA, FCA, MAAA
Vice President
Bartel Associates, LLC
December 20, 2021

Bianca Lin

Bianca Lin, FSA, EA, FCA, MAAA
Assistant Vice President
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December 20, 2021

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July 2021

Miscellaneous Plan of the County of Riverside (CalPERS ID: 5982690295)
Annual Valuation Report as of June 30, 2020

Dear Employer,

Attached to this letter, you will find the June 30, 2020 actuarial valuation report of your CalPERS pension plan. **Provided in this report is the determination of the minimum required employer contributions for fiscal year 2022-23**. In addition, the report also contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 7.0%, which was adopted by the board in December 2016. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017.

Required Contributions

The table below shows the minimum required employer contributions and the Employee PEPRA Rate for fiscal year 2022-23 along with an estimate of the required contribution for fiscal year 2023-24. Employee contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement you may have with your employees.**

Fiscal Year	Employer Normal Cost Rate	Employer Amortization of Unfunded Accrued Liability	Employee PEPRA Rate
2022-23	10.76%	$157,637,843	7.25%
Projected Results			
2023-24	*10.5%*	*$176,219,000*	*TBD*

The actual investment return for fiscal year 2020-21 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.0%. ***To the extent the actual investment return for fiscal year 2020-21 differs from 7.0%, the actual contribution requirements for fiscal year 2023-24 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through fiscal year *2027-28*.

Changes from Previous Year's Valuations

There are no significant changes in actuarial assumptions or policies in your 2020 actuarial valuation. Your annual valuation report is an important tool for monitoring the health of your CalPERS pension Plan. Your report contains useful information about future required contributions and ways to control your plan's funding progress.

In addition to your annual actuarial report, my office has developed tools for employers to plan, project and protect the retirement benefits of your employees. Pension Outlook is a tool to help plan and budget pension costs into the future with easy to understand results and charts.

You will be able to view the projected funded status and required employer contributions for pension plans in different potential scenarios for up to 30 years into the future — which will make budgeting more predictable. While

Pension Outlook cannot predict the future, it can provide valuable planning information based on a variety of future scenarios that you select.

Pension Outlook can help you answer specific questions about your plans, including:

- When is my plan's funded status expected to increase?
- What happens to my required contributions in a down market?
- How does the discount rate assumption affect my contributions?
- What is the impact of making an additional discretionary payment to my plan?

To get started, visit our Pension Outlook page at www.calpers.ca.gov/page/employers/actuarial-resources/pension-outlook-overview and take the steps to register online.

CalPERS will be completing an Asset Liability Management (ALM) review process in November 2021 that will review the capital market assumptions and the strategic asset allocation and ascertain whether a change in the discount rate and other economic assumptions is warranted. In addition, the Actuarial Office will be completing its Experience Study to review the demographic experience within the pension system and make recommendations to modify future assumptions where appropriate. Any assumption change stemming from these studies will be reflected in the June 30, 2021 actuarial valuation.

Furthermore, this valuation does not reflect any impacts from the COVID-19 pandemic on your pension plan. The impact of COVID-19 on retirement plans is not yet known and CalPERS actuaries will continue to monitor the effects and, where necessary, make future adjustments to actuarial assumptions.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Actuarial Methods and Assumptions." The effects of the changes on the required contributions are included in the "Reconciliation of Required Employer Contributions" section.

Questions

We understand that you might have questions about these results, and your assigned CalPERS actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA
Chief Actuary, CalPERS

CalPERS

Actuarial Valuation as of June 30, 2020

for the Miscellaneous Plan of the County of Riverside

(CalPERS ID: 5982690295)
(Rate Plan ID: 62)

Required Contributions for Fiscal Year July 1, 2022 – June 30, 2023

Table of Contents

Actuarial Certification

To the best of our knowledge, this report is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Miscellaneous Plan of the County of Riverside. This valuation is based on the member and financial data as of June 30, 2020 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. It is our opinion that the valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

KURT SCHNEIDER, MPA, ASA, EA, MAAA
Supervising Pension Actuary, CalPERS

Highlights and Executive Summary

- **Introduction**
- **Purpose of the Report**
- **Required Contributions**
- **Additional Discretionary Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Cost**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2020 actuarial valuation of the Miscellaneous Plan of the County of Riverside of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the minimum required employer contributions for fiscal year 2022-23.

Purpose of the Report

The actuarial valuation was prepared by the CalPERS Actuarial Office using data as of June 30, 2020. The purpose of the report is to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2020;
- Determine the minimum required employer contributions for the fiscal year July 1, 2022 through June 30, 2023;
- Provide actuarial information as of June 30, 2020 to the CalPERS Board of Administration and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for an Agent Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on the CalPERS website (calpers.ca.gov).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The employer should contact their actuary before disseminating any portion of this report for any reason that is not explicitly described above.

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; changes in actuarial policies; and changes in plan provisions or applicable law.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0% and 8.0%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current mortality assumptions adopted in 2017.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

Required Contributions

	Fiscal Year
Required Employer Contribution	**2022-23**
Employer Normal Cost Rate	**10.76%**
Plus, Either	
1) Monthly Employer Dollar UAL Payment	**$13,136,487**
Or	
2) Annual UAL Prepayment Option*	**$152,394,255**
Required PEPRA Member Contribution Rate	**7.25%**

The total minimum required employer contribution is the ***sum*** *of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll) and the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly in dollars).*

** Only the UAL portion of the employer contribution can be prepaid* ***(which must be received in full no later than July 31)****. Any prepayment totaling over $5 million requires a 72-hour notice email to FCSD_public_agency_wires@calpers.ca.gov. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.*

In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.

For additional detail regarding the determination of the required contribution for PEPRA members, see "PEPRA Member Contribution Rates" in the "Liabilities and Contributions" section. Required member contributions for Classic members can be found in Appendix B.

	Fiscal Year 2021-22	Fiscal Year 2022-23
Normal Cost Contribution as a Percentage of Payroll		
Total Normal Cost	18.76%	18.34%
Employee Contribution[1]	7.60%	7.58%
Employer Normal Cost[2]	11.16%	10.76%
Projected Annual Payroll for Contribution Year	$1,242,712,226	$1,283,154,608
Estimated Employer Contributions Based On Projected Payroll		
Total Normal Cost	$233,132,814	$235,330,555
Employee Contribution[1]	94,446,129	97,263,119
Employer Normal Cost[2]	138,686,685	138,067,436
Unfunded Liability Contribution	145,275,743	157,637,843
% of Projected Payroll (illustrative only)	11.69%	12.29%
Estimated Total Employer Contribution	$283,962,428	$295,705,279
% of Projected Payroll (illustrative only)	22.85%	23.05%

[1] For classic members, this is the percentage specified in the Public Employees' Retirement Law, net of any reduction from the use of a modified formula or other factors. For PEPRA members, the member contribution rate is based on 50% of the normal cost. A development of PEPRA member contribution rates can be found in the "Liabilities and Contributions" section. Employee cost sharing is not shown in this report.

[2] The Employer Normal Cost is a blended rate for all benefit groups in the plan. For a breakout of normal cost by benefit group, see "Normal Cost by Benefit Group" in the "Liabilities and Contributions" section.

Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for the 2022-23 fiscal year is $157,637,843. CalPERS allows employers to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Employers can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during fiscal year 2022-23 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

If you are considering making an ADP, please contact your actuary for additional information.

Minimum Required Employer Contribution for Fiscal Year 2022-23

Estimated Normal Cost	Minimum UAL Payment	ADP	Total UAL Contribution	Estimated Total Contribution
$138,067,436	$157,637,843	$0	$157,637,843	$295,705,279

Alternative Fiscal Year 2022-23 Employer Contributions for Greater UAL Reduction

Funding Target	Estimated Normal Cost	Minimum UAL Payment	ADP[1]	Total UAL Contribution	Estimated Total Contribution
20 years	$138,067,436	$157,637,843	$50,644,306	$208,282,149	$346,349,585
15 years	$138,067,436	$157,637,843	$84,628,834	$242,266,677	$380,334,113
10 years	$138,067,436	$157,637,843	$156,524,390	$314,162,233	$452,229,669
5 years	$138,067,436	$157,637,843	$380,517,720	$538,155,563	$676,222,999

[1] The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2022 as determined in the June 30, 2020 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

Plan's Funded Status

	June 30, 2019	June 30, 2020
1. Present Value of Projected Benefits	$10,345,888,989	$10,759,573,772
2. Entry Age Accrued Liability	8,602,935,143	8,992,723,006
3. Market Value of Assets (MVA)	6,103,248,893	6,746,072,475
4. Unfunded Accrued Liability (UAL) [(2) – (3)]	$2,499,686,250	$2,246,650,531
5. Funded Ratio [(3) / (2)]	70.9%	75.0%

This measure of funded status is an assessment of the need for future employer contributions based on the actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. The projected normal cost percentages in the projections below reflect that the normal cost will continue to decline over time as new employees are hired into PEPRA or other lower cost benefit tiers.

	Required Contribution	**Projected Future Employer Contributions (Assumes 7.00% Return for Fiscal Year 2020-21)**				
Fiscal Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**
Normal Cost %	10.76%	10.5%	10.3%	10.1%	9.9%	9.7%
UAL Payment	$157,637,843	$176,219,000	$193,223,000	$203,218,000	$212,615,000	$218,151,000
*Total as a % of Payroll**	*23.05%*	*23.9%*	*24.6%*	*24.7%*	*24.8%*	*24.5%*
Projected Payroll	*$1,283,154,608*	*$1,318,441,360*	*$1,354,698,498*	*$1,391,952,706*	*$1,430,231,405*	*$1,469,562,769*

*Illustrative only and based on the projected payroll shown.

For some sources of UAL, the change in UAL is amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A. This method phases in the impact of the change in UAL over a 5-year period in order to reduce employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section.

Our online pension plan modeling and projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook is a tool to help plan and budget pension costs into the future with results and charts that are easy to understand.

Cost

Actuarial Determination of Pension Plan Cost

Contributions to fund the pension plan are comprised of two components:

- Normal Cost, expressed as a percentage of total active payroll
- Amortization of the Unfunded Accrued Liability (UAL), expressed as a dollar amount

For fiscal years prior to 2017-18, the Amortization of UAL component was expressed as percentage of total active payroll. Starting with fiscal year 2017-18, the Amortization of UAL component is expressed as a dollar amount and invoiced on a monthly basis. There is an option to prepay this amount during July of each fiscal year.

The Normal Cost component is expressed as a percentage of active payroll with employer and employee contributions payable as part of the regular payroll reporting process.

The determination of both components requires complex actuarial calculations. The calculations are based on a set of actuarial assumptions which can be divided into two categories:

- Demographic assumptions (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 5.5% over the 20 years ending June 30, 2020, yet individual fiscal year returns have ranged from -23.6% to +20.7%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2017.

Changes Since the Prior Year's Valuation

Benefits

The standard actuarial practice at CalPERS is to recognize mandated legislative benefit changes in the first annual valuation following the effective date of the legislation. Voluntary benefit changes by plan amendment are generally included in the first valuation that is prepared after the amendment becomes effective, even if the valuation date is prior to the effective date of the amendment.

This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B for a summary of the plan provisions used in this valuation. The effect of any mandated benefit changes or plan amendments on the unfunded liability is shown in the "(Gain)/Loss Analysis" and the effect on the employer contribution is shown in the "Reconciliation of Required Employer Contributions." It should be noted that no change in liability or contribution is shown for any plan changes which were already included in the prior year's valuation.

Actuarial Methods and Assumptions

The are no significant changes to the actuarial methods or assumptions for the 2020 actuarial valuation.

Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2020. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase future required contributions while investment returns above the assumed rate of return will decrease future required contributions.

CalPERS will be completing an Asset Liability Management (ALM) review process in November 2021 that will review the capital market assumptions and the strategic asset allocation and ascertain whether a change in the discount rate and other economic assumptions is warranted. In addition, the Actuarial Office will be completing its Experience Study to review the demographic experience within the pension system and make recommendations to modify future assumptions where appropriate.

Furthermore, this valuation does not reflect any impacts from the COVID-19 pandemic on your pension plan. The impact of COVID-19 on retirement plans is not yet known and CalPERS actuaries will continue to monitor the effects and, where necessary, make future adjustments to actuarial assumptions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 7.0% going forward and that the realized rate of return on assets for fiscal year 2020-21 is 7.0%.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2021. Any subsequent changes or actions are not reflected.

Assets

- **Reconciliation of the Market Value of Assets**
- **Asset Allocation**
- **CalPERS History of Investment Returns**

Reconciliation of the Market Value of Assets

1.	Market Value of Assets as of 6/30/19 including Receivables	$6,103,248,893
2.	Change in Receivables for Service Buybacks	(1,042,279)
3.	Employer Contributions	626,324,060
4.	Employee Contributions	86,128,533
5.	Benefit Payments to Retirees and Beneficiaries	(342,016,242)
6.	Refunds	(8,927,479)
7.	Transfers	31,899
8.	Service Credit Purchase (SCP) Payments and Interest	3,631,434
9.	Administrative Expenses	(4,757,494)
10.	Miscellaneous Adjustments	0
11.	Investment Return (Net of Investment Expenses)	283,451,150
12.	Market Value of Assets as of 6/30/20 including Receivables	$6,746,072,475

Asset Allocation

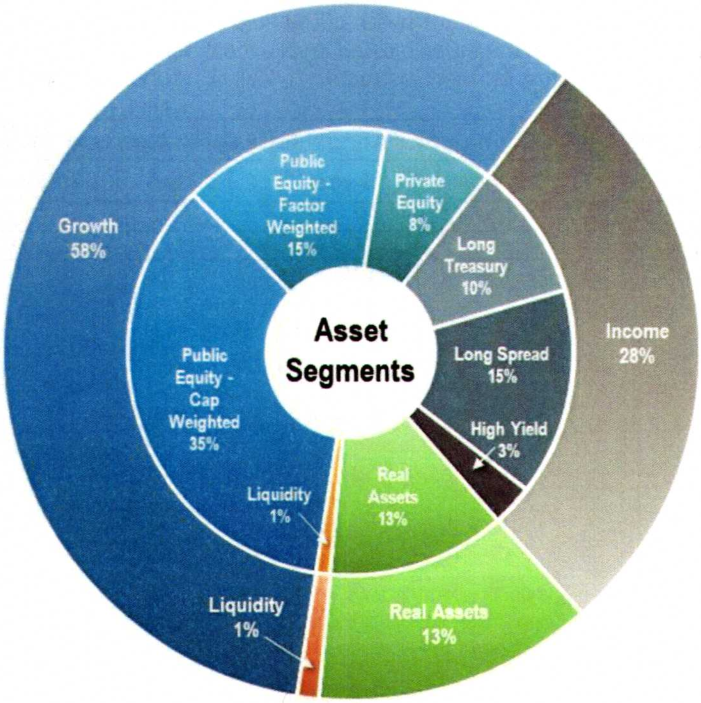
CalPERS adheres to an Asset Allocation Strategy which establishes asset class allocation policy targets and ranges and manages those asset class allocations within their policy ranges. CalPERS Investment Belief No. 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return. On December 19, 2017, the CalPERS Board of Administration adopted changes to the current asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets.

The asset allocation shown below reflect the allocation of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2020. The assets for County of Riverside Miscellaneous Plan are part of the PERF and are invested accordingly.

Asset Class	Actual Allocation	Policy Target Allocation
Public Equity	53.0%	50.0%
Private Equity	6.3%	8.0%
Global Fixed Income	28.3%	28.0%
Real Assets	11.3%	13.0%
Liquidity	0.9%	1.0%
Inflation Sensitive Assets	0.0%	0.0%
Trust Level[1]	0.2%	0.0%
Total Fund	**100.0%**	**100.0%**

[1] Trust Level includes Multi-Asset Class, Completion Overlay, Risk Mitigation, Absolute Return Strategies, Plan Level Transition and other Total Fund level portfolios.

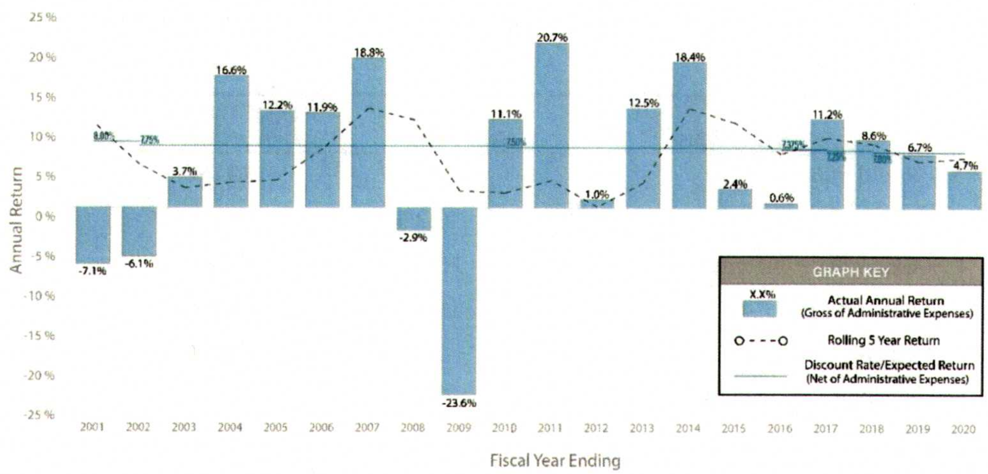
Strategic Asset Allocation Policy Targets



CalPERS History of Investment Returns

The following is a chart with the 20-year historical annual returns of the PERF for each fiscal year ending on June 30. Beginning in 2002, investment returns reported are net of investment expenses and gross of administrative expenses.

History of Investment Returns (2001 - 2020)



The table below shows annualized investment returns of the PERF for various time periods ending on June 30, 2020 (figures reported are net of investment expenses and gross of administrative expenses). These returns are the annual rates that if compounded over the indicated number of years would equate to the actual performance of the PERF. It should be recognized that in any given year the rate of return is volatile. The portfolio has an expected volatility of 11.4% per year based on the most recent Asset Liability Modeling study. The realized volatility is a measure of the risk of the portfolio expressed as the standard deviation of the fund's total monthly return distribution, expressed as an annual percentage. Due to their volatile nature, when looking at investment returns, it is more instructive to look at returns over longer time horizons.

History of CalPERS Compound Annual Rates of Return and Volatilities					
	1 year	**5 year**	**10 year**	**20 year**	**30 year**
Compound Annual Return	4.7%	6.3%	8.5%	5.5%	8.0%
Realized Volatility	–	7.3%	7.1%	8.6%	8.6%

Liabilities and Contributions

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 6/30/19 - 6/30/20**
- **Schedule of Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Reconciliation of Required Employer Contributions**
- **Employer Contribution History**
- **Funding History**
- **Normal Cost by Benefit Group**
- **PEPRA Member Contribution Rates**

Development of Accrued and Unfunded Liabilities

	June 30, 2019	June 30, 2020
1. Present Value of Projected Benefits		
a) Active Members	$5,694,707,271	$5,771,760,582
b) Transferred Members	222,155,350	227,330,641
c) Terminated Members	229,100,940	251,020,488
d) Members and Beneficiaries Receiving Payments	4,199,925,428	4,509,462,061
e) Total	$10,345,888,989	$10,759,573,772
2. Present Value of Future Employer Normal Costs	$989,635,314	$987,271,582
3. Present Value of Future Employee Contributions	$753,318,532	$779,579,184
4. Entry Age Accrued Liability		
a) Active Members [(1a) - (2) - (3)]	$3,951,753,425	$4,004,909,816
b) Transferred Members (1b)	222,155,350	227,330,641
c) Terminated Members (1c)	229,100,940	251,020,488
d) Members and Beneficiaries Receiving Payments (1d)	4,199,925,428	4,509,462,061
e) Total	$8,602,935,143	$8,992,723,006
5. Market Value of Assets (MVA)	$6,103,248,893	$6,746,072,475
6. Unfunded Accrued Liability (UAL) [(4e) - (5)]	$2,499,686,250	$2,246,650,531
7. Funded Ratio [(5) / (4e)]	70.9%	75.0%

(Gain)/Loss Analysis 6/30/19 – 6/30/20

To calculate the cost requirements of the plan, 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 compared to the expected experience based on the actuarial assumptions. This results in actuarial gains or losses, as shown below.

1. Total (Gain)/Loss for the Year	
a) Unfunded Accrued Liability (UAL) as of 6/30/19	$2,499,686,250
b) Expected Payment on the UAL during 2019-20	483,870,982
c) Interest through 6/30/20 [.07 x (1a) - ((1.07)$^{1/2}$ - 1) x (1b)]	158,328,985
d) Expected UAL before all other changes [(1a) - (1b) + (1c)]	2,174,144,253
e) Change due to plan changes	0
f) Change due to AL Significant Increase	0
g) Change due to assumption change	0
h) Change due to method change	0
i) Expected UAL after all other changes [(1d) + (1e) + (1f) + (1g) + (1h)]	2,174,144,253
j) Actual UAL as of 6/30/20	2,246,650,531
k) Total (Gain)/Loss for 2019-20 [(1j) - (1i)]	$72,506,278
2. Contribution (Gain)/Loss for the Year	
a) Expected Contribution (Employer and Employee)	$718,240,872
b) Interest on Expected Contributions	24,713,263
c) Actual Contributions	712,452,593
d) Interest on Actual Contributions	24,514,100
e) Expected Contributions with Interest [(2a) + (2b)]	742,954,135
f) Actual Contributions with Interest [(2c) + (2d)]	736,966,693
g) Contribution (Gain)/Loss [(2e) - (2f)]	$5,987,442
3. Investment (Gain)/Loss for the Year	
a) Market Value of Assets as of 6/30/19	$6,103,248,893
b) Prior Fiscal Year Receivables	(13,452,874)
c) Current Fiscal Year Receivables	12,410,594
d) Contributions Received	712,452,593
e) Benefits and Refunds Paid	(350,943,721)
f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments	3,663,334
g) Expected Return [.07 x (3a + 3b) + ((1.07)$^{1/2}$ - 1) x ((3d) + (3e) + (3f))]	438,850,582
h) Expected Assets as of 6/30/20 [(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]	6,906,229,401
i) Actual Market Value of Assets as of 6/30/20	6,746,072,475
j) Investment (Gain)/Loss [(3h) - (3i)]	$160,156,927
4. Liability (Gain)/Loss for the Year	
a) Total (Gain)/Loss (1j)	$72,506,278
b) Contribution (Gain)/Loss (2g)	5,987,442
c) Investment (Gain)/Loss (3j)	160,156,927
d) Liability (Gain)/Loss [(4a) - (4b) - (4c)]	($93,638,091)
5. Non-Investment (Gain)/Loss for the Year	
a) Contribution (Gain)/Loss (2g)	$5,987,442
b) Liability (Gain)/Loss (4d)	(93,638,091)
c) Non-Investment (Gain)/Loss [(5a) + (5b)]	($87,650,649)

Schedule of Amortization Bases

Below is the schedule of the plan's amortization bases. Note that there is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2020.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: fiscal year 2022-23.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their required employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment on the UAL for a fiscal year is equal to the Expected Employer Contribution for the fiscal year minus the Expected Normal Cost for the year. The Employer Contribution for the first fiscal year is determined by the actuarial valuation two years ago and the contribution for the second year is from the actuarial valuation one year ago. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

Reason for Base	Date Est.	Ramp Level 2022-23	Ramp Shape	Escalation Rate	Amort. Period	Balance 6/30/20	Expected Payment 2020-21	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Minimum Required Payment 2022-23
Fresh Start	6/30/08	No Ramp		2.75%	18	(10,247,299)	(758,043)	(10,180,484)	(778,889)	(10,087,429)	(800,309)
Special (Gain)/Loss	6/30/09	No Ramp		2.75%	19	117,644,970	8,434,601	117,155,299	8,666,553	116,391,418	8,904,883
Golden Handshake	6/30/10	No Ramp		2.75%	1	1,030,880	109,973	989,285	112,998	941,649	974,049
Special (Gain)/Loss	6/30/10	No Ramp		2.75%	20	83,282,672	5,799,374	83,113,540	5,958,857	82,767,598	6,122,726
Special (Gain)/Loss	6/30/11	No Ramp		2.75%	21	(46,233,612)	(3,133,002)	(46,229,162)	(3,219,160)	(46,135,278)	(3,307,686)
Payment (Gain)/Loss	6/30/12	No Ramp		2.75%	22	(70,964,501)	(4,687,974)	(71,082,738)	(4,816,893)	(71,075,897)	(4,949,358)
(Gain)/Loss	6/30/12	No Ramp		2.75%	22	224,756,554	14,847,604	225,131,032	15,255,913	225,109,365	15,675,451
(Gain)/Loss	6/30/13	100%	Up/Down	2.75%	23	651,279,390	44,180,831	651,167,940	45,395,804	649,791,911	46,644,188
Assumption Change	6/30/14	100%	Up/Down	2.75%	14	380,473,467	36,178,919	369,682,845	37,173,839	357,107,726	38,196,120
(Gain)/Loss	6/30/14	100%	Up/Down	2.75%	24	(518,566,320)	(34,291,177)	(519,394,893)	(35,234,184)	(519,306,012)	(36,203,124)
(Gain)/Loss	6/30/15	100%	Up/Down	2.75%	24	488,720,385	25,562,072	496,489,199	33,680,331	496,404,238	34,606,540
(Gain)/Loss	6/30/16	100%	Up/Down	2.75%	24	614,345,319	26,804,544	629,622,655	296,519,196	366,974,400	25,583,412
Assumption Change	6/30/17	80%	Up/Down	2.75%	17	159,488,982	5,815,832	164,637,267	8,963,651	166,889,803	12,280,202
(Gain)/Loss	6/30/17	0%	Up/Down	2.75%	0	(156,180,638)	(4,151,542)	(162,818,894)	(168,421,174)	0	0
Method Change	6/30/18	60%	Up/Down	2.75%	18	68,987,301	1,286,243	72,485,912	2,643,229	74,825,749	4,073,877
Assumption Change	6/30/18	60%	Up/Down	2.75%	18	284,548,078	5,305,294	298,978,605	10,902,379	308,629,599	16,803,292
(Gain)/Loss	6/30/18	0%	Up/Down	2.75%	0	(96,105,953)	(1,312,599)	(101,475,607)	(104,967,184)	0	0
Non-Investment (Gain)/Loss	6/30/19	No Ramp		0.00%	19	(33,806,829)	0	(36,173,307)	(3,300,926)	(35,290,934)	(3,300,926)
Investment (Gain)/Loss	6/30/19	40%	Up Only	0.00%	19	31,691,407	0	33,909,805	741,403	35,516,578	1,482,806

Schedule of Amortization Bases (continued)

Reason for Base	Date Est.	Ramp Level 2022-23	Ramp Shape	Escala-tion Rate	Amort. Period	Balance 6/30/20	Expected Payment 2020-21	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Minimum Required Payment 2022-23
Non-Investment (Gain)/Loss	6/30/20	No Ramp		0.00%	20	(87,650,649)	0	(93,786,194)	0	(100,351,228)	(9,157,359)
Investment (Gain)/Loss	6/30/20	20%	Up Only	0.00%	20	160,156,927	0	171,367,912	0	183,363,666	4,009,059
Total						**2,246,650,531**	**125,990,950**	**2,273,590,017**	**145,275,743**	**2,282,466,922**	**157,637,843**

Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please consult with your plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years, such as:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over a reasonable period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives (continued)

	Current Amortization Schedule		Alternative Schedules: 20 Year Amortization		Alternative Schedules: 15 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2022	2,282,466,922	157,637,843	2,282,466,922	208,282,149	2,282,466,922	242,266,677
6/30/2023	2,279,177,755	176,218,994	2,226,790,876	208,282,149	2,191,637,007	242,266,677
6/30/2024	2,256,437,855	193,223,484	2,167,217,507	208,282,150	2,094,448,998	242,266,677
6/30/2025	2,214,516,581	203,217,893	2,103,474,001	208,282,149	1,990,457,829	242,266,677
6/30/2026	2,159,322,520	212,615,108	2,035,268,451	208,282,150	1,879,187,278	242,266,677
6/30/2027	2,090,544,319	218,151,438	1,962,288,511	208,282,149	1,760,127,788	242,266,677
6/30/2028	2,011,224,816	223,840,016	1,884,199,977	208,282,150	1,632,734,134	242,266,677
6/30/2029	1,920,468,641	229,685,030	1,800,645,244	208,282,149	1,496,422,924	242,266,677
6/30/2030	1,817,313,405	235,690,784	1,711,241,681	208,282,149	1,350,569,929	242,266,676
6/30/2031	1,700,724,901	241,861,697	1,615,579,868	208,282,149	1,194,507,226	242,266,677
6/30/2032	1,569,591,960	238,182,310	1,513,221,729	208,282,150	1,027,520,133	242,266,676
6/30/2033	1,433,085,700	234,126,192	1,403,698,519	208,282,150	848,843,944	242,266,677
6/30/2034	1,291,219,682	229,675,407	1,286,508,684	208,282,150	657,660,421	242,266,677
6/30/2035	1,144,026,970	220,443,040	1,161,115,561	208,282,149	453,094,051	242,266,676
6/30/2036	996,080,804	200,363,640	1,026,944,920	208,282,150	234,208,036	242,266,676
6/30/2037	858,548,701	190,497,340	883,382,333	208,282,149		
6/30/2038	721,595,129	179,945,408	729,770,366	208,282,150		
6/30/2039	585,969,809	168,677,601	565,405,560	208,282,149		
6/30/2040	452,506,229	162,969,540	389,535,219	208,282,149		
6/30/2041	315,604,662	136,204,297	201,353,954	208,282,150		
6/30/2042	196,806,168	93,925,728				
6/30/2043	113,425,071	77,384,359				
6/30/2044	41,317,823	34,371,884				
6/30/2045	8,655,517	8,953,336				
6/30/2046						
6/30/2047						
6/30/2048						
6/30/2049						
6/30/2050						
6/30/2051						
Total		**4,267,862,369**		**4,165,642,989**		**3,634,000,151**
Interest Paid		**1,985,395,447**		**1,883,176,067**		**1,351,533,229**
Estimated Savings				**102,219,380**		**633,862,218**

Reconciliation of Required Employer Contributions

Normal Cost (% of Payroll)

1. For Period 7/1/21 – 6/30/22	
a) Employer Normal Cost	11.16%
b) Employee Contribution	7.60%
c) Total Normal Cost	18.76%
2. Changes since the prior year annual valuation	
a) Effect of demographic experience	(0.42%)
b) Effect of plan changes	0.00%
c) Effect of assumption changes	0.00%
d) Effect of method changes	0.00%
e) Net effect of the changes above [sum of (a) through (d)]	(0.42%)
3. For Period 7/1/22 – 6/30/23	
a) Employer Normal Cost	10.76%
b) Employee Contribution	7.58%
c) Total Normal Cost	18.34%
Employer Normal Cost Change [(3a) – (1a)]	(0.40%)
Employee Contribution Change [(3b) – (1b)]	(0.02%)

Unfunded Liability Contribution ($)

1. For Period 7/1/21 – 6/30/22	145,275,743
2. Changes since the prior year annual valuation	
a) Effect of adjustments to prior year's amortization schedule	0
b) Effect of investment (gain)/loss during prior year[1]	4,009,059
c) Effect of non-investment (gain)/loss during prior year	(9,157,359)
d) Effect of plan changes	0
e) Effect of AL Significant Increase	0
f) Effect of assumption changes	0
g) Changes to prior year amortization payments[2]	17,510,400
h) Effect of changes due to Fresh Start or immediate recognition of small balances	0
i) Effect of elimination of amortization base	0
j) Effect of method change	0
k) Net effect of the changes above [sum of (a) through (j)]	12,362,100
3. For Period 7/1/22 – 6/30/23 [(1) + (2k)]	157,637,843

The amounts shown for the period 7/1/21 – 6/30/22 may be different if a prepayment of unfunded actuarial liability is made or a plan change became effective after the prior year's actuarial valuation was performed.

[1] The unfunded liability contribution for the investment (gain)/loss during the year prior to the valuation date is 20% of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line g) in future years.

[2] Includes scheduled escalation in individual amortization base payments due to the 5-year ramp and payroll growth assumption used in the pre-2019 amortization policy.

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2018 or after June 30, 2020 are not included.

Fiscal Year	Employer Normal Cost	Unfunded Rate	Unfunded Liability Payment ($)	Additional Discretionary Payments
2013 - 14	11.099%	3.902%	N/A	N/A
2014 - 15	10.341%	4.186%	N/A	N/A
2015 - 16	10.376%	5.053%	N/A	N/A
2016 - 17	10.650%	5.826%	N/A	N/A
2017 - 18	10.192%	N/A	73,598,564	N/A
2018 - 19	10.458%	N/A	100,265,926	0
2019 - 20	10.998%	N/A	129,905,894	371,563,461
2020 - 21	11.673%	N/A	155,375,654	
2021 - 22	11.16%	N/A	145,275,743	
2022 - 23	10.76%	N/A	157,637,843	

Funding History

The table below shows the recent history of actuarial accrued liability, market value of assets, unfunded accrued liability, funded ratio and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Market Value of Assets (MVA)	Unfunded Accrued Liability (UAL)	Funded Ratio	Annual Covered Payroll
6/30/2011	$4,461,553,672	$3,525,640,733	$935,912,939	79.0%	$812,362,628
6/30/2012	4,708,881,750	3,520,189,846	1,188,691,904	74.8%	836,418,298
6/30/2013	5,008,806,968	3,974,442,195	1,034,364,773	79.3%	856,593,282
6/30/2014	5,656,121,103	4,682,894,962	973,226,141	82.8%	897,506,714
6/30/2015	6,174,498,346	4,775,099,013	1,399,399,333	77.3%	1,000,223,148
6/30/2016	6,850,143,825	4,799,576,566	2,050,567,259	70.1%	1,090,295,411
6/30/2017	7,441,270,302	5,325,794,759	2,115,475,543	71.6%	1,128,397,500
6/30/2018	8,165,793,889	5,748,832,217	2,416,961,672	70.4%	1,118,711,056
6/30/2019	8,602,935,143	6,103,248,893	2,499,686,250	70.9%	1,145,579,094
6/30/2020	8,992,723,006	6,746,072,475	2,246,650,531	75.0%	1,182,860,410

Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for fiscal year 2022-23. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

Rate Plan Identifier	Benefit Group Name	Total Normal Cost FY 2022-23	Number of Actives	Payroll on 6/30/2020
62	Miscellaneous First Level	17.60%	520	$43,945,254
26035	Miscellaneous PEPRA Level	14.69%	8,001	$440,421,952
30192	Miscellaneous Second Level	21.00%	8,219	$646,561,727
30193	Miscellaneous Third Level	17.22%	727	$51,931,477
	Plan Total	**18.34%**	**17,467**	**$1,182,860,410**

Note that if a Benefit Group above has multiple bargaining units, each of which has separately contracted for different benefits such as Employer Paid Member Contributions, then the Normal Cost split does not reflect those differences. Additionally, if a Second Level Benefit Group amended to the same benefit formula as a First Level Benefit Group, their Normal Costs may be dissimilar due to demographic or other population differences. If you have questions in these situations, please consult with your plan actuary.

PEPRA Member Contribution Rates

The California Public Employees' Pension Reform Act of 2013 ("PEPRA") established new benefit formulas, final compensation period, and contribution requirements for "new" employees (generally those first hired into a CalPERS-covered position on or after January 1, 2013). In accordance with Government Code section 7522.30(b), "new members ... shall have an initial contribution rate of at least 50% of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions and demographics of the plan, particularly members' entry age into the plan. Should the total normal cost of the plan change by more than 1% from the base total normal cost established for the plan, the new member rate shall be 50% of the new normal cost rounded to the nearest quarter percent.

The table below shows the determination of the PEPRA member contribution rates effective July 1, 2022, based on 50% of the Total Normal Cost for each respective plan as of the June 30, 2020 valuation.

		Basis for Current Rate		Rates Effective July 1, 2022			
Rate Plan Identifier	**Benefit Group Name**	**Total Normal Cost**	**Member Rate**	**Total Normal Cost**	**Change**	**Change Needed**	**Member Rate**
26035	Miscellaneous PEPRA Level	14.672%	7.25%	14.69%	0.018%	No	7.25%

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions. For this reason, the PEPRA member contribution rate determined in the table above may not equal 50% of the total normal cost of the PEPRA group shown on the "Normal Cost by Benefit Group" page.

Risk Analysis

- **Future Investment Return Scenarios**
- **Discount Rate Sensitivity**
- **Mortality Rate Sensitivity**
- **Maturity Measures**
- **Maturity Measures History**
- **Hypothetical Termination Liability**

Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2020-21, 2021-22, 2022-23 and 2023-24). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

For fiscal years 2020-21, 2021-22, 2022-23, and 2023-24 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0%, 4.0%, 7.0%, 9.0% and 12.0%.

These alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2024. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5th, 25th, 50th, 75th, and 95th percentiles for these outcomes. For example, of all the four-year outcomes generated in the stochastic analysis, approximately 25% had an average annual return of 4.0% or less.

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0% or greater than 12.0% over a four-year period, the likelihood of a single investment return less than 1.0% or greater than 12.0% in any given year is much greater.

Assumed Annual Return From 2020-21 through 2023-24	**Projected Employer Contributions**			
	2023-24	**2024-25**	**2025-26**	**2026-27**
1.0%				
Normal Cost	10.5%	10.3%	10.1%	9.9%
UAL Contribution	$186,356,000	$223,768,000	$264,560,000	$315,288,000
4.0%				
Normal Cost	10.5%	10.3%	10.1%	9.9%
UAL Contribution	$181,287,000	$208,647,000	$234,505,000	$265,510,000
7.0%				
Normal Cost	10.5%	10.3%	10.1%	9.9%
UAL Contribution	$176,219,000	$193,223,000	$203,218,000	$212,615,000
9.0%				
Normal Cost	10.8%	10.8%	10.9%	11.1%
UAL Contribution	$173,730,000	$186,210,000	$189,474,000	$189,632,000
12.0%				
Normal Cost	10.8%	10.8%	10.9%	11.1%
UAL Contribution	$168,688,000	$170,438,000	$156,553,000	$132,308,000

These projections reflect changes to the amortization policy effective with the June 30, 2019 valuation as wel as the impact of the CalPERS risk mitigation policy (which reduces the discount rate when investment returns exceed specified trigger points). The projected normal cost percentages reflect that normal cost is anticipated to decline over time as new employees are hired into PEPRA or other lower-cost benefit tiers.

Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.50% and 2.50%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2020 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 7.0% as well as alternate discount rates of 6.0% and 8.0%. The rates of 6.0% and 8.0% were selected since they illustrate the impact of a 1.0% increase or decrease to the 7.0% assumption.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2020	1% Lower Real Return Rate	Current Assumptions	1% Higher Real Return Rate
Discount Rate	**6.0%**	**7.0%**	**8.0%**
Inflation	2.5%	2.5%	2.5%
Real Rate of Return	**3.5%**	**4.5%**	**5.5%**
a) Total Normal Cost	23.25%	18.34%	14.64%
b) Accrued Liability	$10,280,656,041	$8,992,723,006	$7,935,582,043
c) Market Value of Assets	$6,746,072,475	$6,746,072,475	$6,746,072,475
d) Unfunded Liability/(Surplus) [(b) - (c)]	$3,534,583,566	$2,246,650,531	$1,189,509,568
e) Funded Status	65.6%	75.0%	85.0%

Sensitivity to the Price Inflation Assumption

As of June 30, 2020	1% Lower Inflation Rate	Current Assumptions	1% Higher Inflation Rate
Discount Rate	**6.0%**	**7.0%**	**8.0%**
Inflation	**1.5%**	**2.5%**	**3.5%**
Real Rate of Return	4.5%	4.5%	4.5%
a) Total Normal Cost	19.66%	18.34%	16.82%
b) Accrued Liability	$9,483,735,419	$8,992,723,006	$8,363,128,568
c) Market Value of Assets	$6,746,072,475	$6,746,072,475	$6,746,072,475
d) Unfunded Liability/(Surplus) [(b) - (c)]	$2,737,662,944	$2,246,650,531	$1,617,056,093
e) Funded Status	71.1%	75.0%	80.7%

Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2020 plan costs and funded status under two different longevity scenarios, namely assuming rates of mortality are 10% lower or 10% higher than our current mortality assumptions. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long term.

As of June 30, 2020	10% Lower Mortality Rates	Current Assumptions	10% Higher Mortality Rates
a) Total Normal Cost	18.63%	18.34%	18.07%
b) Accrued Liability	$9,164,876,894	$8,992,723,006	$8,833,753,175
c) Market Value of Assets	$6,746,072,475	$6,746,072,475	$6,746,072,475
d) Unfunded Liability/(Surplus) [(b) - (c)]	$2,418,804,419	$2,246,650,531	$2,087,680,700
e) Funded Status	73.6%	75.0%	76.4%

Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio increases. A mature plan will often have a ratio above 60%-65%.

Ratio of Retiree Accrued Liability to Total Accrued Liability	**June 30, 2019**	**June 30, 2020**
1. Retiree Accrued Liability	4,199,925,428	4,509,462,061
2. Total Accrued Liability	8,602,935,143	8,992,723,006
3. Ratio of Retiree AL to Total AL [(1) / (2)]	49%	50%

Another measure of the maturity level of CalPERS and its plans is the ratio of actives to retirees, also called Support Ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures, and members retire, the ratio declines. A mature plan will often have a ratio near or below one. The average support ratio for CalPERS public agency plans is 1.25.

Support Ratio	**June 30, 2019**	**June 30, 2020**
1. Number of Actives	17,024	17,467
2. Number of Retirees	12,022	12,557
3. Support Ratio [(1) / (2)]	1.42	1.39

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Asset Volatility Ratio

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have a higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with AVR of 8 may experience twice the contribution volatility due to investment return volatility than a plan with AVR of 4. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as a plan matures.

Liability Volatility Ratio

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR of 8 is expected to have twice the contribution volatility of a plan with LVR of 4 when there is a change in accrued liability, such as when there is a change in actuarial assumptions. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded status approaches 100%.

Maturity Measures (continued)

Contribution Volatility	June 30, 2019	June 30, 2020
1. Market Value of Assets without Receivables	$6,089,796,020	$6,733,661,881
2. Payroll	1,145,579,094	1,182,860,410
3. Asset Volatility Ratio (AVR) [(1) / (2)]	5.3	5.7
4. Accrued Liability	$8,602,935,143	$8,992,723,006
5. Liability Volatility Ratio (LVR) [(4) / (2)]	7.5	7.6

Maturity Measures History

Valuation Date	Ratio of Retiree Accrued Liability to Total Accrued Liability	Support Ratio	Asset Volatility Ratio	Liability Volatility Ratio
6/30/2017	45%	1.58	4.7	6.6
6/30/2018	47%	1.47	5.1	7.3
6/30/2019	49%	1.42	5.3	7.5
6/30/2020	50%	1.39	5.7	7.6

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2020. The plan liability on a termination basis is calculated differently from the plan's ongoing funding liability. For this hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the CalPERS Board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while limiting the funding risk. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate assumption. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 19-month period from 12 months before the valuation date to 7 months after.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] at 0.75%	Funded Status	Unfunded Termination Liability at 0.75%	Hypothetical Termination Liability[1,2] at 2.50%	Funded Status	Unfunded Termination Liability at 2.50%
$6,746,072,475	$21,555,868,429	31.3%	$14,809,795,954	$15,845,303,394	42.6%	$9,099,230,919

[1] The hypothetical liabilities calculated above include a 5% contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

[2] The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 1.18% on June 30, 2020, and was 1.68% on January 31, 2021.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

Plan's Major Benefit Provisions

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group						
Member Category	Misc	Misc	Misc	Misc	Misc	Misc	Misc
Demographics							
Actives	No	No	Yes	No	Yes	Yes	Yes
Transfers/Separated	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Receiving	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit Provision							
Benefit Formula	2% @ 55	2% @ 55	3% @ 60	2% @ 55	3% @ 60	2% @ 62	2% @ 60
Social Security Coverage	Yes	No	Yes	Yes	Yes	Yes	Yes
Full/Modified	Modified	Full	Modified	Modified	Modified	Full	Modified
Employee Contribution Rate			8.00%		8.00%	7.25%	7.00%
Final Average Compensation Period	One Year	One Year	One Year	One Year	One Year	Three Year	Three Year
Sick Leave Credit	No	No	No	No	No	No	No
Non-Industrial Disability	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Industrial Disability	No	No	No	No	No	No	No
Pre-Retirement Death Benefits							
Optional Settlement 2	No	No	No	No	No	No	No
1959 Survivor Benefit Level	No	Indexed	No	No	No	No	No
Special	No	No	No	No	No	No	No
Alternate (firefighters)	No	No	No	No	No	No	No
Post-Retirement Death Benefits							
Lump Sum	$500	$500	$500	$500	$500	$500	$500
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COLA	2%	2%	2%	2%	2%	2%	2%

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group						
Member Category	Misc	Misc	Misc	Misc	Misc	Misc	Misc
Demographics							
Actives	Yes	Yes	No	No	No	No	No
Transfers/Separated	Yes	Yes	Yes	Yes	No	No	No
Receiving	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit Provision							
Benefit Formula	3% @ 60	3% @ 60	3% @ 60	2% @ 55			
Social Security Coverage	Yes	Yes	No	No			
Full/Modified	Modified	Modified	Full	Full			
Employee Contribution Rate	8.00%	8.00%					
Final Average Compensation Period	One Year	One Year	One Year	One Year			
Sick Leave Credit	No	No	No	No			
Non-Industrial Disability	Standard	Standard	Standard	Standard			
Industrial Disability	No	No	No	No			
Pre-Retirement Death Benefits							
Optional Settlement 2	No	No	No	No			
1959 Survivor Benefit Level	No	No	Indexed	Indexed			
Special	No	No	No	No			
Alternate (firefighters)	No	No	No	No			
Post-Retirement Death Benefits							
Lump Sum	$500	$500	$500	$500	$500	$500	$500
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COLA	2%	2%	2%	2%	2%	2%	2%

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group			
Member Category	Misc	Misc	Misc	
Demographics				
Actives	No	No	No	
Transfers/Separated	No	No	No	
Receiving	Yes	Yes	Yes	
Benefit Provision				
Benefit Formula				
Social Security Coverage				
Full/Modified				
Employee Contribution Rate				
Final Average Compensation Period				
Sick Leave Credit				
Non-Industrial Disability				
Industrial Disability				
Pre-Retirement Death Benefits				
Optional Settlement 2				
1959 Survivor Benefit Level				
Special				
Alternate (firefighters)				
Post-Retirement Death Benefits				
Lump Sum	$500	$500	$500	
Survivor Allowance (PRSA)	Yes	Yes	Yes	
COLA	2%	2%	2%	

Appendices

- **Appendix A – Actuarial Methods and Assumptions**
- **Appendix B – Principal Plan Provisions**
- **Appendix C – Participant Data**
- **Appendix D – Glossary of Actuarial Terms**

Appendix A

Actuarial Methods and Assumptions

- **Actuarial Data**
- **Actuarial Methods**
- **Actuarial Assumptions**
- **Miscellaneous**

Actuarial Data

As stated in the Actuarial Certification, the data which serves as the basis of this valuation has been obtained from the various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate. We are unaware of any potential data issues that would have a material effect on the results of this valuation, except that data does not always contain the latest salary information for former members now in reciprocal systems and does not recognize the potential for unusually large salary deviation in certain cases such as elected officials. Therefore, salary information in these cases may not be accurate. These situations are relatively infrequent, however, and generally do not have a material impact on the required employer contributions.

Actuarial Methods

Actuarial Cost Method

The actuarial cost method used is the Entry Age Actuarial Cost Method. Under this method, projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

The actuarial accrued liability for active members is then calculated as the portion of the total cost of the plan allocated to prior years. The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits is equal to the present value of the benefits expected to be paid. No normal costs are applicable for these participants.

CalPERS uses an in-house proprietary actuarial model for calculating pension plan costs. We believe this model is fit for its intended purpose and meets all applicable Actuarial Standards of Practice. Furthermore, the actuarial results of our model are independently confirmed periodically by outside auditing actuaries. The actuarial assumptions used are internally consistent and the generated results reasonable. A further refinement to the actuarial model will be the introduction of generational mortality in the June 30, 2021 actuarial valuation.

Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and a payment toward the UAL. The UAL payment is equal to the sum of individual amortization payments, each representing a different source of UAL for a given measurement period.

Amortization payments are determined according to the CalPERS amortization policy. The CalPERS Board adopted a new policy effective for the June 30, 2019 actuarial valuation. The new policy applies prospectively only; amortization bases (sources of UAL) established prior to the June 30, 2019 valuation will continue to be amortized according to the prior policy.

<u>Prior Policy (Bases Established prior to June 30, 2019)</u>

Amortization payments are determined as a level percentage of payroll whereby the payment increases each year at an escalation rate. Gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. Bases established prior to June 30, 2013 may be amortized differently. A summary is provided in the following table:

Driver	Source (Gain)/Loss: Investment	Source (Gain)/Loss: Non-investment	Source: Assumption/Method Change	Source: Benefit Change	Source: Golden Handshake
Amortization Period	30 Years	30 Years	20 Years	20 Years	5 Years
Escalation Rate - Active Plans - Inactive Plans	 2.75% 0%	 2.75% 0%	 2.75% 0%	 2.75% 0%	 2.75% 0%
Ramp Up	5	5	5	0	0
Ramp Down	5	5	5	0	0

The 5-year ramp up means that the payments in the first four years of the amortization period are 20%, 40%, 60% and 80% of the "full" payment which begins in year five. The 5-year ramp down means that the reverse is true in the final four years of the amortization period.

Current Policy (Bases Established on or after June 30, 2019)

Amortization payments are determined as a level dollar amount. Investment gains or losses are amortized over a fixed 20-year period with a 5-year ramp up at the beginning of the amortization period. Non-investment gains or losses are amortized over a fixed 20-year period with no ramps. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramps. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with no ramps. Changes in unfunded accrued liability due to a Golden Handshake are amortized over a period of five years. A summary is provided in the table below:

	Source (Gain)/Loss: Investment	Source (Gain)/Loss: Non-investment	Source: Assumption/Method Change	Source: Benefit Change	Source: Golden Handshake
Amortization Period	20 Years	20 Years	20 Years	20 Years	5 Years
Escalation Rate	0%	0%	0%	0%	0%
Ramp Up	5	0	0	0	0
Ramp Down	0	0	0	0	0

Exceptions for Inconsistencies

An exception to the amortization rules above is used whenever their application results in inconsistencies. In these cases, a "fresh start" approach is used. This means that the current unfunded actuarial liability is projected and amortized over a set number of years. For example, a fresh start is needed in the following situations:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

It should be noted that the actuary may determine that a fresh start is necessary under other circumstances. In all cases of a fresh start, the period is set by the actuary at what is deemed appropriate; however, the period will not be greater than 20 years.

Exceptions for Plans in Surplus

If a surplus exists (i.e. the Market Value of Assets exceeds the plan's accrued liability) any prior amortization layers shall be considered fully amortized, and the surplus shall not be amortized.

In the event of any subsequent unfunded liability, a Fresh Start shall be used with an amortization period of 20 years or less.

Exceptions for Small Amounts

Where small unfunded liabilities are identified in annual valuations which result in small payment amounts, the actuary may shorten the remaining period for these bases.

- When the balance of a single amortization base has an absolute value less than $250, the amortization period is reduced to one year.
- When the entire unfunded liability is a small amount the actuary may perform a Fresh Start and use an appropriate amortization period.

Exceptions for Inactive Plans

The following exceptions apply to plans classified as Inactive. These plans have no active members and no expectation to have active members in the future.

- Amortization of the unfunded liability is on a "level dollar" basis rather than a "level percent of pay" basis. For amortization layers, which utilize a ramp up and ramp down, the "ultimate" payment is constant.
- Actuarial judgment will be used to shorten amortization periods for Inactive plans with existing periods that are deemed too long given the duration of the liability. The specific demographics of the plan will be used to determine if shorter periods may be more appropriate.

Exceptions for Inactive Agencies

For a public agency with no active members in any CalPERS rate plan, the unfunded liability shall be amortized over a closed amortization period of no more than 15 years.

Asset Valuation Method

The Actuarial Value of Assets is set equal to the market value of assets. Asset values include accounts receivable.

PEPRA Normal Cost Rate Methodology

Per Government Code Section 7522.30(b), the "normal cost rate" shall mean the annual actuarially determined normal cost for the plan of retirement benefits provided to the new member and shall be established based on actuarial assumptions used to determine the liabilities and costs as part of the annual actuarial valuation. The plan of retirement benefits shall include any elements that would impact the actuarial determination of the normal cost, including, but not limited to, the retirement formula, eligibility and vesting criteria, ancillary benefit provisions, and any automatic cost-of-living adjustments as determined by the public retirement system.

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions.

Actuarial Assumptions

In 2017, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In December 2017, the CalPERS Board of Administration adopted relatively modest changes to the asset allocation that reduced the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 7.00%. The Board also approved several changes to the demographic assumptions that more closely aligned with actual experience.

On December 21, 2016, the CalPERS Board of Administration lowered the discount rate from 7.50% to 7.00% using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for fiscal year 2022-23 determined in this valuation were calculated using a discount rate of 7.00%. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate schedule provides a more realistic assumption for the long-term investment return of the fund.

Notwithstanding the Board's decision to phase into a 7.00% discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a change to this discount rate schedule.

For more details and additional rationale for the selection of the actuarial assumptions, please refer to the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017 that can be found on the CalPERS website under: "Forms and Publications". Click on "View All" and search for Experience Study.

All actuarial assumptions (except the discount rates used for the hypothetical termination liability) represent an estimate of future experience rather than observations of the estimates inherent in market data.

Economic Assumptions

Discount Rate

The prescribed discount rate assumption, adopted by the Board on December 21, 2016, is 7.00% compounded annually (net of investment and administrative expenses) as of June 30, 2020.

Termination Liability Discount Rate

The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date.

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 19-month period from 12 months before the valuation date to 7 months after. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 1.18% on June 30, 2020.

Salary Growth

Annual increases vary by category, entry age, and duration of service. A sample of assumed increases are shown below. Wage inflation assumption in the valuation year (2.75% for 2020) is added to these factors for total salary growth.

Public Agency Miscellaneous

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0850	0.0775	0.0650
1	0.0690	0.0635	0.0525
2	0.0560	0.0510	0.0410
3	0.0470	0.0425	0.0335
4	0.0400	0.0355	0.0270
5	0.0340	0.0295	0.0215
10	0.0160	0.0135	0.0090
15	0.0120	0.0100	0.0060
20	0.0090	0.0075	0.0045
25	0.0080	0.0065	0.0040
30	0.0080	0.0065	0.0040

Public Agency Fire

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1700	0.1700	0.1700
1	0.1100	0.1100	0.1100
2	0.0700	0.0700	0.0700
3	0.0580	0.0580	0.0580
4	0.0473	0.0473	0.0473
5	0.0372	0.0372	0.0372
10	0.0165	0.0165	0.0165
15	0.0144	0.0144	0.0144
20	0.0126	0.0126	0.0126
25	0.0111	0.0111	0.0111
30	0.0097	0.0097	0.0097

Public Agency Police

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1027	0.1027	0.1027
1	0.0803	0.0803	0.0803
2	0.0628	0.0628	0.0628
3	0.0491	0.0491	0.0491
4	0.0384	0.0384	0.0384
5	0.0300	0.0300	0.0300
10	0.0145	0.0145	0.0145
15	0.0150	0.0150	0.0150
20	0.0155	0.0155	0.0155
25	0.0160	0.0160	0.0160
30	0.0165	0.0165	0.0165

Salary Growth (continued)

Public Agency County Peace Officers

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1320	0.1320	0.1320
1	0.0960	0.0960	0.0960
2	0.0657	0.0657	0.0657
3	0.0525	0.0525	0.0525
4	0.0419	0.0419	0.0419
5	0.0335	0.0335	0.0335
10	0.0170	0.0170	0.0170
15	0.0150	0.0150	0.0150
20	0.0150	0.0150	0.0150
25	0.0175	0.0175	0.0175
30	0.0200	0.0200	0.0200

Schools

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0428	0.0419	0.0380
1	0.0428	0.0419	0.0380
2	0.0428	0.0419	0.0380
3	0.0354	0.0332	0.0280
4	0.0305	0.0279	0.0224
5	0.0262	0.0234	0.0180
10	0.0171	0.0154	0.0112
15	0.0152	0.0134	0.0098
20	0.0135	0.0117	0.0086
25	0.0120	0.0103	0.0076
30	0.0087	0.0071	0.0048

- The Miscellaneous salary scale is used for Local Prosecutors.
- The Police salary scale is used for Other Safety, Local Sheriff, and School Police.

Overall Payroll Growth

2.75% compounded annually (used in projecting the payroll over which the unfunded liability is amortized). This assumption is used for all plans with active members.

Inflation

2.50% compounded annually.

Non-valued Potential Additional Liabilities

The potential liability loss for a cost-of-living increase exceeding the 2.50% inflation assumption and any potential liability loss from future member service purchases are not reflected in the valuation.

Miscellaneous Loading Factors

Credit for Unused Sick Leave

Total years of service is increased by 1% for those plans that have adopted the provision of providing Credit for Unused Sick Leave.

Conversion of Employer Paid Member Contributions (EPMC)

Total years of service is increased by the Employee Contribution Rate for those plans with the provision providing for the Conversion of Employer Paid Member Contributions (EPMC) during the final compensation period.

Norris Decision (Best Factors)

Employees hired prior to July 1, 1982 have projected benefit amounts increased in order to reflect the use of "Best Factors" in the calculation of optional benefit forms. This is due to a 1983 Supreme Court decision, known as the Norris decision, which required males and females to be treated equally in the determination of benefit amounts. Consequently, anyone already employed at that time is given the best possible conversion factor when optional benefits are determined. No loading is necessary for employees hired after July 1, 1982.

Termination Liability

The termination liabilities include a 5% contingency load. This load is for unforeseen negative experience.

Demographic Assumptions

Pre-Retirement Mortality

Non-industrial death rates vary by age and gender. Industrial death rates vary by age. See sample rates in table below. The non-industrial death rates are used for all plans. The industrial death rates are used for safety plans (except for Local Prosecutor safety members where the corresponding miscellaneous plan does not have the Industrial Death Benefit).

	Non-Industrial Death (Not Job-Related)		Industrial Death (Job-Related)
Age	Male	Female	Male and Female
20	0.00022	0.00007	0.00004
25	0.00029	0.00011	0.00006
30	0.00038	0.00015	0.00007
35	0.00049	0.00027	0.00009
40	0.00064	0.00037	0.00010
45	0.00080	0.00054	0.00012
50	0.00116	0.00079	0.00013
55	0.00172	0.00120	0.00015
60	0.00255	0.00166	0.00016
65	0.00363	0.00233	0.00018
70	0.00623	0.00388	0.00019
75	0.01057	0.00623	0.00021
80	0.01659	0.00939	0.00022

Miscellaneous plans usually have industrial death rates set to zero unless the agency has specifically contracted for industrial death benefits. If so, each non-industrial death rate shown above will be split into two components; 99% will become the non-industrial death rate and 1% will become the industrial death rate.

Post-Retirement Mortality

Rates vary by age, type of retirement, and gender. See sample rates in table below. These rates are used for all plans.

	Healthy Recipients		Non-Industrially Disabled (Not Job-Related)		Industrially Disabled (Job-Related)	
Age	Male	Female	Male	Female	Male	Female
50	0.00372	0.00346	0.01183	0.01083	0.00372	0.00346
55	0.00437	0.00410	0.01613	0.01178	0.00437	0.00410
60	0.00671	0.00476	0.02166	0.01404	0.00671	0.00476
65	0.00928	0.00637	0.02733	0.01757	0.01113	0.00765
70	0.01339	0.00926	0.03358	0.02183	0.01607	0.01111
75	0.02316	0.01635	0.04277	0.02969	0.02779	0.01962
80	0.03977	0.03007	0.06272	0.04641	0.04773	0.03609
85	0.07122	0.05418	0.09793	0.07847	0.08547	0.06501
90	0.13044	0.10089	0.14616	0.13220	0.14348	0.11098
95	0.21658	0.17698	0.21658	0.21015	0.21658	0.17698
100	0.32222	0.28151	0.32222	0.32226	0.32222	0.28151
105	0.46691	0.43491	0.46691	0.43491	0.46691	0.43491
110	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

The post-retirement mortality rates above include 15 years of projected on-going mortality improvement using 90% of Scale MP 2016 published by the Society of Actuaries.

Marital Status

For active members, a percentage who are married upon retirement is assumed according to member category as shown in the following table.

Member Category	Percent Married
Miscellaneous Member	70%
Local Police	85%
Local Fire	90%
Other Local Safety	70%
School Police	85%
Local County Peace Officers	75%

Age of Spouse

It is assumed that female spouses are 3 years younger than male spouses. This assumption is used for all plans.

Terminated Members

It is assumed that terminated members refund immediately if non-vested. Terminated members who are vested are assumed to retire at age 59 for Miscellaneous members and age 54 for safety members.

Termination with Refund

Rates vary by entry age and service for miscellaneous plans. Rates vary by service for safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40	Entry Age 45
0	0.1742	0.1674	0.1606	0.1537	0.1468	0.1400
1	0.1545	0.1477	0.1409	0.1339	0.1271	0.1203
2	0.1348	0.1280	0.1212	0.1142	0.1074	0.1006
3	0.1151	0.1083	0.1015	0.0945	0.0877	0.0809
4	0.0954	0.0886	0.0818	0.0748	0.0680	0.0612
5	0.0212	0.0193	0.0174	0.0155	0.0136	0.0116
10	0.0138	0.0121	0.0104	0.0088	0.0071	0.0055
15	0.0060	0.0051	0.0042	0.0032	0.0023	0.0014
20	0.0037	0.0029	0.0021	0.0013	0.0005	0.0001
25	0.0017	0.0011	0.0005	0.0001	0.0001	0.0001
30	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001
35	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Public Agency Safety

Duration of Service	Fire	Police	County Peace Officer
0	0.1298	0.1013	0.1188
1	0.0674	0.0636	0.0856
2	0.0320	0.0271	0.0617
3	0.0237	0.0258	0.0445
4	0.0087	0.0245	0.0321
5	0.0052	0.0086	0.0121
10	0.0005	0.0053	0.0053
15	0.0004	0.0027	0.0025
20	0.0003	0.0017	0.0012
25	0.0002	0.0012	0.0005
30	0.0002	0.0009	0.0003
35	0.0001	0.0009	0.0002

The police termination and refund rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Schools

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40	Entry Age 45
0	0.2107	0.2107	0.1827	0.1546	0.1375	0.1203
1	0.1807	0.1807	0.1526	0.1246	0.1105	0.0963
2	0.1526	0.1526	0.1259	0.0992	0.0878	0.0765
3	0.1266	0.1266	0.1023	0.0780	0.0691	0.0603
4	0.1026	0.1026	0.0815	0.0605	0.0537	0.0469
5	0.0808	0.0808	0.0634	0.0461	0.0409	0.0358
10	0.0202	0.0202	0.0157	0.0112	0.0087	0.0063
15	0.0107	0.0107	0.0077	0.0048	0.0034	0.0021
20	0.0056	0.0056	0.0037	0.0017	0.0016	0.0016
25	0.0026	0.0026	0.0018	0.0009	0.0012	0.0015
30	0.0013	0.0013	0.0011	0.0009	0.0012	0.0015
35	0.0008	0.0008	0.0009	0.0009	0.0012	0.0015

Termination with Vested Benefits

Rates vary by entry age and service for miscellaneous plans. Rates vary by service for safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40
5	0.0422	0.0422	0.0393	0.0364	0.0344
10	0.0278	0.0278	0.0271	0.0263	0.0215
15	0.0192	0.0192	0.0174	0.0156	0.0120
20	0.0139	0.0139	0.0109	0.0079	0.0047
25	0.0083	0.0083	0.0048	0.0014	0.0007
30	0.0015	0.0015	0.0007	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000

Public Agency Safety

Duration of Service	Fire	Police	County Peace Officer
5	0.0094	0.0163	0.0187
10	0.0064	0.0126	0.0134
15	0.0048	0.0082	0.0092
20	0.0038	0.0065	0.0064
25	0.0026	0.0058	0.0042
30	0.0014	0.0056	0.0022
35	0.0000	0.0000	0.0000

- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.
- The Police termination with vested benefits rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Schools

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40
5	0.0405	0.0405	0.0346	0.0288	0.0264
10	0.0324	0.0324	0.0280	0.0235	0.0211
15	0.0202	0.0202	0.0179	0.0155	0.0126
20	0.0144	0.0144	0.0114	0.0083	0.0042
25	0.0091	0.0091	0.0046	0.0000	0.0000
30	0.0015	0.0015	0.0007	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000

Non-Industrial (Not Job-Related) Disability

Rates vary by age and gender for miscellaneous plans. Rates vary by age and category for safety plans.

	Miscellaneous		Fire	Police	County Peace Officer	Schools	
Age	Male	Female	Male and Female	Male and Female	Male and Female	Male	Female
20	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
25	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
30	0.0002	0.0002	0.0001	0.0002	0.0001	0.0001	0.0002
35	0.0004	0.0007	0.0001	0.0003	0.0004	0.0005	0.0004
40	0.0010	0.0014	0.0001	0.0004	0.0007	0.0012	0.0008
45	0.0015	0.0019	0.0002	0.0005	0.0013	0.0020	0.0017
50	0.0016	0.0020	0.0005	0.0008	0.0018	0.0026	0.0022
55	0.0016	0.0015	0.0007	0.0013	0.0010	0.0025	0.0018
60	0.0015	0.0011	0.0007	0.0020	0.0006	0.0022	0.0011

- The miscellaneous non-industrial disability rates are used for Local Prosecutors.
- The police non-industrial disability rates are also used for Other Safety, Local Sheriff, and School Police.

Industrial (Job-Related) Disability

Rates vary by age and category.

Age	Fire	Police	County Peace Officer
20	0.0001	0.0000	0.0004
25	0.0002	0.0017	0.0013
30	0.0006	0.0048	0.0025
35	0.0012	0.0079	0.0037
40	0.0023	0.0110	0.0051
45	0.0040	0.0141	0.0067
50	0.0208	0.0185	0.0092
55	0.0307	0.0479	0.0151
60	0.0438	0.0602	0.0174

- The police industrial disability rates are also used for Local Sheriff and Other Safety.
- 50% of the police industrial disability rates are used for School Police.
- 1% of the police industrial disability rates are used for Local Prosecutors.
- Normally, rates are zero for miscellaneous plans unless the agency has specifically contracted for industrial disability benefits. If so, each miscellaneous non-industrial disability rate will be split into two components: 50% will become the non-industrial disability rate and 50% will become the industrial disability rate.

Service Retirement

Retirement rates vary by age, service, and formula, except for the safety ½ @ 55 and 2% @ 55 formulas, where retirement rates vary by age only.

Public Agency Miscellaneous 1.5% @ 65

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.011	0.013	0.015	0.017	0.019
51	0.007	0.010	0.012	0.013	0.015	0.017
52	0.010	0.014	0.017	0.019	0.021	0.024
53	0.008	0.012	0.015	0.017	0.019	0.022
54	0.012	0.016	0.019	0.022	0.025	0.028
55	0.018	0.025	0.031	0.035	0.038	0.043
56	0.015	0.021	0.025	0.029	0.032	0.036
57	0.020	0.028	0.033	0.038	0.043	0.048
58	0.024	0.033	0.040	0.046	0.052	0.058
59	0.028	0.039	0.048	0.054	0.060	0.067
60	0.049	0.069	0.083	0.094	0.105	0.118
61	0.062	0.087	0.106	0.120	0.133	0.150
62	0.104	0.146	0.177	0.200	0.223	0.251
63	0.099	0.139	0.169	0.191	0.213	0.239
64	0.097	0.136	0.165	0.186	0.209	0.233
65	0.140	0.197	0.240	0.271	0.302	0.339
66	0.092	0.130	0.157	0.177	0.198	0.222
67	0.129	0.181	0.220	0.249	0.277	0.311
68	0.092	0.129	0.156	0.177	0.197	0.221
69	0.092	0.130	0.158	0.178	0.199	0.224
70	0.103	0.144	0.175	0.198	0.221	0.248

Public Agency Miscellaneous 2% @ 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.020	0.020	0.020	0.020	0.020	0.150
51	0.006	0.019	0.027	0.031	0.035	0.038
52	0.011	0.024	0.031	0.034	0.037	0.040
53	0.010	0.015	0.021	0.027	0.033	0.040
54	0.025	0.025	0.029	0.035	0.041	0.048
55	0.019	0.026	0.033	0.092	0.136	0.146
56	0.030	0.034	0.038	0.060	0.093	0.127
57	0.030	0.046	0.061	0.076	0.090	0.104
58	0.040	0.044	0.059	0.080	0.101	0.122
59	0.024	0.044	0.063	0.083	0.103	0.122
60	0.070	0.074	0.089	0.113	0.137	0.161
61	0.080	0.086	0.093	0.118	0.156	0.195
62	0.100	0.117	0.133	0.190	0.273	0.357
63	0.140	0.157	0.173	0.208	0.255	0.301
64	0.140	0.153	0.165	0.196	0.239	0.283
65	0.140	0.178	0.215	0.264	0.321	0.377
66	0.140	0.178	0.215	0.264	0.321	0.377
67	0.140	0.178	0.215	0.264	0.321	0.377
68	0.112	0.142	0.172	0.211	0.257	0.302
69	0.112	0.142	0.172	0.211	0.257	0.302
70	0.140	0.178	0.215	0.264	0.321	0.377

Service Retirement

Public Agency Miscellaneous 2% @ 55

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.013	0.018	0.021	0.022	0.033
51	0.009	0.016	0.020	0.023	0.026	0.036
52	0.015	0.018	0.020	0.021	0.025	0.030
53	0.016	0.020	0.024	0.028	0.031	0.035
54	0.018	0.022	0.026	0.030	0.034	0.038
55	0.040	0.040	0.056	0.093	0.109	0.154
56	0.034	0.050	0.066	0.092	0.107	0.138
57	0.042	0.048	0.058	0.082	0.096	0.127
58	0.046	0.054	0.062	0.090	0.106	0.131
59	0.045	0.055	0.066	0.097	0.115	0.144
60	0.058	0.075	0.093	0.126	0.143	0.169
61	0.065	0.088	0.111	0.146	0.163	0.189
62	0.136	0.118	0.148	0.190	0.213	0.247
63	0.130	0.133	0.174	0.212	0.249	0.285
64	0.113	0.129	0.165	0.196	0.223	0.249
65	0.145	0.173	0.201	0.233	0.266	0.289
66	0.170	0.199	0.229	0.258	0.284	0.306
67	0.250	0.204	0.233	0.250	0.257	0.287
68	0.227	0.175	0.193	0.215	0.240	0.262
69	0.200	0.180	0.180	0.198	0.228	0.246
70	0.150	0.171	0.192	0.239	0.304	0.330

Public Agency Miscellaneous 2.5% @ 55

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.014	0.020	0.026	0.033	0.050
51	0.008	0.015	0.023	0.030	0.037	0.059
52	0.009	0.016	0.023	0.030	0.037	0.061
53	0.014	0.021	0.028	0.035	0.042	0.063
54	0.014	0.022	0.030	0.039	0.047	0.068
55	0.020	0.038	0.055	0.073	0.122	0.192
56	0.025	0.047	0.069	0.091	0.136	0.196
57	0.030	0.048	0.065	0.083	0.123	0.178
58	0.035	0.054	0.073	0.093	0.112	0.153
59	0.035	0.054	0.073	0.092	0.131	0.183
60	0.044	0.072	0.101	0.130	0.158	0.197
61	0.050	0.078	0.105	0.133	0.161	0.223
62	0.055	0.093	0.130	0.168	0.205	0.268
63	0.090	0.124	0.158	0.192	0.226	0.279
64	0.080	0.112	0.144	0.175	0.207	0.268
65	0.120	0.156	0.193	0.229	0.265	0.333
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Miscellaneous 2.7% @ 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.003	0.010	0.016	0.034	0.033	0.045
51	0.009	0.016	0.023	0.042	0.038	0.047
52	0.015	0.019	0.024	0.040	0.036	0.046
53	0.012	0.020	0.028	0.047	0.046	0.060
54	0.020	0.027	0.035	0.054	0.056	0.073
55	0.033	0.055	0.078	0.113	0.156	0.234
56	0.039	0.067	0.095	0.135	0.169	0.227
57	0.050	0.067	0.084	0.113	0.142	0.198
58	0.043	0.066	0.089	0.124	0.151	0.201
59	0.050	0.070	0.090	0.122	0.158	0.224
60	0.060	0.086	0.112	0.150	0.182	0.238
61	0.071	0.094	0.117	0.153	0.184	0.241
62	0.091	0.122	0.152	0.194	0.226	0.279
63	0.143	0.161	0.179	0.209	0.222	0.250
64	0.116	0.147	0.178	0.221	0.254	0.308
65	0.140	0.174	0.208	0.254	0.306	0.389
66	0.170	0.209	0.247	0.298	0.310	0.324
67	0.170	0.199	0.228	0.269	0.296	0.342
68	0.150	0.181	0.212	0.255	0.287	0.339
69	0.150	0.181	0.212	0.255	0.287	0.339
70	0.150	0.181	0.212	0.243	0.291	0.350

Public Agency Miscellaneous 3% @ 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.013	0.019	0.026	0.042	0.038	0.064
51	0.035	0.037	0.039	0.052	0.047	0.062
52	0.023	0.030	0.038	0.055	0.051	0.056
53	0.025	0.032	0.040	0.057	0.056	0.066
54	0.035	0.042	0.050	0.067	0.066	0.076
55	0.040	0.052	0.064	0.085	0.095	0.120
56	0.043	0.056	0.070	0.094	0.102	0.150
57	0.045	0.060	0.074	0.099	0.109	0.131
58	0.053	0.056	0.059	0.099	0.126	0.185
59	0.050	0.068	0.085	0.113	0.144	0.202
60	0.089	0.106	0.123	0.180	0.226	0.316
61	0.100	0.117	0.133	0.212	0.230	0.298
62	0.130	0.155	0.180	0.248	0.282	0.335
63	0.120	0.163	0.206	0.270	0.268	0.352
64	0.150	0.150	0.150	0.215	0.277	0.300
65	0.200	0.242	0.283	0.330	0.300	0.342
66	0.220	0.264	0.308	0.352	0.379	0.394
67	0.250	0.279	0.309	0.338	0.371	0.406
68	0.170	0.196	0.223	0.249	0.290	0.340
69	0.220	0.261	0.302	0.344	0.378	0.408
70	0.220	0.255	0.291	0.326	0.358	0.388

Service Retirement

Public Agency Miscellaneous 2% @ 62						
	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000
52	0.005	0.008	0.012	0.015	0.019	0.031
53	0.007	0.011	0.014	0.018	0.021	0.032
54	0.007	0.011	0.015	0.019	0.023	0.034
55	0.010	0.019	0.028	0.036	0.061	0.096
56	0.014	0.026	0.038	0.050	0.075	0.108
57	0.018	0.029	0.039	0.050	0.074	0.107
58	0.023	0.035	0.048	0.060	0.073	0.099
59	0.025	0.038	0.051	0.065	0.092	0.128
60	0.031	0.051	0.071	0.091	0.111	0.138
61	0.038	0.058	0.079	0.100	0.121	0.167
62	0.044	0.074	0.104	0.134	0.164	0.214
63	0.077	0.105	0.134	0.163	0.192	0.237
64	0.072	0.101	0.129	0.158	0.187	0.242
65	0.108	0.141	0.173	0.206	0.239	0.300
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Fire ½ @ 55 and 2% @ 55			
Age	Rate	Age	Rate
50	0.0159	56	0.1108
51	0.0000	57	0.0000
52	0.0344	58	0.0950
53	0.0199	59	0.0441
54	0.0413	60	1.00000
55	0.0751		

Public Agency Police ½ @ 55 and 2% @ 55			
Age	Rate	Age	Rate
50	0.0255	56	0.0692
51	0.0000	57	0.0511
52	0.0164	58	0.0724
53	0.0272	59	0.0704
54	0.0095	60	0.3000
55	0.1667		

Service Retirement

Public Agency Police 2% @ 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.040	0.040	0.040	0.040	0.058	0.094
52	0.040	0.040	0.040	0.040	0.061	0.087
53	0.040	0.040	0.040	0.040	0.082	0.123
54	0.040	0.040	0.040	0.046	0.098	0.158
55	0.072	0.072	0.072	0.096	0.141	0.255
56	0.066	0.066	0.066	0.088	0.129	0.228
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.080	0.080	0.080	0.088	0.138	0.228
59	0.080	0.080	0.080	0.092	0.140	0.228
60	0.150	0.150	0.150	0.150	0.150	0.228
61	0.144	0.144	0.144	0.144	0.144	0.170
62	0.150	0.150	0.150	0.150	0.150	0.213
63	0.150	0.150	0.150	0.150	0.150	0.213
64	0.150	0.150	0.150	0.150	0.150	0.319
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% @ 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.009	0.009	0.009	0.009	0.013	0.020
51	0.013	0.013	0.013	0.013	0.020	0.029
52	0.018	0.018	0.018	0.018	0.028	0.042
53	0.052	0.052	0.052	0.052	0.079	0.119
54	0.067	0.067	0.067	0.067	0.103	0.154
55	0.089	0.089	0.089	0.089	0.136	0.204
56	0.083	0.083	0.083	0.083	0.127	0.190
57	0.082	0.082	0.082	0.082	0.126	0.189
58	0.088	0.088	0.088	0.088	0.136	0.204
59	0.074	0.074	0.074	0.074	0.113	0.170
60	0.100	0.100	0.100	0.100	0.154	0.230
61	0.072	0.072	0.072	0.072	0.110	0.165
62	0.099	0.099	0.099	0.099	0.152	0.228
63	0.114	0.114	0.114	0.114	0.175	0.262
64	0.114	0.114	0.114	0.114	0.175	0.262
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% @ 55

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.035	0.035	0.035	0.035	0.070	0.090
51	0.028	0.028	0.028	0.029	0.065	0.101
52	0.032	0.032	0.032	0.039	0.066	0.109
53	0.028	0.028	0.028	0.043	0.075	0.132
54	0.038	0.038	0.038	0.074	0.118	0.333
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% @ 55

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.001	0.001	0.001	0.006	0.016	0.069
51	0.002	0.002	0.002	0.006	0.018	0.071
52	0.012	0.012	0.012	0.021	0.040	0.098
53	0.032	0.032	0.032	0.049	0.085	0.149
54	0.057	0.057	0.057	0.087	0.144	0.217
55	0.073	0.073	0.073	0.109	0.179	0.259
56	0.064	0.064	0.064	0.097	0.161	0.238
57	0.063	0.063	0.063	0.095	0.157	0.233
58	0.065	0.065	0.065	0.099	0.163	0.241
59	0.088	0.088	0.088	0.131	0.213	0.299
60	0.105	0.105	0.105	0.155	0.251	0.344
61	0.118	0.118	0.118	0.175	0.282	0.380
62	0.087	0.087	0.087	0.128	0.210	0.295
63	0.067	0.067	0.067	0.100	0.165	0.243
64	0.067	0.067	0.067	0.100	0.165	0.243
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% @ 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.100	0.155	0.400
51	0.040	0.040	0.040	0.090	0.140	0.380
52	0.040	0.040	0.040	0.070	0.115	0.350
53	0.040	0.040	0.040	0.080	0.135	0.350
54	0.040	0.040	0.040	0.090	0.145	0.350
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% @ 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.020	0.020	0.020	0.040	0.130	0.192
51	0.008	0.008	0.008	0.023	0.107	0.164
52	0.023	0.023	0.023	0.043	0.136	0.198
53	0.023	0.023	0.023	0.043	0.135	0.198
54	0.027	0.027	0.027	0.048	0.143	0.207
55	0.043	0.043	0.043	0.070	0.174	0.244
56	0.053	0.053	0.053	0.085	0.196	0.269
57	0.054	0.054	0.054	0.086	0.197	0.271
58	0.052	0.052	0.052	0.084	0.193	0.268
59	0.075	0.075	0.075	0.116	0.239	0.321
60	0.065	0.065	0.065	0.102	0.219	0.298
61	0.076	0.076	0.076	0.117	0.241	0.324
62	0.068	0.068	0.068	0.106	0.224	0.304
63	0.027	0.027	0.027	0.049	0.143	0.208
64	0.094	0.094	0.094	0.143	0.277	0.366
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2% @ 57

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.040	0.040	0.040	0.040	0.040	0.080
51	0.028	0.028	0.028	0.028	0.040	0.066
52	0.028	0.028	0.028	0.028	0.043	0.061
53	0.028	0.028	0.028	0.028	0.057	0.086
54	0.028	0.028	0.028	0.032	0.069	0.110
55	0.050	0.050	0.050	0.067	0.099	0.179
56	0.046	0.046	0.046	0.062	0.090	0.160
57	0.054	0.054	0.054	0.072	0.106	0.191
58	0.060	0.060	0.060	0.066	0.103	0.171
59	0.060	0.060	0.060	0.069	0.105	0.171
60	0.113	0.113	0.113	0.113	0.113	0.171
61	0.108	0.108	0.108	0.108	0.108	0.128
62	0.113	0.113	0.113	0.113	0.113	0.159
63	0.113	0.113	0.113	0.113	0.113	0.159
64	0.113	0.113	0.113	0.113	0.113	0.239
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% @ 57

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.005	0.005	0.005	0.005	0.008	0.012
51	0.006	0.006	0.006	0.006	0.009	0.013
52	0.012	0.012	0.012	0.012	0.019	0.028
53	0.033	0.033	0.033	0.033	0.050	0.075
54	0.045	0.045	0.045	0.045	0.069	0.103
55	0.061	0.061	0.061	0.061	0.094	0.140
56	0.055	0.055	0.055	0.055	0.084	0.126
57	0.081	0.081	0.081	0.081	0.125	0.187
58	0.059	0.059	0.059	0.059	0.091	0.137
59	0.055	0.055	0.055	0.055	0.084	0.126
60	0.085	0.085	0.085	0.085	0.131	0.196
61	0.085	0.085	0.085	0.085	0.131	0.196
62	0.085	0.085	0.085	0.085	0.131	0.196
63	0.085	0.085	0.085	0.085	0.131	0.196
64	0.085	0.085	0.085	0.085	0.131	0.196
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.5% @ 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.038	0.038	0.038	0.038	0.055	0.089
52	0.038	0.038	0.038	0.038	0.058	0.082
53	0.036	0.036	0.036	0.036	0.073	0.111
54	0.036	0.036	0.036	0.041	0.088	0.142
55	0.061	0.061	0.061	0.082	0.120	0.217
56	0.056	0.056	0.056	0.075	0.110	0.194
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.072	0.072	0.072	0.079	0.124	0.205
59	0.072	0.072	0.072	0.083	0.126	0.205
60	0.135	0.135	0.135	0.135	0.135	0.205
61	0.130	0.130	0.130	0.130	0.130	0.153
62	0.135	0.135	0.135	0.135	0.135	0.191
63	0.135	0.135	0.135	0.135	0.135	0.191
64	0.135	0.135	0.135	0.135	0.135	0.287
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.5% @ 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.007	0.007	0.007	0.007	0.010	0.015
51	0.008	0.008	0.008	0.008	0.012	0.018
52	0.016	0.016	0.016	0.016	0.025	0.038
53	0.042	0.042	0.042	0.042	0.064	0.096
54	0.057	0.057	0.057	0.057	0.088	0.132
55	0.074	0.074	0.074	0.074	0.114	0.170
56	0.066	0.066	0.066	0.066	0.102	0.153
57	0.090	0.090	0.090	0.090	0.139	0.208
58	0.071	0.071	0.071	0.071	0.110	0.164
59	0.066	0.066	0.066	0.066	0.101	0.151
60	0.102	0.102	0.102	0.102	0.157	0.235
61	0.102	0.102	0.102	0.102	0.157	0.236
62	0.102	0.102	0.102	0.102	0.157	0.236
63	0.102	0.102	0.102	0.102	0.157	0.236
64	0.102	0.102	0.102	0.102	0.157	0.236
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.7% @ 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.0500	0.0500	0.0500	0.0500	0.0500	0.1000
51	0.0400	0.0400	0.0400	0.0400	0.0575	0.0942
52	0.0380	0.0380	0.0380	0.0380	0.0580	0.0825
53	0.0380	0.0380	0.0380	0.0380	0.0774	0.1169
54	0.0380	0.0380	0.0380	0.0437	0.0931	0.1497
55	0.0684	0.0684	0.0684	0.0912	0.1340	0.2423
56	0.0627	0.0627	0.0627	0.0836	0.1228	0.2168
57	0.0600	0.0600	0.0600	0.0800	0.1175	0.2125
58	0.0800	0.0800	0.0800	0.0880	0.1375	0.2275
59	0.0800	0.0800	0.0800	0.0920	0.1400	0.2275
60	0.1500	0.1500	0.1500	0.1500	0.1500	0.2275
61	0.1440	0.1440	0.1440	0.1440	0.1440	0.1700
62	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
63	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
64	0.1500	0.1500	0.1500	0.1500	0.1500	0.3188
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.7% @ 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.0065	0.0065	0.0065	0.0065	0.0101	0.0151
51	0.0081	0.0081	0.0081	0.0081	0.0125	0.0187
52	0.0164	0.0164	0.0164	0.0164	0.0254	0.0380
53	0.0442	0.0442	0.0442	0.0442	0.0680	0.1018
54	0.0606	0.0606	0.0606	0.0606	0.0934	0.1397
55	0.0825	0.0825	0.0825	0.0825	0.1269	0.1900
56	0.0740	0.0740	0.0740	0.0740	0.1140	0.1706
57	0.0901	0.0901	0.0901	0.0901	0.1387	0.2077
58	0.0790	0.0790	0.0790	0.0790	0.1217	0.1821
59	0.0729	0.0729	0.0729	0.0729	0.1123	0.1681
60	0.1135	0.1135	0.1135	0.1135	0.1747	0.2615
61	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
62	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
63	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
64	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Service Retirement

Schools 2% @ 55

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.004	0.007	0.011	0.012	0.013	0.015
51	0.004	0.008	0.011	0.014	0.016	0.017
52	0.005	0.010	0.014	0.016	0.018	0.021
53	0.006	0.012	0.016	0.020	0.022	0.025
54	0.008	0.017	0.023	0.027	0.031	0.034
55	0.021	0.042	0.058	0.069	0.077	0.086
56	0.019	0.037	0.053	0.062	0.069	0.078
57	0.019	0.038	0.054	0.064	0.071	0.079
58	0.022	0.045	0.062	0.074	0.082	0.092
59	0.025	0.049	0.069	0.082	0.090	0.101
60	0.033	0.066	0.092	0.109	0.121	0.135
61	0.037	0.072	0.101	0.119	0.133	0.149
62	0.066	0.131	0.184	0.218	0.242	0.271
63	0.064	0.126	0.178	0.209	0.233	0.261
64	0.059	0.117	0.163	0.193	0.215	0.240
65	0.080	0.158	0.221	0.261	0.291	0.326
66	0.081	0.160	0.224	0.265	0.296	0.330
67	0.070	0.139	0.194	0.229	0.255	0.286
68	0.063	0.124	0.173	0.205	0.228	0.255
69	0.066	0.130	0.183	0.216	0.241	0.270
70	0.071	0.140	0.196	0.231	0.258	0.289

Miscellaneous

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. Each year the impact of any changes in this limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. This results in lower contributions for those employers contributing to the Replacement Benefit Fund and protects CalPERS from prefunding expected benefits in excess of limits imposed by federal tax law. The Section 415(b) dollar limit for the 2020 calendar year is $230,000.

Internal Revenue Code Section 401(a)(17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a)(17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2020 calendar year is $285,000.

Appendix B

Principal Plan Provisions

The following is a description of the principal plan provisions used in calculating costs and liabilities. We have indicated whether a plan provision is standard or optional. Standard benefits are applicable to all members while optional benefits vary among employers. Optional benefits that apply to a single period of time, such as Golden Handshakes, have not been included. Many of the statements in this summary are general in nature, and are intended to provide an easily understood summary of the Public Employees' Retirement Law. The law itself governs in all situations.

Service Retirement

Eligibility

A classic CalPERS member or PEPRA Safety member becomes eligible for Service Retirement upon attainment of age 50 with at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). For employees hired into a plan with the 1.5% at age 65 formula, eligibility for service retirement is age 55 with at least 5 years of service. PEPRA miscellaneous members become eligible for service retirement upon attainment of age 52 with at least 5 years of service.

Benefit

The service retirement benefit is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*.

- The *benefit factor* depends on the benefit formula specified in your agency's contract. The table below shows the factors for each of the available formulas. Factors vary by the member's age at retirement. Listed are the factors for retirement at whole year ages:

<u>Miscellaneous Plan Formulas</u>

Retirement Age	1.5% at 65	2% at 60	2% at 55	2.5% at 55	2.7% at 55	3% at 60	PEPRA 2% at 62
50	0.5000%	1.092%	1.426%	2.000%	2.000%	2.000%	N/A
51	0.5667%	1.156%	1.522%	2.100%	2.140%	2.100%	N/A
52	0.6334%	1.224%	1.628%	2.200%	2.280%	2.200%	1.000%
53	0.7000%	1.296%	1.742%	2.300%	2.420%	2.300%	1.100%
54	0.7667%	1.376%	1.866%	2.400%	2.560%	2.400%	1.200%
55	0.8334%	1.460%	2.000%	2.500%	2.700%	2.500%	1.300%
56	0.9000%	1.552%	2.052%	2.500%	2.700%	2.600%	1.400%
57	0.9667%	1.650%	2.104%	2.500%	2.700%	2.700%	1.500%
58	1.0334%	1.758%	2.156%	2.500%	2.700%	2.800%	1.600%
59	1.1000%	1.874%	2.210%	2.500%	2.700%	2.900%	1.700%
60	1.1667%	2.000%	2.262%	2.500%	2.700%	3.000%	1.800%
61	1.2334%	2.134%	2.314%	2.500%	2.700%	3.000%	1.900%
62	1.3000%	2.272%	2.366%	2.500%	2.700%	3.000%	2.000%
63	1.3667%	2.418%	2.418%	2.500%	2.700%	3.000%	2.100%
64	1.4334%	2.418%	2.418%	2.500%	2.700%	3.000%	2.200%
65	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.300%
66	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.400%
67 & up	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.500%

Safety Plan Formulas

Retirement Age	½ at 55 *	2% at 55	2% at 50	3% at 55	3% at 50
50	1.783%	1.426%	2.000%	2.400%	3.000%
51	1.903%	1.522%	2.140%	2.520%	3.000%
52	2.035%	1.628%	2.280%	2.640%	3.000%
53	2.178%	1.742%	2.420%	2.760%	3.000%
54	2.333%	1.866%	2.560%	2.880%	3.000%
55 & Up	2.500%	2.000%	2.700%	3.000%	3.000%

* For this formula, the benefit factor also varies by entry age. The factors shown are for members with an entry age of 35 or greater. If entry age is less than 35, then the age 55 benefit factor is 50% divided by the difference between age 55 and entry age. The benefit factor for ages prior to age 55 is the same proportion of the age 55 benefit factor as in the above table.

PEPRA Safety Plan Formulas

Retirement Age	2% at 57	2.5% at 57	2.7% at 57
50	1.426%	2.000%	2.000%
51	1.508%	2.071%	2.100%
52	1.590%	2.143%	2.200%
53	1.672%	2.214%	2.300%
54	1.754%	2.286%	2.400%
55	1.836%	2.357%	2.500%
56	1.918%	2.429%	2.600%
57 & Up	2.000%	2.500%	2.700%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. An agency may contract for an optional benefit where any unused sick leave accumulated at the time of retirement will be converted to credited service at a rate of 0.004 years of service for each day of sick leave.

- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is $126,291 for 2020 and for those employees that do not participate in Social Security the cap for 2020 is $151,549. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.

- Employees must be covered by Social Security with the 1.5% at 65 formula. Social Security is optional for all other benefit formulas. For employees covered by Social Security, the modified formula is the standard benefit. Under this type of formula, the final compensation is offset by $133.33 (or by one third if the final compensation is less than $400). Employers may contract for the full benefit with Social Security that will eliminate the offset applicable to the final compensation. For employees not covered by Social Security, the full benefit is paid with no offsets.

Auxiliary organizations of the CSUC system may elect reduced contribution rates, in which case the offset is $317 if members are not covered by Social Security or $513 if members are covered by Social Security.

- The miscellaneous and PEPRA safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90% of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

The CalPERS classic members and PEPRA safety members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 50 (55 for employees hired into a 1.5% @ 65 plan). PEPRA miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 52.

Benefit

The vested deferred retirement benefit is the same as the service retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury, which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job related. A CalPERS member must be actively employed by any CalPERS employer at the time of disability in order to be eligible for this benefit.

Standard Benefit

The standard Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or

- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33⅓% of final compensation.

Improved Benefit

Employers have the option of providing the improved Non-Industrial Disability Retirement benefit. This benefit provides a monthly allowance equal to 30% of final compensation for the first 5 years of service, plus 1% for each additional year of service to a maximum of 50% of final compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members eligible to retire, and who have attained the normal retirement age determined by their service retirement benefit formula, will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Industrial (Job Related) Disability Retirement

All safety members have this benefit. For miscellaneous members, employers have the option of providing this benefit. An employer may choose to provide the increased benefit option or the improved benefit option.

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes disabled while working, where disabled means the member is unable to perform the duties of the job because of a work-related illness or injury, which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described below.

Standard Benefit

The standard Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation.

Increased Benefit (75% of Final Compensation)

The increased Industrial Disability Retirement benefit is a monthly allowance equal to 75 percent final compensation for total disability.

Improved Benefit (50% to 90% of Final Compensation)

The improved Industrial Disability Retirement benefit is a monthly allowance equal to the Workman's Compensation Appeals Board permanent disability rate percentage (if 50% or greater, with a maximum of 90%) times the final compensation.

For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return of accumulated member contributions with respect to employment in this group. With the standard or increased benefit, a member may also choose to receive the annuitization of the accumulated member contributions.

If a member is eligible for service retirement and if the service retirement benefit is more than the industrial disability retirement benefit, the member may choose to receive the larger benefit.

Post-Retirement Death Benefit

Standard Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of $500 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Improved Lump Sum Payment

Employers have the option of providing an improved lump sum death benefit of $600, $2,000, $3,000, $4,000 or $5,000.

Form of Payment for Retirement Allowance

Standard Form of Payment

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

Improved Form of Payment (Post-Retirement Survivor Allowance)

Employers have the option to contract for the post-retirement survivor allowance.

For retirement allowances with respect to service subject to the modified formula, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. For retirement allowances with respect to service subject to the full or supplemental formula, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. This additional benefit is referred to as post-retirement survivor allowance (PRSA) or simply as survivor continuance.

In other words, 25% or 50% of the allowance, the continuance portion, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried child(ren) until they attain age 18; or, if no eligible child(ren), to a qualifying dependent parent) for the rest of his or her lifetime. This benefit will not be discontinued in the event the spouse remarries.

The remaining 75% or 50% of the retirement allowance, which may be referred to as the option portion of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. Or, the retiree may choose to provide for some of this option portion to be paid to any designated beneficiary after the retiree's death. Benefit options applicable to the option portion are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the option portion.

Pre-Retirement Death Benefits

Basic Death Benefit

This is a standard benefit.

Eligibility

An employee's beneficiary (or estate) may receive the basic death benefit if the member dies while actively employed. A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this basic death benefit.

Benefit

The basic death benefit is a lump sum in the amount of the member's accumulated contributions, where interest is credited annually at the greater of 6% or the prevailing discount rate through the date of death, plus a lump sum in the amount of one month's salary for each completed year of current service, up to a maximum of six months' salary. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

1957 Survivor Benefit

This is a standard benefit.

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for classic and safety PEPRA members and age 52 for miscellaneous PEPRA members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. An eligible survivor means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried child(ren) under age 18. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this 1957 Survivor benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified service retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to dependent child(ren), the benefit will be discontinued upon death or attainment of age 18, unless the child(ren) is disabled. The total amount paid will be at least equal to the basic death benefit.

Optional Settlement 2 Death Benefit

This is an optional benefit.

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2 Death benefit if the member dies while actively employed, has attained at least age 50 for classic and safety PEPRA members and age 52 for miscellaneous PEPRA members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this Optional Settlement 2 Death benefit.

Benefit

The Optional Settlement 2 Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected 100% to continue to the eligible survivor after the member's death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Special Death Benefit

This is a standard benefit for safety members. An employer may elect to provide this benefit for miscellaneous members.

Eligibility

An employee's *eligible survivor(s)* may receive the special death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The special death benefit is a monthly allowance equal to 50% of final compensation and will be increased whenever the compensation paid to active employees is increased but ceasing to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death at which time the allowance is continued to any unmarried child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving child(ren) (*eligible* means unmarried child(ren) under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- if 1 eligible child: 12.5% of final compensation
- if 2 eligible children: 20.0% of final compensation
- if 3 or more eligible children: 25.0% of final compensation

Alternate Death Benefit for Local Fire Members

This is an optional benefit available only to local fire members.

Eligibility

An employee's *eligible survivor(s)* may receive the alternate death benefit in lieu of the basic death benefit or the 1957 Survivor benefit if the member dies while actively employed and has at least 20 years of total CalPERS service. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 18.

Benefit

The Alternate Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2. (A retiree who elects Optional Settlement 2 receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) If the member has not yet attained age 50, the benefit is equal to that which would be payable if the member had retired at age 50, based on service credited at the time of death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Cost-of-Living Adjustments (COLA)

Standard Benefit

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any given year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

Improved Benefit

Employers have the option of providing a COLA of 3%, 4%, or 5%, determined in the same manner as described above for the standard 2% COLA. An improved COLA is not available with the 1.5% at 65 formula.

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 80% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan.

Employee Contributions

Each employee contributes toward his or her retirement based upon the retirement formula. The standard employee contribution is as described below.

- The percent contributed below the monthly compensation breakpoint is 0%.
- The monthly compensation breakpoint is $0 for full and supplemental formula members and $133.33 for employees covered by the modified formula.
- The percent contributed above the monthly compensation breakpoint depends upon the benefit formula, as shown in the table below.

Benefit Formula	Percent Contributed above the Breakpoint
Miscellaneous, 1.5% at 65	2%
Miscellaneous, 2% at 60	7%
Miscellaneous, 2% at 55	7%
Miscellaneous, 2.5% at 55	8%
Miscellaneous, 2.7% at 55	8%
Miscellaneous, 3% at 60	8%
Miscellaneous, 2% at 62	50% of the Total Normal Cost
Miscellaneous, 1.5% at 65	50% of the Total Normal Cost
Safety, 1/2 at 55	Varies by entry age
Safety, 2% at 55	7%
Safety, 2% at 50	9%
Safety, 3% at 55	9%
Safety, 3% at 50	9%
Safety, 2% at 57	50% of the Total Normal Cost
Safety, 2.5% at 57	50% of the Total Normal Cost
Safety, 2.7% at 57	50% of the Total Normal Cost

The employer may choose to "pick-up" these contributions for classic members (Employer Paid Member Contributions or EPMC). EPMC is prohibited for new PEPRA members.

An employer may also include Employee Cost Sharing in the contract, where employees agree to share the cost of the employer contribution. These contributions are paid in addition to the member contribution.

Auxiliary organizations of the CSU system may elect reduced contribution rates, in which case the offset is $317 and the contribution rate is 6% if members are not covered by Social Security. If members are covered by Social Security, the offset is $513 and the contribution rate is 5%.

Refund of Employee Contributions

If the member's service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited with 6% interest compounded annually.

1959 Survivor Benefit

This is a pre-retirement death benefit available only to members not covered by Social Security. Any agency joining CalPERS subsequent to 1993 is required to provide this benefit if the members are not covered by Social Security. The benefit is optional for agencies joining CalPERS prior to 1994. Levels 1, 2 and 3 are now closed. Any new agency or any agency wishing to add this benefit or increase the current level may only choose the 4th or Indexed Level.

This benefit is not included in the results presented in this valuation. More information on this benefit is available on the CalPERS website.

Appendix C

Participant Data

- **Summary of Valuation Data**
- **Active Members**
- **Transferred and Terminated Members**
- **Retired Members and Beneficiaries**

Summary of Valuation Data

	June 30, 2019	June 30, 2020
1. **Active Members**		
a) Counts	17,024	17,467
b) Average Attained Age	44.22	44.09
c) Average Entry Age to Rate Plan	34.31	34.31
d) Average Years of Credited Service	9.69	9.56
e) Average Annual Covered Pay	$67,292	$67,720
f) Annual Covered Payroll	1,145,579,094	1,182,860,410
g) Projected Annual Payroll for Contribution Year	1,242,712,226	1,283,154,608
h) Present Value of Future Payroll	9,945,114,096	10,335,558,972
2. **Transferred Members**		
a) Counts	4,012	4,066
b) Average Attained Age	43.94	43.59
c) Average Years of Credited Service	2.58	2.57
d) Average Annual Covered Pay	$80,702	$85,014
3. **Terminated Members**		
a) Counts	9,990	10,518
b) Average Attained Age	45.07	45.36
c) Average Years of Credited Service	2.26	2.30
d) Average Annual Covered Pay	$45,359	$46,103
4. **Retired Members and Beneficiaries**		
a) Counts	12,022	12,557
b) Average Attained Age	68.79	68.95
c) Average Annual Benefits	$27,297	$28,248
5. **Active to Retired Ratio** [(1a) / (4a)]	1.42	1.39

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Average Annual Benefits represents benefit amounts payable by this plan only. Some members may have service with another agency and would therefore have a larger total benefit than would be included as part of the average shown here.

Active Members

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Active Members by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**
15-24	302	1	0	0	0	0	303
25-29	1,219	230	3	0	0	0	1,452
30-34	1,304	802	217	4	0	0	2,327
35-39	1,043	805	739	161	5	0	2,753
40-44	794	601	678	387	146	4	2,610
45-49	640	472	596	435	345	95	2,583
50-54	443	384	444	385	298	238	2,192
55-59	317	299	418	320	221	287	1,862
60-64	151	179	261	190	131	112	1,024
65 and Over	62	67	101	63	33	35	361
All Ages	**6,275**	**3,840**	**3,457**	**1,945**	**1,179**	**771**	**17,467**

Distribution of Average Annual Salaries by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Average Salary**
15-24	$38,925	$36,650	$0	$0	$0	$0	$38,918
25-29	46,744	48,729	53,744	0	0	0	47,072
30-34	50,525	56,736	59,845	76,035	0	0	53,578
35-39	54,656	62,728	76,092	69,626	79,753	0	63,692
40-44	59,212	66,833	85,125	80,022	74,268	120,495	71,720
45-49	59,642	72,518	83,855	81,650	86,014	82,878	75,665
50-54	61,501	72,370	80,077	82,697	87,653	85,097	77,008
55-59	65,168	71,301	79,969	79,057	79,468	88,939	77,223
60-64	71,560	70,417	77,359	77,724	83,591	79,077	76,343
65 and Over	77,977	83,131	82,218	77,476	73,328	94,021	81,163
Average	**$54,240**	**$64,823**	**$79,418**	**$79,581**	**$83,096**	**$85,968**	**$67,720**

Transferred and Terminated Members

Distribution of Transfers to Other CalPERS Plans by Age, Service, and average Salary

	Years of Service at Valuation Date							
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**	**Average Salary**
15-24	46	0	0	0	0	0	46	$56,418
25-29	244	1	0	0	0	0	245	60,043
30-34	541	35	4	0	0	0	580	68,753
35-39	623	78	36	2	0	0	739	83,091
40-44	640	79	25	8	1	0	753	92,712
45-49	526	73	27	17	3	0	646	95,243
50-54	378	64	26	16	5	0	489	92,790
55-59	216	56	16	11	2	3	304	86,753
60-64	132	35	13	8	4	0	192	87,214
65 and Over	53	14	3	2	0	0	72	100,700
All Ages	**3,399**	**435**	**150**	**64**	**15**	**3**	**4,066**	**$85,014**

Distribution of Terminated Participants with Funds on Deposit by Age, Service, and average Salary

	Years of Service at Valuation Date							
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**	**Average Salary**
15-24	73	0	0	0	0	0	73	$35,122
25-29	586	19	0	0	0	0	605	37,812
30-34	1,234	117	13	0	0	0	1,364	40,593
35-39	1,526	208	50	6	0	0	1,790	44,545
40-44	1,373	199	75	27	4	0	1,678	47,230
45-49	1,182	192	73	34	9	5	1,495	53,119
50-54	1,004	153	55	16	7	2	1,237	50,505
55-59	854	129	44	15	3	5	1,050	47,493
60-64	660	55	20	5	0	1	741	42,876
65 and Over	451	24	8	1	0	1	485	44,507
All Ages	**8,943**	**1,096**	**338**	**104**	**23**	**14**	**10,518**	**$46,103**

Retired Members and Beneficiaries

Distribution of Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	1	0	16	17
30-34	0	0	3	0	0	11	14
35-39	0	10	18	0	0	11	39
40-44	0	15	24	1	1	14	55
45-49	0	29	26	1	1	22	79
50-54	380	50	26	5	2	26	489
55-59	1,110	79	26	4	0	58	1,277
60-64	2,078	44	26	9	0	83	2,240
65-69	2,674	68	24	12	0	121	2,899
70-74	2,204	70	36	7	0	173	2,490
75-79	1,255	44	8	3	0	141	1,451
80-84	617	31	6	2	0	133	789
85 and Over	494	19	5	2	0	198	718
All Ages	**10,812**	**459**	**228**	**47**	**4**	**1,007**	**12,557**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 30	$0	$0	$0	$3,966	$0	$3,668	$3,685
30-34	0	0	206	0	0	4,464	3,551
35-39	0	12,924	232	0	0	4,106	4,579
40-44	0	12,215	278	9,077	167	7,154	5,442
45-49	0	14,728	416	8,501	136	13,356	9,372
50-54	22,596	12,205	2,514	11,016	950	7,929	19,479
55-59	31,653	12,956	1,068	18,261	0	13,987	29,029
60-64	36,975	15,231	3,625	8,870	0	15,412	35,248
65-69	32,972	11,418	1,662	12,485	0	18,104	31,502
70-74	30,472	15,019	2,814	14,097	0	17,896	28,718
75-79	27,593	14,191	1,494	16,756	0	19,798	26,263
80-84	21,406	14,076	320	3,711	0	14,439	19,738
85 and Over	17,222	10,567	1,323	10,922	0	12,997	15,753
All Ages	**$30,728**	**$13,361**	**$1,629**	**$11,862**	**$551**	**$15,308**	**$28,248**

Retired Members and Beneficiaries (continued)

Distribution of Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Yrs	3,601	74	74	15	1	388	4,153
5-9	2,486	79	43	12	0	252	2,872
10-14	2,372	55	19	9	2	174	2,631
15-19	1,295	87	34	6	0	99	1,521
20-24	647	91	15	2	1	53	809
25-29	253	39	18	1	0	21	332
30 and Over	158	34	25	2	0	20	239
All Years	**10,812**	**459**	**228**	**47**	**4**	**1,007**	**12,557**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 5 Yrs	$36,440	$15,165	$1,014	$10,082	$969	$16,253	$33,440
5-9	29,330	12,352	2,541	15,637	0	14,970	27,145
10-14	31,457	13,123	2,442	10,810	548	15,354	29,705
15-19	28,061	16,627	2,962	8,024	0	16,426	26,009
20-24	18,515	11,931	380	23,167	136	12,541	17,035
25-29	14,341	11,189	1,217	5,039	0	8,873	12,885
30 and Over	9,668	10,128	494	10,922	0	9,404	8,762
All Years	**$30,728**	**$13,361**	**$1,629**	**$11,862**	**$551**	**$15,308**	**$28,248**

* Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the total counts may not match information on C-1 of the report. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix D

Glossary of Actuarial Terms

Appendix D

Glossary of Actuarial Terms

Glossary of Actuarial Terms

Accrued Liability *(also called Actuarial Accrued Liability or Entry Age Actuarial Accrued Liability)*
The total dollars needed as of the valuation date to fund all benefits earned in the past for *current* members.

Actuarial Assumptions
Assumptions made about certain events that will affect pension costs. Assumptions generally can be broken down into two categories: demographic and economic. Demographic assumptions include such things as mortality, disability and retirement rates. Economic assumptions include discount rate, salary growth and inflation.

Actuarial Methods
Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

Actuarial Valuation
The determination as of a valuation date of the Normal Cost, Accrued Liability, and related actuarial present values for a pension plan. These valuations are performed annually or when an employer is contemplating a change to their plan provisions.

Amortization Bases
Separate payment schedules for different portions of the Unfunded Liability. The total Unfunded Liability of a Risk Pool or non-pooled plan can be segregated by cause, creating "bases," and each such base will be separately amortized and paid for over a specific period of time. However, all bases are amortized using investment and payroll assumptions from the current valuation. This can be likened to a home having a first mortgage of 24 years remaining payments and a second mortgage that has 10 years remaining payments. Each base or each mortgage note has its own terms (payment period, principal, etc.).

Generally, in an actuarial valuation, the separate bases consist of changes in unfunded liability due to contract amendments, actuarial assumption changes, method changes, and/or gains and losses.

Amortization Period
The number of years required to pay off an Amortization Base.

Classic Member (under PEPRA)
A classic member is a member who joined CalPERS prior to January 1, 2013 and who is not defined as a new member under PEPRA. (See definition of New Member below.)

Discount Rate
The assumed long-term rate of return on plan assets. This is the rate at which projected cash flows are discounted to the valuation date to determine Accrued Liability. This assumption is called "investment return" in earlier CalPERS reports and "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law (PERL).

Entry Age
The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan. In most cases, this is the age of the member on their date of hire.

Entry Age Actuarial Cost Method
An actuarial cost method designed to fund a member's total plan benefit over the course of his or her career. This method is designed to yield a rate expressed as a level percentage of payroll.
(The assumed retirement age less the entry age is the amount of time required to fund a member's total benefit. Generally, the older a member on the date of hire, the greater the entry age normal cost. This is mainly because there is less time to earn investment income to fund the future benefits.)

Fresh Start

A Fresh Start is when multiple amortization bases are collapsed to one base and amortized together over a new funding period.

Funded Status

A measure of how well funded, or how "on track" a plan or risk pool is with respect to assets versus accrued liabilities. A ratio greater than 100% means the plan or risk pool has more assets than liabilities and a ratio less than 100% means liabilities are greater than assets.

GASB 68

Statement No. 68 of the Governmental Accounting Standards Board. The accounting standard governing a state or local governmental employer's accounting and financial reporting for pensions. GASB 68 replaces GASB 27 effective the first fiscal year beginning after June 15, 2014.

New Member (under PEPRA)

A new member includes an individual who becomes a member of a public retirement system for the first time on or after January 1, 2013, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

Normal Cost

The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost should be viewed as the long-term contribution rate.

Pension Actuary

A business professional that is authorized by the Society of Actuaries and the American Academy of Actuaries to perform the calculations necessary to properly fund a pension plan.

PEPRA

The California Public Employees' Pension Reform Act of 2013

Present Value of Benefits (PVB)

The total dollars needed as of the valuation date to fund all benefits earned in the past or expected to be earned in the future for *current* members.

Unfunded Accrued Liability (UAL)

When a plan or pool's value of assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Accrued Liability (or unfunded liability). If the unfunded liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

California Public Employees' Retirement System
Actuarial Office
400 Q Street, Sacramento, CA 95811 | Phone: (916) 795-3000 | Fax: (916) 795-2744
888 CalPERS (or 888-225-7377) | TTY: (877) 249-7442 | www.calpers.ca.gov

July 2021

Safety Plan of the County of Riverside (CalPERS ID: 5982690295)
Annual Valuation Report as of June 30, 2020

Dear Employer,

Attached to this letter, you will find the June 30, 2020 actuarial valuation report of your CalPERS pension plan. **Provided in this report is the determination of the minimum required employer contributions for fiscal year 2022-23**. In addition, the report also contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 7.0%, which was adopted by the board in December 2016. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017.

Required Contributions

The table below shows the minimum required employer contributions and the Employee PEPRA Rate for fiscal year 2022-23 along with an estimate of the required contribution for fiscal year 2023-24. Employee contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement you may have with your employees.**

Fiscal Year	Employer Normal Cost Rate	Employer Amortization of Unfunded Accrued Liability	Employee PEPRA Rate
2022-23	20.24%	$55,446,291	12.50%
Projected Results			
2023-24	*19.9%*	*$61,707,000*	*TBD*

The actual investment return for fiscal year 2020-21 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.0%. ***To the extent the actual investment return for fiscal year 2020-21 differs from 7.0%, the actual contribution requirements for fiscal year 2023-24 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through fiscal year *2027-28.*

Changes from Previous Year's Valuations

There are no significant changes in actuarial assumptions or policies in your 2020 actuarial valuation. Your annual valuation report is an important tool for monitoring the health of your CalPERS pension Plan. Your report contains useful information about future required contributions and ways to control your plan's funding progress.

In addition to your annual actuarial report, my office has developed tools for employers to plan, project and protect the retirement benefits of your employees. Pension Outlook is a tool to help plan and budget pension costs into the future with easy to understand results and charts.

You will be able to view the projected funded status and required employer contributions for pension plans in different potential scenarios for up to 30 years into the future — which will make budgeting more predictable. While

Pension Outlook cannot predict the future, it can provide valuable planning information based on a variety of future scenarios that you select.

Pension Outlook can help you answer specific questions about your plans, including:

- When is my plan's funded status expected to increase?
- What happens to my required contributions in a down market?
- How does the discount rate assumption affect my contributions?
- What is the impact of making an additional discretionary payment to my plan?

To get started, visit our Pension Outlook page at www.calpers.ca.gov/page/employers/actuarial-resources/pension-outlook-overview and take the steps to register online.

CalPERS will be completing an Asset Liability Management (ALM) review process in November 2021 that will review the capital market assumptions and the strategic asset allocation and ascertain whether a change in the discount rate and other economic assumptions is warranted. In addition, the Actuarial Office will be completing its Experience Study to review the demographic experience within the pension system and make recommendations to modify future assumptions where appropriate. Any assumption change stemming from these studies will be reflected in the June 30, 2021 actuarial valuation.

Furthermore, this valuation does not reflect any impacts from the COVID-19 pandemic on your pension plan. The impact of COVID-19 on retirement plans is not yet known and CalPERS actuaries will continue to monitor the effects and, where necessary, make future adjustments to actuarial assumptions.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Actuarial Methods and Assumptions." The effects of the changes on the required contributions are included in the "Reconciliation of Required Employer Contributions" section.

Questions

We understand that you might have questions about these results, and your assigned CalPERS actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA
Chief Actuary, CalPERS

CalPERS

Actuarial Valuation as of June 30, 2020

for the Safety Plan of the County of Riverside

(CalPERS ID: 5982690295)
(Rate Plan ID: 63)

Required Contributions for Fiscal Year July 1, 2022 – June 30, 2023

Table of Contents

Actuarial Certification

To the best of our knowledge, this report is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Safety Plan of the County of Riverside. This valuation is based on the member and financial data as of June 30, 2020 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. It is our opinion that the valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

Kurt Schneider

KURT SCHNEIDER, MPA, ASA, EA, MAAA
Supervising Pension Actuary, CalPERS

Highlights and Executive Summary

- **Introduction**
- **Purpose of the Report**
- **Required Contributions**
- **Additional Discretionary Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Cost**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2020 actuarial valuation of the Safety Plan of the County of Riverside of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the minimum required employer contributions for fiscal year 2022-23.

Purpose of the Report

The actuarial valuation was prepared by the CalPERS Actuarial Office using data as of June 30, 2020. The purpose of the report is to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2020;
- Determine the minimum required employer contributions for the fiscal year July 1, 2022 through June 30, 2023;
- Provide actuarial information as of June 30, 2020 to the CalPERS Board of Administration and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for an Agent Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on the CalPERS website (calpers.ca.gov).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The employer should contact their actuary before disseminating any portion of this report for any reason that is not explicitly described above.

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; changes in actuarial policies; and changes in plan provisions or applicable law.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0% and 8.0%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current mortality assumptions adopted in 2017.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

Required Contributions

	Fiscal Year
Required Employer Contribution	**2022-23**
Employer Normal Cost Rate	**20.24%**
Plus, Either	
1) Monthly Employer Dollar UAL Payment	**$4,620,524**
Or	
2) Annual UAL Prepayment Option*	**$53,601,953**
Required PEPRA Member Contribution Rate	**12.50%**

*The total minimum required employer contribution is the **sum** of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll) and the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly in dollars).*

** Only the UAL portion of the employer contribution can be prepaid **(which must be received in full no later than July 31)**. Any prepayment totaling over $5 million requires a 72-hour notice email to FCSD_public_agency_wires@calpers.ca.gov. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.*

In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.

For additional detail regarding the determination of the required contribution for PEPRA members, see "PEPRA Member Contribution Rates" in the "Liabilities and Contributions" section. Required member contributions for Classic members can be found in Appendix B.

	Fiscal Year 2021-22	Fiscal Year 2022-23
Normal Cost Contribution as a Percentage of Payroll		
Total Normal Cost	30.38%	30.05%
Employee Contribution[1]	9.64%	9.81%
Employer Normal Cost[2]	20.74%	20.24%
Projected Annual Payroll for Contribution Year	$330,571,045	$343,016,690
Estimated Employer Contributions Based On Projected Payroll		
Total Normal Cost	$100,427,483	$103,076,515
Employee Contribution[1]	31,867,049	33,649,937
Employer Normal Cost[2]	68,560,434	69,426,578
Unfunded Liability Contribution	49,686,992	55,446,291
% of Projected Payroll (illustrative only)	15.03%	16.16%
Estimated Total Employer Contribution	$118,247,426	$124,872,869
% of Projected Payroll (illustrative only)	35.77%	36.40%

[1] For classic members, this is the percentage specified in the Public Employees' Retirement Law, net of any reduction from the use of a modified formula or other factors. For PEPRA members, the member contribution rate is based on 50% of the normal cost. A development of PEPRA member contribution rates can be found in the "Liabilities and Contributions" section. Employee cost sharing is not shown in this report.

[2] The Employer Normal Cost is a blended rate for all benefit groups in the plan. For a breakout of normal cost by benefit group, see "Normal Cost by Benefit Group" in the "Liabilities and Contributions" section.

Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for the 2022-23 fiscal year is $55,446,291. CalPERS allows employers to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Employers can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during fiscal year 2022-23 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

If you are considering making an ADP, please contact your actuary for additional information.

Minimum Required Employer Contribution for Fiscal Year 2022-23

Estimated Normal Cost	Minimum UAL Payment	ADP	Total UAL Contribution	Estimated Total Contribution
$69,426,578	$55,446,291	$0	$55,446,291	$124,872,869

The minimum required contribution above is less than interest on the UAL. With no ADP the UAL is projected to increase over the following year. If the minimum UAL payment were split between interest and principal, the principal portion would be negative. This situation is referred to as "negative amortization."

Fiscal Year 2022-23 Employer Contribution Necessary to Avoid Negative Amortization

Estimated Normal Cost	Minimum UAL Payment	ADP[1]	Total UAL Contribution	Estimated Total Contribution
$69,426,578	$55,446,291	$2,344,574	$57,790,865	$127,217,443

Alternative Fiscal Year 2022-23 Employer Contributions for Greater UAL Reduction

Funding Target	Estimated Normal Cost	Minimum UAL Payment	ADP[1]	Total UAL Contribution	Estimated Total Contribution
20 years	$69,426,578	$55,446,291	$22,482,978	$77,929,269	$147,355,847
15 years	$69,426,578	$55,446,291	$35,198,370	$90,644,661	$160,071,239
10 years	$69,426,578	$55,446,291	$62,098,266	$117,544,557	$186,971,135
5 years	$69,426,578	$55,446,291	$145,905,911	$201,352,202	$270,778,780

[1] The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2022 as determined in the June 30, 2020 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

Plan's Funded Status

	June 30, 2019	June 30, 2020
1. Present Value of Projected Benefits	$4,704,942,010	$4,912,503,829
2. Entry Age Accrued Liability	3,857,810,725	4,045,933,495
3. Market Value of Assets (MVA)	2,742,688,693	3,213,666,825
4. Unfunded Accrued Liability (UAL) [(2) – (3)]	$1,115,122,032	$832,266,670
5. Funded Ratio [(3) / (2)]	71.1%	79.4%

This measure of funded status is an assessment of the need for future employer contributions based on the actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. The projected normal cost percentages in the projections below reflect that the normal cost will continue to decline over time as new employees are hired into PEPRA or other lower cost benefit tiers.

	Required Contribution	**Projected Future Employer Contributions (Assumes 7.00% Return for Fiscal Year 2020-21)**				
Fiscal Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**
Normal Cost %	20.24%	19.9%	19.6%	19.3%	18.9%	18.6%
UAL Payment	$55,446,291	$61,707,000	$68,126,000	$72,228,000	$76,045,000	$77,980,000
*Total as a % of Payroll**	*36.40%*	*37.4%*	*38.4%*	*38.7%*	*38.8%*	*38.4%*
Projected Payroll	*$343,016,690*	*$352,449,649*	*$362,142,015*	*$372,100,920*	*$382,333,695*	*$392,847,871*

*Illustrative only and based on the projected payroll shown.

For some sources of UAL, the change in UAL is amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A. This method phases in the impact of the change in UAL over a 5-year period in order to reduce employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section.

Our online pension plan modeling and projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook is a tool to help plan and budget pension costs into the future with results and charts that are easy to understand.

Cost

Actuarial Determination of Pension Plan Cost

Contributions to fund the pension plan are comprised of two components:

- Normal Cost, expressed as a percentage of total active payroll
- Amortization of the Unfunded Accrued Liability (UAL), expressed as a dollar amount

For fiscal years prior to 2017-18, the Amortization of UAL component was expressed as percentage of total active payroll. Starting with fiscal year 2017-18, the Amortization of UAL component is expressed as a dollar amount and invoiced on a monthly basis. There is an option to prepay this amount during July of each fiscal year.

The Normal Cost component is expressed as a percentage of active payroll with employer and employee contributions payable as part of the regular payroll reporting process.

The determination of both components requires complex actuarial calculations. The calculations are based on a set of actuarial assumptions which can be divided into two categories:

- Demographic assumptions (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 5.5% over the 20 years ending June 30, 2020, yet individual fiscal year returns have ranged from -23.6% to +20.7%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2017.

Changes Since the Prior Year's Valuation

Benefits

The standard actuarial practice at CalPERS is to recognize mandated legislative benefit changes in the first annual valuation following the effective date of the legislation. Voluntary benefit changes by plan amendment are generally included in the first valuation that is prepared after the amendment becomes effective, even if the valuation date is prior to the effective date of the amendment.

This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B for a summary of the plan provisions used in this valuation. The effect of any mandated benefit changes or plan amendments on the unfunded liability is shown in the "(Gain)/Loss Analysis" and the effect on the employer contribution is shown in the "Reconciliation of Required Employer Contributions." It should be noted that no change in liability or contribution is shown for any plan changes which were already included in the prior year's valuation.

Actuarial Methods and Assumptions

The are no significant changes to the actuarial methods or assumptions for the 2020 actuarial valuation.

Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2020. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase future required contributions while investment returns above the assumed rate of return will decrease future required contributions.

CalPERS will be completing an Asset Liability Management (ALM) review process in November 2021 that will review the capital market assumptions and the strategic asset allocation and ascertain whether a change in the discount rate and other economic assumptions is warranted. In addition, the Actuarial Office will be completing its Experience Study to review the demographic experience within the pension system and make recommendations to modify future assumptions where appropriate.

Furthermore, this valuation does not reflect any impacts from the COVID-19 pandemic on your pension plan. The impact of COVID-19 on retirement plans is not yet known and CalPERS actuaries will continue to monitor the effects and, where necessary, make future adjustments to actuarial assumptions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 7.0% going forward and that the realized rate of return on assets for fiscal year 2020-21 is 7.0%.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2021. Any subsequent changes or actions are not reflected.

Assets

- **Reconciliation of the Market Value of Assets**
- **Asset Allocation**
- **CalPERS History of Investment Returns**

Reconciliation of the Market Value of Assets

1.	Market Value of Assets as of 6/30/19 including Receivables	$2,742,688,693
2.	Change in Receivables for Service Buybacks	(132,836)
3.	Employer Contributions	468,162,519
4.	Employee Contributions	30,522,099
5.	Benefit Payments to Retirees and Beneficiaries	(153,996,075)
6.	Refunds	(1,868,481)
7.	Transfers	(31,899)
8.	Service Credit Purchase (SCP) Payments and Interest	2,078,325
9.	Administrative Expenses	(2,136,508)
10.	Miscellaneous Adjustments	0
11.	Investment Return (Net of Investment Expenses)	128,380,987
12.	Market Value of Assets as of 6/30/20 including Receivables	$3,213,666,825

Asset Allocation

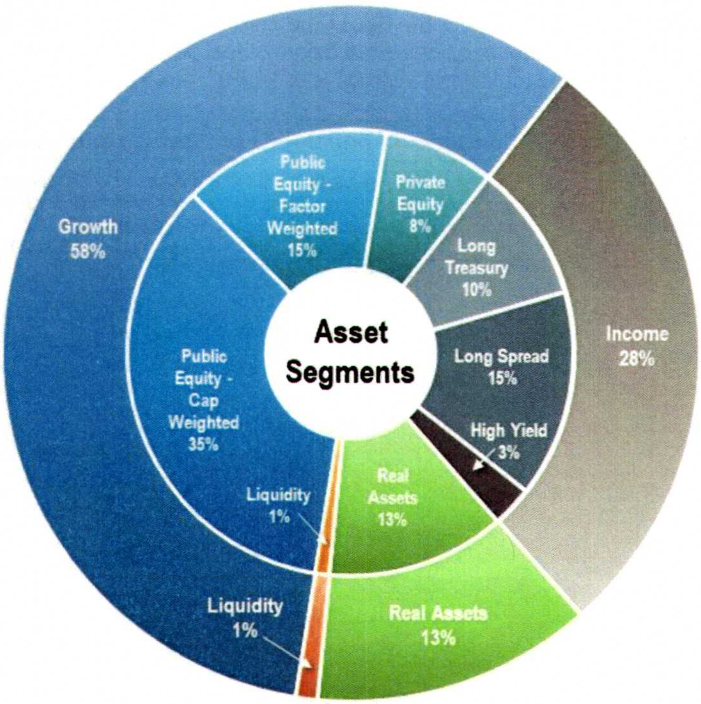
CalPERS adheres to an Asset Allocation Strategy which establishes asset class allocation policy targets and ranges and manages those asset class allocations within their policy ranges. CalPERS Investment Belief No. 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return. On December 19, 2017, the CalPERS Board of Administration adopted changes to the current asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets.

The asset allocation shown below reflect the allocation of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2020. The assets for County of Riverside Safety Plan are part of the PERF and are invested accordingly.

Asset Class	Actual Allocation	Policy Target Allocation
Public Equity	53.0%	50.0%
Private Equity	6.3%	8.0%
Global Fixed Income	28.3%	28.0%
Real Assets	11.3%	13.0%
Liquidity	0.9%	1.0%
Inflation Sensitive Assets	0.0%	0.0%
Trust Level[1]	0.2%	0.0%
Total Fund	**100.0%**	**100.0%**

[1] Trust Level includes Multi-Asset Class, Completion Overlay, Risk Mitigation, Absolute Return Strategies, Plan Level Transition and other Total Fund level portfolios.

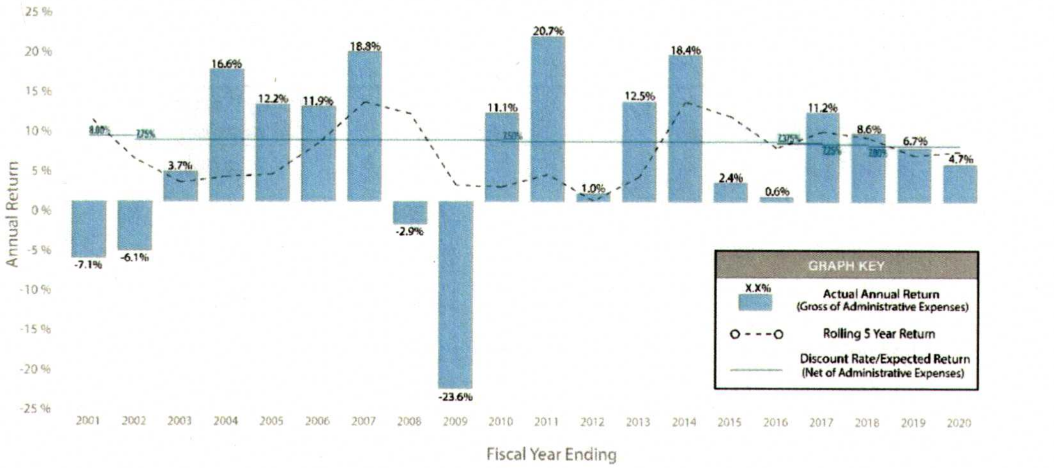
Strategic Asset Allocation Policy Targets



CalPERS History of Investment Returns

The following is a chart with the 20-year historical annual returns of the PERF for each fiscal year ending on June 30. Beginning in 2002, investment returns reported are net of investment expenses and gross of administrative expenses.

History of Investment Returns (2001 - 2020)



The table below shows annualized investment returns of the PERF for various time periods ending on June 30, 2020 (figures reported are net of investment expenses and gross of administrative expenses). These returns are the annual rates that if compounded over the indicated number of years would equate to the actual performance of the PERF. It should be recognized that in any given year the rate of return is volatile. The portfolio has an expected volatility of 11.4% per year based on the most recent Asset Liability Modeling study. The realized volatility is a measure of the risk of the portfolio expressed as the standard deviation of the fund's total monthly return distribution, expressed as an annual percentage. Due to their volatile nature, when looking at investment returns, it is more instructive to look at returns over longer time horizons.

History of CalPERS Compound Annual Rates of Return and Volatilities					
	1 year	**5 year**	**10 year**	**20 year**	**30 year**
Compound Annual Return	4.7%	6.3%	8.5%	5.5%	8.0%
Realized Volatility	–	7.3%	7.1%	8.6%	8.6%

Liabilities and Contributions

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 6/30/19 - 6/30/20**
- **Schedule of Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Reconciliation of Required Employer Contributions**
- **Employer Contribution History**
- **Funding History**
- **Normal Cost by Benefit Group**
- **PEPRA Member Contribution Rates**

Development of Accrued and Unfunded Liabilities

	June 30, 2019	June 30, 2020
1. Present Value of Projected Benefits		
a) Active Members	$2,423,043,342	$2,491,626,150
b) Transferred Members	73,933,907	77,842,492
c) Terminated Members	46,633,097	41,562,514
d) Members and Beneficiaries Receiving Payments	2,161,331,664	2,301,472,673
e) Total	$4,704,942,010	$4,912,503,829
2. Present Value of Future Employer Normal Costs	$558,844,173	$559,574,652
3. Present Value of Future Employee Contributions	$288,287,112	$306,995,682
4. Entry Age Accrued Liability		
a) Active Members [(1a) - (2) - (3)]	$1,575,912,057	$1,625,055,816
b) Transferred Members (1b)	73,933,907	77,842,492
c) Terminated Members (1c)	46,633,097	41,562,514
d) Members and Beneficiaries Receiving Payments (1d)	2,161,331,664	2,301,472,673
e) Total	$3,857,810,725	$4,045,933,495
5. Market Value of Assets (MVA)	$2,742,688,693	$3,213,666,825
6. Unfunded Accrued Liability (UAL) [(4e) - (5)]	$1,115,122,032	$832,266,670
7. Funded Ratio [(5) / (4e)]	71.1%	79.4%

(Gain)/Loss Analysis 6/30/19 – 6/30/20

To calculate the cost requirements of the plan, 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 compared to the expected experience based on the actuarial assumptions. This results in actuarial gains or losses, as shown below.

1. Total (Gain)/Loss for the Year	
a) Unfunded Accrued Liability (UAL) as of 6/30/19	$1,115,122,032
b) Expected Payment on the UAL during 2019-20	394,649,043
c) Interest through 6/30/20 [.07 x (1a) - $((1.07)^{1/2}$ - 1) x (1b)]	64,479,440
d) Expected UAL before all other changes [(1a) - (1b) + (1c)]	784,952,429
e) Change due to plan changes	0
f) Change due to AL Significant Increase	0
g) Change due to assumption change	0
h) Change due to method change	0
i) Expected UAL after all other changes [(1d) + (1e) + (1f) + (1g) + (1h)]	784,952,429
j) Actual UAL as of 6/30/20	832,266,670
k) Total (Gain)/Loss for 2019-20 [(1j) - (1i)]	$47,314,241
2. Contribution (Gain)/Loss for the Year	
a) Expected Contribution (Employer and Employee)	$498,864,598
b) Interest on Expected Contributions	17,164,955
c) Actual Contributions	498,684,618
d) Interest on Actual Contributions	17,158,762
e) Expected Contributions with Interest [(2a) + (2b)]	516,029,553
f) Actual Contributions with Interest [(2c) + (2d)]	515,843,380
g) Contribution (Gain)/Loss [(2e) - (2f)]	$186,173
3. Investment (Gain)/Loss for the Year	
a) Market Value of Assets as of 6/30/19	$2,742,688,693
b) Prior Fiscal Year Receivables	(4,880,191)
c) Current Fiscal Year Receivables	4,747,355
d) Contributions Received	498,684,618
e) Benefits and Refunds Paid	(155,864,556)
f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments	2,046,426
g) Expected Return [.07 x (3a + 3b) + $((1.07)^{1/2}$ - 1) x ((3d) + (3e) + (3f))]	203,512,776
h) Expected Assets as of 6/30/20 [(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]	3,290,935,122
i) Actual Market Value of Assets as of 6/30/20	3,213,666,825
j) Investment (Gain)/Loss [(3h) - (3i)]	$77,268,297
4. Liability (Gain)/Loss for the Year	
a) Total (Gain)/Loss (1j)	$47,314,241
b) Contribution (Gain)/Loss (2g)	186,173
c) Investment (Gain)/Loss (3j)	77,268,297
d) Liability (Gain)/Loss [(4a) - (4b) - (4c)]	($30,140,229)
5. Non-Investment (Gain)/Loss for the Year	
a) Contribution (Gain)/Loss (2g)	$186,173
b) Liability (Gain)/Loss (4d)	(30,140,229)
c) Non-Investment (Gain)/Loss [(5a) + (5b)]	($29,954,056)

Schedule of Amortization Bases

Below is the schedule of the plan's amortization bases. Note that there is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2020.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: fiscal year 2022-23.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their required employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment on the UAL for a fiscal year is equal to the Expected Employer Contribution for the fiscal year minus the Expected Normal Cost for the year. The Employer Contribution for the first fiscal year is determined by the actuarial valuation two years ago and the contribution for the second year is from the actuarial valuation one year ago. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

Reason for Base	Date Est.	Ramp Level 2022-23	Ramp Shape	Escala-tion Rate	Amort. Period	Balance 6/30/20	Expected Payment 2020-21	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Minimum Required Payment 2022-23
Fresh Start	6/30/08	No Ramp		2.75%	18	(5,071,675)	(375,177)	(5,038,606)	(385,494)	(4,992,550)	(396,095)
Special (Gain)/Loss	6/30/09	No Ramp		2.75%	19	72,307,088	5,184,084	72,006,126	5,326,647	71,536,628	5,473,129
Special (Gain)/Loss	6/30/10	No Ramp		2.75%	20	57,778,021	4,023,362	57,660,684	4,134,005	57,420,684	4,247,690
Special (Gain)/Loss	6/30/11	No Ramp		2.75%	21	63,467,196	4,300,829	63,461,088	4,419,102	63,332,210	4,540,627
Payment (Gain)/Loss	6/30/12	No Ramp		2.75%	22	(36,509,479)	(2,411,846)	(36,570,310)	(2,478,172)	(36,566,791)	(2,546,322)
(Gain)/Loss	6/30/12	No Ramp		2.75%	22	(5,210,886)	(344,235)	(5,219,569)	(353,702)	(5,219,067)	(363,429)
(Gain)/Loss	6/30/13	100%	Up/Down	2.75%	23	380,873,620	25,837,318	380,808,444	26,547,845	380,003,731	27,277,911
(Gain)/Loss	6/30/14	100%	Up/Down	2.75%	24	(217,569,233)	(14,387,176)	(217,916,869)	(14,782,824)	(217,879,578)	(15,189,351)
(Gain)/Loss	6/30/15	100%	Up/Down	2.75%	25	204,358,504	10,688,784	207,607,035	13,728,407	207,938,753	14,105,938
(Gain)/Loss	6/30/16	100%	Up/Down	2.75%	26	207,818,834	8,167,002	213,918,140	11,188,792	217,318,633	14,370,605
Assumption Change	6/30/17	80%	Up/Down	2.75%	17	79,369,500	2,894,242	81,931,538	4,460,750	83,052,510	6,111,228
(Gain)/Loss	6/30/17	80%	Up/Down	2.75%	27	(107,771,822)	(2,864,755)	(112,352,524)	(4,415,304)	(115,649,975)	(6,048,966)
Method Change	6/30/18	60%	Up/Down	2.75%	18	20,451,083	381,303	21,488,236	783,577	22,181,874	1,207,689
Assumption Change	6/30/18	60%	Up/Down	2.75%	18	135,962,249	2,534,966	142,857,417	5,209,355	147,468,837	8,028,918
(Gain)/Loss	6/30/18	60%	Up/Down	2.75%	28	(53,847,003)	(735,433)	(56,855,555)	(1,511,316)	(59,272,126)	(2,329,315)
Non-Investment (Gain)/Loss	6/30/19	No Ramp		0.00%	19	(25,815,763)	0	(27,622,866)	(2,520,672)	(26,949,063)	(2,520,672)
Investment (Gain)/Loss	6/30/19	40%	Up Only	0.00%	19	14,362,195	0	15,367,549	335,996	16,095,720	671,991
Non-Investment (Gain)/Loss	6/30/20	No Ramp		0.00%	20	(29,954,056)	0	(32,050,840)	0	(34,294,399)	(3,129,470)
Investment (Gain)/Loss	6/30/20	20%	Up Only	0.00%	20	77,268,297	0	82,677,078	0	88,464,473	1,934,185
Total						**832,266,670**	**42,893,268**	**846,156,196**	**49,686,992**	**853,990,504**	**55,446,291**

Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please consult with your plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years, such as:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over a reasonable period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives (continued)

	Current Amortization Schedule		Alternative Schedules			
			20 Year Amortization		15 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2022	853,990,504	55,446,291	853,990,504	77,929,269	853,990,504	90,644,661
6/30/2023	856,415,750	61,706,694	833,159,177	77,929,269	820,006,273	90,644,662
6/30/2024	852,534,953	68,125,897	810,869,657	77,929,269	783,643,145	90,644,661
6/30/2025	841,742,425	72,228,387	787,019,870	77,929,268	744,734,599	90,644,662
6/30/2026	825,950,770	76,045,273	761,500,599	77,929,269	703,102,453	90,644,661
6/30/2027	805,105,482	77,979,749	734,194,978	77,929,268	658,556,058	90,644,662
6/30/2028	780,799,985	79,967,418	704,977,965	77,929,268	610,891,415	90,644,661
6/30/2029	752,737,043	82,009,750	673,715,761	77,929,269	559,890,248	90,644,662
6/30/2030	720,597,089	84,108,250	640,265,202	77,929,269	505,318,998	90,644,662
6/30/2031	684,036,637	86,264,457	604,473,103	77,929,268	446,927,760	90,644,661
6/30/2032	642,686,552	88,479,957	566,175,559	77,929,269	384,449,137	90,644,662
6/30/2033	596,150,233	90,756,388	525,197,185	77,929,268	317,597,009	90,644,661
6/30/2034	544,001,611	93,095,417	481,350,326	77,929,268	246,065,233	90,644,661
6/30/2035	485,783,074	93,324,905	434,434,187	77,929,268	169,526,233	90,644,662
6/30/2036	423,251,859	88,999,635	384,233,918	77,929,268	87,629,502	90,644,662
6/30/2037	360,817,551	84,370,211	330,519,631	77,929,269		
6/30/2038	298,801,555	79,423,172	273,045,343	77,929,269		
6/30/2039	237,561,695	74,144,554	211,547,854	77,929,268		
6/30/2040	177,495,291	71,654,989	145,745,542	77,929,269		
6/30/2041	115,799,464	56,010,576	75,337,067	77,929,268		
6/30/2042	65,967,637	39,362,173				
6/30/2043	29,868,824	23,156,972				
6/30/2044	8,005,884	8,281,351				
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
6/30/2049						
6/30/2050						
6/30/2051						
Total		**1,634,942,466**		**1,558,585,370**		**1,359,669,923**
Interest Paid		**780,951,962**		**704,594,866**		**505,679,419**
Estimated Savings				**76,357,096**		**275,272,543**

Reconciliation of Required Employer Contributions

Normal Cost (% of Payroll)

1. For Period 7/1/21 – 6/30/22	
a) Employer Normal Cost	20.74%
b) Employee Contribution	9.64%
c) Total Normal Cost	30.38%
2. Changes since the prior year annual valuation	
a) Effect of demographic experience	(0.33%)
b) Effect of plan changes	0.00%
c) Effect of assumption changes	0.00%
d) Effect of method changes	0.00%
e) Net effect of the changes above [sum of (a) through (d)]	(0.33%)
3. For Period 7/1/22 – 6/30/23	
a) Employer Normal Cost	20.24%
b) Employee Contribution	9.81%
c) Total Normal Cost	30.05%
Employer Normal Cost Change [(3a) – (1a)]	(0.50%)
Employee Contribution Change [(3b) – (1b)]	0.17%

Unfunded Liability Contribution ($)

1. For Period 7/1/21 – 6/30/22	49,686,992
2. Changes since the prior year annual valuation	
a) Effect of adjustments to prior year's amortization schedule	0
b) Effect of investment (gain)/loss during prior year[1]	1,934,185
c) Effect of non-investment (gain)/loss during prior year	(3,129,470)
d) Effect of plan changes	0
e) Effect of AL Significant Increase	0
f) Effect of assumption changes	0
g) Changes to prior year amortization payments[2]	6,954,584
h) Effect of changes due to Fresh Start or immediate recognition of small balances	0
i) Effect of elimination of amortization base	0
j) Effect of method change	0
k) Net effect of the changes above [sum of (a) through (j)]	5,759,299
3. For Period 7/1/22 – 6/30/23 [(1) + (2k)]	55,446,291

The amounts shown for the period 7/1/21 – 6/30/22 may be different if a prepayment of unfunded actuarial liability is made or a plan change became effective after the prior year's actuarial valuation was performed.

[1] The unfunded liability contribution for the investment (gain)/loss during the year prior to the valuation date is 20% of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line g) in future years.

[2] Includes scheduled escalation in individual amortization base payments due to the 5-year ramp and payroll growth assumption used in the pre-2019 amortization policy.

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2018 or after June 30, 2020 are not included.

Fiscal Year	Employer Normal Cost	Unfunded Rate	Unfunded Liability Payment ($)	Additional Discretionary Payments
2013 - 14	17.504%	5.864%	N/A	N/A
2014 - 15	16.564%	5.335%	N/A	N/A
2015 - 16	16.729%	6.856%	N/A	N/A
2016 - 17	18.321%	8.249%	N/A	N/A
2017 - 18	17.912%	N/A	35,778,888	N/A
2018 - 19	18.464%	N/A	48,790,038	0
2019 - 20	19.853%	N/A	62,876,977	344,292,468
2020 - 21	21.095%	N/A	73,668,397	
2021 - 22	20.74%	N/A	49,686,992	
2022 - 23	20.24%	N/A	55,446,291	

Funding History

The table below shows the recent history of actuarial accrued liability, market value of assets, unfunded accrued liability, funded ratio and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Market Value of Assets (MVA)	Unfunded Accrued Liability (UAL)	Funded Ratio	Annual Covered Payroll
6/30/2011	$2,032,001,280	$1,565,799,198	$466,202,082	77.1%	$273,169,605
6/30/2012	2,086,406,405	1,567,404,726	519,001,679	75.1%	261,703,717
6/30/2013	2,285,586,497	1,776,122,369	509,464,128	77.7%	271,367,032
6/30/2014	2,615,686,777	2,098,296,808	517,389,969	80.2%	295,171,068
6/30/2015	2,846,014,858	2,140,637,485	705,377,373	75.2%	319,499,129
6/30/2016	3,110,254,402	2,151,981,845	958,272,557	69.2%	338,809,025
6/30/2017	3,361,565,098	2,394,890,161	966,674,937	71.2%	328,400,573
6/30/2018	3,676,571,381	2,586,874,850	1,089,696,531	70.4%	309,713,827
6/30/2019	3,857,810,725	2,742,688,693	1,115,122,032	71.1%	304,732,882
6/30/2020	4,045,933,495	3,213,666,825	832,266,670	79.4%	316,205,748

Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for fiscal year 2022-23. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

Rate Plan Identifier	Benefit Group Name	Total Normal Cost FY 2022-23	Number of Actives	Payroll on 6/30/2020
63	Safety County Peace Officer First Level	31.41%	2,179	$232,915,976
25051	Safety County Peace Officer PEPRA Level	25.93%	1,089	$71,190,668
30194	Safety Fire First Level	N/A	0	$0
30195	Safety County Peace Officer Second Level	29.16%	136	$12,099,104
	Plan Total	**30.05%**	**3,404**	**$316,205,748**

Note that if a Benefit Group above has multiple bargaining units, each of which has separately contracted for different benefits such as Employer Paid Member Contributions, then the Normal Cost split does not reflect those differences. Additionally, if a Second Level Benefit Group amended to the same benefit formula as a First Level Benefit Group, their Normal Costs may be dissimilar due to demographic or other population differences. If you have questions in these situations, please consult with your plan actuary.

PEPRA Member Contribution Rates

The California Public Employees' Pension Reform Act of 2013 ("PEPRA") established new benefit formulas, final compensation period, and contribution requirements for "new" employees (generally those first hired into a CalPERS-covered position on or after January 1, 2013). In accordance with Government Code section 7522.30(b), "new members ... shall have an initial contribution rate of at least 50% of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions and demographics of the plan, particularly members' entry age into the plan. Should the total normal cost of the plan change by more than 1% from the base total normal cost established for the plan, the new member rate shall be 50% of the new normal cost rounded to the nearest quarter percent.

The table below shows the determination of the PEPRA member contribution rates effective July 1, 2022, based on 50% of the Total Normal Cost for each respective plan as of the June 30, 2020 valuation.

		Basis for Current Rate		Rates Effective July 1, 2022			
Rate Plan Identifier	**Benefit Group Name**	**Total Normal Cost**	**Member Rate**	**Total Normal Cost**	**Change**	**Change Needed**	**Member Rate**
25051	Safety County Peace Officer PEPRA Level	24.961%	12.50%	25.93%	0.969%	No	12.50%

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions. For this reason, the PEPRA member contribution rate determined in the table above may not equal 50% of the total normal cost of the PEPRA group shown on the "Normal Cost by Benefit Group" page.

Risk Analysis

- **Future Investment Return Scenarios**
- **Discount Rate Sensitivity**
- **Mortality Rate Sensitivity**
- **Maturity Measures**
- **Maturity Measures History**
- **Hypothetical Termination Liability**

Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2020-21, 2021-22, 2022-23 and 2023-24). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

For fiscal years 2020-21, 2021-22, 2022-23, and 2023-24 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0%, 4.0%, 7.0%, 9.0% and 12.0%.

These alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2024. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5th, 25th, 50th, 75th, and 95th percentiles for these outcomes. For example, of all the four-year outcomes generated in the stochastic analysis, approximately 25% had an average annual return of 4.0% or less.

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0% or greater than 12.0% over a four-year period, the likelihood of a single investment return less than 1.0% or greater than 12.0% in any given year is much greater.

Assumed Annual Return From 2020-21 through 2023-24	**Projected Employer Contributions**			
	2023-24	**2024-25**	**2025-26**	**2026-27**
1.0%				
Normal Cost	19.9%	19.6%	19.3%	18.9%
UAL Contribution	$66,537,000	$82,668,000	$101,399,000	$124,804,000
4.0%				
Normal Cost	19.9%	19.6%	19.3%	18.9%
UAL Contribution	$64,122,000	$75,470,000	$87,107,000	$101,166,000
7.0%				
Normal Cost	19.9%	19.6%	19.3%	18.9%
UAL Contribution	$61,707,000	$68,126,000	$72,228,000	$76,045,000
9.0%				
Normal Cost	20.4%	20.5%	20.6%	20.8%
UAL Contribution	$60,600,000	$64,942,000	$65,903,000	$65,372,000
12.0%				
Normal Cost	20.4%	20.5%	20.6%	20.8%
UAL Contribution	$58,197,000	$57,433,000	$50,246,000	$38,142,000

These projections reflect changes to the amortization policy effective with the June 30, 2019 valuation as well as the impact of the CalPERS risk mitigation policy (which reduces the discount rate when investment returns exceed specified trigger points). The projected normal cost percentages reflect that normal cost is anticipated to decline over time as new employees are hired into PEPRA or other lower-cost benefit tiers.

Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.50% and 2.50%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2020 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 7.0% as well as alternate discount rates of 6.0% and 8.0%. The rates of 6.0% and 8.0% were selected since they illustrate the impact of a 1.0% increase or decrease to the 7.0% assumption.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2020	1% Lower Real Return Rate	Current Assumptions	1% Higher Real Return Rate
Discount Rate	**6.0%**	**7.0%**	**8.0%**
Inflation	2.5%	2.5%	2.5%
Real Rate of Return	**3.5%**	**4.5%**	**5.5%**
a) Total Normal Cost	38.37%	30.05%	23.80%
b) Accrued Liability	$4,654,016,373	$4,045,933,495	$3,551,960,394
c) Market Value of Assets	$3,213,666,825	$3,213,666,825	$3,213,666,825
d) Unfunded Liability/(Surplus) [(b) - (c)]	$1,440,349,548	$832,266,670	$338,293,569
e) Funded Status	69.1%	79.4%	90.5%

Sensitivity to the Price Inflation Assumption

As of June 30, 2020	1% Lower Inflation Rate	Current Assumptions	1% Higher Inflation Rate
Discount Rate	**6.0%**	**7.0%**	**8.0%**
Inflation	**1.5%**	**2.5%**	**3.5%**
Real Rate of Return	4.5%	4.5%	4.5%
a) Total Normal Cost	32.33%	30.05%	27.61%
b) Accrued Liability	$4,288,483,958	$4,045,933,495	$3,766,331,145
c) Market Value of Assets	$3,213,666,825	$3,213,666,825	$3,213,666,825
d) Unfunded Liability/(Surplus) [(b) - (c)]	$1,074,817,133	$832,266,670	$552,664,320
e) Funded Status	74.9%	79.4%	85.3%

Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2020 plan costs and funded status under two different longevity scenarios, namely assuming rates of mortality are 10% lower or 10% higher than our current mortality assumptions. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long term.

As of June 30, 2020	10% Lower Mortality Rates	Current Assumptions	10% Higher Mortality Rates
a) Total Normal Cost	30.42%	30.05%	29.71%
b) Accrued Liability	$4,106,849,846	$4,045,933,495	$3,989,321,435
c) Market Value of Assets	$3,213,666,825	$3,213,666,825	$3,213,666,825
d) Unfunded Liability/(Surplus) [(b) - (c)]	$893,183,021	$832,266,670	$775,654,610
e) Funded Status	78.3%	79.4%	80.6%

Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio increases. A mature plan will often have a ratio above 60%-65%.

Ratio of Retiree Accrued Liability to Total Accrued Liability	**June 30, 2019**	**June 30, 2020**
1. Retiree Accrued Liability	2,161,331,664	2,301,472,673
2. Total Accrued Liability	3,857,810,725	4,045,933,495
3. Ratio of Retiree AL to Total AL [(1) / (2)]	56%	57%

Another measure of the maturity level of CalPERS and its plans is the ratio of actives to retirees, also called Support Ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures, and members retire, the ratio declines. A mature plan will often have a ratio near or below one. The average support ratio for CalPERS public agency plans is 1.25.

Support Ratio	**June 30, 2019**	**June 30, 2020**
1. Number of Actives	3,265	3,404
2. Number of Retirees	2,868	2,999
3. Support Ratio [(1) / (2)]	1.14	1.14

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Asset Volatility Ratio

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have a higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with AVR of 8 may experience twice the contribution volatility due to investment return volatility than a plan with AVR of 4. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as a plan matures.

Liability Volatility Ratio

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR of 8 is expected to have twice the contribution volatility of a plan with LVR of 4 when there is a change in accrued liability, such as when there is a change in actuarial assumptions. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded status approaches 100%.

Maturity Measures (continued)

Contribution Volatility	June 30, 2019	June 30, 2020
1. Market Value of Assets without Receivables	$2,737,808,502	$3,208,919,470
2. Payroll	304,732,882	316,205,748
3. Asset Volatility Ratio (AVR) [(1) / (2)]	9.0	10.1
4. Accrued Liability	$3,857,810,725	$4,045,933,495
5. Liability Volatility Ratio (LVR) [(4) / (2)]	12.7	12.8

Maturity Measures History

Valuation Date	Ratio of Retiree Accrued Liability to Total Accrued Liability	Support Ratio	Asset Volatility Ratio	Liability Volatility Ratio
6/30/2017	51%	1.38	7.3	10.2
6/30/2018	54%	1.20	8.3	11.9
6/30/2019	56%	1.14	9.0	12.7
6/30/2020	57%	1.14	10.1	12.8

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2020. The plan liability on a termination basis is calculated differently from the plan's ongoing funding liability. For this hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the CalPERS Board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while limiting the funding risk. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate assumption. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 19-month period from 12 months before the valuation date to 7 months after.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] at 0.75%	Funded Status	Unfunded Termination Liability at 0.75%	Hypothetical Termination Liability[1,2] at 2.50%	Funded Status	Unfunded Termination Liability at 2.50%
$3,213,666,825	$10,326,645,115	31.1%	$7,112,978,290	$7,438,079,505	43.2%	$4,224,412,680

[1] The hypothetical liabilities calculated above include a 5% contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

[2] The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 1.18% on June 30, 2020, and was 1.68% on January 31, 2021.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

Plan's Major Benefit Provisions

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group						
Member Category	Peace	Fire	Peace	Peace	Peace	Peace	Fire
Demographics							
Actives	Yes	No	No	Yes	Yes	Yes	No
Transfers/Separated	Yes	Yes	No	Yes	Yes	Yes	No
Receiving	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit Provision							
Benefit Formula	3% @ 50	3% @ 50		3% @ 50	2.7% @ 57	2% @ 50	
Social Security Coverage	No	No		No	No	No	
Full/Modified	Full	Full		Full	Full	Full	
Employee Contribution Rate	9.00%			9.00%	12.50%	9.00%	
Final Average Compensation Period	One Year	Three Year		One Year	Three Year	Three Year	
Sick Leave Credit	No	No		No	No	No	
Non-Industrial Disability	Standard	Standard		Standard	Standard	Standard	
Industrial Disability	Standard	Standard		Standard	Standard	Standard	
Pre-Retirement Death Benefits							
Optional Settlement 2	Yes	Yes		Yes	Yes	Yes	
1959 Survivor Benefit Level	Indexed	Indexed		Indexed	Indexed	Indexed	
Special	Yes	Yes		Yes	Yes	Yes	
Alternate (firefighters)	No	No		No	No	No	
Post-Retirement Death Benefits							
Lump Sum	$500	$500	$500	$500	$500	$500	$500
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COLA	2%	2%	2%	2%	2%	2%	2%

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

	Benefit Group		
Member Category	Peace	Peace	
Demographics			
Actives	No	No	
Transfers/Separated	No	No	
Receiving	Yes	Yes	
Benefit Provision			
Benefit Formula			
Social Security Coverage			
Full/Modified			
Employee Contribution Rate			
Final Average Compensation Period			
Sick Leave Credit			
Non-Industrial Disability			
Industrial Disability			
Pre-Retirement Death Benefits			
Optional Settlement 2			
1959 Survivor Benefit Level			
Special			
Alternate (firefighters)			
Post-Retirement Death Benefits			
Lump Sum	$500	$500	
Survivor Allowance (PRSA)	Yes	Yes	
COLA	2%	2%	

Appendices

- **Appendix A – Actuarial Methods and Assumptions**
- **Appendix B – Principal Plan Provisions**
- **Appendix C – Participant Data**
- **Appendix D – Glossary of Actuarial Terms**

Appendix A

Actuarial Methods and Assumptions

- **Actuarial Data**
- **Actuarial Methods**
- **Actuarial Assumptions**
- **Miscellaneous**

Actuarial Data

As stated in the Actuarial Certification, the data which serves as the basis of this valuation has been obtained from the various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate. We are unaware of any potential data issues that would have a material effect on the results of this valuation, except that data does not always contain the latest salary information for former members now in reciprocal systems and does not recognize the potential for unusually large salary deviation in certain cases such as elected officials. Therefore, salary information in these cases may not be accurate. These situations are relatively infrequent, however, and generally do not have a material impact on the required employer contributions.

Actuarial Methods

Actuarial Cost Method

The actuarial cost method used is the Entry Age Actuarial Cost Method. Under this method, projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

The actuarial accrued liability for active members is then calculated as the portion of the total cost of the plan allocated to prior years. The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits is equal to the present value of the benefits expected to be paid. No normal costs are applicable for these participants.

CalPERS uses an in-house proprietary actuarial model for calculating pension plan costs. We believe this model is fit for its intended purpose and meets all applicable Actuarial Standards of Practice. Furthermore, the actuarial results of our model are independently confirmed periodically by outside auditing actuaries. The actuarial assumptions used are internally consistent and the generated results reasonable. A further refinement to the actuarial model will be the introduction of generational mortality in the June 30, 2021 actuarial valuation.

Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and a payment toward the UAL. The UAL payment is equal to the sum of individual amortization payments, each representing a different source of UAL for a given measurement period.

Amortization payments are determined according to the CalPERS amortization policy. The CalPERS Board adopted a new policy effective for the June 30, 2019 actuarial valuation. The new policy applies prospectively only; amortization bases (sources of UAL) established prior to the June 30, 2019 valuation will continue to be amortized according to the prior policy.

Prior Policy (Bases Established prior to June 30, 2019)

Amortization payments are determined as a level percentage of payroll whereby the payment increases each year at an escalation rate. Gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. Bases established prior to June 30, 2013 may be amortized differently. A summary is provided in the following table:

Driver	Source				
	(Gain)/Loss		Assumption/Method Change	Benefit Change	Golden Handshake
	Investment	Non-investment			
Amortization Period	30 Years	30 Years	20 Years	20 Years	5 Years
Escalation Rate - Active Plans - Inactive Plans	 2.75% 0%	 2.75% 0%	 2.75% 0%	 2.75% 0%	 2.75% 0%
Ramp Up	5	5	5	0	0
Ramp Down	5	5	5	0	0

The 5-year ramp up means that the payments in the first four years of the amortization period are 20%, 40%, 60% and 80% of the "full" payment which begins in year five. The 5-year ramp down means that the reverse is true in the final four years of the amortization period.

Current Policy (Bases Established on or after June 30, 2019)

Amortization payments are determined as a level dollar amount. Investment gains or losses are amortized over a fixed 20-year period with a 5-year ramp up at the beginning of the amortization period. Non-investment gains or losses are amortized over a fixed 20-year period with no ramps. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramps. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with no ramps. Changes in unfunded accrued liability due to a Golden Handshake are amortized over a period of five years. A summary is provided in the table below:

	Source				
	(Gain)/Loss		Assumption/ Method Change	Benefit Change	Golden Handshake
	Investment	Non-investment			
Amortization Period	20 Years	20 Years	20 Years	20 Years	5 Years
Escalation Rate	0%	0%	0%	0%	0%
Ramp Up	5	0	0	0	0
Ramp Down	0	0	0	0	0

Exceptions for Inconsistencies

An exception to the amortization rules above is used whenever their application results in inconsistencies. In these cases, a "fresh start" approach is used. This means that the current unfunded actuarial liability is projected and amortized over a set number of years. For example, a fresh start is needed in the following situations:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

It should be noted that the actuary may determine that a fresh start is necessary under other circumstances. In all cases of a fresh start, the period is set by the actuary at what is deemed appropriate; however, the period will not be greater than 20 years.

Exceptions for Plans in Surplus

If a surplus exists (i.e. the Market Value of Assets exceeds the plan's accrued liability) any prior amortization layers shall be considered fully amortized, and the surplus shall not be amortized.

In the event of any subsequent unfunded liability, a Fresh Start shall be used with an amortization period of 20 years or less.

Exceptions for Small Amounts

Where small unfunded liabilities are identified in annual valuations which result in small payment amounts, the actuary may shorten the remaining period for these bases.

- When the balance of a single amortization base has an absolute value less than $250, the amortization period is reduced to one year.
- When the entire unfunded liability is a small amount the actuary may perform a Fresh Start and use an appropriate amortization period.

Exceptions for Inactive Plans

The following exceptions apply to plans classified as Inactive. These plans have no active members and no expectation to have active members in the future.

- Amortization of the unfunded liability is on a "level dollar" basis rather than a "level percent of pay" basis. For amortization layers, which utilize a ramp up and ramp down, the "ultimate" payment is constant.
- Actuarial judgment will be used to shorten amortization periods for Inactive plans with existing periods that are deemed too long given the duration of the liability. The specific demographics of the plan will be used to determine if shorter periods may be more appropriate.

Exceptions for Inactive Agencies

For a public agency with no active members in any CalPERS rate plan, the unfunded liability shall be amortized over a closed amortization period of no more than 15 years.

Asset Valuation Method

The Actuarial Value of Assets is set equal to the market value of assets. Asset values include accounts receivable.

PEPRA Normal Cost Rate Methodology

Per Government Code Section 7522.30(b), the "normal cost rate" shall mean the annual actuarially determined normal cost for the plan of retirement benefits provided to the new member and shall be established based on actuarial assumptions used to determine the liabilities and costs as part of the annual actuarial valuation. The plan of retirement benefits shall include any elements that would impact the actuarial determination of the normal cost, including, but not limited to, the retirement formula, eligibility and vesting criteria, ancillary benefit provisions, and any automatic cost-of-living adjustments as determined by the public retirement system.

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions.

Actuarial Assumptions

In 2017, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In December 2017, the CalPERS Board of Administration adopted relatively modest changes to the asset allocation that reduced the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 7.00%. The Board also approved several changes to the demographic assumptions that more closely aligned with actual experience.

On December 21, 2016, the CalPERS Board of Administration lowered the discount rate from 7.50% to 7.00% using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for fiscal year 2022-23 determined in this valuation were calculated using a discount rate of 7.00%. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate schedule provides a more realistic assumption for the long-term investment return of the fund.

Notwithstanding the Board's decision to phase into a 7.00% discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a change to this discount rate schedule.

For more details and additional rationale for the selection of the actuarial assumptions, please refer to the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017 that can be found on the CalPERS website under: "Forms and Publications". Click on "View All" and search for Experience Study.

All actuarial assumptions (except the discount rates used for the hypothetical termination liability) represent an estimate of future experience rather than observations of the estimates inherent in market data.

Economic Assumptions

Discount Rate

The prescribed discount rate assumption, adopted by the Board on December 21, 2016, is 7.00% compounded annually (net of investment and administrative expenses) as of June 30, 2020.

Termination Liability Discount Rate

The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date.

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 19-month period from 12 months before the valuation date to 7 months after. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 1.18% on June 30, 2020.

Salary Growth

Annual increases vary by category, entry age, and duration of service. A sample of assumed increases are shown below. Wage inflation assumption in the valuation year (2.75% for 2020) is added to these factors for total salary growth.

Public Agency Miscellaneous

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0850	0.0775	0.0650
1	0.0690	0.0635	0.0525
2	0.0560	0.0510	0.0410
3	0.0470	0.0425	0.0335
4	0.0400	0.0355	0.0270
5	0.0340	0.0295	0.0215
10	0.0160	0.0135	0.0090
15	0.0120	0.0100	0.0060
20	0.0090	0.0075	0.0045
25	0.0080	0.0065	0.0040
30	0.0080	0.0065	0.0040

Public Agency Fire

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1700	0.1700	0.1700
1	0.1100	0.1100	0.1100
2	0.0700	0.0700	0.0700
3	0.0580	0.0580	0.0580
4	0.0473	0.0473	0.0473
5	0.0372	0.0372	0.0372
10	0.0165	0.0165	0.0165
15	0.0144	0.0144	0.0144
20	0.0126	0.0126	0.0126
25	0.0111	0.0111	0.0111
30	0.0097	0.0097	0.0097

Public Agency Police

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1027	0.1027	0.1027
1	0.0803	0.0803	0.0803
2	0.0628	0.0628	0.0628
3	0.0491	0.0491	0.0491
4	0.0384	0.0384	0.0384
5	0.0300	0.0300	0.0300
10	0.0145	0.0145	0.0145
15	0.0150	0.0150	0.0150
20	0.0155	0.0155	0.0155
25	0.0160	0.0160	0.0160
30	0.0165	0.0165	0.0165

Salary Growth (continued)

Public Agency County Peace Officers

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.1320	0.1320	0.1320
1	0.0960	0.0960	0.0960
2	0.0657	0.0657	0.0657
3	0.0525	0.0525	0.0525
4	0.0419	0.0419	0.0419
5	0.0335	0.0335	0.0335
10	0.0170	0.0170	0.0170
15	0.0150	0.0150	0.0150
20	0.0150	0.0150	0.0150
25	0.0175	0.0175	0.0175
30	0.0200	0.0200	0.0200

Schools

Duration of Service	(Entry Age 20)	(Entry Age 30)	(Entry Age 40)
0	0.0428	0.0419	0.0380
1	0.0428	0.0419	0.0380
2	0.0428	0.0419	0.0380
3	0.0354	0.0332	0.0280
4	0.0305	0.0279	0.0224
5	0.0262	0.0234	0.0180
10	0.0171	0.0154	0.0112
15	0.0152	0.0134	0.0098
20	0.0135	0.0117	0.0086
25	0.0120	0.0103	0.0076
30	0.0087	0.0071	0.0048

- The Miscellaneous salary scale is used for Local Prosecutors.
- The Police salary scale is used for Other Safety, Local Sheriff, and School Police.

Overall Payroll Growth

2.75% compounded annually (used in projecting the payroll over which the unfunded liability is amortized). This assumption is used for all plans with active members.

Inflation

2.50% compounded annually.

Non-valued Potential Additional Liabilities

The potential liability loss for a cost-of-living increase exceeding the 2.50% inflation assumption and any potential liability loss from future member service purchases are not reflected in the valuation.

Miscellaneous Loading Factors

Credit for Unused Sick Leave

Total years of service is increased by 1% for those plans that have adopted the provision of providing Credit for Unused Sick Leave.

Conversion of Employer Paid Member Contributions (EPMC)

Total years of service is increased by the Employee Contribution Rate for those plans with the provision providing for the Conversion of Employer Paid Member Contributions (EPMC) during the final compensation period.

Norris Decision (Best Factors)

Employees hired prior to July 1, 1982 have projected benefit amounts increased in order to reflect the use of "Best Factors" in the calculation of optional benefit forms. This is due to a 1983 Supreme Court decision, known as the Norris decision, which required males and females to be treated equally in the determination of benefit amounts. Consequently, anyone already employed at that time is given the best possible conversion factor when optional benefits are determined. No loading is necessary for employees hired after July 1, 1982.

Termination Liability

The termination liabilities include a 5% contingency load. This load is for unforeseen negative experience.

Demographic Assumptions

Pre-Retirement Mortality

Non-industrial death rates vary by age and gender. Industrial death rates vary by age. See sample rates in table below. The non-industrial death rates are used for all plans. The industrial death rates are used for safety plans (except for Local Prosecutor safety members where the corresponding miscellaneous plan does not have the Industrial Death Benefit).

	Non-Industrial Death (Not Job-Related)		**Industrial Death (Job-Related)**
Age	Male	Female	Male and Female
20	0.00022	0.00007	0.00004
25	0.00029	0.00011	0.00006
30	0.00038	0.00015	0.00007
35	0.00049	0.00027	0.00009
40	0.00064	0.00037	0.00010
45	0.00080	0.00054	0.00012
50	0.00116	0.00079	0.00013
55	0.00172	0.00120	0.00015
60	0.00255	0.00166	0.00016
65	0.00363	0.00233	0.00018
70	0.00623	0.00388	0.00019
75	0.01057	0.00623	0.00021
80	0.01659	0.00939	0.00022

Miscellaneous plans usually have industrial death rates set to zero unless the agency has specifically contracted for industrial death benefits. If so, each non-industrial death rate shown above will be split into two components; 99% will become the non-industrial death rate and 1% will become the industrial death rate.

Post-Retirement Mortality

Rates vary by age, type of retirement, and gender. See sample rates in table below. These rates are used for all plans.

	Healthy Recipients		Non-Industrially Disabled (Not Job-Related)		Industrially Disabled (Job-Related)	
Age	Male	Female	Male	Female	Male	Female
50	0.00372	0.00346	0.01183	0.01083	0.00372	0.00346
55	0.00437	0.00410	0.01613	0.01178	0.00437	0.00410
60	0.00671	0.00476	0.02166	0.01404	0.00671	0.00476
65	0.00928	0.00637	0.02733	0.01757	0.01113	0.00765
70	0.01339	0.00926	0.03358	0.02183	0.01607	0.01111
75	0.02316	0.01635	0.04277	0.02969	0.02779	0.01962
80	0.03977	0.03007	0.06272	0.04641	0.04773	0.03609
85	0.07122	0.05418	0.09793	0.07847	0.08547	0.06501
90	0.13044	0.10089	0.14616	0.13220	0.14348	0.11098
95	0.21658	0.17698	0.21658	0.21015	0.21658	0.17698
100	0.32222	0.28151	0.32222	0.32226	0.32222	0.28151
105	0.46691	0.43491	0.46691	0.43491	0.46691	0.43491
110	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

The post-retirement mortality rates above include 15 years of projected on-going mortality improvement using 90% of Scale MP 2016 published by the Society of Actuaries.

Marital Status

For active members, a percentage who are married upon retirement is assumed according to member category as shown in the following table.

Member Category	Percent Married
Miscellaneous Member	70%
Local Police	85%
Local Fire	90%
Other Local Safety	70%
School Police	85%
Local County Peace Officers	75%

Age of Spouse

It is assumed that female spouses are 3 years younger than male spouses. This assumption is used for all plans.

Terminated Members

It is assumed that terminated members refund immediately if non-vested. Terminated members who are vested are assumed to retire at age 59 for Miscellaneous members and age 54 for safety members.

Termination with Refund

Rates vary by entry age and service for miscellaneous plans. Rates vary by service for safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40	Entry Age 45
0	0.1742	0.1674	0.1606	0.1537	0.1468	0.1400
1	0.1545	0.1477	0.1409	0.1339	0.1271	0.1203
2	0.1348	0.1280	0.1212	0.1142	0.1074	0.1006
3	0.1151	0.1083	0.1015	0.0945	0.0877	0.0809
4	0.0954	0.0886	0.0818	0.0748	0.0680	0.0612
5	0.0212	0.0193	0.0174	0.0155	0.0136	0.0116
10	0.0138	0.0121	0.0104	0.0088	0.0071	0.0055
15	0.0060	0.0051	0.0042	0.0032	0.0023	0.0014
20	0.0037	0.0029	0.0021	0.0013	0.0005	0.0001
25	0.0017	0.0011	0.0005	0.0001	0.0001	0.0001
30	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001
35	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Public Agency Safety

Duration of Service	Fire	Police	County Peace Officer
0	0.1298	0.1013	0.1188
1	0.0674	0.0636	0.0856
2	0.0320	0.0271	0.0617
3	0.0237	0.0258	0.0445
4	0.0087	0.0245	0.0321
5	0.0052	0.0086	0.0121
10	0.0005	0.0053	0.0053
15	0.0004	0.0027	0.0025
20	0.0003	0.0017	0.0012
25	0.0002	0.0012	0.0005
30	0.0002	0.0009	0.0003
35	0.0001	0.0009	0.0002

The police termination and refund rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Schools

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40	Entry Age 45
0	0.2107	0.2107	0.1827	0.1546	0.1375	0.1203
1	0.1807	0.1807	0.1526	0.1246	0.1105	0.0963
2	0.1526	0.1526	0.1259	0.0992	0.0878	0.0765
3	0.1266	0.1266	0.1023	0.0780	0.0691	0.0603
4	0.1026	0.1026	0.0815	0.0605	0.0537	0.0469
5	0.0808	0.0808	0.0634	0.0461	0.0409	0.0358
10	0.0202	0.0202	0.0157	0.0112	0.0087	0.0063
15	0.0107	0.0107	0.0077	0.0048	0.0034	0.0021
20	0.0056	0.0056	0.0037	0.0017	0.0016	0.0016
25	0.0026	0.0026	0.0018	0.0009	0.0012	0.0015
30	0.0013	0.0013	0.0011	0.0009	0.0012	0.0015
35	0.0008	0.0008	0.0009	0.0009	0.0012	0.0015

Termination with Vested Benefits

Rates vary by entry age and service for miscellaneous plans. Rates vary by service for safety plans. See sample rates in tables below.

Public Agency Miscellaneous

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40
5	0.0422	0.0422	0.0393	0.0364	0.0344
10	0.0278	0.0278	0.0271	0.0263	0.0215
15	0.0192	0.0192	0.0174	0.0156	0.0120
20	0.0139	0.0139	0.0109	0.0079	0.0047
25	0.0083	0.0083	0.0048	0.0014	0.0007
30	0.0015	0.0015	0.0007	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000

Public Agency Safety

Duration of Service	Fire	Police	County Peace Officer
5	0.0094	0.0163	0.0187
10	0.0064	0.0126	0.0134
15	0.0048	0.0082	0.0092
20	0.0038	0.0065	0.0064
25	0.0026	0.0058	0.0042
30	0.0014	0.0056	0.0022
35	0.0000	0.0000	0.0000

- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.
- The Police termination with vested benefits rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

Schools

Duration of Service	Entry Age 20	Entry Age 25	Entry Age 30	Entry Age 35	Entry Age 40
5	0.0405	0.0405	0.0346	0.0288	0.0264
10	0.0324	0.0324	0.0280	0.0235	0.0211
15	0.0202	0.0202	0.0179	0.0155	0.0126
20	0.0144	0.0144	0.0114	0.0083	0.0042
25	0.0091	0.0091	0.0046	0.0000	0.0000
30	0.0015	0.0015	0.0007	0.0000	0.0000
35	0.0000	0.0000	0.0000	0.0000	0.0000

Non-Industrial (Not Job-Related) Disability

Rates vary by age and gender for miscellaneous plans. Rates vary by age and category for safety plans.

	Miscellaneous		Fire	Police	County Peace Officer	Schools	
Age	Male	Female	Male and Female	Male and Female	Male and Female	Male	Female
20	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
25	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
30	0.0002	0.0002	0.0001	0.0002	0.0001	0.0001	0.0002
35	0.0004	0.0007	0.0001	0.0003	0.0004	0.0005	0.0004
40	0.0010	0.0014	0.0001	0.0004	0.0007	0.0012	0.0008
45	0.0015	0.0019	0.0002	0.0005	0.0013	0.0020	0.0017
50	0.0016	0.0020	0.0005	0.0008	0.0018	0.0026	0.0022
55	0.0016	0.0015	0.0007	0.0013	0.0010	0.0025	0.0018
60	0.0015	0.0011	0.0007	0.0020	0.0006	0.0022	0.0011

- The miscellaneous non-industrial disability rates are used for Local Prosecutors.
- The police non-industrial disability rates are also used for Other Safety, Local Sheriff, and School Police.

Industrial (Job-Related) Disability

Rates vary by age and category.

Age	Fire	Police	County Peace Officer
20	0.0001	0.0000	0.0004
25	0.0002	0.0017	0.0013
30	0.0006	0.0048	0.0025
35	0.0012	0.0079	0.0037
40	0.0023	0.0110	0.0051
45	0.0040	0.0141	0.0067
50	0.0208	0.0185	0.0092
55	0.0307	0.0479	0.0151
60	0.0438	0.0602	0.0174

- The police industrial disability rates are also used for Local Sheriff and Other Safety.
- 50% of the police industrial disability rates are used for School Police.
- 1% of the police industrial disability rates are used for Local Prosecutors.
- Normally, rates are zero for miscellaneous plans unless the agency has specifically contracted for industrial disability benefits. If so, each miscellaneous non-industrial disability rate will be split into two components: 50% will become the non-industrial disability rate and 50% will become the industrial disability rate.

Service Retirement

Retirement rates vary by age, service, and formula, except for the safety ½ @ 55 and 2% @ 55 formulas, where retirement rates vary by age only.

Public Agency Miscellaneous 1.5% @ 65

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.011	0.013	0.015	0.017	0.019
51	0.007	0.010	0.012	0.013	0.015	0.017
52	0.010	0.014	0.017	0.019	0.021	0.024
53	0.008	0.012	0.015	0.017	0.019	0.022
54	0.012	0.016	0.019	0.022	0.025	0.028
55	0.018	0.025	0.031	0.035	0.038	0.043
56	0.015	0.021	0.025	0.029	0.032	0.036
57	0.020	0.028	0.033	0.038	0.043	0.048
58	0.024	0.033	0.040	0.046	0.052	0.058
59	0.028	0.039	0.048	0.054	0.060	0.067
60	0.049	0.069	0.083	0.094	0.105	0.118
61	0.062	0.087	0.106	0.120	0.133	0.150
62	0.104	0.146	0.177	0.200	0.223	0.251
63	0.099	0.139	0.169	0.191	0.213	0.239
64	0.097	0.136	0.165	0.186	0.209	0.233
65	0.140	0.197	0.240	0.271	0.302	0.339
66	0.092	0.130	0.157	0.177	0.198	0.222
67	0.129	0.181	0.220	0.249	0.277	0.311
68	0.092	0.129	0.156	0.177	0.197	0.221
69	0.092	0.130	0.158	0.178	0.199	0.224
70	0.103	0.144	0.175	0.198	0.221	0.248

Public Agency Miscellaneous 2% @ 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.020	0.020	0.020	0.020	0.020	0.150
51	0.006	0.019	0.027	0.031	0.035	0.038
52	0.011	0.024	0.031	0.034	0.037	0.040
53	0.010	0.015	0.021	0.027	0.033	0.040
54	0.025	0.025	0.029	0.035	0.041	0.048
55	0.019	0.026	0.033	0.092	0.136	0.146
56	0.030	0.034	0.038	0.060	0.093	0.127
57	0.030	0.046	0.061	0.076	0.090	0.104
58	0.040	0.044	0.059	0.080	0.101	0.122
59	0.024	0.044	0.063	0.083	0.103	0.122
60	0.070	0.074	0.089	0.113	0.137	0.161
61	0.080	0.086	0.093	0.118	0.156	0.195
62	0.100	0.117	0.133	0.190	0.273	0.357
63	0.140	0.157	0.173	0.208	0.255	0.301
64	0.140	0.153	0.165	0.196	0.239	0.283
65	0.140	0.178	0.215	0.264	0.321	0.377
66	0.140	0.178	0.215	0.264	0.321	0.377
67	0.140	0.178	0.215	0.264	0.321	0.377
68	0.112	0.142	0.172	0.211	0.257	0.302
69	0.112	0.142	0.172	0.211	0.257	0.302
70	0.140	0.178	0.215	0.264	0.321	0.377

Service Retirement

Public Agency Miscellaneous 2% @ 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.013	0.018	0.021	0.022	0.033
51	0.009	0.016	0.020	0.023	0.026	0.036
52	0.015	0.018	0.020	0.021	0.025	0.030
53	0.016	0.020	0.024	0.028	0.031	0.035
54	0.018	0.022	0.026	0.030	0.034	0.038
55	0.040	0.040	0.056	0.093	0.109	0.154
56	0.034	0.050	0.066	0.092	0.107	0.138
57	0.042	0.048	0.058	0.082	0.096	0.127
58	0.046	0.054	0.062	0.090	0.106	0.131
59	0.045	0.055	0.066	0.097	0.115	0.144
60	0.058	0.075	0.093	0.126	0.143	0.169
61	0.065	0.088	0.111	0.146	0.163	0.189
62	0.136	0.118	0.148	0.190	0.213	0.247
63	0.130	0.133	0.174	0.212	0.249	0.285
64	0.113	0.129	0.165	0.196	0.223	0.249
65	0.145	0.173	0.201	0.233	0.266	0.289
66	0.170	0.199	0.229	0.258	0.284	0.306
67	0.250	0.204	0.233	0.250	0.257	0.287
68	0.227	0.175	0.193	0.215	0.240	0.262
69	0.200	0.180	0.180	0.198	0.228	0.246
70	0.150	0.171	0.192	0.239	0.304	0.330

Public Agency Miscellaneous 2.5% @ 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.014	0.020	0.026	0.033	0.050
51	0.008	0.015	0.023	0.030	0.037	0.059
52	0.009	0.016	0.023	0.030	0.037	0.061
53	0.014	0.021	0.028	0.035	0.042	0.063
54	0.014	0.022	0.030	0.039	0.047	0.068
55	0.020	0.038	0.055	0.073	0.122	0.192
56	0.025	0.047	0.069	0.091	0.136	0.196
57	0.030	0.048	0.065	0.083	0.123	0.178
58	0.035	0.054	0.073	0.093	0.112	0.153
59	0.035	0.054	0.073	0.092	0.131	0.183
60	0.044	0.072	0.101	0.130	0.158	0.197
61	0.050	0.078	0.105	0.133	0.161	0.223
62	0.055	0.093	0.130	0.168	0.205	0.268
63	0.090	0.124	0.158	0.192	0.226	0.279
64	0.080	0.112	0.144	0.175	0.207	0.268
65	0.120	0.156	0.193	0.229	0.265	0.333
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Miscellaneous 2.7% @ 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.003	0.010	0.016	0.034	0.033	0.045
51	0.009	0.016	0.023	0.042	0.038	0.047
52	0.015	0.019	0.024	0.040	0.036	0.046
53	0.012	0.020	0.028	0.047	0.046	0.060
54	0.020	0.027	0.035	0.054	0.056	0.073
55	0.033	0.055	0.078	0.113	0.156	0.234
56	0.039	0.067	0.095	0.135	0.169	0.227
57	0.050	0.067	0.084	0.113	0.142	0.198
58	0.043	0.066	0.089	0.124	0.151	0.201
59	0.050	0.070	0.090	0.122	0.158	0.224
60	0.060	0.086	0.112	0.150	0.182	0.238
61	0.071	0.094	0.117	0.153	0.184	0.241
62	0.091	0.122	0.152	0.194	0.226	0.279
63	0.143	0.161	0.179	0.209	0.222	0.250
64	0.116	0.147	0.178	0.221	0.254	0.308
65	0.140	0.174	0.208	0.254	0.306	0.389
66	0.170	0.209	0.247	0.298	0.310	0.324
67	0.170	0.199	0.228	0.269	0.296	0.342
68	0.150	0.181	0.212	0.255	0.287	0.339
69	0.150	0.181	0.212	0.255	0.287	0.339
70	0.150	0.181	0.212	0.243	0.291	0.350

Public Agency Miscellaneous 3% @ 60

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.013	0.019	0.026	0.042	0.038	0.064
51	0.035	0.037	0.039	0.052	0.047	0.062
52	0.023	0.030	0.038	0.055	0.051	0.056
53	0.025	0.032	0.040	0.057	0.056	0.066
54	0.035	0.042	0.050	0.067	0.066	0.076
55	0.040	0.052	0.064	0.085	0.095	0.120
56	0.043	0.056	0.070	0.094	0.102	0.150
57	0.045	0.060	0.074	0.099	0.109	0.131
58	0.053	0.056	0.059	0.099	0.126	0.185
59	0.050	0.068	0.085	0.113	0.144	0.202
60	0.089	0.106	0.123	0.180	0.226	0.316
61	0.100	0.117	0.133	0.212	0.230	0.298
62	0.130	0.155	0.180	0.248	0.282	0.335
63	0.120	0.163	0.206	0.270	0.268	0.352
64	0.150	0.150	0.150	0.215	0.277	0.300
65	0.200	0.242	0.283	0.330	0.300	0.342
66	0.220	0.264	0.308	0.352	0.379	0.394
67	0.250	0.279	0.309	0.338	0.371	0.406
68	0.170	0.196	0.223	0.249	0.290	0.340
69	0.220	0.261	0.302	0.344	0.378	0.408
70	0.220	0.255	0.291	0.326	0.358	0.388

Service Retirement

Public Agency Miscellaneous 2% @ 62

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000
52	0.005	0.008	0.012	0.015	0.019	0.031
53	0.007	0.011	0.014	0.018	0.021	0.032
54	0.007	0.011	0.015	0.019	0.023	0.034
55	0.010	0.019	0.028	0.036	0.061	0.096
56	0.014	0.026	0.038	0.050	0.075	0.108
57	0.018	0.029	0.039	0.050	0.074	0.107
58	0.023	0.035	0.048	0.060	0.073	0.099
59	0.025	0.038	0.051	0.065	0.092	0.128
60	0.031	0.051	0.071	0.091	0.111	0.138
61	0.038	0.058	0.079	0.100	0.121	0.167
62	0.044	0.074	0.104	0.134	0.164	0.214
63	0.077	0.105	0.134	0.163	0.192	0.237
64	0.072	0.101	0.129	0.158	0.187	0.242
65	0.108	0.141	0.173	0.206	0.239	0.300
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Fire ½ @ 55 and 2% @ 55

Age	Rate	Age	Rate
50	0.0159	56	0.1108
51	0.0000	57	0.0000
52	0.0344	58	0.0950
53	0.0199	59	0.0441
54	0.0413	60	1.00000
55	0.0751		

Public Agency Police ½ @ 55 and 2% @ 55

Age	Rate	Age	Rate
50	0.0255	56	0.0692
51	0.0000	57	0.0511
52	0.0164	58	0.0724
53	0.0272	59	0.0704
54	0.0095	60	0.3000
55	0.1667		

Service Retirement

Public Agency Police 2% @ 50

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.040	0.040	0.040	0.040	0.058	0.094
52	0.040	0.040	0.040	0.040	0.061	0.087
53	0.040	0.040	0.040	0.040	0.082	0.123
54	0.040	0.040	0.040	0.046	0.098	0.158
55	0.072	0.072	0.072	0.096	0.141	0.255
56	0.066	0.066	0.066	0.088	0.129	0.228
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.080	0.080	0.080	0.088	0.138	0.228
59	0.080	0.080	0.080	0.092	0.140	0.228
60	0.150	0.150	0.150	0.150	0.150	0.228
61	0.144	0.144	0.144	0.144	0.144	0.170
62	0.150	0.150	0.150	0.150	0.150	0.213
63	0.150	0.150	0.150	0.150	0.150	0.213
64	0.150	0.150	0.150	0.150	0.150	0.319
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% @ 50

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.009	0.009	0.009	0.009	0.013	0.020
51	0.013	0.013	0.013	0.013	0.020	0.029
52	0.018	0.018	0.018	0.018	0.028	0.042
53	0.052	0.052	0.052	0.052	0.079	0.119
54	0.067	0.067	0.067	0.067	0.103	0.154
55	0.089	0.089	0.089	0.089	0.136	0.204
56	0.083	0.083	0.083	0.083	0.127	0.190
57	0.082	0.082	0.082	0.082	0.126	0.189
58	0.088	0.088	0.088	0.088	0.136	0.204
59	0.074	0.074	0.074	0.074	0.113	0.170
60	0.100	0.100	0.100	0.100	0.154	0.230
61	0.072	0.072	0.072	0.072	0.110	0.165
62	0.099	0.099	0.099	0.099	0.152	0.228
63	0.114	0.114	0.114	0.114	0.175	0.262
64	0.114	0.114	0.114	0.114	0.175	0.262
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% @ 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.035	0.035	0.035	0.035	0.070	0.090
51	0.028	0.028	0.028	0.029	0.065	0.101
52	0.032	0.032	0.032	0.039	0.066	0.109
53	0.028	0.028	0.028	0.043	0.075	0.132
54	0.038	0.038	0.038	0.074	0.118	0.333
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% @ 55

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.001	0.001	0.001	0.006	0.016	0.069
51	0.002	0.002	0.002	0.006	0.018	0.071
52	0.012	0.012	0.012	0.021	0.040	0.098
53	0.032	0.032	0.032	0.049	0.085	0.149
54	0.057	0.057	0.057	0.087	0.144	0.217
55	0.073	0.073	0.073	0.109	0.179	0.259
56	0.064	0.064	0.064	0.097	0.161	0.238
57	0.063	0.063	0.063	0.095	0.157	0.233
58	0.065	0.065	0.065	0.099	0.163	0.241
59	0.088	0.088	0.088	0.131	0.213	0.299
60	0.105	0.105	0.105	0.155	0.251	0.344
61	0.118	0.118	0.118	0.175	0.282	0.380
62	0.087	0.087	0.087	0.128	0.210	0.295
63	0.067	0.067	0.067	0.100	0.165	0.243
64	0.067	0.067	0.067	0.100	0.165	0.243
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% @ 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.100	0.155	0.400
51	0.040	0.040	0.040	0.090	0.140	0.380
52	0.040	0.040	0.040	0.070	0.115	0.350
53	0.040	0.040	0.040	0.080	0.135	0.350
54	0.040	0.040	0.040	0.090	0.145	0.350
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 3% @ 50

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.020	0.020	0.020	0.040	0.130	0.192
51	0.008	0.008	0.008	0.023	0.107	0.164
52	0.023	0.023	0.023	0.043	0.136	0.198
53	0.023	0.023	0.023	0.043	0.135	0.198
54	0.027	0.027	0.027	0.048	0.143	0.207
55	0.043	0.043	0.043	0.070	0.174	0.244
56	0.053	0.053	0.053	0.085	0.196	0.269
57	0.054	0.054	0.054	0.086	0.197	0.271
58	0.052	0.052	0.052	0.084	0.193	0.268
59	0.075	0.075	0.075	0.116	0.239	0.321
60	0.065	0.065	0.065	0.102	0.219	0.298
61	0.076	0.076	0.076	0.117	0.241	0.324
62	0.068	0.068	0.068	0.106	0.224	0.304
63	0.027	0.027	0.027	0.049	0.143	0.208
64	0.094	0.094	0.094	0.143	0.277	0.366
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2% @ 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.040	0.040	0.040	0.040	0.040	0.080
51	0.028	0.028	0.028	0.028	0.040	0.066
52	0.028	0.028	0.028	0.028	0.043	0.061
53	0.028	0.028	0.028	0.028	0.057	0.086
54	0.028	0.028	0.028	0.032	0.069	0.110
55	0.050	0.050	0.050	0.067	0.099	0.179
56	0.046	0.046	0.046	0.062	0.090	0.160
57	0.054	0.054	0.054	0.072	0.106	0.191
58	0.060	0.060	0.060	0.066	0.103	0.171
59	0.060	0.060	0.060	0.069	0.105	0.171
60	0.113	0.113	0.113	0.113	0.113	0.171
61	0.108	0.108	0.108	0.108	0.108	0.128
62	0.113	0.113	0.113	0.113	0.113	0.159
63	0.113	0.113	0.113	0.113	0.113	0.159
64	0.113	0.113	0.113	0.113	0.113	0.239
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2% @ 57

	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.005	0.005	0.005	0.005	0.008	0.012
51	0.006	0.006	0.006	0.006	0.009	0.013
52	0.012	0.012	0.012	0.012	0.019	0.028
53	0.033	0.033	0.033	0.033	0.050	0.075
54	0.045	0.045	0.045	0.045	0.069	0.103
55	0.061	0.061	0.061	0.061	0.094	0.140
56	0.055	0.055	0.055	0.055	0.084	0.126
57	0.081	0.081	0.081	0.081	0.125	0.187
58	0.059	0.059	0.059	0.059	0.091	0.137
59	0.055	0.055	0.055	0.055	0.084	0.126
60	0.085	0.085	0.085	0.085	0.131	0.196
61	0.085	0.085	0.085	0.085	0.131	0.196
62	0.085	0.085	0.085	0.085	0.131	0.196
63	0.085	0.085	0.085	0.085	0.131	0.196
64	0.085	0.085	0.085	0.085	0.131	0.196
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.5% @ 57

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.038	0.038	0.038	0.038	0.055	0.089
52	0.038	0.038	0.038	0.038	0.058	0.082
53	0.036	0.036	0.036	0.036	0.073	0.111
54	0.036	0.036	0.036	0.041	0.088	0.142
55	0.061	0.061	0.061	0.082	0.120	0.217
56	0.056	0.056	0.056	0.075	0.110	0.194
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.072	0.072	0.072	0.079	0.124	0.205
59	0.072	0.072	0.072	0.083	0.126	0.205
60	0.135	0.135	0.135	0.135	0.135	0.205
61	0.130	0.130	0.130	0.130	0.130	0.153
62	0.135	0.135	0.135	0.135	0.135	0.191
63	0.135	0.135	0.135	0.135	0.135	0.191
64	0.135	0.135	0.135	0.135	0.135	0.287
65	1.000	1.000	1.000	1.000	1.000	1.000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.5% @ 57

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.007	0.007	0.007	0.007	0.010	0.015
51	0.008	0.008	0.008	0.008	0.012	0.018
52	0.016	0.016	0.016	0.016	0.025	0.038
53	0.042	0.042	0.042	0.042	0.064	0.096
54	0.057	0.057	0.057	0.057	0.088	0.132
55	0.074	0.074	0.074	0.074	0.114	0.170
56	0.066	0.066	0.066	0.066	0.102	0.153
57	0.090	0.090	0.090	0.090	0.139	0.208
58	0.071	0.071	0.071	0.071	0.110	0.164
59	0.066	0.066	0.066	0.066	0.101	0.151
60	0.102	0.102	0.102	0.102	0.157	0.235
61	0.102	0.102	0.102	0.102	0.157	0.236
62	0.102	0.102	0.102	0.102	0.157	0.236
63	0.102	0.102	0.102	0.102	0.157	0.236
64	0.102	0.102	0.102	0.102	0.157	0.236
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.7% @ 57

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.0500	0.0500	0.0500	0.0500	0.0500	0.1000
51	0.0400	0.0400	0.0400	0.0400	0.0575	0.0942
52	0.0380	0.0380	0.0380	0.0380	0.0580	0.0825
53	0.0380	0.0380	0.0380	0.0380	0.0774	0.1169
54	0.0380	0.0380	0.0380	0.0437	0.0931	0.1497
55	0.0684	0.0684	0.0684	0.0912	0.1340	0.2423
56	0.0627	0.0627	0.0627	0.0836	0.1228	0.2168
57	0.0600	0.0600	0.0600	0.0800	0.1175	0.2125
58	0.0800	0.0800	0.0800	0.0880	0.1375	0.2275
59	0.0800	0.0800	0.0800	0.0920	0.1400	0.2275
60	0.1500	0.1500	0.1500	0.1500	0.1500	0.2275
61	0.1440	0.1440	0.1440	0.1440	0.1440	0.1700
62	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
63	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
64	0.1500	0.1500	0.1500	0.1500	0.1500	0.3188
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

Service Retirement

Public Agency Fire 2.7% @ 57

Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.0065	0.0065	0.0065	0.0065	0.0101	0.0151
51	0.0081	0.0081	0.0081	0.0081	0.0125	0.0187
52	0.0164	0.0164	0.0164	0.0164	0.0254	0.0380
53	0.0442	0.0442	0.0442	0.0442	0.0680	0.1018
54	0.0606	0.0606	0.0606	0.0606	0.0934	0.1397
55	0.0825	0.0825	0.0825	0.0825	0.1269	0.1900
56	0.0740	0.0740	0.0740	0.0740	0.1140	0.1706
57	0.0901	0.0901	0.0901	0.0901	0.1387	0.2077
58	0.0790	0.0790	0.0790	0.0790	0.1217	0.1821
59	0.0729	0.0729	0.0729	0.0729	0.1123	0.1681
60	0.1135	0.1135	0.1135	0.1135	0.1747	0.2615
61	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
62	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
63	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
64	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Service Retirement

Schools 2% @ 55						
	Duration of Service					
Age	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.004	0.007	0.011	0.012	0.013	0.015
51	0.004	0.008	0.011	0.014	0.016	0.017
52	0.005	0.010	0.014	0.016	0.018	0.021
53	0.006	0.012	0.016	0.020	0.022	0.025
54	0.008	0.017	0.023	0.027	0.031	0.034
55	0.021	0.042	0.058	0.069	0.077	0.086
56	0.019	0.037	0.053	0.062	0.069	0.078
57	0.019	0.038	0.054	0.064	0.071	0.079
58	0.022	0.045	0.062	0.074	0.082	0.092
59	0.025	0.049	0.069	0.082	0.090	0.101
60	0.033	0.066	0.092	0.109	0.121	0.135
61	0.037	0.072	0.101	0.119	0.133	0.149
62	0.066	0.131	0.184	0.218	0.242	0.271
63	0.064	0.126	0.178	0.209	0.233	0.261
64	0.059	0.117	0.163	0.193	0.215	0.240
65	0.080	0.158	0.221	0.261	0.291	0.326
66	0.081	0.160	0.224	0.265	0.296	0.330
67	0.070	0.139	0.194	0.229	0.255	0.286
68	0.063	0.124	0.173	0.205	0.228	0.255
69	0.066	0.130	0.183	0.216	0.241	0.270
70	0.071	0.140	0.196	0.231	0.258	0.289

Miscellaneous

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. Each year the impact of any changes in this limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. This results in lower contributions for those employers contributing to the Replacement Benefit Fund and protects CalPERS from prefunding expected benefits in excess of limits imposed by federal tax law. The Section 415(b) dollar limit for the 2020 calendar year is $230,000.

Internal Revenue Code Section 401(a)(17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a)(17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2020 calendar year is $285,000.

Appendix B

Principal Plan Provisions

The following is a description of the principal plan provisions used in calculating costs and liabilities. We have indicated whether a plan provision is standard or optional. Standard benefits are applicable to all members while optional benefits vary among employers. Optional benefits that apply to a single period of time, such as Golden Handshakes, have not been included. Many of the statements in this summary are general in nature, and are intended to provide an easily understood summary of the Public Employees' Retirement Law. The law itself governs in all situations.

Service Retirement

Eligibility

A classic CalPERS member or PEPRA Safety member becomes eligible for Service Retirement upon attainment of age 50 with at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). For employees hired into a plan with the 1.5% at age 65 formula, eligibility for service retirement is age 55 with at least 5 years of service. PEPRA miscellaneous members become eligible for service retirement upon attainment of age 52 with at least 5 years of service.

Benefit

The service retirement benefit is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation.*

- The *benefit factor* depends on the benefit formula specified in your agency's contract. The table below shows the factors for each of the available formulas. Factors vary by the member's age at retirement. Listed are the factors for retirement at whole year ages:

Miscellaneous Plan Formulas

Retirement Age	1.5% at 65	2% at 60	2% at 55	2.5% at 55	2.7% at 55	3% at 60	PEPRA 2% at 62
50	0.5000%	1.092%	1.426%	2.000%	2.000%	2.000%	N/A
51	0.5667%	1.156%	1.522%	2.100%	2.140%	2.100%	N/A
52	0.6334%	1.224%	1.628%	2.200%	2.280%	2.200%	1.000%
53	0.7000%	1.296%	1.742%	2.300%	2.420%	2.300%	1.100%
54	0.7667%	1.376%	1.866%	2.400%	2.560%	2.400%	1.200%
55	0.8334%	1.460%	2.000%	2.500%	2.700%	2.500%	1.300%
56	0.9000%	1.552%	2.052%	2.500%	2.700%	2.600%	1.400%
57	0.9667%	1.650%	2.104%	2.500%	2.700%	2.700%	1.500%
58	1.0334%	1.758%	2.156%	2.500%	2.700%	2.800%	1.600%
59	1.1000%	1.874%	2.210%	2.500%	2.700%	2.900%	1.700%
60	1.1667%	2.000%	2.262%	2.500%	2.700%	3.000%	1.800%
61	1.2334%	2.134%	2.314%	2.500%	2.700%	3.000%	1.900%
62	1.3000%	2.272%	2.366%	2.500%	2.700%	3.000%	2.000%
63	1.3667%	2.418%	2.418%	2.500%	2.700%	3.000%	2.100%
64	1.4334%	2.418%	2.418%	2.500%	2.700%	3.000%	2.200%
65	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.300%
66	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.400%
67 & up	1.5000%	2.418%	2.418%	2.500%	2.700%	3.000%	2.500%

Safety Plan Formulas

Retirement Age	½ at 55 *	2% at 55	2% at 50	3% at 55	3% at 50
50	1.783%	1.426%	2.000%	2.400%	3.000%
51	1.903%	1.522%	2.140%	2.520%	3.000%
52	2.035%	1.628%	2.280%	2.640%	3.000%
53	2.178%	1.742%	2.420%	2.760%	3.000%
54	2.333%	1.866%	2.560%	2.880%	3.000%
55 & Up	2.500%	2.000%	2.700%	3.000%	3.000%

* For this formula, the benefit factor also varies by entry age. The factors shown are for members with an entry age of 35 or greater. If entry age is less than 35, then the age 55 benefit factor is 50% divided by the difference between age 55 and entry age. The benefit factor for ages prior to age 55 is the same proportion of the age 55 benefit factor as in the above table.

PEPRA Safety Plan Formulas

Retirement Age	2% at 57	2.5% at 57	2.7% at 57
50	1.426%	2.000%	2.000%
51	1.508%	2.071%	2.100%
52	1.590%	2.143%	2.200%
53	1.672%	2.214%	2.300%
54	1.754%	2.286%	2.400%
55	1.836%	2.357%	2.500%
56	1.918%	2.429%	2.600%
57 & Up	2.000%	2.500%	2.700%

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. An agency may contract for an optional benefit where any unused sick leave accumulated at the time of retirement will be converted to credited service at a rate of 0.004 years of service for each day of sick leave.

- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is $126,291 for 2020 and for those employees that do not participate in Social Security the cap for 2020 is $151,549. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.

- Employees must be covered by Social Security with the 1.5% at 65 formula. Social Security is optional for all other benefit formulas. For employees covered by Social Security, the modified formula is the standard benefit. Under this type of formula, the final compensation is offset by $133.33 (or by one third if the final compensation is less than $400). Employers may contract for the full benefit with Social Security that will eliminate the offset applicable to the final compensation. For employees not covered by Social Security, the full benefit is paid with no offsets.

Auxiliary organizations of the CSUC system may elect reduced contribution rates, in which case the offset is $317 if members are not covered by Social Security or $513 if members are covered by Social Security.

- The miscellaneous and PEPRA safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90% of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

The CalPERS classic members and PEPRA safety members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 50 (55 for employees hired into a 1.5% @ 65 plan). PEPRA miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 52.

Benefit

The vested deferred retirement benefit is the same as the service retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance.

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury, which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job related. A CalPERS member must be actively employed by any CalPERS employer at the time of disability in order to be eligible for this benefit.

Standard Benefit

The standard Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or

- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33⅓% of final compensation.

Improved Benefit

Employers have the option of providing the improved Non-Industrial Disability Retirement benefit. This benefit provides a monthly allowance equal to 30% of final compensation for the first 5 years of service, plus 1% for each additional year of service to a maximum of 50% of final compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members eligible to retire, and who have attained the normal retirement age determined by their service retirement benefit formula, will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

Industrial (Job Related) Disability Retirement

All safety members have this benefit. For miscellaneous members, employers have the option of providing this benefit. An employer may choose to provide the increased benefit option or the improved benefit option.

Eligibility

An employee is eligible for Industrial Disability Retirement if he or she becomes disabled while working, where disabled means the member is unable to perform the duties of the job because of a work-related illness or injury, which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described below.

Standard Benefit

The standard Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation.

Increased Benefit (75% of Final Compensation)

The increased Industrial Disability Retirement benefit is a monthly allowance equal to 75 percent final compensation for total disability.

Improved Benefit (50% to 90% of Final Compensation)

The improved Industrial Disability Retirement benefit is a monthly allowance equal to the Workman's Compensation Appeals Board permanent disability rate percentage (if 50% or greater, with a maximum of 90%) times the final compensation.

For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return of accumulated member contributions with respect to employment in this group. With the standard or increased benefit, a member may also choose to receive the annuitization of the accumulated member contributions.

If a member is eligible for service retirement and if the service retirement benefit is more than the industrial disability retirement benefit, the member may choose to receive the larger benefit.

Post-Retirement Death Benefit

Standard Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of $500 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Improved Lump Sum Payment

Employers have the option of providing an improved lump sum death benefit of $600, $2,000, $3,000, $4,000 or $5,000.

Form of Payment for Retirement Allowance

Standard Form of Payment

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

Improved Form of Payment (Post-Retirement Survivor Allowance)

Employers have the option to contract for the post-retirement survivor allowance.

For retirement allowances with respect to service subject to the modified formula, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. For retirement allowances with respect to service subject to the full or supplemental formula, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. This additional benefit is referred to as post-retirement survivor allowance (PRSA) or simply as survivor continuance.

In other words, 25% or 50% of the allowance, the continuance portion, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried child(ren) until they attain age 18; or, if no eligible child(ren), to a qualifying dependent parent) for the rest of his or her lifetime. This benefit will not be discontinued in the event the spouse remarries.

The remaining 75% or 50% of the retirement allowance, which may be referred to as the option portion of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. Or, the retiree may choose to provide for some of this option portion to be paid to any designated beneficiary after the retiree's death. Benefit options applicable to the option portion are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the option portion.

Pre-Retirement Death Benefits

Basic Death Benefit

This is a standard benefit.

Eligibility

An employee's beneficiary (or estate) may receive the basic death benefit if the member dies while actively employed. A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this basic death benefit.

Benefit

The basic death benefit is a lump sum in the amount of the member's accumulated contributions, where interest is credited annually at the greater of 6% or the prevailing discount rate through the date of death, plus a lump sum in the amount of one month's salary for each completed year of current service, up to a maximum of six months' salary. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

1957 Survivor Benefit

This is a standard benefit.

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for classic and safety PEPRA members and age 52 for miscellaneous PEPRA members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. An eligible survivor means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried child(ren) under age 18. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this 1957 Survivor benefit.

Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified service retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to dependent child(ren), the benefit will be discontinued upon death or attainment of age 18, unless the child(ren) is disabled. The total amount paid will be at least equal to the basic death benefit.

Optional Settlement 2 Death Benefit

This is an optional benefit.

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2 Death benefit if the member dies while actively employed, has attained at least age 50 for classic and safety PEPRA members and age 52 for miscellaneous PEPRA members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this Optional Settlement 2 Death benefit.

Benefit

The Optional Settlement 2 Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected 100% to continue to the eligible survivor after the member's death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Special Death Benefit

This is a standard benefit for safety members. An employer may elect to provide this benefit for miscellaneous members.

Eligibility

An employee's *eligible survivor(s)* may receive the special death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

Benefit

The special death benefit is a monthly allowance equal to 50% of final compensation and will be increased whenever the compensation paid to active employees is increased but ceasing to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death at which time the allowance is continued to any unmarried child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving child(ren) (*eligible* means unmarried child(ren) under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- if 1 eligible child: 12.5% of final compensation
- if 2 eligible children: 20.0% of final compensation
- if 3 or more eligible children: 25.0% of final compensation

Alternate Death Benefit for Local Fire Members

This is an optional benefit available only to local fire members.

Eligibility

An employee's *eligible survivor(s)* may receive the alternate death benefit in lieu of the basic death benefit or the 1957 Survivor benefit if the member dies while actively employed and has at least 20 years of total CalPERS service. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 18.

Benefit

The Alternate Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2. (A retiree who elects Optional Settlement 2 receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) If the member has not yet attained age 50, the benefit is equal to that which would be payable if the member had retired at age 50, based on service credited at the time of death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

Cost-of-Living Adjustments (COLA)

Standard Benefit

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any given year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

Improved Benefit

Employers have the option of providing a COLA of 3%, 4%, or 5%, determined in the same manner as described above for the standard 2% COLA. An improved COLA is not available with the 1.5% at 65 formula.

Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 80% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan.

Employee Contributions

Each employee contributes toward his or her retirement based upon the retirement formula. The standard employee contribution is as described below.

- The percent contributed below the monthly compensation breakpoint is 0%.
- The monthly compensation breakpoint is $0 for full and supplemental formula members and $133.33 for employees covered by the modified formula.
- The percent contributed above the monthly compensation breakpoint depends upon the benefit formula, as shown in the table below.

Benefit Formula	Percent Contributed above the Breakpoint
Miscellaneous, 1.5% at 65	2%
Miscellaneous, 2% at 60	7%
Miscellaneous, 2% at 55	7%
Miscellaneous, 2.5% at 55	8%
Miscellaneous, 2.7% at 55	8%
Miscellaneous, 3% at 60	8%
Miscellaneous, 2% at 62	50% of the Total Normal Cost
Miscellaneous, 1.5% at 65	50% of the Total Normal Cost
Safety, 1/2 at 55	Varies by entry age
Safety, 2% at 55	7%
Safety, 2% at 50	9%
Safety, 3% at 55	9%
Safety, 3% at 50	9%
Safety, 2% at 57	50% of the Total Normal Cost
Safety, 2.5% at 57	50% of the Total Normal Cost
Safety, 2.7% at 57	50% of the Total Normal Cost

The employer may choose to "pick-up" these contributions for classic members (Employer Paid Member Contributions or EPMC). EPMC is prohibited for new PEPRA members.

An employer may also include Employee Cost Sharing in the contract, where employees agree to share the cost of the employer contribution. These contributions are paid in addition to the member contribution.

Auxiliary organizations of the CSU system may elect reduced contribution rates, in which case the offset is $317 and the contribution rate is 6% if members are not covered by Social Security. If members are covered by Social Security, the offset is $513 and the contribution rate is 5%.

Refund of Employee Contributions

If the member's service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited with 6% interest compounded annually.

1959 Survivor Benefit

This is a pre-retirement death benefit available only to members not covered by Social Security. Any agency joining CalPERS subsequent to 1993 is required to provide this benefit if the members are not covered by Social Security. The benefit is optional for agencies joining CalPERS prior to 1994. Levels 1, 2 and 3 are now closed. Any new agency or any agency wishing to add this benefit or increase the current level may only choose the 4th or Indexed Level.

This benefit is not included in the results presented in this valuation. More information on this benefit is available on the CalPERS website.

Appendix C

Participant Data

- **Summary of Valuation Data**
- **Active Members**
- **Transferred and Terminated Members**
- **Retired Members and Beneficiaries**

Summary of Valuation Data

	June 30, 2019	June 30, 2020
1. **Active Members**		
a) Counts	3,265	3,404
b) Average Attained Age	40.36	40.07
c) Average Entry Age to Rate Plan	28.62	28.56
d) Average Years of Credited Service	11.75	11.52
e) Average Annual Covered Pay	$93,333	$92,892
f) Annual Covered Payroll	304,732,882	316,205,748
g) Projected Annual Payroll for Contribution Year	330,571,045	343,016,690
h) Present Value of Future Payroll	2,898,262,882	3,011,365,119
2. **Transferred Members**		
a) Counts	694	701
b) Average Attained Age	40.71	40.67
c) Average Years of Credited Service	3.68	3.78
d) Average Annual Covered Pay	$89,160	$94,036
3. **Terminated Members**		
a) Counts	673	717
b) Average Attained Age	41.82	41.68
c) Average Years of Credited Service	3.50	3.41
d) Average Annual Covered Pay	$53,806	$53,263
4. **Retired Members and Beneficiaries**		
a) Counts	2,868	2,999
b) Average Attained Age	63.52	63.71
c) Average Annual Benefits	$51,980	$53,284
5. **Active to Retired Ratio** [(1a) / (4a)]	1.14	1.14

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Average Annual Benefits represents benefit amounts payable by this plan only. Some members may have service with another agency and would therefore have a larger total benefit than would be included as part of the average shown here.

Active Members

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Distribution of Active Members by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**
15-24	172	4	0	0	0	0	176
25-29	238	112	0	0	0	0	350
30-34	168	246	141	0	0	0	555
35-39	88	138	331	51	1	0	609
40-44	33	58	263	218	58	2	632
45-49	25	26	162	168	182	35	598
50-54	16	15	88	61	83	51	314
55-59	17	8	24	29	21	20	119
60-64	4	2	17	10	5	5	43
65 and Over	0	0	4	3	0	1	8
All Ages	**761**	**609**	**1,030**	**540**	**350**	**114**	**3,404**

Distribution of Average Annual Salaries by Age and Service

	Years of Service at Valuation Date						
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Average Salary**
15-24	$50,247	$65,582	$0	$0	$0	$0	$50,596
25-29	60,716	72,937	0	0	0	0	64,627
30-34	61,574	76,760	90,899	0	0	0	75,755
35-39	71,989	77,516	100,453	110,888	119,385	0	92,047
40-44	84,724	85,259	100,979	108,027	121,133	113,776	103,009
45-49	84,854	84,991	102,601	107,741	123,342	133,719	110,671
50-54	94,328	78,142	108,947	110,111	130,203	147,761	118,879
55-59	95,502	106,136	88,382	95,493	117,949	150,950	108,059
60-64	78,310	94,006	118,140	86,046	86,689	136,537	104,331
65 and Over	0	0	95,710	73,306	0	21,102	77,983
Average	**$63,253**	**$77,792**	**$100,335**	**$107,171**	**$123,745**	**$141,810**	**$92,892**

Transferred and Terminated Members

Distribution of Transfers to Other CalPERS Plans by Age, Service, and average Salary

	Years of Service at Valuation Date							
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**	**Average Salary**
15-24	5	0	0	0	0	0	5	$50,973
25-29	62	2	0	0	0	0	64	72,056
30-34	120	25	3	0	0	0	148	88,426
35-39	101	26	10	0	0	0	137	99,296
40-44	88	21	10	5	0	0	124	97,370
45-49	83	16	5	5	0	0	109	105,013
50-54	48	4	5	6	1	0	64	100,176
55-59	21	9	5	0	0	0	35	95,190
60-64	10	1	2	0	0	0	13	74,691
65 and Over	2	0	0	0	0	0	2	64,090
All Ages	**540**	**104**	**40**	**16**	**1**	**0**	**701**	**$94,036**

Distribution of Terminated Participants with Funds on Deposit by Age, Service, and average Salary

	Years of Service at Valuation Date							
Attained Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**	**Total**	**Average Salary**
15-24	23	0	0	0	0	0	23	$41,790
25-29	47	3	0	0	0	0	50	46,833
30-34	96	21	9	0	0	0	126	55,388
35-39	94	35	9	0	0	0	138	56,016
40-44	82	22	14	6	1	0	125	58,250
45-49	69	20	11	9	2	1	112	60,418
50-54	49	9	2	0	0	0	60	50,597
55-59	39	7	3	0	0	0	49	38,944
60-64	21	2	1	0	0	0	24	35,497
65 and Over	10	0	0	0	0	0	10	33,330
All Ages	**530**	**119**	**49**	**15**	**3**	**1**	**717**	**$53,263**

Retired Members and Beneficiaries

Distribution of Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	0	3	14	17
30-34	0	1	6	0	0	4	11
35-39	0	0	26	0	0	3	29
40-44	0	4	40	0	1	2	47
45-49	0	7	47	1	1	3	59
50-54	285	6	69	1	4	11	376
55-59	440	5	90	0	7	24	566
60-64	433	2	90	2	4	27	558
65-69	401	5	100	3	4	29	542
70-74	279	3	80	3	1	48	414
75-79	128	1	47	2	0	32	210
80-84	52	0	21	0	1	22	96
85 and Over	29	0	11	0	1	33	74
All Ages	**2,047**	**34**	**627**	**12**	**27**	**252**	**2,999**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 30	$0	$0	$0	$0	$28,967	$8,633	$12,222
30-34	0	28,461	28,782	0	0	4,019	19,748
35-39	0	0	34,152	0	0	29,290	33,649
40-44	0	6,363	33,838	0	62,568	2,893	30,794
45-49	0	22,968	39,187	53,601	49,584	31,807	37,308
50-54	78,138	12,131	36,049	8,157	40,897	22,436	67,149
55-59	70,366	18,624	35,621	0	52,142	45,590	63,108
60-64	61,450	22,549	36,140	10,262	45,585	41,551	55,969
65-69	57,123	11,219	27,674	54,225	41,424	36,199	50,015
70-74	57,371	14,124	32,540	28,783	23,852	34,971	49,374
75-79	49,331	24,857	37,657	35,393	0	29,702	43,478
80-84	43,999	0	29,189	0	28,198	33,617	38,216
85 and Over	35,565	0	36,351	0	37,608	22,304	29,796
All Ages	**$62,719**	**$16,148**	**$34,059**	**$33,508**	**$43,160**	**$31,521**	**$53,284**

Retired Members and Beneficiaries (continued)

Distribution of Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Yrs	657	8	135	1	3	109	913
5-9	462	8	87	3	1	68	629
10-14	503	6	53	2	5	34	603
15-19	276	6	79	5	13	14	393
20-24	98	5	89	0	0	16	208
25-29	41	1	66	1	1	6	116
30 and Over	10	0	118	0	4	5	137
All Years	**2,047**	**34**	**627**	**12**	**27**	**252**	**2,999**

Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Years Retired and Retirement Type*

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 5 Yrs	$71,811	$16,088	$45,128	$53,601	$31,422	$35,085	$62,840
5-9	58,848	18,436	31,144	30,913	55,115	31,683	51,426
10-14	63,268	15,919	43,683	67,700	53,947	30,480	59,164
15-19	56,932	13,351	37,267	19,755	46,267	30,590	50,549
20-24	41,679	15,233	31,298	0	0	22,580	35,132
25-29	46,060	21,036	28,402	21,579	33,588	17,635	34,009
30 and Over	50,703	0	22,322	0	27,791	6,584	23,979
All Years	**$62,719**	**$16,148**	**$34,059**	**$33,508**	**$43,160**	**$31,521**	**$53,284**

* Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the total counts may not match information on C-1 of the report. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix D

Glossary of Actuarial Terms

Glossary of Actuarial Terms

Accrued Liability *(also called Actuarial Accrued Liability or Entry Age Actuarial Accrued Liability)*
The total dollars needed as of the valuation date to fund all benefits earned in the past for *current* members.

Actuarial Assumptions
Assumptions made about certain events that will affect pension costs. Assumptions generally can be broken down into two categories: demographic and economic. Demographic assumptions include such things as mortality, disability and retirement rates. Economic assumptions include discount rate, salary growth and inflation.

Actuarial Methods
Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

Actuarial Valuation
The determination as of a valuation date of the Normal Cost, Accrued Liability, and related actuarial present values for a pension plan. These valuations are performed annually or when an employer is contemplating a change to their plan provisions.

Amortization Bases
Separate payment schedules for different portions of the Unfunded Liability. The total Unfunded Liability of a Risk Pool or non-pooled plan can be segregated by cause, creating "bases," and each such base will be separately amortized and paid for over a specific period of time. However, all bases are amortized using investment and payroll assumptions from the current valuation. This can be likened to a home having a first mortgage of 24 years remaining payments and a second mortgage that has 10 years remaining payments. Each base or each mortgage note has its own terms (payment period, principal, etc.).

Generally, in an actuarial valuation, the separate bases consist of changes in unfunded liability due to contract amendments, actuarial assumption changes, method changes, and/or gains and losses.

Amortization Period
The number of years required to pay off an Amortization Base.

Classic Member (under PEPRA)
A classic member is a member who joined CalPERS prior to January 1, 2013 and who is not defined as a new member under PEPRA. (See definition of New Member below.)

Discount Rate
The assumed long-term rate of return on plan assets. This is the rate at which projected cash flows are discounted to the valuation date to determine Accrued Liability. This assumption is called "investment return" in earlier CalPERS reports and "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law (PERL).

Entry Age
The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan. In most cases, this is the age of the member on their date of hire.

Entry Age Actuarial Cost Method
An actuarial cost method designed to fund a member's total plan benefit over the course of his or her career. This method is designed to yield a rate expressed as a level percentage of payroll.
(The assumed retirement age less the entry age is the amount of time required to fund a member's total benefit. Generally, the older a member on the date of hire, the greater the entry age normal cost. This is mainly because there is less time to earn investment income to fund the future benefits.)

Fresh Start

A Fresh Start is when multiple amortization bases are collapsed to one base and amortized together over a new funding period.

Funded Status

A measure of how well funded, or how "on track" a plan or risk pool is with respect to assets versus accrued liabilities. A ratio greater than 100% means the plan or risk pool has more assets than liabilities and a ratio less than 100% means liabilities are greater than assets.

GASB 68

Statement No. 68 of the Governmental Accounting Standards Board. The accounting standard governing a state or local governmental employer's accounting and financial reporting for pensions. GASB 68 replaces GASB 27 effective the first fiscal year beginning after June 15, 2014.

New Member (under PEPRA)

A new member includes an individual who becomes a member of a public retirement system for the first time on or after January 1, 2013, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

Normal Cost

The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost should be viewed as the long-term contribution rate.

Pension Actuary

A business professional that is authorized by the Society of Actuaries and the American Academy of Actuaries to perform the calculations necessary to properly fund a pension plan.

PEPRA

The California Public Employees' Pension Reform Act of 2013

Present Value of Benefits (PVB)

The total dollars needed as of the valuation date to fund all benefits earned in the past or expected to be earned in the future for *current* members.

Unfunded Accrued Liability (UAL)

When a plan or pool's value of assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Accrued Liability (or unfunded liability). If the unfunded liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

Proprietary & Confidential

Actuarial Valuation Report

County of Riverside

County of Riverside Postretirement Benefits Plan

As of June 30, 2021

AON
Empower Results®

Executive Summary

Background

The County of Riverside provides retiree medical benefits for eligible retirees enrolled in County sponsored plans. The benefits are provided in the form of:

- Monthly County contributions toward the retiree's premium,
- Access to CalPERS health plan coverage at subsidized premium levels, and
- $25 per month to the RSA Trust for RSA law enforcement retirees.

County Contributions

The County of Riverside makes contributions to eligible retirees for their medical plan premiums when the retiree enrolls in a County sponsored health plan. The current monthly amount paid by the County ranges from $25 – $256, depending on the retiree's bargaining unit at retirement. The County provided amounts are detailed in the Summary of Principal Plan Provisions and outlined as follows:

- **CalPERS Health Benefits program retirees** includes all bargaining units except RSA are eligible for the greater of the stated Public Employees' Medical and Hospital Care Act (PEMHCA) amounts and the bargaining unit's negotiated amount. The PEMHCA monthly amounts are $143.00 and $149.00 in 2021 and 2022, respectively, and increase annually thereafter by Medical CPI. The negotiated benefit amounts are not inflation-indexed.
- **RSA Law Enforcement retirees** are eligible for benefits from the RSA Benefit Trust to which the County contributes $25.00 per month (does not increase in future years to account for inflation). The County contribution is included in Plan liabilities.

As described above, the majority of participants are eligible to receive CalPERS health benefits, including PEMHCA benefits that are subject to inflation adjustments. The long-term benefit under PEMHCA could be more than 10 times greater than certain fixed benefit amounts in 15 years, as illustrated in Appendix A.

Implicit Subsidy

Under CalPERS health plans, retirees receive benefits prior to age 65 by paying premiums that are developed by blending active and retiree costs. Since retirees are older and generally cost more than actives, the premium paid by the retiree is less than the "true cost" of coverage for retirees. For example, under the Blue Shield Access Plus, the estimated "true cost" for an age 60 retiree is $1,022.97 per month, while the required premium is only $779.87 per month in 2022. Subsidization can also occur for post 65 benefits due to demographic differences between the County retirees and the CalPERS population used to develop premiums. This implicit subsidy is considered an employer obligation under the Actuarial Standards of Practice (ASOP) No. 6 requirements (see below) and is included in this valuation.

ASOP 6

The Actuarial Standards Board (ASB) amended Actuarial Standards of Practice (ASOP) No. 6 – Measuring Retiree Group Benefit Obligations, effective for measurement dates after March 31, 2015. This amendment requires plans to recognize certain additional healthcare costs (i.e., implicit subsidy) for pooled health plans. Since CalPERS plans are considered pooled health plans, the implicit subsidy is reflected in this actuarial valuation.

GASB 75

In June 2015, GASB released Statement 75, which was initially effective for the FYE June 30, 2018. This July 1, 2021 valuation is based on census data provided as of July 1, 2021 for the purpose of providing GASB 75 financial statement information, including final expense, for FYE June 30, 2022.

The measurement date for results shown in this valuation report is June 30, 2021.

It is important to note that only current active and retired participants are valued in this actuarial study. Future new entrants or any projected growth in the County's employee population are not considered.

Summary of Results

Liabilities

There are a few terms to understand related to the Plan's liabilities. The Present Value of Benefits (PVB) represents the actuarial present value of all future benefits expected to be paid to current employees and retirees. The Actuarial Accrued Liability (AAL) is the portion of the PVB attributable to past service. The Normal Cost is the portion of the PVB that is allocated to the current plan year for active employees.

Each liability is a present value calculated by using a selected discount rate. Results in this report are shown using a 7.00% discount rate. The table below summarizes the liability results as of July 1, 2021:

	County Contribution	Implicit Subsidy	Total Liability
Present Value of Benefits (PVB)	$189,168,133	$159,062,865	$348,230,998
Actuarial Accrued Liability (AAL)	$144,317,027	$115,892,218	$260,209,245
Normal Cost	$5,393,764	$4,896,556	$10,290,320

Discount Rate

The discount rate can have a considerable impact on the magnitude of the liabilities, with lower discount rates resulting in higher liabilities. GASB 75 prescribes the discount rate methodology to be used. Based on the County's current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate for GASB disclosures can be based entirely on the assumed asset return, as illustrated in the GASB 75 section of the report. For funding purposes, the discount rate is based on the assumed asset return of 7.00%.

Comparison to Prior Valuation

The following table summarizes the prior valuation results using a 6.15% discount rate and the current valuation using a 7.00% discount rate:

	July 1, 2020	July 1, 2021
Discount Rate	6.15%	7.00%
Present Value of Benefits (PVB)	$329,928,508	$348,230,998
Actuarial Accrued Liability (AAL)	235,343,271	260,209,245
Normal Cost	10,521,825	10,290,320
Market Value of Assets	53,014,172	73,625,008
Funding Contribution		
AAL excluding implicit subsidy	139,891,747	144,317,027
Smoothed Value of Assets	53,464,694	68,130,272
Unfunded AAL	86,427,053	76,186,755
Funded Status	38.2%	47.2%
Funding Contribution for FYE 2022 / 2023	16,339,607	14,108,781
% of pay	1.10%	0.92%
GASB 75 Accounting		
Net OPEB Liability	$182,329,099	$186,584,237
Plan Fiduciary Net Position as a percentage of the OPEB Liability	22.5%	28.3%
GASB Annual Expense for FYE 2021 / 2022	$24,495,618	$38,628,779
GASB Annual Expense for FYE 2023 (Estimate)	N/A	$40,117,000

Results varied compared to the prior valuation and projected outcomes, as the following items had significant impact on liabilities:

- A change to provide the LIUNA bargaining group access to CalPERS health plans, which have higher costs and participation rates that results in an increase in liability.
- Incorporated an explicit election assumption to better reflect the value of participants who elect to defer their medical benefits to a later date, resulting in an increase in liability.
- Incorporated an explicit lapse assumption to better reflect the impact of retirees electing to drop coverage in the future, resulting in a decrease in liability.

Overall, the unfunded AAL is lower than expected based on a projection from the prior valuation. Generally, liabilities are higher than last year although lower than expected while assets are higher than expected. These net results are due to the following factors:

- Expected return on assets was changed from 6.15% to 7.00%, reflecting higher expectations and consideration for migration from CERBT Asset Allocation Strategy 2 to Strategy 1. As a result, the discount rate similarly increased. Both changes resulted in a decrease in liability.
- Healthcare cost increases were higher than projected from the prior year, resulting in a liability loss.
- Deferred retirees eligible for CalPERS health plans elected coverage higher than previously assumed, resulting in a liability loss.
- A change in future CalPERS vs County health plan elections for participants eligible for both from 90%/10% to 95%/5%, for CalPERS/County respectively, resulting in an increase in liability.

- Mortality assumptions were updated to reflect the improvement scale MP-2021, resulting in an increase in liabilities.
- Investment return was higher than expected, resulting in an asset gain.
- RCA liabilities are included within this valuation, resulting in a relatively small liability increase.

It should be noted that employee groups from Special Districts (Waste, Parks, and Flood) and active Court members were not included in the valuation results presented in this report.

Projected Funding Status

All valuation and projection results on the following pages are based on the assumptions and plan provisions stated in the appendices. Specifically, they only include health plan eligibility (i.e., CalPERS or County plans) for bargaining groups as specified as of June 30, 2021. Changes to such eligibility or associated plan participation assumptions may result in higher liabilities, funding costs, and accounting expense than shown in this report.

80% Funded Status (excluding implicit subsidy)

The County requested a review of maintaining an 80% funded status for the OPEB Plan excluding the implicit subsidy liability. The valuation shows the plan is projected to be below 80% funded for such County Contribution liability as of June 30, 2022.

Projected Actuarial Accrued Liability (AAL), 6/30/2022	$ 153,810,628
Projected Smoothed Value of Assets, 6/30/2022	91,468,605
Projected Shortfall, 6/30/2022	62,342,023
Projected Funded Status, 6/30/2022	59.5%
Shortfall to achieve 80% as of 6/30/2022	31,579,898
Additional funding in FYE 2022 to achieve 80% as of 6/30/2022[1]	$ 30,529,440

[1] Assumes funding on 1/1/2022 and is in addition to the proposed FYE 2022 contribution of $16,339,607.

The table below summarizes the estimated additional annual contribution projected to attain a funded status of 80% at various future dates. The total contribution % shown below includes the Actuarially Determined Contribution (ADC) as developed in this report plus the additional amount to attain 80% funded status by the target funding date.

	Additional Payment to Fund 80% by Target Date		Total Contribution to Fund 80% by Target Date	
80% Target Funding Date	Annual Payment in FYE 2023[1]	% of Pay	Annual Payment in FYE 2023[1,2]	% of pay[2]
6/30/2023	$ 23,408,970	1.53%	$ 37,517,752	2.45%
6/30/2024	7,452,196	0.47%	21,560,978	1.41%
6/30/2025	2,143,613	0.13%	16,252,395	1.06%
6/30/2026	0	0.00%	14,108,782	0.92%

[1] Contributions shown for FYE 2023 are assumed to be made throughout the year based on a level percent of pay and are therefore assumed to increase at 2.75% per year from FYE 2023 to the target funding date.

[2] Includes current FYE 2023 contribution of $14,108,782 (0.92% of pay).

For example, to attain 80% funded (excluding implicit subsidy) by FYE 2024, the County would need to contribute approximately $7.5M in FYE 2023 and $7.7 in FYE 2024 in addition to the current ADC contributions of $14.1M in FYE 2023 and $14.5M in FYE 2024.

Note: The breakdown of results between Safety and Miscellaneous funded status may vary from above.

80% Funded Status (including implicit subsidy)

For illustrative purposes of comparing a contribution policy utilizing total liability (i.e., including the implicit subsidy), we also performed a review of maintaining an 80% funded status for the OPEB Plan, including the implicit subsidy liability. The valuation shows the plan continues to be under 80% funded as of June 30, 2022, as shown below:

Projected Actuarial Accrued Liability (AAL), 6/30/2022	$ 277,785,565
Projected Smoothed Value of Assets, 6/30/2022	91,468,605
Projected Shortfall, 6/30/2022	186,316,960
Projected Funded Status, 6/30/2022	32.9%
Shortfall to achieve 80% as of 6/30/2022	130,759,847
Additional funding in FYE 2022 to achieve 80% as of 6/30/2022[1]	$ 126,410,316

[1] Assumes funding on 1/1/2022 and is in addition to the proposed FYE 2022 contribution of $16,339,607.

Effect of Asset Allocation Strategy Selection and the Discount Rate Impact

CalPERS offers three asset allocation strategies for selection by employers who contract to pre-fund their future OPEB costs through CERBT.

The asset allocation and associated expected asset return, and thus the assumed discount rate, have a considerable impact on valuation results and the magnitude of liabilities. CalPERS periodically reviews the expected asset returns and the rates shown below are based on CalPERS revised guidance adopted in October 2018.

A recent review of the long-term expected return rates, based on Aon's 2021 Q3 Capital Market Assumptions and the CERBT target asset allocation for each strategy, resulted in a range of reasonable return assumptions below the published CERBT expected return assumptions. More details of the expected return assumption are included in the 2021 assumption rationale document.

The following table summarizes financial characteristics of the three strategies:

	Strategy 1	Strategy 2	Strategy 3
CERBT Expected Return Rate	7.59%	7.01%	6.22%
CERBT Standard Deviation of Expected Returns	11.83%	9.24%	7.28%
Aon's Reasonable Range of Expected Returns	5.34%-7.09%	4.71%-6.05%	3.93%-4.91%
Hypothetical Expected Return Assumptions	7.00%	6.00%	4.90%

All three asset allocation strategies invest to some extent in each of the five asset classes (Global Equity, Domestic Fixed Income, U.S. Inflation Linked Bonds, Global Public Real Estate and Commodities). The portion of assets allocated to each asset class varies among the strategies, and thus, the long term expected rate of return and level of risk of each asset allocation is different for each strategy.

Effective July 1, 2021, a portion of the assets has been transferred to Strategy 1 as part of the County plan to fully migrate assets from Strategy 2 over an 18-month period ending in 2022. The County selected a 7.00% long term expected return assumption under Strategy 1 for purposes of this valuation and should continue to monitor the return versus risk balance and maintain an asset allocation strategy appropriate for the County's funding and overall financial policies.

In order to understand the impact of strategy selection, we compared valuation results under each Asset Allocation Strategy:

	Asset Allocation Strategy 1 7.00%	Asset Allocation Strategy 2 6.00%	Asset Allocation Strategy 3 4.90%
Liabilities			
Present Value of Benefits (PVB)	$348,230,998	$411,229,654	$503,385,614
Actuarial Accrued Liability (AAL)	$260,209,245	$293,805,430	$339,291,736
Normal Cost	$10,290,320	$12,715,085	$16,223,417

Under GASB 75, the expected return will be considered along with the municipal bond index to determine a blended discount rate.

* * *

The following report shows the details of results by participant status and benefits provided, based on a 7.00% discount rate.

Effect of Asset Allocation Strategy Selection and the Discount Rate Impact

CalPERS offers three asset allocation strategies for selection by employers who contract to pre-fund their future OPEB costs through CERBT.

The asset allocation and associated expected asset return, and thus the assumed discount rate, have a considerable impact on valuation results and the magnitude of liabilities. CalPERS periodically reviews the expected asset returns and the rates shown below are based on CalPERS revised guidance adopted in October 2018.

A recent review of the long-term expected return rates, based on Aon's 2021 Q3 Capital Market Assumptions and the CERBT target asset allocation for each strategy, resulted in a range of reasonable return assumptions below the published CERBT expected return assumptions. More details of the expected return assumption are included in the 2021 assumption rationale document.

The following table summarizes financial characteristics of the three strategies:

	Strategy 1	Strategy 2	Strategy 3
CERBT Expected Return Rate	7.59%	7.01%	6.22%
CERBT Standard Deviation of Expected Returns	11.83%	9.24%	7.28%
Aon's Reasonable Range of Expected Returns	5.34%-7.09%	4.71%-6.05%	3.93%-4.91%
Hypothetical Expected Return Assumptions	7.00%	6.00%	4.90%

All three asset allocation strategies invest to some extent in each of the five asset classes (Global Equity, Domestic Fixed Income, U.S. Inflation Linked Bonds, Global Public Real Estate and Commodities). The portion of assets allocated to each asset class varies among the strategies, and thus, the long term expected rate of return and level of risk of each asset allocation is different for each strategy.

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Under GASB 75, the expected return will be considered along with the municipal bond index to determine a blended discount rate.

* * *

The following report shows the details of results by participant status and benefits provided, based on a 7.00% discount rate.

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Actuarial Valuation Certificate

This report documents the results of the July 1, 2021 actuarial valuation for the County of Riverside Postretirement Medical Benefits. The information provided in this report is intended strictly for documenting:

- Disclosure items under Governmental Accounting Standards Board (GASB) Statement 75 for Fiscal Year Ending June 30, 2022.
- Funding contribution amounts and the Actuarial Determined Contribution (ADC) for Fiscal Year Ending June 30, 2023.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 75 (GASB 75) including any guidance or interpretations provided by the Company and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of the County of Riverside's auditors. Additional disclosures may be required under GASB 74.

A valuation model was used to develop the liabilities for the June 30, 2021 valuation. The valuation model relies on ProVal software, which was developed by Winklevoss Technologies, LLC. Experts within Aon selected this software and determined it is appropriate for performing valuations. We coded and reviewed the software for the provisions, assumptions, methods, and data of the Postretirement Health Benefits.

A model was used to develop the appropriate GASB discount rate. The undersigned relied on experts within Aon for the development of the capital market assumptions and the model underlying the expected rate of return.

The valuation model outputs various cost scenarios. The "1% increase" and "1% decrease" interest rate scenarios vary only the discount rate assumption, in order to illustrate the impact of a change in that assumption in isolation. In practice, certain other assumptions, such as the expected or realized asset returns, would also be expected to vary when the discount rate changes. Therefore, the output from these scenarios should be used solely for assessing the impact of the discount rate in isolation and may not represent a realistic set of results for other purposes.

The "1% increase" and "1% decrease" healthcare cost trend scenarios vary only the healthcare cost trend assumption, in order to illustrate the impact of a change in that assumption in isolation. Therefore, the output from these scenarios should be used solely for assessing the impact of the healthcare cost trend in isolation and may not represent a realistic set of results for other purposes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due (but not limited to) to such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or in economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and
- Changes in plan provisions or applicable law.

Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

Funded status measurements shown in this report are determined based on various measures of plan assets and liabilities. For entity and plan disclosure and reporting purposes, funded status is determined using plan assets measured at market value. Plan liabilities are measured based on the interest rates and other assumptions summarized in the Actuarial Assumptions and Methods section of this report.

These funded status measurements may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for County of Riverside and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions. In conducting the valuation, we have relied on personnel, plan design, health care claim cost, and asset information supplied by County of Riverside as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results.

The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. County of Riverside selected the economic and demographic assumptions and prescribed them for use for purposes of compliance with GASB 75. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience.

The undersigned are familiar with the near-term and long-term aspects of OPEB valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to County of Riverside has any material direct or indirect financial interest in County of Riverside. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for County of Riverside.

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January 2022

Plan Liabilities

The liabilities shown in this exhibit were calculated using a 7.00% discount rate.

The **Present Value of Benefits (PVB)** represents the actuarial present value of all benefits ever to be paid to current employees and retirees. The PVB is as follows:

	Safety Employees	Miscellaneous Employees	Total
PVB			
County Contribution			
Retirees	$15,505,853	$54,859,399	$70,365,252
Actives	$9,826,571	$108,976,310	$118,802,881
Subtotal	$25,332,424	$163,835,709	$189,168,133
Implicit Subsidy			
Retirees	$12,069,126	$28,514,209	$40,583,335
Actives	$10,670,444	$107,809,086	$118,479,530
Subtotal	$22,739,570	$136,323,295	$159,062,865
All Benefits			
Retirees	$27,574,979	$83,373,608	$110,948,587
Actives	$20,497,015	$216,785,396	$237,282,411
Total PVB	**$48,071,994**	**$300,159,004**	**$348,230,998**
Number of Retirees as of 7/1/2021 [1]	824	1,957	2,781
Number of Actives as of 7/1/2021	3,396	16,354	19,750
PVB Per Retiree [2]	$20,990	$27,952	$25,889
PVB Per Active	$6,036	$13,256	$12,014

[1] Deferred retirees (former employees who did not elect medical benefits at the time of their retirement and are eligible to elect the benefits at a later date) are not explicitly included in the count, but their future benefits are valued based on the election assumption developed in the experience study carried out in 2021.

[2] Average liability excluding deferred retirees; Average liability for eligible deferred retirees is approximately $9,700.

The **Actuarial Accrued Liability (AAL)** is a portion of the PVB attributable to past service. For retirees and fully eligible active employees, the AAL is equal to the PVB. For other active employees, the AAL is the portion of the PVB deemed to be accrued to date. The **Normal Cost** is the portion of the PVB that is allocated to the current plan year for only active employees.

The AAL in this report is based on the Entry Age Normal cost method and has been developed by spreading costs as a level percentage of payrolls.

	Safety Employees	Miscellaneous Employees	Total
AAL			
County Contribution			
Retirees	$15,505,853	$54,859,399	$70,365,252
Actives	$6,765,829	$67,185,946	$73,951,775
Subtotal	$22,271,682	$122,045,345	$144,317,027
Implicit Subsidy			
Retirees	$12,069,126	$28,514,209	$40,583,335
Actives	$7,861,059	$67,447,824	$75,308,883
Subtotal	$19,930,185	$95,962,033	$115,892,218
All Benefits			
Retirees	$27,574,979	$83,373,608	$110,948,587
Actives	$14,626,888	$134,633,770	$149,260,658
Total AAL	**$42,201,867**	**$218,007,378**	**$260,209,245**
Number of Retirees as of 7/1/2021 [1]	824	1,957	2,781
Number of Actives as of 7/1/2021	3,396	16,354	19,750
AAL Per Retiree [2]	$20,990	$27,952	$25,889
AAL Per Active	$4,307	$8,232	$7,558
Normal Cost			
County Contribution	$356,435	$5,037,329	$5,393,764
Implicit Subsidy	$314,308	$4,582,248	$4,896,556
Total Normal Cost	**$670,743**	**$9,619,577**	**$10,290,320**
Normal Cost per Active	$198	$588	$521

[1] Deferred retirees (former employees who did not elect medical benefits at the time of their retirement and are eligible to elect the benefits at a later date) are not explicitly included in the count, but their future benefits are valued based on the election assumption developed in the experience study carried out in 2021.

[2] Average liability excluding deferred retirees; Average liability for eligible deferred retirees is approximately $9,700.

Plan Assets

The County of Riverside participates in CalPERS' CERBT trust fund. The following table shows the development of assets since the prior valuation.

Reconciliation of Plan Assets	July 1, 2020 to June 30, 2021
Market Value of Assets, Beginning of Year	$53,014,172
Contributions	
Retiree Premiums	$4,502,972
Reimbursement from CERBT	$0
Implicit Subsidy	$3,067,597
Pre-Funding	$9,600,000
Total Contributions	$17,170,569
Investment Earnings	$11,041,124
Administrative Expense	($30,288)
Benefit Payments	
Retiree Premiums	($4,502,972)
Implicit Subsidy	($3,067,597)
Total Benefit Payments	($7,570,569)
Market Value of Assets at Valuation Date	$73,625,008
Return on Assets	19.10%
Development of (Gain)/Loss	
Expected Investment Earnings (assumed 6.15%)	$3,549,305
Actual Investment Earnings	$11,041,124
(Gain)/Loss on Assets	($7,491,819)
Smoothed Value of Assets at Valuation Date	
Market Value of Assets at Valuation Date	$73,625,008
Unrecognized (Gain)/Loss[1]	($5,494,736)
Preliminary Smoothed Value of Assets at Valuation Date	$68,130,272
Lower Corridor (80% of Market Value)	$58,900,006
Upper Corridor (120% of Market Value)	$88,350,010
Smoothed Value of Assets	$68,130,272

[1] Schedule of the Current and Prior Asset (Gain)/Losses as of June 30, 2021.

Date Established	Original (Gain)/Loss	Years Remaining As of 6/30/2021	Amount Recognized	Total Amount Unrecognized
6/30/2018	$165,275	1	$132,220	$33,055
6/30/2019	($55,790)	2	($33,474)	($22,316)
6/30/2020	$813,300	3	$325,320	$487,980
6/30/2021	($7,491,819)	4	($1,498,364)	($5,993,455)
Total			($1,074,298)	($5,494,736)

Plan Funded Status

The Plan's funded status as of July 1, 2021 is developed based on the Actuarial Accrued Liability excluding implicit subsidy and the smoothed value of Plan assets.

The following table shows the development of the Plan's funded status as of July 1, 2021:

Funding Methodology	Entry Age Normal
Discount Rate	7.00%
Actuarial Accrued Liability	$144,317,027
Smoothed Value of Plan Assets	68,130,272
Unfunded Liability	$76,186,755
Funded Percentage	47.2%

Development of Funding Contribution[1]

Effective July 1, 2020 (contributions developed for FYE June 30, 2022)[2], the County's funding policy ignores implicit subsidy liabilities and determines amounts on a level percentage of pay based on the sum of:

a) Normal Cost with interest, plus
b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
c) Amortization of subsequent unanticipated liability changes (i.e., actuarial gains / losses and changes in assumptions) over 15-year period, plus
d) Amortization of subsequent unanticipated asset changes (i.e., unexpected gains / losses on assets) over 5-year period.

Amortization amounts are calculated based on the discount rate and payroll increase assumption appropriate for the valuation date.

The following table shows the development of the funding contribution as a level percentage of pay, assuming middle of year payment, for FYE June 30, 2023:

	Safety	Miscellaneous	Total
Funding Contribution, FYE June 30, 2023[3]			
Normal Cost, plus interest	$378,838	$5,353,947	$5,732,785
Amortization of UAAL, plus interest[4]	(240,210)	8,616,206	8,375,996
Funding Contribution	$138,628	$13,970,153	$14,108,781
% of Pay			0.92%

The following table shows the development of the liability gain / loss as of June 30, 2021[1]

	Safety	Miscellaneous	Total
Liability as of June 30, 2020	$30,239,261	$109,652,486	$139,891,747
Service Cost	794,661	5,580,098	6,374,759
Interest on Liability	1,877,620	6,981,370	8,858,990
Plan Change	-	-	-
Assumption Changes	**(9,573,850)**	**1,437,470**	**(8,136,380)**
Benefit Payments	(1,022,291)	(3,480,681)	(4,502,972)
Expected Liability as of June 30, 2021	22,315,401	120,170,743	142,486,144
Actual Liability as of June 30, 2021	22,271,682	122,045,345	144,317,027
Liability (Gain)/Loss	**($43,719)**	**$1,874,602**	**$1,830,883**

The following table shows the development of the asset gain / loss as of June 30, 2021

	Safety	Miscellaneous	Total
Market Value of Assets (MVA) as of June 30, 2020	$30,744,739	$22,269,433	$53,014,172
Total Contributions[5]	4,803,492	9,299,480	14,102,972
Investment Earnings	6,239,407	4,801,717	11,041,124
Administrative Expense	(17,565)	(12,723)	(30,288)
Benefit Payments[5]	(1,022,291)	(3,480,681)	(4,502,972)
Expected MVA as of June 30, 2021	40,747,782	32,877,226	73,625,008
Expected Investment Earnings	2,004,258	1,545,046	3,549,305
Asset (Gain)/Loss	**($4,235,148)**	**($3,256,671)**	**($7,491,819)**

[1] Funding contributions are in addition to Pay-as-you-go.
[2] Prior to July 1, 2020, funding was based on liabilities including the implicit subsidy.
[3] Excludes the implicit subsidy liability/service cost.
[4] Amortization allocation shown on next page.
[5] County contributions only excluding the implicit subsidy.

Amortization Schedule

The following table shows the amortization of Unfunded Actuarial Accrued Liability excluding the implicit subsidy as of July 1, 2022. Amortization of bases is first recognized in the fiscal year subsequent to the date established.

Date Established	Type of Base	Original Period	Remaining Period as of June 30, 2022	Original Balance	Balance Remaining as of June 30, 2022	Total Amortization Recognized in FYE June 30, 2023	Safety Amortization Recognized in FYE June 30, 2023[1]	Miscellaneous Amortization Recognized in FYE June 30, 2023[1]
6/30/2017	7/1/2017 UAAL[2]	20	15	$ 11,733,484	$ 11,010,882	960,078	$ 589,749	$ 370,329
6/30/2018	Liability (Gain)/Loss	15	12	2,657,510	2,587,235	266,822	163,901	102,921
6/30/2018	Assets (Gain)Loss	5	2	165,275	80,715	41,175	25,293	15,882
6/30/2018	Assumptions	15	12	5,348,501	5,207,066	537,007	329,868	207,139
6/30/2019	Liability (Gain)/Loss	15	13	115,351	116,782	11,325	11,455	(130)
6/30/2019	Assets (Gain)Loss	5	3	(55,790)	(39,192)	(13,596)	(8,297)	(5,299)
6/30/2019	Assumptions	15	13	10,726,730	10,859,770	1,053,190	142,053	911,137
6/30/2020	Liability (Gain)/Loss	15	14	3,731,444	3,855,942	353,699	(42,259)	395,958
6/30/2020	Assets (Gain)/Loss	5	4	813,300	721,007	191,354	113,370	77,984
6/30/2020	Assumptions	15	14	74,063,338	76,534,436	7,020,380	321,174	6,699,206
6/30/2021	Liability (Gain)/Loss	15	15	1,830,883	1,959,045	170,816	(4,079)	174,895
6/30/2021	Assets (Gain)/Loss	5	5	(7,491,819)	(8,016,247)	(1,735,768)	(981,235)	(754,533)
6/30/2021	Assumptions	15	15	(8,136,380)	(8,705,927)	(759,100)	(893,212)	134,112
	Total Charges			$ 95,501,827	$ 96,171,516	$ 8,097382	$ (232,219)	$ 8,329,601

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[1] Amortization allocation by classification is based on proportionate share of AAL prior to 7/1/2018 and estimated safety/miscellaneous gain/loss since 7/1/2018.
[2] Includes Asset (Gain)/Loss as of 6/30/2017

Projected Benefit Payments[1]

The following table shows the estimated projected net County benefit payments based on the current plan provisions, current plan participants, and the valuation assumptions used in this report. The County Contributions would be equivalent to funding the liabilities on a pay-as-you-go basis.

Fiscal Year Ending June 30	Safety		Miscellaneous		Total
	County Contribution	Implicit Subsidy	County Contribution	Implicit Subsidy	
2022	$1,112,034	$995,054	$5,055,666	$4,098,729	$11,261,483
2023	$1,206,131	$1,136,059	$5,755,725	$5,180,291	$13,278,206
2024	$1,304,785	$1,346,677	$6,270,333	$5,796,451	$14,718,246
2025	$1,391,683	$1,486,403	$6,805,376	$6,302,050	$15,985,511
2026	$1,484,780	$1,608,993	$7,354,750	$6,825,230	$17,273,753
2027	$1,577,670	$1,694,401	$7,908,290	$7,035,939	$18,216,300
2028	$1,670,297	$1,785,801	$8,479,640	$7,487,262	$19,423,000
2029	$1,746,373	$1,873,533	$8,972,383	$7,762,249	$20,354,538
2030	$1,818,978	$1,841,094	$9,484,295	$8,136,578	$21,280,945
2031	$1,891,810	$1,929,287	$10,010,806	$8,612,892	$22,444,796
2032	$1,965,053	$1,827,764	$10,552,202	$9,211,208	$23,556,227
2033	$2,028,848	$1,786,803	$11,101,216	$9,718,269	$24,635,135
2034	$2,066,358	$1,786,906	$11,612,845	$10,442,395	$25,908,504
2035	$2,108,952	$1,765,213	$12,142,128	$11,039,640	$27,055,932
2036	$2,148,968	$1,779,579	$12,677,138	$11,294,474	$27,900,160
2037	$2,184,921	$1,824,593	$13,262,219	$11,778,025	$29,049,756
2038	$2,213,483	$1,881,469	$13,887,952	$12,302,460	$30,285,363
2039	$2,226,780	$1,854,324	$14,511,373	$13,031,801	$31,624,277
2040	$2,237,225	$1,899,526	$15,123,827	$13,645,043	$32,905,620
2041	$2,242,170	$1,888,848	$15,725,084	$14,389,919	$34,246,021
2042	$2,243,402	$1,822,588	$16,287,435	$15,022,976	$35,376,400
2043	$2,241,182	$1,849,705	$16,828,105	$15,479,476	$36,398,468
2044	$2,240,084	$1,812,141	$17,337,142	$15,917,338	$37,306,705
2045	$2,237,661	$1,765,167	$17,838,403	$15,998,762	$37,839,992
2046	$2,234,361	$1,784,469	$18,309,209	$15,982,439	$38,310,478
2047	$2,227,211	$1,798,074	$18,739,715	$15,976,199	$38,741,199
2048	$2,216,402	$1,744,320	$19,135,797	$15,655,110	$38,751,630
2049	$2,194,590	$1,739,111	$19,490,514	$15,678,647	$39,102,862
2050	$2,169,998	$1,703,776	$19,796,665	$15,421,511	$39,091,950
2051	$2,138,434	$1,612,529	$20,047,754	$15,188,358	$38,987,075

[1] Include the estimated benefit payments for the deferred retirees.

GASB 75 Reporting and Disclosure Information for Fiscal Year Ending June 30, 2022

Calculation Details

The following table illustrates the Net OPEB Liability under GASB 75.

	Fiscal Year Ending 6/30/2021	Fiscal Year Ending 6/30/2022
(1) OPEB Liability		
(a) Retired Participants and Beneficiaries Receiving Payment	$ 81,733,395	$ 110,948,587
(b) Active Participants	153,609,876	149,260,658
(c) Total	$ 235,343,271	$ 260,209,245
(2) Plan Fiduciary Net Position	53,014,172	73,625,008
(3) Net OPEB Liability	$ 182,329,099	$ 186,584,237
(4) Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	22.53%	28.29%
(5) Deferred Outflow of Resources for Contributions Made After Measurement Date	$ 17,170,569	TBD

Expense

The following table illustrates the OPEB expense under GASB 75.

	Fiscal Year Ending 6/30/2021	Fiscal Year Ending 6/30/2022
(1) Service Cost	$ 2,966,332	$ 10,521,825
(2) Interest Cost	7,282,813	14,891,381
(3) Expected Investment Return	(3,339,596)	(3,549,305)
(4) Employee Contributions	0	0
(5) Administrative Expense	23,282	30,288
(6) Plan Changes	0	0
(7) Amortization of Unrecognized		
(a) Liability (Gain)/Loss	575,931	1,006,971
(b) Asset (Gain)/Loss	(48,197)	(1,546,559)
(c) Assumption Change (Gain)/Loss	17,035,053	17,274,178
(8) Total Expense	$ 24,495,618	$ 38,628,779

Shown below are details regarding the calculation of Service, Interest Cost and Expected Investment Return components of the Expense.

	Fiscal Year Ending 6/30/2021	Fiscal Year Ending 6/30/2022
(1) Development of Service Cost:		
(a) Normal Cost at Beginning of Measurement Period	$ 2,966,332	$ 10,521,825
(2) Development of Interest Cost:		
(a) Total OPEB Liability at Beginning of Measurement Period	$ 103,122,741	$ 235,343,271
(b) Normal Cost at Beginning of Measurement Period	2,966,332	10,521,825
(c) Actual Benefit Payments	(4,470,321)	(7,570,569)
(d) Discount Rate	7.01%	6.15%
(e) Interest Cost	$ 7,282,813	$ 14,891,381
(3) Development of Expected Investment Return:		
(a) Plan Fiduciary Net Position at Beginning of Measurement Period	$ 44,911,158	$ 53,014,172
(b) Actual Contributions—Employer	10,070,321	17,170,569
(c) Actual Contributions—Employee	0	0
(d) Actual Benefit Payments	(4,470,321)	(7,570,569)
(e) Administrative Expenses	(23,282)	(30,288)
(f) Other	0	0
(g) Expected Return on Assets	7.01%	6.15%
(h) Expected Return	$ 3,339,596	$ 3,549,305

Reconciliation of Net OPEB Liability

Shown below are details regarding the Total OPEB Liability, Plan Fiduciary Net Position, and Net OPEB Liability for the Measurement Period from June 30, 2020 to June 30, 2021:

	Increase (Decrease)		
	Total OPEB Liability (a)	Plan Fiduciary Net Position (b)	Net OPEB Liability (c) = (a) – (b)
Balance Recognized at 6/30/2021 (Based on 6/30/2020 Measurement Date)	$ 235,343,271	$ 53,014,172	$ 182,329,099
Changes Recognized for the Fiscal Year:			
Service Cost	$ 10,521,825	N/A	$ 10,521,825
Interest on the Total OPEB Liability	14,891,381	N/A	14,891,381
Changes of Benefit Terms	0	N/A	0
Differences Between Expected and Actual Experience	4,517,303	N/A	4,517,303
Changes of Assumptions	2,506,034	N/A	2,506,034
Benefit Payments	(7,570,569)	(7,570,569)	0
Contributions From the Employer	N/A	17,170,569	(17,170,569)
Contributions From the Employee	N/A	0	0
Net Investment Income	N/A	11,041,124	(11,041,124)
Administrative Expense	N/A	(30,288)	30,288
Net Changes	$ 24,865,974	20,610,836	$ 4,255,138
Balance Recognized at 6/30/2022 (Based on 6/30/2021 Measurement Date)	$ 260,209,245	$ 73,625,008	$ 186,584,237

Liability (Gain)/Loss

The following table illustrates the liability gain/loss under GASB 75.

	Fiscal Year Ending 6/30/2021	Fiscal Year Ending 6/30/2022
(1) OPEB Liability at Beginning of Measurement Period	$ 103,122,741	$ 235,343,271
(2) Service Cost	2,966,332	10,521,825
(3) Interest on the Total OPEB Liability	7,282,813	14,891,381
(4) Changes of Benefit Terms	0	0
(5) Changes of Assumptions	133,909,170	2,506,034
(6) Benefit Payments	(4,470,321)	(7,570,569)
(7) Expected OPEB Liability at End of Measurement Period	$ 242,810,735	$ 255,691,942
(8) Actual OPEB Liability at End of Measurement Period	235,343,271	260,209,245
(9) OPEB Liability (Gain)/Loss	$ (7,467,464)	$ 4,517,303
(10) Average Future Working Life Expectancy	10.54	10.48
(11) OPEB Liability (Gain)/Loss Amortization	$ (708,488)	$ 431,040

Asset (Gain)/Loss

The following table illustrates the asset gain/loss under GASB 75.

	Fiscal Year Ending 6/30/2021	Fiscal Year Ending 6/30/2022
(1) OPEB Asset at Beginning of Measurement Period	$ 44,911,158	$ 53,014,172
(2) Contributions—Employer	10,070,321	17,170,569
(3) Contributions—Employee	0	0
(4) Expected Investment Income	3,339,596	3,549,305
(5) Benefit Payments	(4,470,321)	(7,570,569)
(6) Administrative Expense	(23,282)	(30,288)
(7) Other	0	0
(8) Expected OPEB Asset at End of Measurement Period	$ 53,827,472	$ 66,133,189
(9) Actual OPEB Asset at End of Measurement Period	53,014,172	73,625,008
(10) OPEB Asset (Gain)/Loss	$ 813,300	$ (7,491,819)
(11) Amortization Factor	5.00	5.00
(12) OPEB Asset (Gain)/Loss Amortization	$ 162,660	$ (1,498,364)

Deferred Outflows/Inflows

The following table illustrates the Deferred Inflows and Outflows as of June 30, 2022 under GASB 75.

	Deferred Outflows	Deferred Inflows
(1) Difference Between Actual and Expected Experience	$ 10,975,987	$ 6,050,488
(2) Net Difference Between Expected and Actual Earnings on OPEB Plan Investments	0	5,494,736
(3) Assumption Changes	140,109,176	0
(4) Sub Total	$ 151,085,163	$ 11,545,224
(5) Contributions Made in Fiscal Year Ending 6/30/2022 After Measurement Date	TBD	N/A
(6) Total	$ TBD	$ 11,545,224

Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of June 30, 2022.

Date		Period		Balance		Annual
Established	Type of Base	Original	Remaining	Original	Remaining	Payment
6/30/2021	Liability (Gain)/Loss	10.48	9.48	$4,517,303	$4,086,263	431,040
6/30/2021	Asset (Gain)/Loss	5.00	4.00	(7,491,819)	(5,993,455)	(1,498,364)
6/30/2021	Assumptions	10.48	9.48	2,506,034	2,266,909	239,125
6/30/2020	Liability (Gain)/Loss	10.54	8.54	(7,467,464)	(6,050,488)	(708,488)
6/30/2020	Asset (Gain)/Loss	5.00	3.00	813,300	487,980	162,660
6/30/2020	Assumptions	10.54	8.54	133,909,170	108,499,460	12,704,855
6/30/2019	Liability (Gain)/Loss	10.63	7.63	2,528,861	1,815,167	237,898
6/30/2019	Asset (Gain)/Loss	5.00	2.00	(55,790)	(22,316)	(11,158)
6/30/2019	Assumptions	10.63	7.63	29,685,609	21,307,734	2,792,625
6/30/2018	Liability (Gain)/Loss	9.45	5.45	4,062,300	2,342,808	429,873
6/30/2018	Asset (Gain)/Loss	5.00	1.00	165,275	33,055	33,055
6/30/2018	Assumptions	9.45	5.45	11,336,502	6,537,982	1,199,630
6/30/2017	Liability (Gain)/Loss	9.43	4.43	5,814,989	2,731,749	616,648
6/30/2017	Asset (Gain)/Loss	5.00	0.00	(1,163,768)	0	(232,752)
6/30/2017	Assumptions	9.43	4.43	3,186,806	1,497,091	337,943
	Total Charges				139,539,939	16,734,590

Amounts Recognized in the deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in the OPEB expense as follows:

Year End June 30:

2023	$ 16,967,342
2024	$ 16,934,287
2025	$ 16,945,445
2026	$ 16,782,786
2027	$ 17,737,034
Thereafter	$ 54,173,045
Total	$139,539,939

Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2022.

($ in thousands)

Year Ending June 30[2]	Beginning Fiduciary Net Position (a)	Total Contributions (b)	Benefit Payments (c)	Administrative Expenses (d)	Investment Earnings (e)	Ending Fiduciary Net Position[1] (f)
2022	$73,625	$27,601	$11,261	$31	$5,731	$95,665
2023	95,665	27,387	13,278	33	7,197	116,938
2024	116,938	28,063	14,718	35	8,660	138,909
2025	138,909	29,319	15,986	37	10,199	162,405
2026	162,405	30,576	17,274	39	11,843	187,511
2027	187,511	31,569	18,216	41	13,603	214,426
2028	214,426	32,602	19,423	43	15,481	243,042
2029	243,042	35,631	20,355	46	17,558	275,831
2030	275,831	36,674	21,281	48	19,858	311,035
2031	311,035	37,966	22,445	51	22,327	348,832
2032	348,832	39,213	23,556	53	24,978	389,415
2033	389,415	40,440	24,635	55	27,825	432,989
2034	432,989	41,872	25,909	58	30,881	479,776
2035	479,776	43,191	27,056	60	34,163	530,014
2036	530,014	43,067	27,900	63	37,646	582,765
2037	582,765	42,819	29,050	65	41,290	637,759
2038	637,759	33,040	30,285	67	44,755	685,202
2039	685,202	33,644	31,624	69	48,051	735,204
2040	735,204	34,763	32,906	71	51,546	788,537
2041	788,537	35,946	34,246	73	55,275	845,439
2042	845,439	36,926	35,376	74	59,253	906,168
2043	906,168	37,802	36,398	75	63,500	970,996
2044	970,996	38,570	37,307	76	68,033	1,040,215
2045	1,040,215	38,969	37,840	77	72,874	1,114,141
2046	1,114,141	39,311	38,310	78	78,045	1,193,108
2047	1,193,108	39,619	38,741	79	83,569	1,277,476
2048	1,277,476	39,514	38,752	79	89,470	1,367,630
2049	1,367,630	39,757	39,103	80	95,777	1,463,982
2050	1,463,982	39,646	39,092	80	102,518	1,566,974
2051	1,566,974	39,449	38,987	80	109,725	1,677,080

[1] (f)=(a) + (b) − (c) − (d) + (e)
[2] Years later than 2050 were omitted from this table.

Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2119.

The Plan's projected fiduciary net position is not projected to reach $0.

As such, 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 "depletion 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 OPEB liability as of June 30, 2022.

In projecting the Plan's fiduciary net position, the following assumptions were made:

1. Interest rate for discounting was 7.00% per annum.

2. Projected total contributions are Actuarially Determined Contribution (ADC) and pay-as-you-go. Contributions are assumed to be paid mid-year.

3. Assumed contributions are based on the County of Riverside continuing to follow the current funding policy of normal cost plus 20-year closed period amortization of the 2017 unfunded liability and amortization of subsequent unanticipated changes in actuarial accrued liability over the 15-year period from date established and 5-years for any unexpected asset gains/losses. For funding purposes, implicit subsidy liability and normal cost are not considered.

4. The County has a history of contributing more than the Actuarially Determined Contribution (ADC). We have not recognized contributions in excess of the ADC in the above projection. Allowance for any such contributions would not result in a different discount rate.

5. Projected benefit payments have been determined in accordance with Paragraphs 30-35 of GASB Statement No. 75, and are based on the closed group of active, retired members and beneficiaries as of June 30, 2022. Benefit payments are assumed to be paid mid-year.

6. Administrative expenses are $31,000 for 2022 and are projected with 2.50% inflation. Expenses are assumed to be paid mid-year.

7. Projected investment earnings are based on the assumed investment rate of return of 7.00% per annum.

Discount Rate Sensitivity

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2021:

	1% Decrease (5.15%)	Current Rate (6.15%)	1% Increase (7.15%)
(1) Total OPEB Liability	$ 275,091,495	$ 235,343,271	$ 203,637,568
(2) Plan Fiduciary Net Position	53,014,172	53,014,172	53,014,172
(3) Net OPEB Liability	$ 222,077,323	$ 182,329,099	$ 150,623,396

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2022:

	1% Decrease (6.00%)	Current Rate (7.00%)	1% Increase (8.00%)
(1) Total OPEB Liability	$ 293,805,430	$ 260,209,245	$ 232,336,700
(2) Plan Fiduciary Net Position	73,625,008	73,625,008	73,625,008
(3) Net OPEB Liability	$ 220,180,422	$ 186,584,237	$ 158,711,692

Healthcare Cost Trend Sensitivity

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2021:

	1% Decrease	Trend Rate	1% Increase
(1) Total OPEB Liability	$ 199,764,092	$ 235,343,271	$ 281,129,356
(2) Plan Fiduciary Net Position	53,014,172	53,014,172	53,014,172
(3) Net OPEB Liability	$ 146,749,920	$ 182,329,099	$ 228,115,184

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2022:

	1% Decrease	Trend Rate	1% Increase
(1) Total OPEB Liability	$ 228,588,306	$ 260,209,245	$ 299,177,839
(2) Plan Fiduciary Net Position	73,625,008	73,625,008	73,625,008
(3) Net OPEB Liability	$ 154,963,298	$ 186,584,237	$ 225,552,831

Disclosure—Changes in the Net OPEB Liability and Related Ratios

Changes in the Net OPEB Liability and Related Ratios[1]

	Fiscal Year Ending				
	2018	2019	2020	2021	2022
Total OPEB Liability					
Service Cost	$ 700,296	$ 882,148	$ 1,433,883	$ 2,966,332	$ 10,521,825
Interest Cost	3,011,073	3,446,096	4,583,381	7,282,813	14,891,381
Changes of Benefit Terms	0	0	0	0	0
Differences Between Expected and Actual Experiences	5,814,989	4,062,300	2,528,861	(7,467,464)	4,517,303
Changes of Assumptions	3,186,806	11,336,502	29,685,609	133,909,170	2,506,034
Benefit Payments	(2,841,778)	(3,263,258)	(3,500,687)	(4,470,321)	(7,570,569)
Net Change in Total OPEB Liability	$ 9,871,386	$ 16,463,788	$ 34,731,047	$ 132,220,530	$ 24,865,974
Total OPEB Liability (Beginning)	42,056,520	51,927,906	68,391,694	103,122,741	235,343,271
Total OPEB Liability (Ending)	$ 51,927,906	$ 68,391,694	$ 103,122,741	$ 235,343,271	$ 260,209,245
Plan Fiduciary Net Position					
Contributions—Employer	$ 1,909,771	$ 4,263,258	$ 5,500,687	$ 10,070,321	$ 17,170,569
Contributions—Member	0	0	0	0	0
Net Investment Income	3,613,278	2,342,895	2,820,756	2,526,296	11,041,124
Benefit Payments	(2,841,778)	(3,263,258)	(3,500,687)	(4,470,321)	(7,570,569)
Administrative Expense	(17,481)	(18,325)	(19,822)	(23,282)	(30,288)
Other	0	0	0	0	0
Net Change in Plan Fiduciary Net Position	$ 2,663,790	$ 3,324,570	$ 4,800,934	$ 8,103,014	$ 20,610,836
Plan Fiduciary Net Position (Beginning)	34,121,863	36,785,654	40,110,224	44,911,158	53,014,172
Plan Fiduciary Net Position (Ending)	$ 36,785,654	$ 40,110,224	$ 44,911,158	$ 53,014,172	$ 73,625,008
Net OPEB Liability (Ending)	$ 15,142,252	$ 28,281,470	$ 58,211,583	$ 182,329,099	$ 186,584,237
Net Position as a Percentage of OPEB Liability	70.84%	58.65%	43.55%	22.53%	28.29%
Covered-Employee Payroll	$ 1,382,304,129	$ 1,374,752,875	$ 1,399,892,784	$1,445,184,896	$ 1,487,523,641
Net OPEB Liability as a Percentage of Payroll	1.10%	2.06%	4.16%	12.62%	12.54%

[1] GASB 75 was effective first for employer fiscal years beginning after June 15, 2017.

Disclosure—Contribution Schedule

Contributions

	2018	2019	2020	2021	2022
Actuarially Determined Contribution [1]	$ 1,288,000	$ 2,141,196	$ 4,254,133	$ 9,061,596	$ 16,339,607
Contributions Made in Relation to the Actuarially Determined Contribution	4,263,258	5,500,687	10,070,321	17,170,569	TBD
Contribution Deficiency (Excess)	$ (2,978,258)	$ (3,246,554)	$ (5,816,188)	$ (8,108,973)	TBD
Covered-Employee Payroll	$ 1,374,752,875	$ 1,399,892,784	$ 1,445,184,896	$ 1,487,523,641	TBD
Contributions as a Percentage of Payroll	0.31%	0.39%	0.70%	1.15%	TBD

Notes to Schedule:

Valuation Date: Actuarially Determined Contribution rates are calculated as of June 30, one year prior to the beginning of the fiscal year in which contributions are reported.

Methods and assumptions used to determine contribution rates:

Actuarial Cost Method	Entry Age Normal with amortization of 7/1/2017 unfunded liability over a period ending 6/30/2037 and amortization of subsequent unanticipated changes in liability over 15-year periods and any asset gain/loss over 5-year periods. For funding purposes, implicit subsidy liability and normal cost are not considered.
Asset Valuation Method	Market Value
Salary Increases	2.75%
Investment Rate of Return	7.00%, net of OPEB plan investment expense, including inflation.
Retirement Age	Retirement rates developed in the 2017 CalPERS Experience Study
Mortality	Pub-2010 Headcount-Weighted Public Retirement Plans Mortality Tables using Scale MP-2021

[1] Developed based on the prior valuation.

Participant Information

These exhibit summaries contain participant demographic information.

Active Employee Age/Service Distribution

	Years of Service								
Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	>35	Total
<25	487	3	0	0	0	0	0	0	490
25-29	1,433	289	8	0	0	0	0	0	1,730
30-34	1,358	1,106	269	21	0	0	0	0	2,754
35-39	993	952	827	339	11	0	0	0	3,122
40-44	758	710	757	679	233	6	0	0	3,143
45-49	592	505	624	617	531	104	1	0	2,974
50-54	417	414	434	446	442	179	64	1	2,397
55-59	283	336	336	314	287	114	109	22	1,801
60-64	137	191	211	187	177	56	34	16	1,009
>65	39	83	82	62	32	14	7	11	330
Total	6,497	4,589	3,548	2,665	1,713	473	215	50	19,750

Participant Statistics [1]

	Safety Employees	Miscellaneous Employees	Total
Retirees			
Number of retirees	824	1,957	2,781
Average age	64.7	69.5	68.1
Number of retiree spouses	453	475	928
Actives			
Number of actives	3,396	16,354	19,750
Average age	40.0	44.0	43.3
Average past service (years)	11.8	9.6	10.0

[1] As of July 1, 2021, there are approximately 4,000 deferred retirees are eligible to elect benefits, although are not explicitly included in the participant counts.

Development of GASB 75 Amortization Period for Changes in Liability

	July 1, 2020		July 1, 2021	
Status	2020 Count	Average Future Working Life	2021 Count	Average Future Working Life[1]
Actives	19,476	11.84	19,750	11.90
Retirees[2]	2,522	0.00	2,781	0.00
Total/Weighted Average	21,998	10.48	22,531	10.43

Active Participant Benefit Summary

The table below summarizes the number of participants by bargaining units and the benefits valued. As described in the plan summary and actuarial assumptions sections, certain groups are eligible for PEMHCA benefits not shown in this summary.

Union Code	Description	Bargaining Unit (used to determine contribution)	# Records	2021 Monthly County Contribution*	Health Plan**	CalPERS Retirement Program
CNF	Confidential	Confidential	249	$ 256.00	CalPERS	Misc
LEM	Law Enforcement Management	LEMU	452	$ 143.00	CalPERS	Safety
MGT	Management (General)	Management	1,016	$ 256.00	CalPERS	Misc
MLX	Law Enforcement Exec Staff	LE Exec Staff	14	$ 256.00	CalPERS	Safety
PD7	Public Defender, Prosecution (District Attorney's)	DDAA	392	$ 256.00	CalPERS	Misc
RSA	RSA Law Enforcement	RSA	2,394	$ 25.00	RSA	Safety
RSP	RSA Public Safety	RSA Public Safety	536	$ 143.00	CalPERS	Safety
SE2	SEIU Professional	SEIU	3,364	$ 143.00	CalPERS	Misc
SE8	SEIU Registered Nurses	SEIU	1,302	$ 143.00	CalPERS	Misc
SE9	SEIU Para Professional	SEIU	1,062	$ 143.00	CalPERS	Misc
SES	SEIU Supervisory	SEIU	1,643	$ 143.00	CalPERS	Misc
SPD	SEIU Temporary Assistant	SEIU	3	$ 143.00	CalPERS	Misc
UNC	Unrepresented Confidential	Confidential	157	$ 256.00	CalPERS	Misc
UNR	Unrepresented Management	Management	8	$ 256.00	CalPERS	Misc
UP4	LIUNA Inspection and Technical	LIUNA	1,399	$ 143.00	CalPERS	Misc
UP5	LIUNA Trades, Crafts and Labor	LIUNA	904	$ 143.00	CalPERS	Misc
UP6	LIUNA Supporting Services	LIUNA	4,855	$ 143.00	CalPERS	Misc
		County Total	19,750			

* Other than RSA, all Bargaining Units are eligible to receive the greater of the PEMHCA amount or the bargained amount. Currently, Confidential, DDAA, Management (General), Law Enforcement Executive Staff, Unrepresented Confidential, and Unrepresented management are above the PEMHCA amount, LEMU, RSA Public Safety, SEIU, and LIUNA are at the PEMHCA amount.

** CalPERS designated groups are also eligible to participate in County plans.

Special District (Waste, Parks, and Flood) employees are not included in this valuation.

1 Based on demographic assumptions set out in the Actuarial Assumption and Methods section of this report.
2 Excludes deferred retirees. Including this group would decrease the Average Future Working Life by 0.5.

Retired Participant Benefit Summary

The table below summarizes the number of current retirees receiving various monthly County contribution amounts:

Age	$25.00	$143.00	$256.00	Total
<40	4	1	0	5
40-44	6	1	0	7
45-49	6	1	0	7
50-54	40	75	20	135
55-59	59	195	81	335
60-64	86	399	132	617
65-69	64	333	195	592
70-74	33	320	150	503
75-79	14	208	85	307
80-84	6	113	41	160
85-89	4	57	12	73
90-95	1	16	17	34
>95	0	4	2	6
Total	323	1,723	735	2,781

Summary of Principal Plan Provisions

The following plan provisions are the basis for the calculations in this actuarial valuation.

1. **Benefit Eligibility**
   All employees who retire from active employment within 120 days of separation are eligible for participation. Participants are eligible for service retirement at or after age 50, or disability retirement at an age younger than 50, with at least 5 years of service. Former employees who become eligible for CalPERS pension benefits more than 120 days after separation are not eligible for retiree health benefits.

2. **Benefits / Plans Covered**
   The County contributes a portion of an eligible retiree's medical plan premium under a County sponsored health plan (either at retirement or during a subsequent annual enrollment) for the retiree's lifetime. Contributions are based on the employee's bargaining unit at the time of retirement; as follows:

Bargaining Unit at Retirement	Monthly Contribution 2018	2019	2020	2021	2022
Confidential**	$256.00	$256.00	$256.00	$256.00	$256.00
LEMU (Management)*	$133.12	$136.00	$139.00	$143.00	$149.00
MLX (Executive Staff)**	$256.00	$256.00	$256.00	$256.00	$256.00
LIUNA	$25.00	$25.00	$25.00	$25.00	$149.00
Management**	$256.00	$256.00	$256.00	$256.00	$256.00
District Attorneys (DDAA)*	$256.00	$256.00	$256.00	$256.00	$256.00
RSA Law Enforcement	$25.00	$25.00	$25.00	$25.00	$25.00
RSA Public Safety*	$133.12	$136.00	$139.00	$143.00	$149.00
SEIU	$25.00	$25.00	$139.00	$143.00	$149.00
Unrepresented**	$256.00	$256.00	$256.00	$256.00	$256.00

* Other than RSA, all Bargaining units are eligible to receive the greater of the PEMHCA amount or the bargained amount. Currently, Confidential, MLX (Executive Staff), Management, Prosecution (Deputy DAs), and Unrepresented are above the PEMHCA amount, LEMU, RSA Public Safety, SEIU, and LIUNA are at the PEMHCA amount.

** Confidential, MLX (Executive Staff), Management and Unrepresented retired before 11/1/2005 receive a monthly contribution of $128 and after 11/1/2005 receive a monthly contribution of $256.

Future PEMHCA amounts increase at the same rate as Medical CPI. See Appendix A for a projection of the monthly PEMHCA contribution amounts.

RSA – The County contributes $25.00 per month to the RSA Benefit Trust for RSA Law Enforcement retirees. Although the Trust is responsible for providing a benefit with a much larger premium, the County is responsible for the $25.00 monthly contribution and this benefit is included in Plan liabilities.

Implicit Subsidy – Under CalPERS plans, retirees can receive coverage at premium rates that are subsidized due to demographic differences between those receiving benefits and the population used to develop premiums (e.g., blended active and retiree premiums.)

3. **Survivor Coverage Benefits**
   Upon the death of the retiree, the eligible surviving spouse receives the same monthly benefit amount for their lifetime.

Actuarial Assumptions and Methods

1. **Actuarial Cost Method**

   The costs shown in the report were developed using the Entry Age Normal cost method.

   The Entry Age Normal (EAN) cost method spreads plan costs for each participant from entry date (assuming the plan existed on the employee's hire date) to the expected retirement date. Under the EAN cost method, the plan's normal cost is developed as a level percentage of pay spread over the participants' working lifetime. For this purpose, pay is assumed to increase 2.75% per annum. The AAL is the cumulative value, on the valuation date, of prior service costs. For retirees, the AAL is the present value of all projected benefits.

   The Plan costs are derived by making certain specific assumptions as to the rates of interest, mortality, turnover and other demographic events, which are assumed to hold for many years into the future. Actual experience may differ somewhat from the assumptions and the effect of such differences is spread over all periods. Due to these differences, the costs determined by the valuation must be regarded as estimates of the true Plan costs.

2. **Funding Policy and Actuarially Determined Contribution (ADC)**

   The County's funding policy is to contribute the normal cost plus the amortization of unfunded liability based on the following:

   - Amortization of the 2017 unfunded liability over the period ending June 30, 2037, plus
   - 15-year amortization of subsequent unanticipated changes in liability (i.e., actuarial gains/losses and assumption changes), plus
   - 5-year amortization of subsequent unanticipated changes in assets (i.e., asset gains/losses).

   The amortization is calculated based on a level percentage of future payroll amounts

   Effective July 1, 2020 (ADC for Fiscal Year Ending June 30, 2022), the County elected to exclude the implicit subsidy liability in the funding contribution development.

3. **Discount Rate**

   6.15% - as of 7/1/2020
   7.00% - as of 7/1/2021

   Under GASB 75, the discount rate is based on a single equivalent rate that reflects a blend of:

   - Expected return on assets during the period such that assets are projected to be sufficient to pay benefits of current participants; and
   - 20-year, municipal bond yields / index for periods beyond the depletion of the assets.

   Based on the current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate can be based on the expected asset return.

4. **Expected Return on Assets**

   7.00% - Selected by the County based on CalPERS CERBT Asset Allocation Strategy 1.

5. **Payroll Increases**

2.75% - This is the annual rate at which total payroll is expected to increase and is used in the funding method to calculate the funding contribution as a level percent of payroll.

6. **Inflation**

2.50% - This is the assumed annual rate of inflation for future years.

For demographic assumptions:

Public Agency Police consists of Law Enforcement Management and Law Enforcement Executive Staff;

Public Agency County Peace Officer consists of RSA Law Enforcement and RSA Public Safety, and;

Miscellaneous consists of all other bargaining units.

7. **Mortality**

Mortality rates are based on the Pub-2010 headcount-weighted tables for general employees of all income levels, with generational future improvement scale MP-2021. Sample rates for the 2010 base year mortality are as follows:

Age	Male	Female
30	0.05%	0.02%
40	0.08%	0.04%
50	0.18%	0.10%
60	0.38%	0.21%
70	0.82%	0.53%
80	2.03%	1.41%
90	15.78%	12.12%

8. **Termination**

Termination rates developed in the 2017 CalPERS Experience Study were used in the valuation. The following sample rates are based on age and service:

Public Agency Police

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	10.13%	2.49%	1.79%	1.09%	0.00%	0.00%	0.00%
35	10.13%	2.49%	1.79%	1.09%	0.82%	0.00%	0.00%
40	10.13%	2.49%	1.79%	1.09%	0.82%	0.70%	0.00%
45	10.13%	2.49%	1.79%	1.09%	0.82%	0.70%	0.65%
50	10.13%	0.86%	0.53%	0.27%	0.17%	0.12%	0.09%
55	10.13%	0.86%	0.53%	0.27%	0.17%	0.12%	0.09%

Termination (cont.)

Public Agency County Peace Officer

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	23.76%	2.42%	1.06%	0.50%	0.00%	0.00%	0.00%
35	23.76%	2.42%	1.06%	0.50%	0.24%	0.00%	0.00%
40	23.76%	2.42%	1.06%	0.50%	0.24%	0.10%	0.00%
45	23.76%	2.42%	1.06%	0.50%	0.24%	0.10%	0.06%
50	23.76%	2.42%	1.06%	0.50%	0.24%	0.10%	0.06%
55	23.76%	2.42%	1.06%	0.50%	0.24%	0.10%	0.06%

Miscellaneous

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	16.06%	6.15%	4.16%	2.62%	0.00%	0.00%	0.00%
35	15.37%	5.67%	3.99%	2.52%	1.84%	0.00%	0.00%
40	14.68%	5.19%	3.75%	2.43%	1.76%	1.07%	0.00%
45	14.00%	4.80%	3.51%	2.16%	1.68%	1.00%	0.26%
50	13.32%	4.41%	2.86%	1.88%	1.30%	0.94%	0.20%
55	12.62%	3.68%	2.22%	1.43%	0.92%	0.53%	0.16%

9. Disability

Disability rates developed in the 2017 CalPERS Experience Study were used in the valuation. Sample rates are as follows:

	Public Agency Police		Public Agency County Peace Officer		CalPERS Miscellaneous	
Age	Male	Female	Male	Female	Male	Female
25	0.18%	0.18%	0.14%	0.14%	0.02%	0.01%
30	0.50%	0.50%	0.26%	0.26%	0.02%	0.02%
35	0.82%	0.82%	0.41%	0.41%	0.04%	0.07%
40	1.14%	1.14%	0.58%	0.58%	0.10%	0.14%
45	1.46%	1.46%	0.80%	0.80%	0.15%	0.19%
50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
55	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

10. Retirement Age

Retirement rates developed in the 2017 CalPERS Experience Study are used in the valuation. Sample rates are provided below.

- Hire date prior to August 24, 2012:
  - Police 3% @ 50 were used for safety employees (including County Peace Officers)
  - Miscellaneous 3% @ 60 rates were used for all other employees.
- Hire date August 24, 2012 to December 31, 2012:
  - Police 2% @ 50 were used for safety employees (including County Peace Officers)
  - Miscellaneous 2% @ 60 rates were used for all other employees.
- Hire date post December 31, 2012:
  - Police 2.7% @ 57 were used for safety employees (including County Peace Officers)
  - Miscellaneous 2% @ 62 rates were used for all other employees.

Miscellaneous 3% @ 60

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	1.30%	1.90%	2.60%	4.20%	3.80%	6.40%	10.00%
55	4.00%	5.20%	6.40%	8.50%	9.50%	12.00%	17.20%
60	8.90%	10.60%	12.30%	18.00%	22.60%	31.60%	38.70%
65	20.00%	24.20%	28.30%	33.00%	30.00%	34.20%	37.00%
70	22.00%	25.50%	29.10%	32.60%	35.80%	38.80%	40.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Miscellaneous 2% @ 60

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	2.00%	2.00%	2.00%	2.00%	2.00%	15.00%	15.00%
55	1.90%	2.60%	3.30%	9.20%	13.60%	14.60%	15.00%
60	7.00%	7.40%	8.90%	11.30%	13.70%	16.10%	24.60%
65	14.00%	17.80%	21.50%	26.40%	32.10%	37.70%	41.20%
70	14.00%	17.80%	21.50%	26.40%	32.10%	37.70%	41.20%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Miscellaneous 2% @ 62

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
55	1.20%	2.10%	2.90%	3.80%	6.80%	10.30%	16.60%
60	3.50%	5.50%	7.50%	9.50%	11.50%	14.50%	19.30%
65	11.50%	14.70%	18.00%	21.30%	24.50%	31.50%	35.40%
70	12.70%	16.40%	20.00%	23.60%	27.30%	35.00%	39.40%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Police 3% @ 50

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	5.00%	5.00%	5.00%	10.00%	15.50%	40.00%	40.00%
55	7.00%	7.00%	7.00%	12.00%	17.50%	34.00%	34.00%
60	15.00%	15.00%	15.00%	15.00%	18.50%	35.00%	35.00%
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Police 2% @ 50

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	5.00%	5.00%	5.00%	5.00%	5.00%	10.00%	11.00%
55	7.20%	7.20%	7.20%	9.60%	14.10%	25.50%	40.80%
60	15.00%	15.00%	15.00%	15.00%	15.00%	22.80%	35.00%
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Police 2.7% @ 57

Attained	Years of Service						
Age	5	10	15	20	25	30	35
50	5.00%	5.00%	5.00%	5.00%	6.00%	10.20%	0.00%
55	6.84%	6.84%	6.84%	10.66%	13.89%	25.00%	38.76%
60	15.00%	15.00%	15.00%	15.00%	15.14%	24.78%	35.00%
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

11. Annual Medical Inflation ("Trend")

County Contribution: PEMHCA amounts have been determined through 2022 ($149.00). After 2022, the PEMHCA amounts will increase at the same rate as the Medical CPI. For valuation purposes, this is assumed to be 4% for all years. This applies to RSA Public Safety, Deputy District Attorney, Law Enforcement Management, Confidential, Management, Executive Staff, and Unrepresented who were assumed to participate in CalPERS Health Benefits programs and receive the PEMHCA amounts.

All other County contributions are assumed to remain at their current level.

For purposes of calculating the implicit subsidy, a medical trend rate assumption was used to develop the projected future medical claim amounts. The medical trend rate represents the long-term expected growth of medical benefits paid by the plan, due to non-age-related factors such as general medical inflation, utilization, new technology, and the like. The following table sets forth the trend assumptions used for the valuation:

	Medical	
Year	Pre Medicare	Post Medicare
2020	Actual	Actual
2021	6.65%	7.71%
2022	6.30%	7.19%
2023	5.95%	6.66%
2024	5.59%	6.12%
2025	5.23%	5.59%
2026	4.87%	5.04%
2027+	4.50%	4.50%

12. Monthly Medical Costs (for implicit Subsidy calculations)

The table below shows 2022 premiums as of the valuation date based on Region 3 (Los Angeles, Riverside, San Bernardino).

Plan	HMO/PPO	Employee Only	Employee & 1 Dep.
Basic			
Anthem Select	HMO	$676.48	$1,352.96
Anthem Traditional	HMO	935.57	1,871.14
Blue Shield Access +	HMO	779.87	1,559.74
Blue Shield Trio	HMO	668.13	1,336.26
Health Net Salud y Más	HMO	463.87	927.74
Health Net SmartCare	HMO	764.96	1,529.92
Kaiser	HMO	719.78	1,439.56
PERS Gold	PPO	575.56	1,151.12
PERS Platinum	PPO	863.37	1,726.74
PORAC	PPO	775.00	1,475.00
United Healthcare Alliance	HMO	771.85	1,543.70
United Healthcare Harmony	HMO	714.28	1,428.56
Supplemental/Managed Medicare			
Anthem	HMO	360.19	720.38
Blue Shield	HMO	353.11	706.22
Kaiser	HMO	302.53	605.06
PERS Gold	PPO	377.41	754.82
PERS Platinum	PPO	381.94	763.88
PORAC	PPO	461.00	919.00
United Healthcare	PPO	294.65	589.30

Monthly Medical costs were developed by applying age adjustments to the above premiums to reflect the implicit subsidy. These age adjustments are based on statewide information provided by CalPERS (updated in 2020). Single rate age adjustment factors are used for retirees and spouses. A sampling of the factors used is included below:

	Aging Factors	
Age	HMO Plans	PPO Plans
20	0.32	0.27
30	0.51	0.45
40	0.67	0.60
50	0.99	0.89
60	1.47	1.32
64	1.71	1.54
65	0.78	0.73
70	0.90	0.86
80	1.17	1.14
90+	1.20	1.25

13. Retiree Contributions

Retirees pay the premiums in excess of the County contributions.

14. Dental Benefits

Retirees are eligible for dental benefits if they pay the entire premium. Since dental claims are not assumed to vary with age, costs are expected to be fully paid by retirees and no County liabilities exist.

15. Lapse Rates

The lapse rate represents the annual rate at which retirees elect not to renew coverage. Assumed lapse rates of future and current retirees are included below:

Age	Lapse Rate
50-59	6.5%
60-64	6.5%
65-69	5.0%
70-74	4.0%
75-79	3.5%
80-84	3.0%
85+	0.0%

16. Participants Valued

Only current active and retired participants are directly valued. No future entrants are considered in this valuation except for the participants listed below.

Certain employees who do not immediately elect coverage at retirement are eligible to elect retiree coverage at a later date. Currently, there are approximately 4,000 such deferred retirees. These deferred retirees' liabilities are estimated using recent experience and July 1, 2021 census data. Future deferred election rates are included below:

Age	Election Rate
50-54	3.5%
55-59	6.0%
60-64	10.5%
65-69	4.0%
70+	0.0%

For RSA, it is anticipated that a significant number of retirees will defer benefits to later years. The RSA retiree liability was loaded 15% to account for such current "deferred" retirees that are not included in the census data.

On July 1, 2021, the assets for County and RCA were merged. Therefore, Special District (RCA) employees are included in the valuation.

17. Plan Participation

Assumed plan participation rates of future retirees is as set out in the following table:

Health Plan / Benefit Eligibility	Assumed Participation Rate
CalPERS health plans	60% immediate - 95% (57% of total) elect CalPERS Health Plans - 5% (3% of total) elect County Health Plans 20% deferred to age 68
RSA health plans	60% immediate / 20% defer to age 65
County health plans	
$25 per month benefit	10%

These percentages were developed based on a review of the County's recent experience.

18. Spousal Coverage Assumption

50% of future eligible retirees are assumed to cover their spouses. Males are assumed to be three years older than their female spouses. Current spousal coverage is used for current retirees.

19. Participants Excluded

Special District (Waste, Parks, and Flood) employees, along with active Court members, were not included in this valuation.

20. Changes in Valuation Assumptions

The following assumptions were changed from the prior valuation:

1) Mortality improvement was updated from scale MP-2020 to scale MP-2021.
2) The claims table was updated to reflect most recent CalPERS monthly premiums available for 2021.
3) Expected return on assets was updated from 6.15% to 7.00%.
4) Discount rate was updated from 6.15% to 7.00%, in light of change in expected return assumption.
5) Incorporated a change to provide the LIUNA bargaining group access to CalPERS health plans, which lead to higher costs and participation rates
6) Future CalPERS vs County health plan elections for participants eligible for both was changed from 90%/10% to 95%/5%, for CalPERS/County respectively.
7) A lapse rate assumption was developed based on an experience study that was carried out in 2021.
8) A deferred election rate for actives and deferred retirees was developed based on an experience study that was carried out in 2021.

COVID-19 Impacts

Given the events related to COVID-19, we reviewed participant information, as available, including terminations, retirements, and deaths over the year to compare plan experience against the assumptions used in the valuation to determine whether a modification to future assumptions may be warranted. Evaluation of the information provided did not suggest a significant impact to the plan or justify a change to assumptions other than those already used.

Additional assumption analysis is included in the 2021 assumption rationale document.

Appendix A—Comparison of County Contribution to PEMHCA

The following table compares the projected monthly benefit per participant under the current plan to the projected monthly benefit per participant under PEMHCA. The PEMHCA amounts are assumed to increase at the same rate as medical inflation each year after 2022.

	Current Benefits		
Year	Low - $25/month	High - $256/month	PEMHCA Benefit
2021	$25.00	$256.00	$ 143.00
2022	$25.00	$256.00	$ 149.00
2023	$25.00	$256.00	$ 154.96
2024	$25.00	$256.00	$ 161.16
2025	$25.00	$256.00	$ 167.60
2026	$25.00	$256.00	$ 174.31
2027	$25.00	$256.00	$ 181.28
2028	$25.00	$256.00	$ 188.53
2029	$25.00	$256.00	$ 196.07
2030	$25.00	$256.00	$ 203.92
2031	$25.00	$256.00	$ 212.07
2032	$25.00	$256.00	$ 220.56
2033	$25.00	$256.00	$ 229.38
2034	$25.00	$256.00	$ 238.55
2035	$25.00	$256.00	$ 248.10
2036	$25.00	$256.00	$ 258.02
2037	$25.00	$256.00	$ 268.34
2038	$25.00	$256.00	$ 279.07
2039	$25.00	$256.00	$ 290.24
2040	$25.00	$256.00	$ 301.85
2041	$25.00	$256.00	$ 313.92
2042	$25.00	$256.00	$ 326.48

Appendix B—GASB 75 Expense Estimate for Fiscal Year Ending June 30, 2023

The following table illustrates the estimated OPEB expense under GASB 75 for the Fiscal Year ending June 30, 2023. The amounts shown are estimates based on the results of the July 1, 2021 actuarial valuation and a 7.00% discount rate.

	Fiscal Year Ending 6/30/2023[1]
(1) Service Cost	$ 10,290,000
(2) Interest Cost	18,547,000
(3) Expected Investment Return	(5,723,000)
(4) Employee Contributions	0
(5) Administrative Expense	31,000
(6) Plan Changes	0
(7) Amortization of Unrecognized	
(a) Liability (Gain)/Loss	1,007,000
(b) Asset (Gain)/Loss	(1,314,000)
(c) Assumption Change (Gain)/Loss	17,274,000
(8) Total Estimated Expense	$ 40,112,000
(9) Total Expense as a Percentage of Payroll[2]	2.62%

The FYE 2023 estimate is higher than the FYE 2022 expense of $38.6 million, primarily due to a) higher interest cost which is a result of higher discount rate and higher OPEB liability, and b) partially offset by higher expected investment return. The estimated FYE 2023 expense has been developed based on the same eligibility basis used for all groups as of June 30, 2021.

[1] Final FYE 2023 expense information will be provided in the actuarial valuation based on a June 30, 2022 measurement date reflecting updated census, assumptions, plan provisions and actual asset values, in addition to any asset, liability, or assumption gains/losses initially recognized over the period June 30, 2021 to June 30, 2022.
[2] Based on estimated payroll.

Appendix C—Pre-65 / Post-65 Breakdown

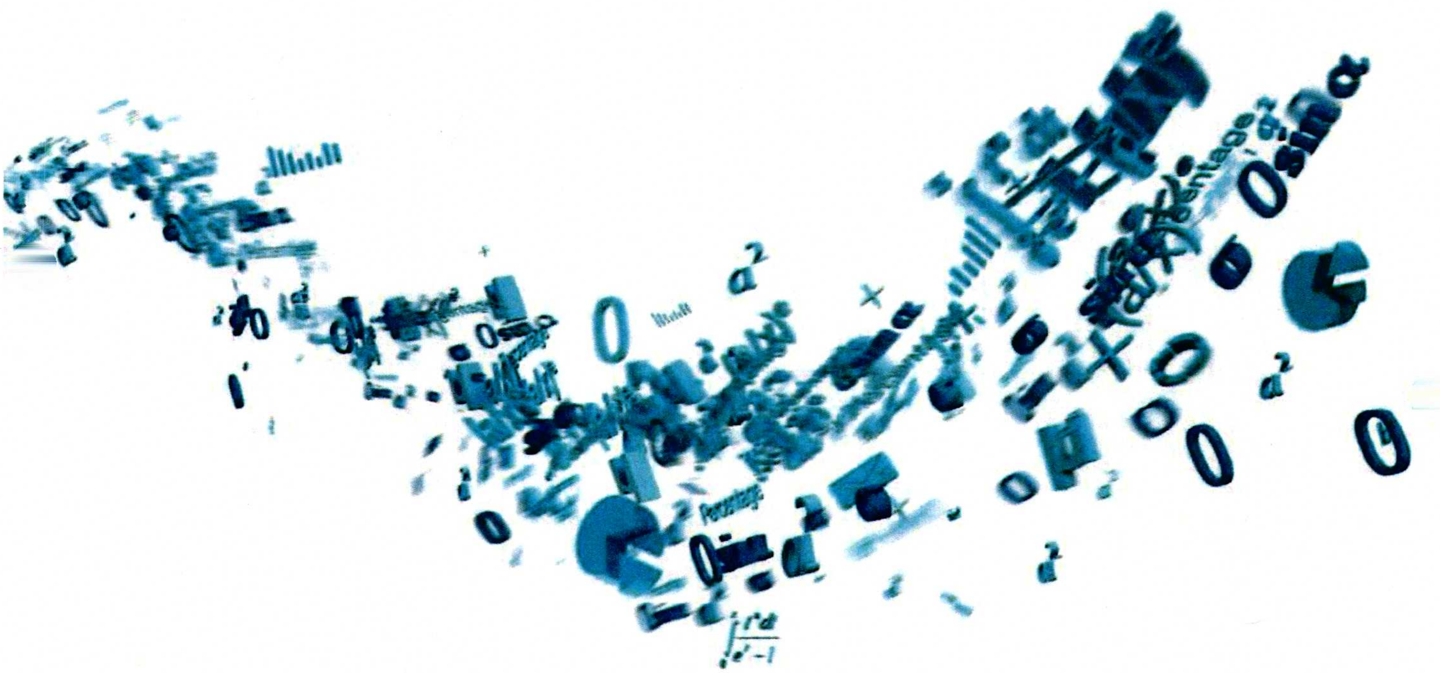
Alternate breakdown of AAL is shown below to help understand the source of costs.

	Pre-65	Post-65	Total
All Benefits			
County Contribution - Flat Dollar (County & RSA)			
Retirees	$295,267	$594,901	$890,168
Actives	$503,245	$392,318	$895,563
Subtotal	$798,512	$987,219	$1,785,731
County Contribution - CalPERS Benefits			
Retirees	$10,833,498	$58,641,586	$69,475,084
Actives	$22,884,676	$50,171,536	$73,056,212
Subtotal	$33,718,174	$108,813,122	$142,531,296
CalPERS - Implicit Subsidy			
Retirees	$34,670,024	$5,913,311	$40,583,335
Actives	$74,182,690	$1,126,193	$75,308,883
Subtotal	$108,852,714	$7,039,504	$115,892,218
Total AAL	**$143,369,400**	**$116,839,845**	**$260,209,245**
Number of Retirees as of 7/1/2021[1]	1,106	2,781	2,781
Number of Actives as of 7/1/2021[1]	19,420	19,750	19,750
AAL Per Retiree[2]	$22,203	$17,059	$25,889
AAL Per Active	$5,024	$2,617	$7,558
Normal Cost			
Flat Dollar (County & RSA)	$36,984	$21,888	$58,872
CalPERS Benefits	$1,503,772	$3,831,120	$5,334,892
CalPERS - Implicit Subsidy	$4,697,274	$199,282	$4,896,556
Total Normal Cost	**$6,238,030**	**$4,052,290**	**$10,290,320**

[1] For purpose of illustrating per participant AAL, counts reflect number of participants eligible for pre-65 and post-65 benefits, respectively. Deferred retirees are not explicitly included in the count, but their future benefits are valued based on the election assumption developed in the experience study carried out in 2021.

[2] Average liability excluding deferred retirees; Average liability for eligible deferred retirees is approximately $9,700.

Proprietary & Confidential



Actuarial Valuation Report

County of Riverside

Part-time and Temporary Employees' Retirement Plan

As of July 1, 2021

AON
Empower Results®

Executive Summary

Background

The County of Riverside established the Part-Time and Temporary Employees' Retirement Plan to provide retirement benefits to eligible employees as a substitute for benefits under Social Security, as allowed under OBRA '90. The Plan is an IRS Section 401(a) defined benefit plan.

The County's current funding policy is to contribute a level percentage of pay based on the sum of

a) Normal Cost with interest and administrative expense, plus

b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus

c) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods, less

d) Expected Employee Contributions

Amortization amounts are calculated based on the discount rate and payroll increase assumption appropriate for the valuation date.

Summary of Results

Funding Contribution

The funding contribution for Fiscal Year Ending (FYE) 2022 is $1,547,637 and was developed based on the prior year valuation. The funding contribution for FYE 2023 is $0 and is developed based on the funding policy described in the Background section above. This decrease is mainly a result of higher than expected asset returns. Although the funding contribution for FYE 2023 is $0 using the current funding policy, the plan is less than 100% funded and the County may wish to explore alternatives, including implementing a floor to the annual contribution amount.

GASB 68

This valuation is based on census data provided as of July 1, 2021 for the purpose of providing GASB 68 financial statement information, including expense, for FYE June 30, 2022. The final FYE June 30, 2022 expense/(income) is ($1,161,713), which is lower than estimated in the prior valuation due to actual employee contribution higher than projected and a large asset gain during FY 2021.

The measurement date for results shown in this valuation report is June 30, 2021.

ASOP 51

In September 2017, the Actuarial Standards Board (ASB) introduced Actuarial Standard of Practice (ASOP) No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions, which is effective for any actuarial work product with a measurement date on or after November 1, 2018. This ASOP provides guidance to actuaries with regard to the assessment and disclosure of the risk that actual future measurements may differ significantly from expected future measurements. Examples of future measurements include pension liabilities, actuarially determined contributions, and funded status. A report that addresses the requirements of ASOP 51 will be provided in a report separate to these valuation results.

Comparison to Prior Valuation

The purpose of the actuarial valuation of the Plan is to:

- Determine the Plan's funded status and annual costs; and
- Provide information for Government Accounting Standards Board financial statement disclosure.

The following table summarizes the current valuation results as of July 1, 2021, compared to prior year results:

	July 1, 2020	July 1, 2021
Active participant count	1,394	1,809
Funding Contribution		
Discount Rate	6.00%	6.00%
Actuarial accrued liability (Projected Unit Credit):	$58,549,103	$64,932,752
Smoothed value of plan assets	45,479,406	52,938,998
Unfunded liability	$13,069,697	$11,993,754
Funded percentage	77.7%	81.5%
Actuarially Determined Contribution (ADC), FYE 2022 / 2023	$1,547,637	$0
Expected Participant Compensation	$27,756,000	$34,014,000
Contribution as a Percentage of Compensation	5.58%	0.00%
GASB 68 Expense		
Discount Rate	6.00%	6.00%
Total Pension Liability (Entry Age Normal):	$54,846,295	$59,915,382
Plan Fiduciary Net Position	45,366,169	61,424,642
Net Pension Liability	$9,480,126	($1,509,260)
GASB 68 Annual Pension Expense/(Income), FYE 2022 final / 2023 estimate	($1,161,713)	$156,000

Overall, the plan's funded status improved and Net Pension Liability decreased from the prior valuation due to the following offsetting factors:

- Assets were higher than expected due to favorable investment return on plan assets (30.35% actual compared to 6.0% assumed);
- Demographic experience was different than expected, primarily due to more new entrants, resulting in a liability loss;
- Mortality assumptions were updated to reflect the recent improvement scale MP-2021, resulting in a small increase in liabilities.
- Lump sum conversion mortality table was updated to the 2021 applicable table under IRC section 417(e), resulting in a small decrease in liabilities.

The funding contribution (Actuarial Determined Contribution) decreased in magnitude compared to FYE 2021 mainly due to the large asset gain.

Projected Funding Status

80% Funded Status

The County's target is to maintain an 80% funded status for the plan. The funded status as of July 1, 2021 is above 80% and is not projected to be less than 80% in the future.

Projected Actuarial Accrued Liability (AAL), 6/30/2022	$67,746,046
Projected Smoothed Value of Assets, 6/30/2022	59,042,430
Funding Shortfall, 6/30/2022	8,703,616
Projected Funded Status, 6/30/2022	87.2%

90% Funded Status

The County also requested review of maintaining an alternative 90% funded status for the Plan. The valuation projects the Plan to be under 90% funded based on the cost method used for funding, as shown below.

Projected Actuarial Accrued Liability (AAL), 6/30/2022	$67,746,046
Projected Smoothed Value of Assets, 6/30/2022	59,042,430
Funding Shortfall, 6/30/2022	8,703,616
Projected Funded Status, 6/30/2022	87.2%
Shortfall to achieve 90% as of 6/30/2022	1,929,011
Additional funding in FYE 2022 to achieve 90% as of 6/30/2022[1]	$1,873,622

[1] Assumes funding on 1/1/2022 and is in addition to the proposed FYE 2022 contribution of $0.

The table below summarizes the estimated contribution projected in order to attain 90% at various future dates. The total contributions include the fiscal year ending June 30, 2023 ADC rate of 0.00% plus the additional amount to attain 90% funded status by the target funding date.

	Additional Payment to Fund 90% by Target Date		**Total Contribution to Fund 90% by Target Date**	
90% Target Funding Date	**Annual Payment in FYE 2023[1]**	**% of Pay**	**Annual Payment in FYE 2023[1,2]**	**% of pay[2]**
6/30/2023	$522,861	1.54%	$522,861	1.54%
6/30/2024	0	0.00%	0	0.00%

[1] Contributions shown for FYE 2023 are assumed to be made throughout the year based on a level percent of pay and are therefore assumed to increase at 2.75% per year from FYE 2023 to the target funding date.
[2] Includes current FYE 2022 contribution of $0 (0.00% of pay).

For example, to attain 90% funded by FYE 2023 the County would need to contribute approx. $0.5M in FYE 2023 in addition to the current ADC contributions of $0.0M in FYE 2023.

* * *

This July 1, 2021 valuation is based on census data provided as of June 30, 2021 for the purpose of providing GASB 68 financial statement information, including final expense for the fiscal year ending June 30, 2022, estimated expense for fiscal year ending June 30, 2023 and the funding contribution amount for the fiscal year ending June 30, 2023.

The following report provides details of the results summarized above and the disclosure information for fiscal year ending 2022.

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Actuarial Valuation Certification

This report documents the results of the July 1, 2021 actuarial valuation for the County of Riverside Part-time and Temporary Employee's Retirement Plan. The information provided in this report is intended strictly for documenting the development of the Funding Contribution and disclosure items under Governmental Accounting Standards Board (GASB) Statements No. 68.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 68 (GASB 68) including any guidance or interpretations provided by the Company and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of the County of Riverside's auditors.

A valuation model was used to develop the liabilities for the June 30, 2021 valuation. The valuation model relies on ProVal software, which was developed by Winklevoss Technologies, LLC. Experts within Aon selected this software and determined it is appropriate for performing valuations. We coded and reviewed the software for the provisions, assumptions, methods, and data of the County of Riverside Part-time and Temporary Employee's Retirement Plan.

A model was used to develop the appropriate GASB discount rate. The undersigned relied on experts within Aon for the development of the capital market assumptions and the model underlying the expected rate of return.

The valuation model outputs various cost scenarios. The "1% increase" and "1% decrease" interest rate scenarios vary only the discount rate assumption, in order to illustrate the impact of a change in that assumption in isolation. In practice, certain other assumptions, such as the expected or realized asset returns, would also be expected to vary when the discount rate changes. Therefore, the output from these scenarios should be used solely for assessing the impact of the discount rate in isolation and may not represent a realistic set of results for other purposes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to (but not limited to) such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions
- Changes in actuarial methods or in economic or demographic assumptions
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period)
- Changes in plan provisions or applicable law

Due to the limited scope of this valuation report, we have not included an analysis of the potential range of such future measurements. However, an assessment and disclosure of risks pertaining to the funding valuation as required by the actuarial standards of practice is being provided in a separate report.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by the County of Riverside as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results. We have relied on actual and expected contributions as summarized within this report.

Actuarial computations under GASB are for purposes of fulfilling plan and employer accounting requirements. The calculations reported herein have been made on a basis consistent with our understanding of these accounting standards. Determinations for purposes other than meeting Employer financial accounting requirements may be different from these results.

This report is intended for the sole use of the County of Riverside. It is intended only to supply information for the County of Riverside to comply with the stated purpose of the report and may not be appropriate for other business purposes. Reliance on information contained in this report by anyone for other than the intended purposes, puts the relying entity at risk of being misled because of confusion or failure to understand applicable assumptions, methodologies, or limitations of the report's conclusions. Accordingly, no person or entity, including the County of Riverside, should base any representations or warranties in any business agreement on any statements or conclusions contained in this report without the written consent of Aon.

Funded status measurements shown in this report may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for the employer and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions.

In determining the annual expense and Funding Contribution for the County of Riverside Part-time and Temporary Employees' Retirement Plan and information relating to plan disclosure and reporting requirements, Aon may be assisting the appropriate plan fiduciary as it performs tasks that are required for the administration of an employee benefit plan. Aon also may be consulting with the employer/plan sponsor (County of Riverside) as it considers alternative strategies for funding the plan, or as it evaluates information relating to employer reporting requirements. Thus, Aon potentially will be providing assistance to County of Riverside (and/or certain of its employees) acting in a fiduciary capacity (for the benefit of plan participants and beneficiaries) and to County of Riverside (and/or its executives) acting in a settlor capacity (for the benefit of the employer sponsoring the County of Riverside Part-time and Temporary Employees' Retirement Plan).

The undersigned are familiar with the near-term and long-term aspects of pension valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to the County of Riverside has any material direct or indirect financial interest in the County of Riverside. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for the County of Riverside.

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January 2022

Summary of Liabilities

This exhibit shows the plan liabilities as of July 1, 2021 based on census data provided by the County as of June 30, 2021 and the Summary of Plan Provisions and Summary of Actuarial Assumptions described in this report.

The Actuarial Accrued Liability (AAL) is the portion of the actuarial present value of all future benefits to be paid to current plan participants that is attributable to past service.

GASB 68 prescribes use of the Entry Age Normal (EAN) cost method for development of expense and disclosure information. For funding contributions, the Projected Unit Credit (PUC) cost method is used to maintain a more stable contribution level for this plan that experiences high turnover rates.

	Funding Contributions	GASB 68
Cost Method	PUC	EAN
Discount Rate	6.00%	6.00%
Actuarial Accrued Liability (AAL), as of July 1, 2021		
Actives	$11,983,477	$12,723,806
Actives not accruing benefits [1]	15,602,203	9,844,504
Deferred Vested Terminated	24,250,164	24,250,164
Retirees and Beneficiaries	13,096,908	13,096,908
Total	$64,932,752	$ 59,915,382
Normal (Service) Cost, as of July 1, 2021	$1,212,570	$1,621,033

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

Summary of Plan Assets

This exhibit develops the asset values used in the valuation.

Statement of Invested Plan Assets as of June 30, 2021	2021
1. Mutual Funds – Equity	$43,804,419
2. Mutual Funds – Fixed Income	16,999,601
3. Cash and Equivalents (including receivables)	620,622
4. Total Assets held in Trust for Pension Benefits	$61,424,642
Reconciliation of Plan Assets	
1. Market Value of Assets at beginning of Plan Year	$45,366,169
2. Employer Contributions	2,281,929
3. Employee Contributions	2,268,481
4. Net Investment Income	14,068,526
5. Benefit Payments	(2,270,047)
6. Administrative Expenses	(290,416)
7. Market Value of Assets at end of Plan Year	$61,424,642
Rate of Return for 2020/2021 Plan year (net of expenses)	30.35%
Development of (Gain)/Loss	
1. Expected Investment Earnings (assumed 6.00%)	$2,780,799
2. Actual Investment Earnings	14,068,526
3. (Gain)/Loss on Assets (1)-(2)	**($11,287,727)**
Smoothed Value of Assets as of June 30, 2021	
1. Market Value of Assets at end of Plan Year	$61,424,642
2. Unrecognized (Gain)/Loss[1]	(8,485,644)
3. Preliminary Smoothed Value of Assets at end of Plan Year (1)+(2)	$52,938,998
4. Lower Corridor (80% of Market Value)	$49,139,714
5. Upper Corridor (120% of Market Value)	$73,709,570
6. Smoothed Value of Assets	$52,938,998

[1] Schedule of the Current and Prior Asset (Gains)/Losses as of June 30, 2021.

Date Established	Original (Gain)/Loss	Years Remaining as of 06/30/2021	Amount recognized	Total Amount Unrecognized
7/1/2021	($11,287,727)	4	($2,257,545)	$(9,030,182)
7/1/2020	$997,436	3	$398,974	$598,462
7/1/2019	$556,864	2	$334,119	$222,745
7/1/2018	($1,383,353)	1	($1,106,684)	($276,669)
Total			($2,631,136)	$(8,485,644)

Summary of Funded Status

The Plan's funded status as of July 1, 2021 is developed based on the Actuarial Accrued Liability determined using the Projected Unit Credit methodology and the smoothed value of Plan assets.

The following table shows the development of the Plan's funded status as of July 1, 2021:

Funding Methodology	Projected Unit Credit
Discount Rate	6.00%
Actuarial Accrued Liability	$64,932,752
Smoothed Value of Plan Assets	52,938,998
Unfunded Liability	$11,993,754
Funded Percentage	81.5%

Development of Funding Contribution

The County's current funding policy is to contribute an amount equal to a level percentage of pay. Note the determination developed below assumes a constant active population over which the unfunded liabilities are amortized. The funding contribution is based on the sum of:

a) Normal Cost with interest and administrative expense, plus
b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
c) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods, less
d) Expected Employee Contributions

The following table shows the development of the funding contribution as a level percentage of pay, assuming middle of year payment, for the FYE June 30, 2023:

	Total
Funding Contribution, FYE June 30, 2023	
Projected Normal Cost (including expense), plus interest	$1,623,322
Amortization of UAAL, plus interest	(945,122)
Expected Employee Contributions During FYE June 30, 2023	(1,275,525)
Funding Contribution, not less than 0	$0
Funding Contribution as a Percentage of Pay	
Estimated Participant Compensation [1]	$34,014,000
Normal Cost	4.77%
Amortization of UAAL	(2.78%)
Employee Contributions	(3.75%)
Funding Contribution, not less than 0	0.00%

We understand the County makes plan contributions based on the percentage of pay determined above. To the extent actual funding differs from dollar **amount** anticipated, the variation will be reflected in future contribution levels through amortization of unexpected changes in the UAAL.

The significant gain on plan assets for the year ending June 30, 2021 results in a large negative amortization base which, under the current funding policy, is amortized over a 5-year period. This large negative annual amortization results in the net amortization to be recognized in 2023, including all prior (gains)/losses, to be negative. However, the plan is not currently 100% funded and as such, the County should expect future annual amortization payments in future contribution rates. The County may wish to review the funding contribution development and explore alternatives, including a floor on the contribution amount equal to the difference between the projected normal cost and employee contributions (i.e., 0.097% for FYE 2023).

[1] Based on 2.75% payroll increase assumption.

Liability (Gain)/ Loss

The following table shows the development of the liability gain / loss as of June 30, 2021.

Liability as of June 30, 2020	$58,549,103
Service Cost	1,003,889
Interest on Liability	3,505,078
Plan Change	0
Assumption Changes	**124,057**
Benefit Payments	(2,270,047)
Expected Liability as of June 30, 2021	60,912,080
Actual Liability as of June 30, 2021	64,932,752
Liability (Gain)/Loss	**$4,020,672**

Amortization Schedule

The following table shows the amortization of Unfunded Actuarial Accrued Liability as of July 1, 2022. Amortization of bases is first recognized in the fiscal year subsequent to the year established.

Date Established	Type of Base	Original Period	Remaining Period as of June 30, 2022	Original Balance	Balance Remaining as of June 30, 2022	Amortization Recognized in FYE June 30, 2023
7/1/2017	7/1/2017 UAAL [1]	20	15	$8,013,534	$7,029,512	$577,535
7/1/2018	Liability (Gain)/Loss	15	12	1,628,720	1,564,789	153,869
7/1/2018	Assets (Gain)/Loss	5	2	(1,383,353)	(666,134)	(338,253)
7/1/2018	Assumptions	15	12	(67,964)	(65,298)	(6,421)
7/1/2019	Liability (Gain)/Loss	15	13	2,675,755	2,671,241	246,020
7/1/2019	Assets (Gain)/Loss	5	3	556,864	385,491	132,519
7/1/2019	Assumptions	15	13	2,564,505	2,560,173	235,790
7/1/2020	Liability (Gain)/Loss	15	14	645,612	665,809	57,771
7/1/2020	Assets (Gain)/Loss	5	4	997,436	882,404	231,010
7/1/2020	Assumptions	15	14	(273,516)	(282,073)	(24,475)
7/1/2021	Liability (Gain)/Loss	15	15	4,020,672	4,261,912	350,153
7/1/2021	Assets (Gain)/Loss	5	5	(11,287,727)	(11,964,991)	(2,544,306)
7/1/2021	Assumptions	15	15	124,057	131,500	10,804
	Total Charges			$8,214,595	$7,174,334	($917,984)

[1] Includes Asset (Gain)/Loss as of 6/30/2017.

GASB 68 Reporting and Disclosure Information for Fiscal Year Ending June 30, 2022

Development of GASB 68 Annual Expense

The expense amounts shown below have been prepared for GASB 68 reporting purposes for the fiscal year ending June 30, 2022 based on a Valuation Date of July 1, 2021 and Measurement period July 1, 2020 to July 1, 2021.

The following table illustrates the Net Pension Liability under GASB 68.

	Fiscal Year Ending 6/30/2021	Fiscal Year Ending 6/30/2022
1. Pension Liability		
(a) Actives	$ 13,313,785	$ 12,723,806
(b) Actives not accruing benefits [1]	$ 8,813,915	$ 9,844,504
(c) Deferred Vested Terminated	$ 20,067,981	$ 24,250,164
(d) Retirees and Beneficiaries	$ 12,650,614	$ 13,096,908
(e) Total	$ 54,846,295	$ 59,915,382
2. Plan Fiduciary Net Position	$ 45,366,169	$ 61,424,642
3. Net Pension Liability	$ 9,480,126	$ (1,509,260)
4. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	82.72%	102.52%
5. Deferred Outflow of Resources for Contributions Made After Measurement Date	$ 2,281,929	TBD

Annual Expense, FYE June 30, 2022	
1. Service Cost	$ 1,099,119
2. Interest Cost	3,289,615
3. Expected Return on Assets	(2,780,799)
4. Employee Contributions	(2,268,481)
5. Administrative Expense	290,416
6. Plan Changes	0
7. Amortization of Unrecognized	
(a) Liability (Gain)/Loss	1,395,869
(b) Asset (Gain)/Loss	(2,694,075)
(c) Assumption Changes	506,623
(d) Total	(791,583)
8. Annual Expense	$ (1,161,713)

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

Reconciliation of Net Pension Liability

The following table shows details regarding the Total Pension Liability, Plan Fiduciary Net Position and Net Pension Liability for the measurement period June 30, 2020 to June 30, 2021.

	Increase (Decrease)		
	Total Pension Liability (a)	**Plan Fiduciary Net Position (b)**	**Net Pension Liability (a) – (b)**
Balance Recognized at 6/30/2021 (Based on 6/30/2020 Measurement Date)	$54,846,295	$45,366,169	$9,480,126
Changes for the year:			
Service Cost	$1,099,119	N/A	$1,099,119
Interest Cost	$3,289,615	N/A	$3,289,615
Plan Amendment	$0	N/A	$0
Differences Between expected and actual experience	$2,831,731	N/A	$2,831,731
Changes of Assumptions	$118,669	N/A	$118,669
Benefit Payments, including refunds of employee contributions	($2,270,047)	($2,270,047)	$0
Contributions – Employer	N/A	$2,281,929	($2,281,929)
Contributions – Employee	N/A	$2,268,481	($2,268,481)
Net Investment Income	N/A	$14,068,526	($14,068,526)
Administrative Expenses	N/A	($290,416)	$290,416
Other Changes	$0	$0	$0
Net Changes	$5,069,087	$16,058,473	($10,989,386)
Balance Recognized at 6/30/2022 (Based on 6/30/2021 Measurement Date)	$59,915,382	$61,424,642	($1,509,260)

Development of Items Used in Determination of 2022 Expense

Liability (Gain)/Loss

The following table illustrates the liability (gain)/loss under GASB 68.

		Fiscal Year Ending 6/30/2022
1.	Pension Liability at Beginning of Measurement Period	$ 54,846,295
2.	Service Cost	1,099,119
3.	Interest on the Total Pension Liability	3,289,615
4.	Changes of Benefit Terms	0
5.	Changes of Assumptions	118,669
6.	Benefit Payments	(2,270,047)
7.	Expected Pension Liability at End of Measurement Period	57,083,731
8.	Actual Pension Liability at End of Measurement Period	59,915,382
9.	Pension Liability (Gain)/Loss	$ 2,831,731
10.	Average Future Working Life Expectancy	9.04
11.	Pension Liability (Gain)/Loss Amortization	$ 313,245

Asset (Gain)/Loss

The following illustrates the asset (gain)/loss under GASB 68.

		Fiscal Year Ending 6/30/2022
1.	Pension Asset at Beginning of Measurement Period	$ 45,366,169
2.	Contributions—Employer	2,281,929
3.	Contributions—Employee	2,268,481
4.	Expected Investment Income	2,780,799
5.	Benefit Payments	(2,270,047)
6.	Administrative Expense	(290,416)
7.	Other	0
8.	Expected Pension Asset at End of Measurement Period	50,136,915
9.	Actual Pension Asset at End of Measurement Period	61,424,642
10.	Pension Asset (Gain)/Loss	$(11,287,727)
11.	Amortization Factor	5.00
12.	Pension Asset (Gain)/Loss Amortization	$ (2,257,545)

Deferred Outflows/Inflows of Resources

The following table illustrates the Deferred Inflows and Outflows as of June 30, 2022 under GASB 68.

	Deferred Outflows of Resources	Deferred Inflows of Resources
1. Difference between actual and expected experience	$6,202,611	$286,937
2. Net difference between expected and actual earnings on pension plan investments	0	8,485,644
3. Assumption changes	2,617,798	627,973
4. Total	$8,820,409	$9,400,554

Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of June 30, 2022.

Date		Period[1]		Balance		Annual
Established	Type of Base	Original	Remaining	Original	Remaining	Payment
6/30/2021	Liability (Gain)/Loss	9.04	8.04	$2,831,731	$2,518,486	$313,245
6/30/2021	Asset (Gain)/Loss	5.00	4.00	(11,287,727)	(9,030,182)	(2,257,545)
6/30/2021	Assumptions	9.04	8.04	118,669	105,542	13,127
6/30/2020	Liability (Gain)/Loss	9.31	7.31	(365,443)	(286,937)	(39,253)
6/30/2020	Asset (Gain)/Loss	5.00	3.00	997,436	598,462	199,487
6/30/2020	Assumptions	9.31	7.31	(258,607)	(203,053)	(27,777)
6/30/2019	Liability (Gain)/Loss	8.78	5.78	2,732,087	1,798,571	311,172
6/30/2019	Asset (Gain)/Loss	5.00	2.00	556,864	222,745	111,373
6/30/2019	Assumptions	8.78	5.78	2,985,149	1,965,167	339,994
6/30/2018	Liability (Gain)/Loss	8.07	4.07	1,620,937	817,497	200,860
6/30/2018	Asset (Gain)/Loss	5.00	1.00	(1,383,353)	(276,669)	(276,671)
6/30/2018	Assumptions	8.07	4.07	39,510	19,926	4,896
6/30/2017	Liability (Gain)/Loss	7.97	2.97	1,456,980	542,940	182,808
6/30/2017	Asset (Gain)/Loss	5.00	0.00	(2,353,591)	0	(470,719)
6/30/2017	Assumptions	7.97	2.97	(746,218)	(278,078)	(93,628)
6/30/2016	Liability (Gain)/Loss	7.97	1.97	1,524,469	376,813	191,276
6/30/2016	Assumptions	7.97	1.97	(594,082)	(146,842)	(74,540)
6/30/2015	Liability (Gain)/Loss	8.53	1.53	795,023	142,601	93,203
6/30/2015	Assumptions	8.53	1.53	2,939,020	527,163	344,551
6/30/2014	Liability (Gain)/Loss	8.04	0.04	1,146,168	5,703	142,558
	Total Charges			$2,755,022	$(580,145)	$(791,583)

[1] Periods prior to 6/30/2017 were based on future working life as of the end of the measurement period.

Amounts reported as Deferred Outflows of Resources and Deferred (Inflows) of Resources related to pensions will be recognized in pension expense as follows:

Year Ending June 30	
2023	$ (457,717)
2024	(395,997)
2025	(855,291)
2026	(1,141,283)
2027	924,907
Thereafter	1,345,236
Total	$ (580,145)

Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2022.

($ in thousands)

Year Ending June 30[2]	Beginning Fiduciary Net Position (a)	Total Contributions (b)	Benefit Payments (c)	Administrative Expenses (d)	Investment Earnings (e)	Ending Fiduciary Net Position[1] (f)
2022	$61,425	$2,588	$3,540	$304	$3,649	$63,819
2023	63,819	1,276	2,979	274	3,771	65,613
2024	65,613	476	3,016	265	3,854	66,663
2025	66,663	377	3,067	261	3,913	67,624
2026	67,624	295	3,164	260	3,965	68,459
2027	68,459	282	3,366	260	4,009	69,125
2028	69,125	2,213	3,526	260	4,102	71,654
2029	71,654	2,242	3,719	260	4,249	74,166
2030	74,166	2,279	3,830	261	4,397	76,752
2031	76,752	2,325	3,886	261	4,552	79,482
2032	79,482	2,376	3,924	262	4,716	82,389
2033	82,389	2,431	4,030	263	4,889	85,417
2034	85,417	2,489	4,083	264	5,071	88,630
2035	88,630	2,340	4,260	265	5,254	91,699
2036	91,699	1,691	4,338	266	5,417	94,202
2037	94,202	1,680	4,423	267	5,564	96,757
2038	96,757	424	4,543	267	5,676	98,047
2039	98,047	444	4,581	267	5,753	99,396
2040	99,396	498	4,696	267	5,832	100,763
2041	100,763	502	4,755	266	5,912	102,157
2042	102,157	546	4,917	265	5,993	103,513
2043	103,513	538	4,971	264	6,072	104,888
2044	104,888	565	5,040	262	6,153	106,304
2045	106,304	604	5,071	260	6,239	107,817
2046	107,817	626	5,131	257	6,329	109,384
2047	109,384	633	5,197	254	6,421	110,986
2048	110,986	643	5,340	250	6,513	112,553
2049	112,553	695	5,349	246	6,609	114,261
2050	114,261	735	5,384	241	6,711	116,082
2051	116,082	721	5,453	237	6,818	117,932

[1] (f)=(a) + (b) − (c) − (d) + (e).
[2] Years later than 2051 were omitted from this table.

Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2116.

The Plan's projected fiduciary net position is not projected to reach $0.

As such, 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 "depletion date" when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 6.00% per annum was applied to all periods of projected benefit payments to determine the total Pension liability as of June 30, 2022 shown earlier in this report.

Asset Projection Basis

In projecting the Plan's fiduciary net position, the following assumptions were made:

1. Interest rate for discounting was 6.00% per annum.
2. Projected total contributions are employer and employee contributions to the unfunded actuarial accrued liability and normal cost (for the current active population only). Contributions are assumed to be paid mid-year.
3. Projected employee contributions to the plan are 3.75% of compensation.
4. Assumed contributions are based on the County of Riverside continuing to follow the current funding policy.
5. 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 June 30, 2022. Benefit payments are assumed to be paid mid-year.
6. Administrative expenses are assumed to be $300,000 per year increased with inflation at 2.5% per year and pro-rated based on projected proportion of headcount that relates to current population.

Sensitivity to Discount Rate

The following table illustrates the impact of interest rate sensitivity on the Net Pension Liability for fiscal year ending June 30, 2021:

	1% Decrease (5.0%)	Current Rate (6.0%)	1% Increase (7.0%)
Total Pension Liability	$64,161,459	$54,846,295	$47,554,255
Plan Fiduciary Net Position	($45,366,169)	($45,366,169)	($45,366,169)
Net Pension Liability	$18,795,290	$9,480,126	$2,188,086

The following table illustrates the impact of interest rate sensitivity on the Net Pension Liability for fiscal year ending June 30, 2022:

	1% Decrease (5.0%)	Current Rate (6.0%)	1% Increase (7.0%)
Total Pension Liability	$69,914,791	$59,915,382	$52,088,067
Plan Fiduciary Net Position	($61,424,642)	($61,424,642)	($61,424,642)
Net Pension Liability	$8,490,149	($1,509,260)	($9,336,575)

Schedule of Changes in the Net Pension Liability and Related Ratios

The following exhibit is a 10-year history of change in Net Pension Liability.

Year Ending June 30,	2015	2016	2017	2018	2019	2020	2021	2022
Total Pension Liability								
Service Cost	$1,556,594	$1,511,755	$1,717,422	$1,913,998	$1,299,918	$1,082,026	$1,255,013	$1,099,119
Interest Cost	$1,800,053	$1,983,322	$2,186,254	$2,358,408	$2,547,913	$2,747,097	$3,200,332	$3,289,615
Changes of Benefit Terms	$0	$0	$0	$0	$0	$0	$0	$0
Differences Between Expected and Actual Experiences	$1,146,168	$795,023	$1,524,469	$1,456,980	$1,620,937	$2,732,087	($365,443)	$2,831,731
Changes of Assumptions	$0	$2,939,020	($594,082)	($746,218)	$39,510	$2,985,149	($258,607)	$118,669
Benefit Payments, Including Refunds of Member Contributions	($1,761,676)	($1,511,284)	($1,506,614)	($1,757,166)	($1,726,399)	($2,222,152)	($2,107,016)	($2,270,047)
Net Change in Total Pension Liability	$2,741,139	$5,717,836	$3,327,449	$3,226,002	$3,781,879	$7,324,207	$1,724,279	$5,069,087
Total Pension Liability (Beginning)	$27,003,504	$29,744,643	$35,462,479	$38,789,928	$42,015,930	$45,797,809	$53,122,016	$54,846,295
Total Pension Liability (Ending)	$29,744,643	$35,462,479	$38,789,928	$42,015,930	$45,797,809	$53,122,016	$54,846,295	$59,915,382
Plan Fiduciary Net Position								
Contributions—Employer	$955,554	$606,694	$667,952	$1,341,340	$815,531	$831,825	$811,519	$2,281,929
Contributions—Member	$1,394,450	$1,266,962	$1,399,254	$1,674,410	$1,632,926	$1,701,351	$1,722,324	$2,268,481
Net Investment Income	$4,437,066	$131,206	($116,966)	$4,288,900	$3,647,940	$1,939,447	$1,622,054	$14,068,526
Benefit Payments, Including Refunds of Member Contributions	($1,761,676)	($1,511,284)	($1,506,614)	($1,757,166)	($1,726,399)	($2,222,152)	($2,107,016)	($2,270,047)
Administrative Expense	($227,581)	($217,041)	($188,657)	($127,973)	($347,081)	($251,756)	($257,402)	($290,416)
Other	$0	$0	$0	$0	$0	$0	$0	$0
Net Change in Plan Fiduciary Net Position	$4,797,813	$276,537	$254,969	$5,419,511	$4,022,617	$1,998,715	$1,791,479	$16,058,473
Plan Fiduciary Net Position (Beginning)	$26,804,528	$31,602,341	$31,878,878	$32,133,847	$37,553,358	$41,575,975	$43,574,690	$45,366,169
Plan Fiduciary Net Position (Ending)	$31,602,341	$31,878,878	$32,133,847	$37,553,358	$41,575,975	$43,574,690	$45,366,169	$61,424,642
Net Pension Liability (Ending)	($1,857,698)	$3,583,601	$6,656,081	$4,462,572	$4,221,834	$9,547,326	$9,480,126	($1,509,260)
Net Position as a % of Pension Liability	106.25%	89.89%	82.84%	89.38%	90.78%	82.03%	82.72%	102.52%
Covered-Employee Payroll	$29,516,733	$23,120,653	$33,058,770	$34,610,720	$29,381,080	$32,096,397	$27,012,910	$32,217,343
Net Pension Liability as a % of Payroll	(6.29%)	15.50%	20.13%	12.89%	14.37%	29.75%	35.09%	(4.68%)

Notes to Schedule:

- No changes have been made over the 10-year history since GASB 68 has become effective.

Schedule of Contributions

The follow exhibit is a 10-year history of Schedule of Contributions.

Year Ending June 30,	2015	2016	2017	2018	2019	2020	2021	2022
Actuarially Determined Contributions	$252,273	$122,127	$727,119	$656,930	$610,522	$474,617	$1,325,770	$1,547,637
Contributions in Relation to the Actuarially Determined Contribution	$606,694	$667,952	$1,341,340	$815,531	$831,825	$811,519	$2,281,929	TBD
Contribution Deficiency/(Excess)	($354,421)	($545,825)	($585,457)	($158,601)	($221,303)	($366,902)	($956,159)	TBD
Covered-Employee Payroll	$37,918,375	$41,747,000	$44,650,933	$43,544,693	$50,109,940	$53,040,458	$56,764,403	TBD
Contributions as a Percentage of Covered-Employee Payroll	1.60%	1.60%	3.00%	1.87%	1.66%	1.53%	4.02%	TBD

Schedule of Investment Returns

The follow exhibit is a 10-year history of Investment Returns.

Year Ending June 30,	2015	2016	2017	2018	2019	2020	2021	2022
Annual Money-Weighted Rate of Return, Net of Investment Expense	16.5%	0.41%	(0.36%)	13.12%	9.66%	4.66%	3.72%	30.35%

These schedules are presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, pension plans should present information for those years for which information is available

Participant Information

The below exhibits summarize participant demographic information as of June 30, 2021.

Number of Participants:	
Actives	1,809
Full-time Actives (not accruing benefits)[1]	5,364
Deferred Vested	3,459
Retirees	381
Total	11,013
Participant Compensation – Active Participants Currently Accruing Benefits	
Compensation (prior year)	$32,217,343
Number of Active Participants below assumed retirement age	1,792
Average Compensation	$17,809
Actives	
Average Age	37.82
Average Benefit Service (years)	2.74
Full-time Actives	
Average Age	43.07
Average Accrued Annual Benefit	$568
Deferred Vested	
Average Age	46.73
Average Accrued Annual Benefit	$1,302
Retired	
Average Age	74.06
Average Annual Benefit	$3,668

Reconciliation of Participants from Prior Valuation

	Active	Full-time Actives[1]	Terminated Vested	Retirees and Beneficiaries	Total
As of July 1, 2020	**1,394**	**5,051**	**2,720**	**357**	**9,522**
Duplicates	0	0	0	0	0
Classification Change	(241)	241			0
New Entrants	1,136	534	370	0	2,040
Vested Terminations	(340)	(340)	680	0	0
Rehires	22	16	(37)	(1)	0
Retired	(2)	(7)	(22)	31	0
Deaths	0	0	(1)	(6)	(7)
Lump Sum Cash-outs	(160)	(131)	(251)	0	(542)
Data Correction	0	0	0	0	0
Net Change	415	313	739	24	1,491
As of July 1, 2021	**1,809**	**5,364**	**3,459**	**381**	**11,013**

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

Active Age Distribution as of July 1, 2021

Age	Number of Participants
15-19	0
20-24	27
25-29	258
30-34	366
35-39	314
40-44	205
45-49	152
50-54	123
55-59	110
60-64	98
65-69	76
70-74	51
75 +	17
Total	1,809

Active Career Earnings Distribution as of July 1, 2021

Career Earnings	Number of Participants
Under $5,000	646
$5,000 - $10,000	302
$10,000 - $25,000	267
$25,000 - $50,000	158
$50,000 - $100,000	158
Over $100,000	278
Total	1,809

This valuation includes the following active participants by category:

Category	Number of participants
▪ Seasonal	0
▪ Resident/Physician	65
▪ Per Diem	813
▪ Temporary	924
▪ Regular	7
	1,809

Development of GASB 68 Amortization Period for Changes in Liability

Status	July 1, 2020 Count	July 1, 2020 Average Future Working Life	July 1, 2021 Count	July 1, 2021 Average Future Working Life[1]
1. Actives	1,394	0.94	1,809	0.91
2. Actives not accruing benefits	5,051	16.79	5,364	16.63
3. Deferred Vested Terminated	2,720	0.00	3,459	0.00
4. Retirees	357	0.00	381	0.00
5. Total/Weighted Average	9,522	9.04	11,013	8.25

[1] Based on demographic assumptions set out in the Actuarial Assumption and Methods section of this report.

Summary of Principal Plan Provisions

1. **Membership Requirements**

   All employees of the County not covered by another retirement plan as provided by Code Section 3121(b)(7)(F).

2. **Career Compensation**

   Total amount of compensation, limited annually by the Social Security Wage Base.

3. **Normal or Late Retirement Benefit**

   Eligibility: Age 65

   Benefit: 2% times Career Compensation, payable as a single life annuity.

4. **Pre-Retirement Death Benefit**

   Refund of contributions accumulated with interest at 5% per annum.

5. **Death after Retirement**

   None. Benefits are payable for the life of the employee only.

6. **Termination Benefit**

   Normal retirement benefit accrued to date of termination.

   A lump sum distribution is paid if the actuarial equivalent benefit is less than $5,000. Actuarial Equivalence for this purpose is based on the greater of the factor produced under the UP1984 unisex mortality table at 6% or the applicable mortality table and interest rate under 417(e).

7. **Vesting**

   Benefits are 100% vested immediately.

8. **Member Contributions**

   3.75% of compensation per pay period.

Actuarial Assumptions and Methods

1. **Actuarial Cost Method**

   Actuarially Determined Contributions – Projected Unit Credit

   GASB 68 – Entry Age Normal

2. **Funding Contribution Methodology**

   Funding contributions are based on the sum of:

   a) Normal Cost with interest and administrative expense, plus
   b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
   c) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets year 5-year periods, less
   d) Expected Employee Contributions

3. **Interest Rates**

   Funding Interest Rate – 6.00%

   Used as the asset return assumption and based on the long term expected return on plan assets.

   GASB 68 Discount Rate – 6.00%

   The discount rate is based on a single equivalent rate that reflects a blend of:

   - Expected return on assets during the period such that assets are projected to be sufficient to pay benefits of current participants (6.00%); and
   - Municipal bond index for periods beyond the depletion of assets (2.16%).

   Based on the current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate can be based on the 6.00% asset return.

4. **Salary Increases**

   2.75% per year

5. **Payroll Growth (used for amortization of unfunded liability)**

   2.75% per year (same as CalPERS assumption)

6. Mortality

Pub-2010 amount-weighted tables for General employees of all income levels, projected using improvement scale MP-2021 from 2010.

Sample rates for the 2010 base year are as follows:

Age	Male	Female
30	0.04%	0.02%
40	0.07%	0.04%
50	0.30%	0.02%
60	0.61%	0.38%
70	0.70%	0.49%
80	1.73%	1.33%
90	14.67%	11.49%

7. Termination Rates

Actives (accruing benefits)

	Years of Service	
Attained Age	0-2	2+
20-24	65%	65%
25-29	65%	55%
30-34	65%	50%
35-39	65%	50%
40-44	65%	40%
45-49	65%	40%
50-54	55%	40%
55-59	50%	35%
60-64	50%	30%

Full-time Actives (no longer accruing benefits)

Turnover rates developed in the 2017 CalPERS Experience Study for Miscellaneous were used in the valuation. The following sample rates are based on age and service:

Attained	Years of Service						
Age	0 – 1	5	10	15	20	25	30
30	16.06%	6.15%	4.16%	2.62%	0.00%	0.00%	0.00%
35	15.37%	5.67%	3.99%	2.52%	1.84%	0.00%	0.00%
40	14.68%	5.19%	3.75%	2.43%	1.76%	1.07%	0.00%
45	14.00%	4.80%	3.51%	2.16%	1.68%	1.00%	0.26%
50	13.32%	4.41%	2.86%	1.88%	1.30%	0.94%	0.20%
55	12.62%	3.68%	2.22%	1.43%	0.92%	0.53%	0.16%

8. Retirement Rates

Actives (accruing benefits)

Attained Age	Probability of Retirement
65-66	60%
67-74	50%
75+	100%

Full-time Actives (no longer accruing benefits)

Retirement rates developed in the 2017 CalPERS Experience Study for Miscellaneous were used in the valuation. Applicable retirement rate table is based on employee date of hire, as summarized below:

- Hire date prior to August 24, 2012: Miscellaneous 3% @ 60 rates
- Hire date August 24, 2012 to December 31, 2012: Miscellaneous 2% @ 60 rates
- Hire date post December 31, 2012: Miscellaneous 2% @ 62 rates

Sample rates from the 'Miscellaneous 3% @ 60 table' are as follows:

Attained	Years of Service						
Age	5	10	15	20	25	30	35
<65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	20.00%	24.20%	28.30%	33.00%	30.00%	34.20%	37.00%
70	22.00%	25.50%	29.10%	32.60%	35.80%	38.80%	40.00%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Sample rates from the 'Miscellaneous 2% @ 60 table' are as follows:

Attained	Years of Service						
Age	5	10	15	20	25	30	35
<65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	14.00%	17.80%	21.50%	26.40%	32.10%	37.70%	41.20%
70	14.00%	17.80%	21.50%	26.40%	32.10%	37.70%	41.20%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Sample rates from the 'Miscellaneous 2% @ 62 table' are as follows:

Attained	Years of Service						
Age	5	10	15	20	25	30	35
<65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	11.50%	14.70%	18.00%	21.30%	24.50%	31.50%	35.40%
70	12.70%	16.40%	20.00%	23.60%	27.30%	35.00%	39.40%
75	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

9. Value of Assets

Funding – Effective June 30, 2014, smoothed asset value, with differences between actual and expected earnings recognized over a 5-year period (with the first year of recognition being the period in which the Gain/(Loss) occurred), subject to an 80%-120% corridor around market value.

GASB 68 – Market value

10. Form of Benefit Paid

Lump sums paid immediately at termination for benefits with a present value less than $5,000. Single life annuities deferred to normal retirement age paid for benefits with a present value greater than $5,000.

11. Lump Sum Conversion Assumptions

Mortality – Current IRC section 417(e) table

Lump Sum Interest Rate – 4.00%

Used to estimate lump sum benefit amounts and based on the long term expected effective rate used for determining lump sums under plan provisions. Generally, this is based on high quality corporate bonds.

12. Administrative Expenses

Assumed $300,000 per year

13. Participants Valued

Only current active, full time active, terminated vested, retirees and beneficiaries of the plan as of June 30, 2021 are included in the valuation.

Changes in Assumptions and Methods Since the Prior Valuation

1) Mortality improvement scale was updated from MP-2020 to MP-2021.
2) Lump sum conversion mortality table was updated from the 2020 applicable table to the 2021 applicable table under IRC section 417(e).
3) The administrative expense was updated from $225,000 to $300,000 to better reflect the recent experience.

COVID-19 Impacts

Given the events related to COVID-19, we reviewed participant information, as available, including terminations, retirements, and deaths over the year to compare plan experience against the assumptions used in the valuation to determine whether a modification to future assumptions may be warranted. We noted a larger number of new entrants to the plan than normal, however, we do not expect items like this to continue, so did not make further adjustments. Evaluation of the information provided did not suggest any other significant impact to the plan or justify a change to assumptions other than those already used.

Additional assumption analysis is included in the 2021 assumption rationale document.

Appendix A – Estimated Annual Expense for FYE 2023

Development of Annual Expense FYE 2023 under GASB 68 (Estimate)

The estimated expense amount shown below has been prepared for GASB 68 for the fiscal year ending June 30, 2023.

The Actuarial Accrued Liability as of July 1, 2021 has been prepared using the Entry Age Normal cost method, as required by GASB 68. The following estimated expense amounts have been prepared based on a Valuation Date of July 1, 2021, Measurement Date of July 1, 2022 and interest rate of 6.00%.

The expense shown below will be updated in next year's report to reflect actual administrative costs, employee contributions, and any gains or losses with respect to assets and liabilities.

Unfunded Actuarial Accrued Liability, as of July 1, 2021	
Actuarial Accrued Liability as of 7/1/2021	$59,915,382
Value of Plan Assets as of 7/1/2021	61,424,642
Unfunded Actuarial Accrued Liability (UAAL)	($1,509,260)
Estimated Annual Expense, FYE June 30, 2023[1]	
1. Service Cost	$1,621,000
2. Interest Cost	3,624,000
3. Expected Return on Assets	(3,691,000)
4. Employee Contributions[2]	(1,241,000)
5. Administrative Expense	300,000
6. Plan Changes	0
7. Amortization of Unrecognized	
(a) Liability (Gain)/Loss	1,259,000
(b) Asset (Gain)/Loss	(2,223,000)
(c) Assumption Changes	507,000
(d) Total	(457,000)
8. Annual Expense	$156,000

[1] Final FYE 2023 expense information will be provided in the actuarial valuation based on a June 30, 2022 measurement date reflecting updated census, assumptions, plan provisions and actual asset values, in addition to any asset, liability, or assumption gains/losses initially recognized over the period June 30, 2021 to June 30, 2022

[2] Employee contribution was developed assuming a constant active population