Orange County Employees
Retirement System

Actuarial Experience Study

Analysis of Actuarial Experience During the Period January 1, 2020 through December 31, 2022

Segal

180 Howard Street
Suite 1100
San Francisco, CA 94105-6147
segalco.com

August 11, 2023

Board of Retirement
Orange County Employees Retirement System
2223 Wellington Avenue
Santa Ana, CA 92701

RE: Review of Actuarial Assumptions for the December 31, 2023 Actuarial Valuation

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience for the Orange County Employees Retirement System. This study utilizes the census data for the period January 1, 2020 to December 31, 2022 as well as prior periods for some assumptions, and provides the proposed actuarial assumptions, both economic and demographic, to be used in the December 31, 2022 valuation.

We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

We look forward to reviewing this report with you and answering any questions you may have.

Sincerely,

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

Andy Yeung, ASA, MAAA, FCA, EA
Vice President and Actuary

Todd Tauzer, FSA, MAAA, FCA, CERA
Senior Vice President and Actuary

JY/jl

5631889v10/05111.002

Table of Contents

1. Introduction, Summary, and Recommendations

To project the cost and liabilities of the Retirement System, assumptions are made about all future events that could affect the amount and timing of the benefits to be paid and the assets to be accumulated. Each year actual experience is compared against the projected experience, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are modified, contribution requirements are adjusted to take into account a change in the projected experience in all future years. There is a great difference in both philosophy and cost impact between recognizing the actuarial deviations as they occur annually and changing the actuarial assumptions. Taking into account one year's gains or losses without making a change in the assumptions means that year's experience is treated as temporary and that, over the long run, experience will return to what was originally assumed. For example, the actuarial assumptions used in the most recent valuation did not include any possible short-term or long-term impacts on mortality of the covered population that emerged due to COVID-19.[1] Changing assumptions reflects a basic change in thinking about the future, and has a much greater effect on the current contribution requirements than recognizing gains or losses as they occur.

The use of realistic actuarial assumptions is important in maintaining adequate funding, while paying the promised benefit amounts to participants already retired and to those near retirement. The actuarial assumptions used do not determine the "actual cost" of the plan. The actual cost is determined solely by the benefits and administrative expenses paid out, offset by investment income received. However, it is desirable to estimate as closely as possible what the actual cost will be so as to permit an orderly method for setting aside contributions today to provide benefits in the future, and to maintain equity among generations of participants and taxpayers.

This study was undertaken in order to review the economic and demographic actuarial assumptions and to compare the actual experience with that expected under the current assumptions during the three-year experience period from January 1, 2020 through December 31, 2022. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27 "Selection of Economic Assumptions for Measuring Pension Obligations"[2] and ASOP No. 35 "Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations." These Standards of Practice provide guidance for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation. Based on the study's results and expected future experience, we are recommending various changes in the current actuarial assumptions.

We are recommending changes in the assumptions for: merit and promotion salary increases, retirement from active employment, retirement age for inactive vested members, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases, pre-retirement mortality, post-retirement healthy and disabled life mortality, beneficiary mortality,

[1] An analysis of the ongoing impact of the COVID-19 pandemic is beyond the scope of the current experience study.
[2] References made later in this report are with respect to the revised ASOP 27 adopted in June 2020.

termination (refunds and deferred vested retirements), disability incidence (service and non-service), and additional cashouts. We are also recommending a change in the allocation of the cost of COLA benefits after Legacy Safety members reach 30 years of service as well as some technical changes to the application of the Entry Age cost allocation method.

Our recommendations for the major actuarial assumption categories are as follows:

Pg #	Actuarial Assumption Categories	Recommendation
11	**Inflation:** Future increases in the Consumer Price Index (CPI), which drives investment returns and active member salary increases.	Maintain the inflation assumption at 2.50% per annum as discussed in Section (3)(A).
14	**Retiree Cost-of-Living Increases:** Future increases in the cost-of-living adjustment for retirees.	Maintain the retiree cost-of-living assumption at 2.75% per annum (based on our recommended inflation assumption of 2.50% plus a margin for adverse deviation of 0.25%) as discussed in Section (3)(A).
15	**Investment Return:** The estimated average future net rate of return on current and future assets of the System as of the valuation date. This rate is used to discount liabilities.	Maintain the current investment return assumption at 7.00% per annum as discussed in Section (3)(B).
24	**Individual Salary Increases:** Increases in the salary of a member between the date of the valuation to the date of separation from active service. This assumption has three components: • Inflationary salary increases • Real "across the board" salary increases • Merit and promotion increases	Maintain the current inflationary salary increase assumption at 2.50% and maintain the current real "across the board" salary increase assumption at 0.50%. This means that the combined inflationary and real "across the board" salary increases will remain unchanged at 3.00%. Adjust the merit and promotion rates of salary increase as developed in Section 3(C) to reflect past experience. Future merit and promotion salary increases are higher in some service categories and lower in other service categories under the proposed assumptions. The recommended total rates of salary increase anticipate slightly lower increases overall than the current assumptions for General and Safety members.
30	**Retirement Rates:** The probability of retirement at each age at which participants are eligible to retire. **Other Retirement Related Assumptions including:** • Retirement age for deferred vested members • Future reciprocal members and reciprocal salary increases • Percent married and spousal age differences for members not yet retired	For active members, adjust the current retirement rates to those developed in Section (4)(A). For General members, increase the assumed retirement age for reciprocal deferred vested members from 59 to 60 and decrease the assumed retirement age for non-reciprocal deferred vested members from 59 to 58. For Safety members, maintain the assumed retirement age for both reciprocal and non-reciprocal deferred vested members at 54. Decrease the current proportion of future deferred vested members expected to be covered by a reciprocal system from 15% to 12.5% for General members and maintain the assumption at 20% for Safety members. In addition, decrease the reciprocal salary increase assumption from 4.00% to 3.90% for General members and decrease the reciprocal salary increase assumption from 4.60% to 4.50% for Safety members. For active and deferred vested members, maintain the current percent married at retirement assumption at 75% for males and 55% for females. Maintain the spouse age difference assumption that male retirees are three years older than their spouses and female retirees are two years younger than their spouses.

Pg #	Actuarial Assumption Categories	Recommendation
52	**Mortality Rates:** The probability of dying at each age. Mortality rates are used to project life expectancies.	**Healthy Retirees:** Current base table for General Members: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and females. Recommended base table for General Members: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for females. Current base table for Safety Members: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table. Recommended base table for Safety Members: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates decreased by 5% for females. **All Beneficiaries:** Current base table: Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and females. Recommended base table – in pay status at the valuation: Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table with rates increased by 10% for males. Recommended base table – not in pay status at the valuation: For the purposes of the actuarial valuations (for funding and financial reporting), when calculating the liability for the continuance to a beneficiary of a surviving member we recommend that the General Healthy Retiree mortality tables be used for beneficiary mortality both before and after the expected death of the General or Safety member. **Pre-Retirement Mortality:** Current & recommended base table for General Members: Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table. Current & recommended base table for Safety Members: Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table.

Pg #	Actuarial Assumption Categories	Recommendation
	Mortality Rates (continued)	**Disabled Retirees:** Current & recommended base table for General Members: Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table, with rates decreased by 5% for males and females. Current base table for Safety Members: Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table. Recommended base table for General Members: Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table with rates decreased by 5% for females. **All current tables** are projected generationally with the two-dimensional mortality improvement scale MP-2019. **All recommended tables** are projected generationally with the two-dimensional mortality improvement scale MP-2021. This is the most recent projection scale, as an updated projection scale was not published in 2022. **For member contribution rates, optional forms, and reserves:** change the mortality rates to those developed in Section (4)(B).
65	**Termination Rates:** The probability of leaving employment at each age and receiving either a refund of member contributions or a deferred vested retirement benefit.	Adjust the termination rates to those developed in Section (4)(D) to reflect a slightly higher incidence of termination for General All Other (non-OCTA) members and Safety Law and Fire members, and a slightly lower incidence of termination for General OCTA and Safety Probation members. In addition, a lower proportion of members is expected to elect a withdrawal of member contributions with a higher proportion electing instead to receive a deferred vested benefit under the recommended assumptions.
72	**Disability Incidence Rates:** The probability of becoming disabled at each age.	Adjust the disability rates to those developed in Section (4)(E) to reflect slightly lower incidence of disability for General members and slightly higher incidence of disability for Safety members.
77	**Leave Cashouts:** Additional pay elements that are expected to be received during the member's final average earnings period.	Adjust the additional cashout assumptions to those developed in Section (4)(F) to reflect recent years' experience.
78	Including **Change in the allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service.**	Adjust the allocation as discussed in Section (4)(G), and make technical changes to the application of the Entry Age cost allocation method.

We have estimated the impact of all the recommended economic and demographic assumptions as if they were applied to the December 31, 2022 actuarial valuation. The table below shows the changes in the employer and member contribution rates due to the proposed assumption changes separately for the recommended economic assumption changes (as recommended in Section 3 of this report) and the recommended demographic assumption changes (as recommended in Section 4 of this report).

Cost Impact of the Recommended Assumptions Based on December 31, 2022 Actuarial Valuation

Assumption	Impact on Average Employer Contribution Rates
Decrease due to changes in economic assumptions	(0.15%)
Increase due to changes in demographic assumptions and methods[1]	1.06%
Total increase in average employer rate	**0.91%**
Total estimated decrease in annual dollar amount ($000s)[2]	**$18,422**

Assumption	Impact on Weighted Average Member Contribution Rates
Decrease due to changes in economic assumptions	(0.01%)
Decrease due to changes in demographic assumptions and methods[3]	(0.13%)
Total decrease in average member rate	**(0.14%)**
Total estimated decrease in annual dollar amount ($000s)[2]	**$(3,081)**

Assumption	Impact on UAAL ($000s)
Decrease due to changes in economic assumptions	$(42,218)
Increase due to changes in demographic assumptions and methods[4]	193,621
Total increase in UAAL ($000s)	**$151,403**

	Impact on Funded Percentage on VVA Basis
Change in Funded Percentage	81.5% to 81.0%

Of the various assumption changes, the most significant rate increase for employer is due to the retirement assumption followed by the mortality assumption.

Section 2 provides some background on the basic principles and methodology used for the experience study and for the review of the economic and demographic actuarial assumptions. A detailed discussion of each assumption and reasons for the proposed changes are found in Section 3 for the economic assumptions and Section 4 for the demographic assumptions. The cost impact of the proposed changes by Rate Group is detailed in Section 5.

[1] The increase in the average employer contribution rate due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 78, is 0.08% of payroll.
[2] Based on December 31, 2022 projected annual payroll as determined under each set of assumptions.
[3] The decrease in the average member contribution rate due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 78, is 0.07% of payroll.
[4] There is no impact on the UAAL due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service.

2. Background and Methodology

In this report, we analyzed both economic and demographic ("non-economic") assumptions. The primary economic assumptions reviewed are inflation, investment return, and salary increases. Demographic assumptions include the probabilities of certain events occurring in the population of members, referred to as "decrements," e.g., termination from service, disability retirement, service retirement, and death before and after retirement. In addition to decrements, other demographic assumptions reviewed in this study include the percentage of members with an eligible spouse or domestic partner, spousal age difference, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increase and additional cashouts.

Economic Assumptions

Economic assumptions consist of:

- **Inflation:** Increases in the price of goods and services. The inflation assumption reflects the basic return that investors expect from securities markets. It also reflects the expected basic salary increase for active employees and drives increases in the allowances of retired members (if any).
- **Investment Return:** Expected long-term rate of return on the System's investments after accounting for certain investment expenses and all administrative expenses. This assumption has a significant impact on contribution rates.
- **Salary Increases:** In addition to inflationary increases, it is assumed that salaries will also grow by real "across the board" pay increases in excess of price inflation. It is also assumed that employees will receive raises above these average increases as they advance in their careers. These are commonly referred to as merit and promotion increases. Payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the price inflation rate plus any real "across the board" pay increases that are assumed.

The setting of these economic assumptions is described in Section 3.

Demographic Assumptions

In order to determine the probability of an event occurring, we examine the "decrements" and "exposures" of that event. For example, taking termination from service, we compare the number of employees who actually terminate in a certain age and/or service category (i.e., the number of "decrements") with those who could have terminated (i.e., the number of "exposures"). For example, if there were 500 active employees in the 20-24 age group at the beginning of the year and 50 of them left during the year, we would say the probability of termination in that age group is 50 ÷ 500 or 10%.

The reliability of the resulting probability is highly dependent on both the number of decrements and the number of exposures. For example, if there are only a few people in a high age category at the beginning of the year (number of exposures), we would not lend as much credibility to the probability of termination developed for that age category, especially if it is out

of line with the pattern shown for the other age groups. Similarly, if we are considering the death decrement, there may be a large number of exposures in the age 20-24 category, but very few decrements (actual deaths); therefore, we would not be able to rely heavily on the probability developed for that category.

One reason we use several years of experience for such a study is to have more exposures and decrements, and therefore more statistical reliability. Another reason for using several years of data is to smooth out fluctuations that may occur from one year to the next. However, we also calculate the rates on a year-to-year basis to check for any trend that may be developing in the later years.

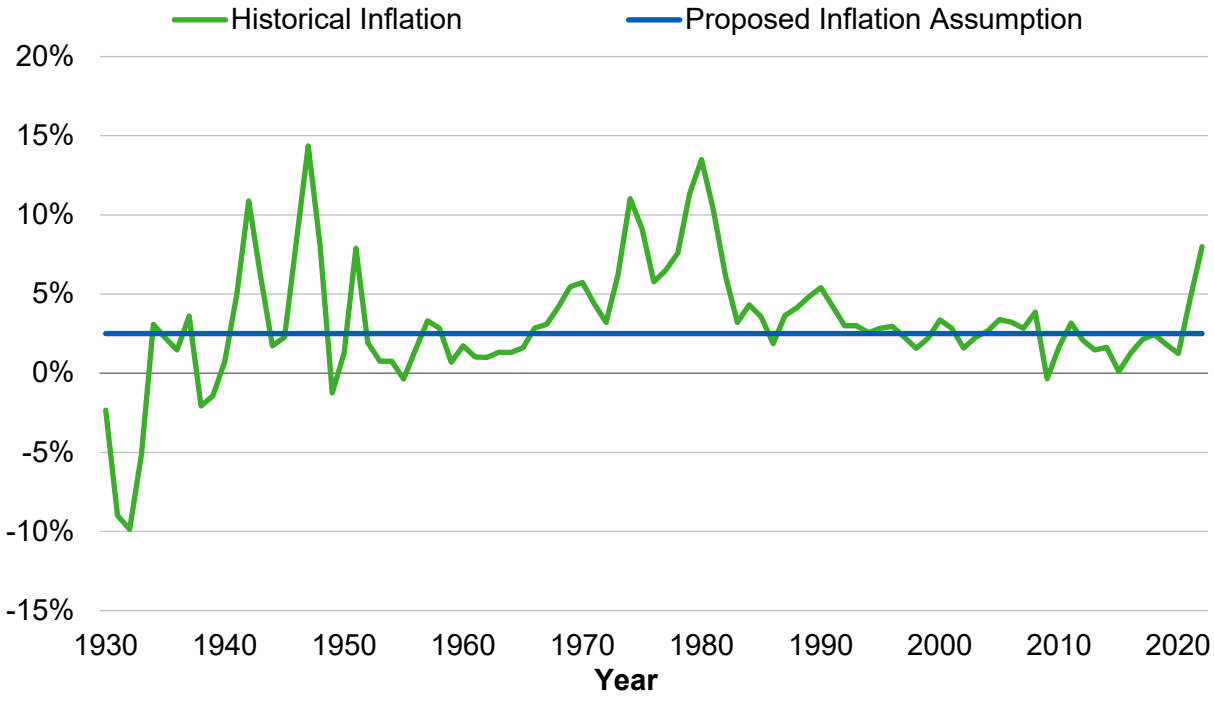
3. Economic Assumptions

A. Inflation

Unless an investment grows at least as fast as prices increase, investors will experience a reduction in the inflation-adjusted value of their investment. There may be times when "riskless" investments return more or less than inflation, but over the long term, investment market forces will generally require an issuer of fixed income securities to maintain a minimum return which protects investors from inflation.

The inflation assumption is long term in nature, so our analysis begins with a review of historical information. Following is a graph showing historical inflation rates and a comparison with the inflation assumption of 2.50% that we recommend in this report:

Historical Consumer Price Index – 1930 to 2022[1]
(U.S. City Average - All Urban Consumers)



There has been a spike in inflation that started in the second quarter of 2021 and continued into 2022. However, the rate of inflation, while still elevated, has leveled off and started to decline since the Federal Reserve began to increase interest rates starting around the second quarter of 2022. In particular, the change in the CPI from June 30, 2022 to June 2023 was 2.97%.

Based on information found in the Public Plans Database, which is produced in partnership with the National System of State Retirement Administrators (NASRA), the median inflation

[1] Source: Bureau of Labor Statistics – Based on annual-to-annual CPI for All Items in U.S. city average, all urban consumers, not seasonally adjusted (Series ID: CUUR0000SA0).

assumption used by 194 large public retirement funds in their 2021 fiscal year valuations was 2.50%.[1] In California, CalSTRS and six[2] 1937 Act CERL systems currently use an inflation assumption of 2.75%, the other fourteen 1937 Act CERL systems (including OCERS) use an inflation assumption of 2.50%[3] and CalPERS uses an inflation assumption of 2.30%.

OCERS' investment consultant, Meketa, anticipates an annual inflation rate of 2.63% over a 20-year horizon, while the average inflation assumption provided by Meketa and five other investment advisory firms retained by Segal's California public sector clients, as well as Segal's investment advisory division (Segal Marco Advisors),[4] was 2.43%. Note that, in general, investment consultants use a time horizon for this assumption that is shorter than the time horizon we use for the process of setting actuarial assumptions.[5]

To find a forecast of inflation based on a longer time horizon, we referred to the Social Security Administration's (SSA) 2023 report on the financial status of the Social Security program.[6] The projected average increase in the Consumer Price Index (CPI) over the next 75 years under the intermediate cost assumptions used in that report was 2.40%. The SSA report also includes alternative projections using lower and higher inflation assumptions of 1.80% and 3.00%, respectively.

We also compared the yields on the 30-year inflation indexed U.S. Treasury bonds to comparable 30-year traditional U.S. Treasury bonds.[7] This "break-even rate" is commonly regarded as a market-based gauge of future inflation expectations. As of June 2023, the difference in yields is about 2.23% which provides a measure of market expectations of inflation. This market expectation for long-term inflation can be quite volatile and has dropped from the high of 2.55% over the last 12 months, which is illustrated in the table below. It is worth noting that even during the peak of the recent inflation spike this break-even rate exceeded 2.50% in only a single month, April 2022.

[1] Among 219 large public retirement funds, the 2021 fiscal year inflation assumption was not available for 25 of the public retirement funds in the survey data as of March 2023.

[2] We note that out of these six 1937 Act CERL Systems, two of those are served by Segal and we would generally expect to recommend 2.50% as the inflation assumption in their next experience study.

[3] Six of these 1937 Act CERL systems use a 2.50% inflation assumption with a 2.75% COLA assumption.

[4] We note that this is the first time we have included inflation and real rate of return assumptions used by Segal Marco Advisors in our review of economic assumptions for OCERS.

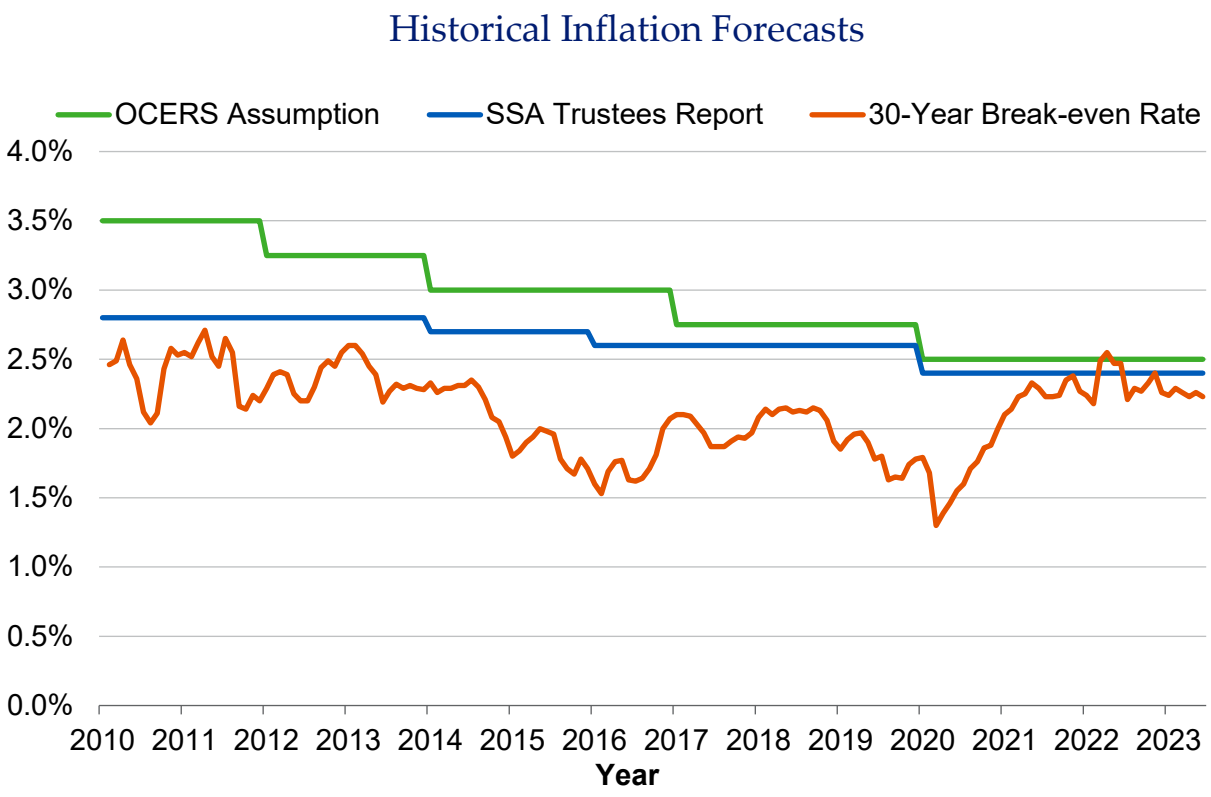
[5] The time horizon used by the six investment consultants included in our review, with the exception of one investment consultant that uses a 1-year horizon, generally ranges from 20 years to 30 years, with Meketa using a 20-year horizon.

[6] Source: Social Security Administration: The 2023 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds.

[7] Source: Board of Governors of the Federal Reserve System.

Observation Month	Difference in Yields	Observation Month	Difference in Yields
January 2022	2.24%	October 2022	2.33%
February 2022	2.18%	November 2022	2.40%
March 2022	2.49%	December 2022	2.26%
April 2022	2.55%	January 2023	2.24%
May 2022	2.47%	February 2023	2.29%
June 2022	2.47%	March 2023	2.26%
July 2022	2.21%	April 2023	2.23%
August 2022	2.29%	May 2023	2.26%
September 2022	2.27%	June 2023	2.23%

The following graph shows OCERS' historical and current proposed inflation assumptions compared to the two other metrics just discussed, going back to 2010. In effect, this compares OCERS' assumption to two separate independent forecasts, one based on market observations and one developed by economists at the SSA. The graph shows that over the observed period, OCERS' assumption has been higher but consistently moving towards these other forecasts.



The setting of the inflation assumption using the information outlined above is a somewhat subjective process, and Segal does not apply a specific weight to each of the metrics in determining our recommended inflation assumption. Based on a consideration of all of the above metrics, beginning in 2021 we are generally recommending the same 2.50% inflation assumption in our experience studies for our California public retirement system clients.

Based on all of the above information, we recommend maintaining the annual inflation assumption at 2.50%.

Retiree Cost-of-Living Increases

In our last experience study as of December 31, 2020, the Board adopted a 2.75% cost-of-living adjustment (COLA) for all retirees[1] with a 0.25% margin on top of the 2.50% inflation assumption.

In the table below, we continue to observe that the changes in the average annual CPI based on Los Angeles-Long Beach-Anaheim area used by the Board to set COLAs have exceeded those of the average annual CPI for the U.S. City Average during the most recent 5-year, 10-year and 20-year periods ending before December 31, 2022.

	Change in Average Annual CPI for Los Angeles-Long Beach-Anaheim Area	Change in Annual Average CPI for U.S. City Average
5-Year Period	3.94%	3.61%
10-Year Period	2.76%	2.46%
20-Year Period	2.71%	2.46%

We recommend maintaining the current assumptions to value the post-retirement COLA benefit at 2.75% per year which includes a 0.25% margin above our recommended inflation assumption.

In developing the COLA assumption, we also considered the results of a stochastic approach that would attempt to account for the possible impact of low inflation that could occur before COLA banks are able to be established for the member. Although the results of this type of analysis might justify the use of a lower COLA assumption, we are not recommending that at this time. The reasons for this conclusion include the following:

- The results of the stochastic modeling are significantly dependent on assuming that lower levels of inflation will persist in the early years of the projections. If this is not assumed, then the stochastic modeling will produce results similar to our proposed COLA assumptions.
- Using lower long-term COLA assumptions based on a stochastic analysis would mean that an actuarial loss would occur even when the inflation assumption of 2.50% (before considering the 0.25% margin on top of the inflation assumption for COLA) is met in a year. We question the reasonableness of this result.

We do not see the stochastic possibility of COLAs averaging less than those predicted by the assumed rate of inflation as a reliable source of cost savings that should be anticipated in our COLA assumptions. Therefore, we continue to recommend setting the COLA assumption consistent with the COLA assumption we have used in prior years.

[1] For current retirees and beneficiaries, we would utilize the accumulated COLA banks to value annual 3.00% COLA increases as long as the COLA banks are available.

B. Investment Return

The investment return assumption is comprised of two primary components, inflation and real rate of investment return, with adjustments for certain expenses and risk.

Real Rate of Investment Return

This component represents the portfolio's incremental investment market returns over inflation. Generally, when an investor takes on greater investment risk, the return on the investment is expected to also be greater, at least in the long run. This additional risk and return is expected to vary by asset class and empirical data supports that expectation. For that reason, the real rate of return assumptions are developed by asset class. Therefore, the real rate of return assumption for a retirement plan's portfolio will vary with the Board's asset allocation among asset classes.

The System's current target asset allocation and the assumed real rate of return assumptions by asset class are shown in the following table. The first column of real rate of return assumptions are determined by reducing Meketa's total or "nominal" 2023 return assumptions by their assumed 2.63% inflation rate. The second column of returns (except certain asset classes as noted in the table) represents the average of a sample of real rate of return assumptions. The sample includes the expected annual real rate of return provided to us by Meketa and five other investment advisory firms retained by Segal's public sector clients, as well as Segal's investment advisory division. We believe these averages are a reasonable consensus forecast of long-term future market returns in excess of inflation.[1]

[1] Note that, just as for the inflation assumption, in general the time horizon used by the investment consultants in determining the real rate of return assumption is shorter than the time horizon encompassed by the actuarial valuation.

OCERS' Target Asset Allocation and Assumed Arithmetic Net Real Rate of Return Assumptions by Asset Class and for the Portfolio

Asset Class	Percentage of Portfolio	Meketa's Assumed Net Real Rate of Return[1]	Average Assumed Net Real Rate of Return from a Sample of Consultants to Segal's California Public Sector Clients[2]
Global Equity	45.00%	7.94%	7.05%
Investment Grade Bonds	9.00%	2.13%	1.97%
High Yield Bond	0.50%	5.23%	4.63%
TIPS	2.00%	2.06%	1.77%
Emerging Market Debt	0.50%	4.44%	4.72%
Long-Term Government Bonds	3.30%	2.99%	2.82%
Real Estate	3.00%	4.46%	3.86%
Private Equity	15.00%	11.29%	9.84%
Private Credit	3.50%	7.33%	6.47%
Value Added Real Estate	3.00%	7.38%	7.38%[3]
Opportunistic Real Estate	1.00%	9.74%	9.74%[3]
Energy	2.00%	10.89%	10.89%[3]
Infrastructure (Core Private)	1.00%	5.98%	5.98%[3]
Infrastructure (Non-Core Private)	3.00%	8.88%	8.88%[3]
Global Macro	1.70%	3.17%	3.17%[3]
CTA (Trend Following)	3.30%	3.15%	3.15%[3]
Alternative Risk Premia	1.70%	3.24%	3.24%[3]
Special Situations Lending	1.50%	8.96%	8.96%[3]
Total	**100.00%**	**7.25%**	**6.55%**

Generally, the above are representative of "indexed" returns for securities that are publicly traded, returns net of fees for securities that are non-publicly traded and do not include any additional returns ("alpha") from active management. Consideration of returns without alpha is consistent with the Actuarial Standard of Practice No. 27, Section 3.8.3.d, which states:

> "Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (or pessimistic). The actuary should not assume that superior or inferior returns will be achieved, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy unless the actuary has reason to believe, based on relevant

[1] The rates shown have been estimated by Segal by taking Meketa's nominal projected arithmetic returns and reducing by Meketa's assumed 2.63% inflation rate to develop the assumed real rate of return shown.

[2] These are based on the projected arithmetic returns provided by Meketa and five other investment advisory firms serving the county retirement system of OCERS and 16 other city and county retirement systems in California, as well as Segal's investment advisory division. These return assumptions are net of any applicable investment management expenses.

[3] For this asset class, Meketa's assumption is applied in lieu of the average because there is a larger disparity in returns for these asset classes among the firms surveyed and using Meketa's assumption should more closely reflect the underlying investments made specifically for OCERS.

supporting data, that such superior or inferior returns represent a reasonable expectation over the long term."

The following are some observations about the returns provided above:

1. The investment consultants to our California public sector clients, as well as Segal's investment advisory division, have each provided us with their expected real rates of return for each asset class, over various future periods of time. However, in general, the returns available from investment consultants are projected over time periods that are shorter than the durations of a retirement plan's liabilities.
2. As discussed in the next section, the real rates of return provided this year by the investment consultants reflect a change in how investment expenses are reported.
3. Using a sample average of expected net real rates of return allows the System's investment return assumption to reflect a broader range of capital market information and should help reduce year to year volatility in the investment return assumption.
4. Therefore, we recommend that the 6.55% portfolio net real rate of return be used to determine OCERS' investment return assumption, but with some caution. This return is 0.88% higher than the 5.67% gross return that was used three years ago in the review to prepare the recommended investment return assumption for the December 31, 2020 valuation even before we consider the approximately 0.55% in investment management expense that, as discussed in the next section, will no longer be subtracted from the 6.55% return.
5. The 0.88% increase in the portfolio net real rate of return since the 2021 return is due to changes in the real rate of return assumptions provided to us by the investment advisory firms (+0.56% under the 2020 asset allocation), changes in OCERS' target asset allocation (+0.39%) and the interaction effect between these changes (-0.07%). We believe the increase in the portfolio net real rate of return attributable to those real rate of return assumptions may be due to the very low returns earned in the first half of the 2022 calendar year, as well as the increase in the federal funds rate during 2022, and so should be used with caution in selecting a long-term investment return assumption.

System Expenses

For funding purposes, the real rate of return assumption for the portfolio needs to reflect investment expenses expected to be paid from investment income. Current practice for OCERS also adjusts for expected administrative expenses. In the prior experience studies, we have adjusted the gross real rate of return developed using the target asset allocation by the investment expenses expected to be paid by OCERS.

However, as prevailing practice by investment advisory firms is to provide us with the real rates of return net of expected investment expenses, especially for active portfolio management, we now need to make adjustments only for investment consulting fees, custodian fees and other miscellaneous investment expenses.

The following table provides these investment and administrative expenses in relation to the valuation value of assets as of the beginning of the year, for the six-year period ending December 31, 2022.

Investment and Administrative Expenses as a Percentage of Valuation Value of Assets *(Dollars in 000's)*

Year Ending December 31	Valuation Value of Assets[1]	Investment Expenses[2,3]	Administrative Expenses	Investment and Administrative %
2017	$13,102,978	$10,219	$17,002	0.21%
2018	14,197,125	20,850	18,284	0.28
2019	14,994,420	21,866	19,171	0.27
Three-Year Average (2017-2019)				**0.25**
2020	16,036,869	19,563	20,428	0.25
2021	17,525,117	27,966	21,473	0.28
2022	19,488,761	37,213	23,546	0.31
Three-Year Average (2020-2022)				**0.28**
Six-Year Average				**0.27**
Current Assumption (including investment management fees)				**0.85**
Proposed Assumption (excluding investment management fees)				**0.30**

Based on the above experience, we recommend reducing the investment and administrative expense component of the investment return assumption from 0.85% to 0.30%.

Note related to investment expenses paid to active managers – As cited above, under Section 3.8.3.d of ASOP No. 27, the effect of an active investment management strategy should be considered "net of investment expenses…unless the actuary believes, based on relevant data, that such superior or inferior returns represent a reasonable expectation over the measurement period."

We have not performed a detailed analysis to measure how much of the investment expenses paid to active managers might have been offset by additional returns ("alpha") earned by that active management. For this study, we will continue to use the current approach that any "alpha" that may be identified would be treated as an increase in the risk adjustment and corresponding confidence level that are discussed in the next section. However, as discussed above, the real return assumptions provided by the investment advisory firms assume that active management will generate additional returns to cover the expense of such management, an assumption that is consistent with ASOP No. 27.

Risk Adjustment

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. OCERS' asset allocation determines this portfolio risk, since risk levels are driven by the variability of returns for the various asset classes and the

[1] As of beginning of plan year.
[2] Equals the sum of investment consulting fees, custodian fees and other miscellaneous investment expenses. Excludes investment manager fees.
[3] Net of securities lending expenses. Because we do not assume any additional net return for this program, we effectively assume that any securities lending expenses will be offset by related income.

correlation of returns among those asset classes. This portfolio risk is incorporated into the real rate of return assumption through a risk adjustment.

The purpose of the risk adjustment (as measured by the corresponding confidence level) is to increase the likelihood of achieving the actuarial investment return assumption in the long term.[1] This is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

The 6.55% expected real rate of return developed earlier in this report was based on expected arithmetic average returns. A retirement system using an expected arithmetic average return as the discount rate in a funding valuation is expected on average to have no surplus or asset shortfall relative to its expected obligations assuming all other actuarial assumptions are met in the future.[2] That is the basis used in Segal's previous experience studies for OCERS.

Beginning with this study, in addition to no longer including an explicit adjustment for investment management fees, we are converting the portfolio's expected arithmetic average return to an expected geometric average return. A retirement system using an expected geometric average return as the discount rate in a funding valuation will, over long periods of time, have an equal likelihood of having a surplus or asset shortfall relative to its expected obligations assuming all actuarial assumptions are met in the future.[3]

Under either the arithmetic or geometric model, the confidence level associated with a particular risk adjustment represents a relative likelihood that future investment earnings would equal or exceed the assumed earnings over a 15-year period. The 15-year time horizon represents an approximation of the "duration" of the fund's liabilities, where the duration of a liability represents the sensitivity of that liability to interest rate variations.

For comparison purposes we first consider how the earlier model would look if used in this year's study. Three years ago, the Board adopted an investment return assumption of 7.00%. Under the model used in that experience study, that return implied a risk adjustment of 0.32%, corresponding to a 15-year confidence level of 54%, based on an annual portfolio return standard deviation of 13.60% provided by Meketa in 2020.

If we use the same 54% 15-year confidence level from our last study to set this year's risk adjustment and the current annual portfolio return standard deviation of 14.00% provided by Meketa, the corresponding risk adjustment would be 0.33%. Together with the other investment return components (including for this comparison updated expected arithmetic average returns and the same expense adjustment as used in the prior study), this would result in an investment return assumption of 7.87%, which is higher than the current assumption of 7.00%.

Based on the general practice of using one-quarter percentage point increments for economic assumptions, we evaluated the effect on the confidence level of other alternative investment return assumptions. We also considered that, as discussed above, the increase in the real rates of return provided by the investment consultants may reflect the very low returns earned in the first half of the 2022 calendar year, as well as the increase in the federal funds rate during 2022, and so could be overly optimistic when used for selecting a long-term investment return

[1] This type of risk adjustment is referred to in the Actuarial Standards of Practice as a "margin for adverse deviation."
[2] The mathematical terminology for this is that the mean (or average) surplus or asset shortfall is expected to be zero.
[3] The mathematical terminology for this is that over time the median surplus or asset shortfall is expected to be zero.

assumption. For that reason, for this comparison value we considered the current net investment return assumption of 7.00% which, together with the other investment return components, would produce a risk adjustment of 1.20% which corresponds to a confidence level of 63% under the model and expense adjustment used in prior studies. We believe this increase in confidence level would be appropriate given the concerns stated regarding the increase in the portfolio net real rate of return.

As noted above, beginning with this study, in addition to no longer including an explicit adjustment for investment management fees, we are converting the portfolio's expected arithmetic average return to an expected geometric average return. For any given asset portfolio, the expected geometric average return will be less than expected arithmetic average return.[1] The difference depends on the variability of the portfolio as measured by its standard deviation. Based on the annual portfolio return standard deviation of 14.00% provided by Meketa, the adjustment to an expected geometric average return reduces the expected return by 0.91%.

Together with the other investment return components (now excluding investment management expenses) and prior to any risk adjustment, this would result in a median expected assumption of 7.84%, which is higher than the current assumption of 7.00%. In applying this model to OCERS for the first time we again considered the current net investment return assumption of 7.00% which, together with the other investment return components, would produce a risk adjustment of 0.84% which under the expected geometric average return model corresponds to a confidence level of 59%. **We recommend this increased confidence level given our stated concerns that current capital market assumptions could be overly optimistic when used for selecting a long-term investment return assumption.**

Recommended Investment Return Assumption

The following table summarizes the components of the recommended investment return assumption developed in the previous discussion. For comparison purposes, we have also included similar values from the last study as well as the comparison values discussed above that apply the prior year's model to this year's information.

[1] This is because the expected geometric average return reflects expected median outcomes, while the expected arithmetic average return reflects expected average or mean outcomes. Expected median outcomes are lower than expected average outcomes because they are less affected by the possibility of extraordinary ("outlier") favorable outcomes.

Assumption Component	December 31, 2023 Recommended Value	December 31, 2023 Comparison Values	December 31, 2020 Adopted Value
Inflation	2.50%	2.50%	2.50%
Portfolio Expected Arithmetic Real Rate of Return	6.55%	6.55%	5.67%
Expense Adjustment	(0.30)%	(0.85)%[1]	(0.85)%
Adjustment to Expected Geometric Real Rate of Return	(0.91)%	N/A	N/A
Risk Adjustment	(0.84)%	(1.20)%	(0.32)%
Total	**7.00%**	**7.00%**	**7.00%**
Confidence Level	**59%**	**63%**	**54%**

Based on this analysis, we recommend maintaining the investment return assumption at 7.00% per annum.

The table below shows OCERS' recommended investment return assumption and the corresponding risk adjustment and confidence level compared to the similar values for prior studies.

Historical Investment Return Assumptions, Risk Adjustments and Confidence Levels based on Assumptions Adopted by the Board

Years Ending December 31	Investment Return	Risk Adjustment	Corresponding Confidence Level
2004 - 2007	7.75%	0.39%	56%
2008 - 2010	7.75%	0.80%	61%
2011	7.75%	-0.23%	<50%
2012 - 2013	7.25%	0.34%	55%
2014 - 2016	7.25%	0.28%	53%
2017 - 2019	7.00%	0.22%	53%[2]
2020 - 2022	7.00%	0.32%	54%
2023 (Comparison)	7.00%	1.20%	63%
2023 (Recommended)	7.00%	0.84%	59%

As we have discussed in prior experience studies, the risk adjustment model and associated confidence level is most useful as a means for comparing how OCERS has positioned itself relative to risk over periods of time.[3] The use of either a 63% or 59% confidence level should be considered in context with other factors, including:

[1] For purposes of these comparison values we have assumed the same investment expenses as in the previous study, which included investment management fees.

[2] This was based on the 2.75% inflation assumption adopted by the Board. In our December 31, 2017 triennial experience study report, we calculated a 55% confidence level based on an inflation assumption of 3.00%.

[3] In particular, it would not be appropriate to use this type of risk adjustment as a measure of determining an investment return rate that is "risk-free."

- As noted above, the confidence level is more of a relative measure than an absolute measure, and so can be reevaluated and reset for future comparisons. This is particularly true when comparing confidence levels developed using different models, as we are doing in this transitional year from one model to another.
- The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by Meketa. The standard deviation is a statistical measure of the future volatility of the portfolio and so is itself based on assumptions about future portfolio volatility and can be considered somewhat of a "soft" number.
- We have not taken into account any additional returns ("alpha") that might be earned on active management. This means that if active management generates enough alpha to cover its related expenses, this would increase returns. This aspect of Segal's model is further evaluated below.
- As with any model, the results of the risk adjustment model should be evaluated for reasonableness and consistency. This is discussed in the later section on "Comparison with Other Public Retirement Systems."
- As noted earlier, we believe the increased confidence level is appropriate given our stated concerns that current capital market assumptions could be overly optimistic when used for selecting a long-term investment return assumption.

Comparison with Alternative Model used to Review Investment Return Assumption

In previous studies, we have consistently reviewed investment return assumptions based on our model that incorporates expected arithmetic real returns for the different asset classes and for the entire portfolio as one component of that model.[1] The use of "forward looking expected arithmetic returns" is one of the approaches discussed for use in the Selection of Economic Assumptions for measuring Pension Obligations under Actuarial Standards of Practice (ASOP) No. 27.

Besides using forward looking expected arithmetic returns, ASOP No. 27 also discusses setting investment return assumptions using an alternative "forward looking expected geometric returns" approach, which is the model we have used in this study.[2] Even though as noted earlier expected geometric returns are lower than expected arithmetic returns, public retirement systems that have set investment return assumptions using this geometric approach have in practice adopted investment return assumptions that are comparable to those adopted by the Board for OCERS under the arithmetic approach. This is because under the model used by those retirement systems and by Segal in this report, the investment return assumption is not reduced to anticipate future investment management expenses. That is also why the comparison values and recommended values discussed earlier reach the same 7.00% expected return with generally comparable confidence levels.

[1] Again, as discussed earlier in this section, if a retirement system uses the expected arithmetic average return as the discount rate in the funding valuation, that retirement system is expected to have no surplus or asset shortfall relative to its expected obligations assuming all actuarial assumptions are met in the future.

[2] As also noted earlier in slightly different terms, if a retirement system uses the expected geometric average return as the discount rate in the funding valuation, that retirement system is expected to have an asset value that generally converges to the median accumulated value as the time horizon lengthens assuming all actuarial assumptions are met in the future.

In the interest of still having an alternative model for comparison, we evaluated the recommended 7.00% assumption based on the expected geometric return for the entire portfolio gross of investment management expenses, but using a fully stochastic approach and a different source for capital market assumptions. Under this alternative model, over a 15-year period, there is a 50% likelihood that future average geometric returns will meet or exceed 7.00%[1] developed using the capital market assumptions compiled by Horizon Actuarial Services based their most recent survey published in August 2022. This 50% likelihood is lower than the corresponding likelihood of 59% that we observed in this comparison during the assumption review in 2020. However, note that some of the investment advisory firms that participated in the 2022 Horizon survey have since raised their capital market assumptions and it is reasonable to expect the 50% likelihood to increase if we were to revise these results using the updated capital market assumptions when the 2023 Horizon survey becomes available.

Comparing with Other Public Retirement Systems

One final test of the recommended investment return assumption is to compare it against those used by other public retirement systems, both in California and nationwide.

While we are recommending that OCERS maintain the 7.00% investment return assumption, an investment return of 6.75% or lower is becoming more common among California public sector retirement systems. Of the twenty 1937 Act CERL systems, seven use a 7.00% investment return assumption (including OCERS), eight use 6.75%, three use 6.50% and one uses 6.25%. The remaining 1937 Act CERL system currently uses a 7.25% investment return assumption. Furthermore, CalSTRS currently uses a 7.00% investment return assumption and CalPERS uses a 6.80% investment return assumption, while the San Jose and San Diego City retirement systems use investment return assumptions of 6.625% and 6.50%, respectively.

The following table compares the System's recommended net investment return assumption against those of the 210 large public retirement funds in their 2021 fiscal year valuations based on information found in the Public Plans Database, which is produced in partnership with NASRA:[2]

		Public Plans Data[3]		
Assumption	**OCERS**	**Low**	**Median**	**High**
Net Investment Return	7.00%	4.25%	7.00%	8.25%

The detailed survey results show that over 80% of the systems have an investment return assumption in the range of 6.75% to 7.50%. Also, over half of the systems have reduced their investment return assumption from 2017 to 2021. State systems outside of California tend to change their economic assumptions less frequently and so may lag behind emerging practices in this area.

[1] We performed this stochastic simulation using the capital market assumptions included in the 2022 survey prepared by Horizon Actuarial Services. That simulation was performed using 10,000 trial outcomes of future market returns, using assumptions from 20-year arithmetic returns, standard deviations and correlation matrix that were found in the 2022 survey that included responses from 24 investment advisors.

[2] Among 219 large public retirement funds, the 2021 fiscal year investment return assumption was not available for 9 of the public retirement funds in the Public Plans Database as of March 2023.

[3] Public Plans Data website – Produced in partnership with the National System of State Retirement Administrators (NASRA).

C. Salary Increase

Salary increases impact plan costs in two ways: (1) by increasing members' benefits (since benefits are a function of the members' highest average pay) and future normal cost collections; and (2) by increasing total active member payroll which in turn generates lower UAAL contribution rates as a percent of payroll. These two impacts are discussed separately as follows:

As an employee progresses through his or her career, increases in pay are expected to come from three sources:

1. **Inflation:** Unless pay grows at least as fast as consumer prices grow, employees will experience a reduction in their standard of living. There may be times when pay increases lag or exceed inflation, but over the long term, labor market forces may require an employer to maintain its employees' standards of living.

   As discussed earlier in this report, we recommend maintaining the annual inflation assumption at 2.50%. This inflation component is used as part of the salary increase assumption.

2. **Real "Across the Board" Pay Increases:** These increases are typically termed productivity increases since they are considered to be derived from the ability of an organization or an economy to produce goods and services in a more efficient manner. As that occurs, at least some portion of the value of these improvements can provide a source for pay increases. These increases are typically assumed to extend to all employees "across the board". The State and Local Government Workers Employment Cost Index produced by the Department of Labor provides evidence that real "across the board" pay increases have averaged about 0.5% – 0.8% annually during the last ten to twenty years.

   We also referred to the annual report on the financial status of the Social Security program published in March 2023. In that report, real "across the board" pay increases are forecast to be 1.14% per year under the intermediate assumptions.

   The real pay increase assumption is generally considered a more "macroeconomic" assumption that is not necessarily based on individual plan experience. However, recent salary experience with public systems in California as well as anecdotal discussions with plans and plan sponsors indicate lower future real wage growth expectations for public sector employees. We note that for OCERS' active members, the actual average inflation plus "across the board" increase (i.e., wage inflation) over the three-year period ending December 31, 2022 was 3.16%, which is less than the change in annual average CPI for Los Angeles- Riverside-Orange County Area of 4.30% during that same period, largely as a result of the inflation spike discussed above:

Valuation Date	Actual Average Increase[1]	Change in Annual Average CPI for Los Angeles- Riverside-Orange County Area
December 31, 2020	3.78%	1.62%
December 31, 2021	2.43%	3.83%
December 31, 2022	3.27%	7.45%
Three-Year Average	**3.16%**	**4.30%**

[1] Reflects the increase in average salary for members at the beginning of the year versus those at the end of the year. It does not reflect the average salary increases received by members who worked the full year.

Even though the actual average salary increase was lower than the average change in the CPI over the 3-year period ending December 31, 2022, this was in part due to the spike in inflation in 2022.

Based on all of the above information, we recommend maintaining the real "across the board" salary increase assumption at 0.50%. This means that the combined inflation and "across the board" salary increase assumption will remain at 3.00%.

3. **Merit and Promotion Increases:** As the name implies, these increases come from an employee's career advances. This form of pay increase differs from the previous two, since it is specific to the individual. For OCERS, there are service-specific merit and promotion increases.

   The annual merit and promotion increases are determined by measuring the actual increases received by members over the experience period, net of the inflationary and real "across the board" pay increases. Increases are measured separately for General and Safety members. This is accomplished by:

   a. Measuring each continuing member's actual salary increase over each year of the experience period on a salary-weighted basis, with higher weights assigned to experience from members with larger salaries;
   b. Excluding any members with increases of more than 50% or any decreases during any particular year;
   c. Categorizing these increases according to member demographics;
   d. Removing the wage inflation component from these increases (assumed to be equal to the increase in the members' average salary during the year);
   e. Averaging these annual increases over the experience period; and
   f. Modifying current assumptions to reflect some portion of these measured increases reflective of their "credibility."

   To be consistent with the other economic assumptions, these merit and promotion assumptions should be used in combination with the total 3.00% assumed inflation and real "across the board" increases recommended in this study.

   Due to the high variability of the actual salary increases, we have analyzed this assumption using data for the past six years. We believe that when the experience from the current and prior studies is combined, it provides a more reasonable representation of potential future merit and promotion salary increases over the long term.

The following table shows the General members' actual average merit and promotion increases by years of service over the three-year period from January 1, 2020 through December 31, 2022 along with the actual average increases based on combining the current three-year period with the three-year period from the prior experience study. The current and proposed assumptions are also shown. The actual increases were reduced by the actual average inflation plus "across the board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year during the experience period (3.25% on average for the most recent three-year period, 2.57% on average for the prior three-year period).

General

Rate (%)

Years of Service	Current Assumption	Actual Average Increase from Current Study (Last 3 Years)	Actual Average Increase from Current and Prior Studies (Last 6 Years)	Proposed Assumption
Less than 1	8.00	3.38	4.03	5.00
1 – 2	7.25	6.97	7.24	7.25
2 – 3	6.25	6.76	6.72	6.50
3 – 4	5.25	5.77	5.95	5.50
4 – 5	4.25	4.98	5.19	4.50
5 – 6	3.50	4.25	4.13	3.75
6 – 7	2.75	3.27	3.19	3.00
7 – 8	2.50	2.86	2.76	2.75
8 – 9	1.70	2.42	2.01	2.00
9 – 10	1.70	2.05	1.89	1.80
10 – 11	1.60	1.86	1.65	1.60
11 – 12	1.60	1.31	1.47	1.50
12 – 13	1.50	1.31	1.44	1.40
13 – 14	1.50	1.29	1.37	1.30
14 – 15	1.25	1.29	1.23	1.25
15 – 16	1.25	1.21	1.07	1.25
16 – 17	1.00	1.36	1.08	1.15
17 – 18	1.00	1.25	0.98	1.10
18 – 19	1.00	1.25	0.97	1.10
19 – 20	1.00	0.83	0.81	0.90
20 & Over	1.00	0.66	0.68	0.90

The following table shows the Safety members' actual average merit and promotion increases by years of service over the three-year period from January 1, 2020 through December 31, 2022 along with the actual average increases based on combining the current three-year period with the three-year period from the prior experience study. The current and proposed assumptions are also shown. The actual increases were reduced by the actual average inflation plus "across the board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year during the experience period (3.14% on average for the most recent three-year period, 3.01% on average for the prior three-year period).

Safety
Rate (%)

Years of Service	Current Assumption	Actual Average Increase from Current Study (Last 3 Years)	Actual Average Increase from Current and Prior Studies (Last 6 Years)	Proposed Assumption
Less than 1	12.00	12.82	11.67	12.00
1 – 2	10.00	9.42	10.64	10.00
2 – 3	8.50	10.66	10.91	8.75
3 – 4	7.50	10.18	10.26	7.75
4 – 5	6.50	8.51	8.62	6.75
5 – 6	5.50	6.14	6.85	5.75
6 – 7	5.00	4.25	5.35	5.00
7 – 8	4.00	2.12	3.17	3.75
8 – 9	3.00	2.03	2.65	3.00
9 – 10	2.50	2.75	2.91	2.75
10 – 11	1.85	2.26	2.20	2.00
11 – 12	1.85	1.54	2.05	1.85
12 – 13	1.85	1.84	1.85	1.85
13 – 14	1.85	1.52	1.86	1.85
14 – 15	1.85	1.74	1.87	1.85
15 – 16	1.60	1.96	1.65	1.60
16 – 17	1.60	1.88	1.58	1.60
17 – 18	1.60	0.83	1.31	1.60
18 – 19	1.60	0.86	1.30	1.60
19 – 20	1.60	1.43	1.47	1.50
20 & Over	1.60	1.43	1.72	1.50

Based on this experience, we are proposing changes in the merit and promotion salary increases for both General and Safety members, with increases in some service categories and decreases in other service categories. Overall, *merit and promotion* salary increases are assumed to be slightly lower for General and about the same for Safety members.

Chart 1 that follows later in the section compares actual experience with the current and proposed rates of actual merit and promotion increases for General members. Also shown is the actual merit and promotion increases based on an average of both the current and previous three-year experience periods.

Chart 2 compares actual experience with the current and proposed rates of actual merit and promotion increases for Safety members. Also shown is the actual merit and promotion increases based on an average of both the current and previous three-year experience periods.

Active Member Payroll

Projected active member payrolls are used to develop the UAAL contribution rate. Future values are determined as a product of the number of employees in the workforce and the average pay for all employees. The average pay for all employees increases only by inflation and real "across the board" pay increases. The merit and promotion increases are not an influence, because this average pay is not specific to an individual.

Under the Board's current practice, the UAAL contribution rate is developed by assuming that the total payroll for all active members will increase annually over the amortization periods at the same assumed rates of inflation plus real "across the board" salary increase assumptions as are used to project the members' future benefits.

Consistent with the combined recommended inflation and real "across the board" salary increase assumptions, we recommend maintaining the payroll growth assumption at 3.00% annually.

Chart 1: Merit and Promotion Salary Increase Rates
General Members

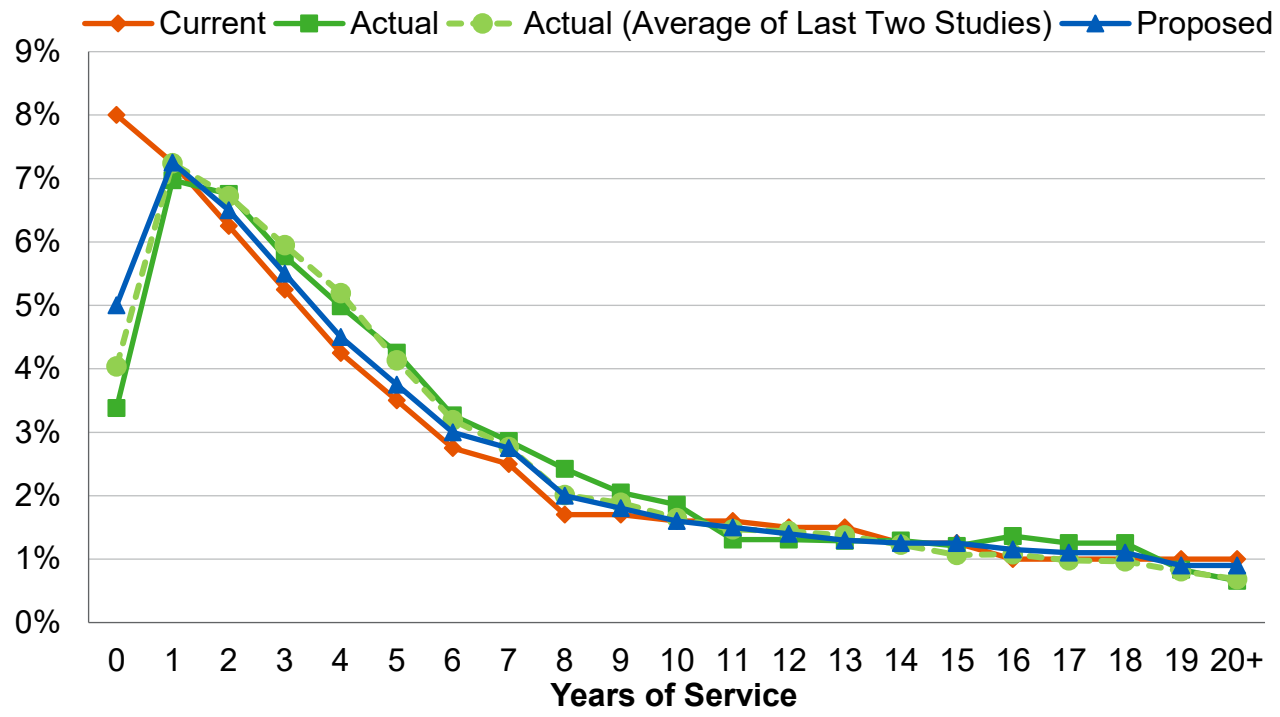
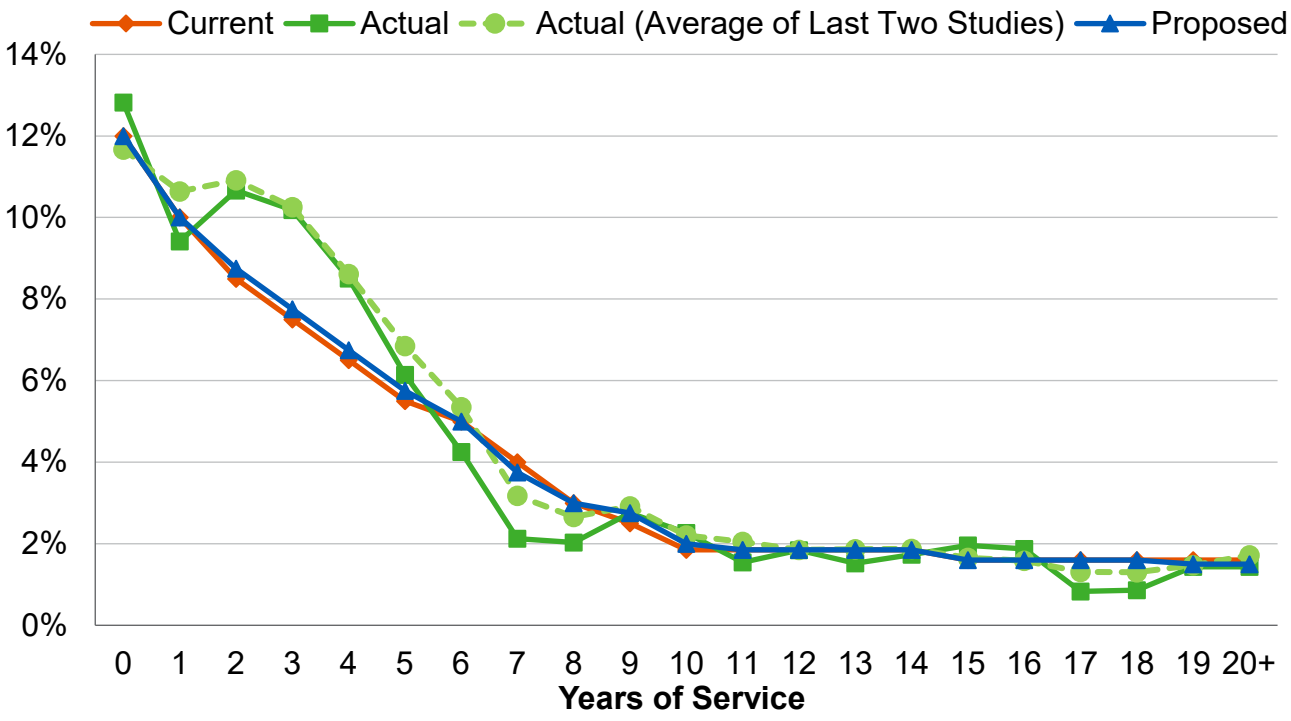


Chart 2: Merit and Promotion Salary Increase Rates
Safety Members



4. Demographic Assumptions

A. Retirement Rates

The age at which a member retires from service (i.e., who did not retire on a disability pension) will affect both the amount of the benefits that will be paid to that member as well as the period over which funding must take place.

The System's current retirement rates for the non-CalPEPRA Plans[1] are separated into:

(1) General Enhanced

(2) General Non-Enhanced[2]

(3) General SJC (2.0% @ 57 under §31676.12)

(4) Safety Law Enforcement (3.0% @ 50 under §31664.1)

(5) Safety Law Enforcement (3.0% @ 55 under §31664.2)

(6) Safety Fire (3.0% @ 50 under §31664.1)

(7) Safety Fire (3.0% @ 55 under §31664.2)

(8) Safety Probation (3.0% @ 50 under §31664.1)

For members who are covered under the CalPEPRA Plans, the retirement rates are separated into:

(1) CalPEPRA General

(2) CalPEPRA Safety Probation

(3) CalPEPRA Safety Law Enforcement

(4) CalPEPRA Safety Fire

As of the last experience study, we recommended that retirement rates be structured as a function of both age and years of service for the legacy tiers that have been adopted for a longer period of time for which we have enough data to support proposing rates based on both age and service. The new structure of retirement assumptions for these tiers will apply different sets of age-based retirement assumptions for those with less than 30 years of service and for those with more than 30 years of service. For General San Juan Capistrano or SJC (2.0% @ 57 under §31676.12), Safety Law Enforcement (3.0% @ 55 under §31664.2), and Safety Fire (3.0% @ 55 under §31664.2), as well as the CalPEPRA Tiers, we continue to recommend that retirement rates be structured as a function of only age until more data on actual retirement experience is available to review the retirement rates based on both age and service.

The retirement experience during the current three-year period indicated that there were more actual retirements than expected, likely due in large part to actual retirements under the County of Orange's Voluntary Incentive Program (VIP) that occurred during 2020. Aside from a few

[1] CalPEPRA or California Public Employees' Pension Reform Act of 2013 imposed lower benefit tiers for General and Safety members together with other changes.

[2] These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (§31676.01).

exceptions, all employees in the County were eligible to participate in this program. Because of this, we have also reviewed the retirement experience over a six-year period from January 1, 2017 through December 31, 2022, in order to dampen the effect of the VIP. However, there is a significant increase in the actual retirement experience for Safety Probation group (about 40% increase without adjusting for the size of the pool of members eligible to retire in each of the two three-year periods) for the current three-year period which we believe can be substantially explained by high utilization of the VIP. For that reason we recommend maintaining the current retirement assumptions for Safety Probation members, and will review their experience in the next experience study.

The following table summarizes the number of actual retirements over the most recent three-year period as compared to the prior three-year period for the groups that were affected by the VIP:

Actual Retirement	Most Recent Three-Year Period	Prior Study Three-Year Period
General Enhanced[1]	1,760	1,604
General Non-Enhanced[1]	255	236
Safety Law Enforcement	276	250
Safety Probation	127	93

The following table summarizes the number of actual retirements over the most recent three-year period compared to those expected prepared using the current and the proposed assumptions.

Most Recent Three-Year Period	Actual Retirement	Expected Retirement - Current Rate	Expected Retirement - Proposed Rate
General Enhanced[1]	1,760	1,500	1,632
General Non-Enhanced[1]	255	250	257
Safety Law Enforcement	276	224	247
Safety Probation	127	84	84

The table on the following page shows the observed service retirement rates for General Enhanced members based on the actual experience over the past three years as well as the prior three-year period. The observed service retirement rates were determined by comparing those members who actually retired from service to those eligible to retire from service. This same methodology is followed throughout this report and was described in Section 2. Also shown are the current assumed rates and the rates we propose.

[1] Include both County and non-County members.

General Enhanced

Rate of Retirement (%)

	Less than 30 Years of Service				30 or More Years of Service			
Age	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate
49	0.00	N/A	N/A	0.00	30.00	0.00	0.00	30.00
50	2.00	4.81	2.97	2.25	4.00	9.09	7.14	5.00
51	2.00	2.53	1.82	2.25	4.00	4.69	3.23	5.00
52	2.50	2.52	2.79	2.50	5.00	3.96	3.64	5.00
53	2.50	4.06	2.48	3.00	5.00	10.22	10.11	9.00
54	7.00	9.39	7.51	7.50	14.00	23.21	16.81	16.00
55	12.00	14.79	11.72	13.00	30.00	41.36	41.77	35.00
56	9.00	11.11	9.05	10.00	19.00	28.23	24.58	24.00
57	9.00	10.13	7.77	10.00	18.00	22.73	30.51	22.00
58	9.00	9.88	8.88	10.00	18.00	31.53	24.04	22.00
59	10.00	11.31	10.97	11.00	20.00	31.82	20.78	24.00
60	11.00	13.35	11.54	12.00	20.00	28.42	29.27	24.00
61	11.00	12.03	9.54	12.00	20.00	32.18	23.29	24.00
62	13.00	17.53	13.87	14.00	20.00	30.16	24.00	24.00
63	13.00	14.99	12.82	14.00	22.00	22.41	28.79	24.00
64	16.00	22.50	16.20	17.00	24.00	42.03	18.37	30.00
65	24.00	30.77	24.92	25.00	28.00	34.78	38.64	30.00
66	24.00	29.58	24.35	25.00	30.00	30.30	40.48	30.00
67	24.00	33.33	24.06	25.00	30.00	36.36	29.63	30.00
68	22.00	29.27	21.84	25.00	27.50	28.00	22.22	25.00
69	22.00	32.61	19.86	25.00	27.50	8.33	23.53	25.00
70	25.00	17.39	27.27	25.00	27.50	7.14	11.76	25.00
71	25.00	24.36	24.44	25.00	27.50	28.57	54.55	25.00
72	25.00	18.03	28.77	22.00	27.50	10.00	22.22	25.00
73	20.00	22.81	13.21	20.00	27.50	30.00	37.50	25.00
74	20.00	13.33	18.00	20.00	27.50	0.00	33.33	25.00
75 & Over	100.00	25.76	24.09	100.00	100.00	30.00	22.22	100.00

As shown above, we are recommending increases overall in the retirement rates for General Enhanced members for both less than 30 years of service and 30 or more years of service.

Chart 3 that follows later in this section compares actual experience with the current and proposed rates of retirement for General Enhanced members with less than 30 years of service.

Chart 4 compares actual experience with the current and proposed rates of retirement for General Enhanced members with 30 or more years of service.

The following table shows the observed retirement rates for General Non-Enhanced members over the past three years as well as the prior three-year period. Also shown are the current rates assumed and the rates we propose:

General Non-Enhanced

Rate of Retirement (%)

	Less than 30 Years of Service				30 or More Years of Service			
Age	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate
49	0.00	N/A	0.00	0.00	25.00	0.00	N/A	25.00
50	3.00	1.39	3.73	2.75	3.00	N/A	0.00	2.75
51	3.00	1.32	3.31	2.75	3.00	0.00	0.00	2.75
52	2.00	5.88	0.68	2.75	2.00	0.00	0.00	2.75
53	3.50	2.38	5.44	2.75	3.50	0.00	0.00	2.75
54	2.75	2.70	1.30	2.75	2.75	0.00	0.00	2.75
55	3.25	3.94	4.38	3.25	3.25	0.00	0.00	3.50
56	3.50	1.71	2.82	3.25	3.50	0.00	5.56	3.50
57	5.00	6.11	4.19	5.50	5.00	0.00	4.35	5.50
58	5.50	9.02	5.59	6.50	5.50	0.00	9.09	6.50
59	6.50	6.62	7.80	6.50	6.50	3.03	4.17	6.50
60	9.00	4.20	10.60	8.00	13.50	2.50	13.33	12.00
61	9.00	6.25	7.52	8.00	13.50	26.32	15.15	15.00
62	9.00	6.86	7.69	8.00	18.00	13.04	24.14	18.00
63	9.50	12.38	7.00	10.00	19.00	30.30	15.79	22.00
64	10.00	16.28	9.28	12.00	20.00	31.03	25.00	25.00
65	22.00	32.58	21.13	22.00	26.40	36.00	38.46	30.00
66	25.00	26.67	25.00	25.00	30.00	50.00	30.00	32.00
67	25.00	38.64	18.00	27.00	30.00	22.22	40.00	32.00
68	30.00	41.67	35.29	32.00	27.50	50.00	0.00	32.00
69	30.00	29.41	40.00	30.00	27.50	33.33	0.00	30.00
70	20.00	35.71	26.67	25.00	27.50	0.00	0.00	30.00
71	20.00	10.00	9.52	20.00	27.50	33.33	0.00	30.00
72	20.00	12.50	4.35	20.00	27.50	66.67	0.00	30.00
73	20.00	11.11	30.77	20.00	27.50	0.00	0.00	30.00
74	20.00	22.22	18.18	20.00	27.50	0.00	0.00	30.00
75 & Over	100.00	24.00	26.67	100.00	100.00	40.00	0.00	100.00

As shown above, we are recommending increases overall in the retirement rates for General Non-Enhanced members for both less than 30 years of service and 30 or more years of service.

Chart 5 that follows later in this section compares actual experience with the current and proposed rates of retirement for General Non-Enhanced members with less than 30 years of service.

Chart 6 compares actual experience with the current and proposed rates of retirement for General Non-Enhanced members with 30 or more years of service.

The following table shows the observed retirement rates for Safety Law Enforcement (3.0% @ 50 under §31664.1) members over the past three years as well as the prior three-year period. Also shown are the current rates assumed and the rates we propose:

Safety Law Enforcement (3.0% @ 50 under §31664.1)

Rate of Retirement (%)

	Less than 30 Years of Service				30 or More Years of Service			
Age	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate
45	1.00	2.90	1.27	2.50	16.00	N/A	N/A	16.00
46	1.00	3.16	0.91	2.50	16.00	N/A	N/A	16.00
47	1.00	6.03	2.38	2.50	16.00	N/A	N/A	16.00
48	1.00	6.67	0.00	2.50	16.00	N/A	N/A	16.00
49	11.00	14.29	10.53	12.00	16.00	N/A	N/A	16.00
50	16.00	21.62	16.00	18.00	16.00	0.00	20.00	20.00
51	16.00	21.02	14.65	18.00	16.00	50.00	16.67	20.00
52	17.00	19.67	17.29	18.00	16.00	0.00	9.09	20.00
53	19.00	23.53	19.59	20.00	30.00	60.00	37.50	35.00
54	24.00	23.19	25.88	24.00	30.00	26.67	40.00	35.00
55	24.00	27.27	23.08	24.00	30.00	52.94	29.41	35.00
56	22.00	18.18	22.50	24.00	30.00	45.45	41.18	35.00
57	22.00	26.92	23.53	24.00	30.00	50.00	20.00	35.00
58	22.00	36.84	23.81	24.00	40.00	0.00	50.00	40.00
59	22.00	30.00	20.00	24.00	40.00	44.44	50.00	40.00
60	30.00	11.11	30.77	30.00	40.00	50.00	25.00	40.00
61	30.00	12.50	38.46	30.00	40.00	0.00	50.00	40.00
62	30.00	55.56	10.00	30.00	40.00	0.00	50.00	40.00
63	30.00	33.33	33.33	30.00	40.00	0.00	60.00	40.00
64	30.00	0.00	20.00	30.00	40.00	0.00	60.00	40.00
65 & Over	100.00	25.00	41.67	100.00	100.00	100.00	66.67	100.00

As shown above, we are recommending increases overall in the retirement rates for Safety Law Enforcement (3.0% @ 50 under §31664.1) members for both less than 30 years of service and 30 or more years of service.

Chart 7 that follows later in this section compares actual experience with the current and proposed rates of retirement for Safety Law Enforcement (3.0% @ 50 under §31664.1) members with less than 30 years of service.

Chart 8 compares actual experience with the current and proposed rates of retirement for Safety Law Enforcement (3.0% @ 50 under §31664.1) members with 30 or more years of service.

The following table shows the observed retirement rates for Safety Fire (3.0% @ 50 under §31664.1) members over the past three years as well as the prior three-year period. Also shown are the current rates assumed and the rates we propose:

Safety Fire (3.0% @ 50 under §31664.1)

Rate of Retirement (%)

	Less than 30 Years of Service				30 or More Years of Service			
Age	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate
45	2.00	0.00	0.00	2.00	10.00	N/A	N/A	10.00
46	2.00	0.00	0.00	2.00	10.00	N/A	N/A	10.00
47	2.00	3.03	0.00	2.00	10.00	N/A	N/A	10.00
48	2.00	2.63	0.00	2.00	10.00	N/A	N/A	10.00
49	2.00	0.00	6.82	2.00	10.00	0.00	0.00	10.00
50	4.00	5.63	5.88	4.50	10.00	0.00	0.00	10.00
51	4.00	4.62	2.82	4.50	10.00	20.00	14.29	10.00
52	4.00	7.84	1.54	4.50	10.00	0.00	8.33	10.00
53	9.00	10.42	8.93	9.00	20.00	27.27	22.73	20.00
54	12.00	9.76	11.76	12.00	25.00	33.33	28.57	25.00
55	12.00	16.67	12.12	12.00	25.00	11.76	26.32	25.00
56	12.00	13.64	11.76	12.00	25.00	38.10	28.57	25.00
57	18.00	6.67	21.21	20.00	25.00	54.55	50.00	25.00
58	18.00	23.08	4.76	20.00	30.00	20.00	40.00	30.00
59	18.00	28.57	16.67	25.00	30.00	33.33	50.00	30.00
60	18.00	31.25	27.27	25.00	30.00	42.86	14.29	30.00
61	18.00	37.50	11.11	25.00	30.00	40.00	33.33	30.00
62	18.00	33.33	20.00	25.00	35.00	20.00	33.33	30.00
63	18.00	0.00	0.00	25.00	35.00	16.67	20.00	30.00
64	18.00	33.33	0.00	25.00	35.00	28.57	33.33	30.00
65 & Over	100.00	25.00	22.22	100.00	100.00	13.33	22.22	100.00

As shown above, we are recommending increases in most of the retirement rates for Safety Fire (3.0% @ 50 under §31664.1) members with less than 30 years of service and recommending decreases in some of the retirement rates for Safety Fire (3.0% @ 50 under §31664.1) members with 30 or more years of service.

Chart 9 that follows later in this section compares actual experience with the current and proposed rates of retirement for Safety Fire (3.0% @ 50 under §31664.1) members with less than 30 years of service.

Chart 10 compares actual experience with the current and proposed rates of retirement for Safety Fire (3.0% @ 50 under §31664.1) members with 30 or more years of service.

The following table shows the observed retirement rates for Safety Probation (3.0% @ 50 under §31664.1) members over the past three years as well as the prior three-year period. Also shown are the current rates assumed and the rates we propose:

Safety Probation (3.0% @ 50 under §31664.1)

Rate of Retirement (%)

	Less than 30 Years of Service				30 or More Years of Service			
Age	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate	Current Rate	Actual Rate	Prior Study Actual Rate	Proposed Rate
45	3.00	3.92	0.00	3.00	5.00	N/A	N/A	5.00
46	3.00	1.49	3.64	3.00	5.00	N/A	N/A	5.00
47	3.00	0.00	5.56	3.00	5.00	N/A	N/A	5.00
48	3.00	0.00	5.56	3.00	5.00	N/A	N/A	5.00
49	3.00	7.69	3.64	3.00	5.00	N/A	N/A	5.00
50	9.00	15.53	18.68	9.00	12.00	N/A	N/A	12.00
51	7.00	15.66	5.63	7.00	10.00	N/A	N/A	10.00
52	5.00	8.06	5.26	5.00	9.00	N/A	0.00	9.00
53	7.00	16.36	11.36	7.00	9.00	20.00	0.00	9.00
54	7.00	25.53	5.56	7.00	12.00	33.33	25.00	12.00
55	12.00	40.74	9.09	12.00	30.00	72.73	57.14	30.00
56	18.00	27.78	19.23	18.00	30.00	50.00	57.14	30.00
57	25.00	13.33	31.58	25.00	30.00	0.00	0.00	30.00
58	25.00	37.50	20.00	25.00	30.00	50.00	42.86	30.00
59	18.00	18.18	16.67	18.00	30.00	50.00	0.00	30.00
60	20.00	20.00	21.43	20.00	40.00	66.67	0.00	40.00
61	20.00	40.00	15.38	20.00	40.00	50.00	50.00	40.00
62	20.00	40.00	15.38	20.00	40.00	0.00	100.00	40.00
63	20.00	50.00	20.00	20.00	40.00	100.00	N/A	40.00
64	20.00	20.00	16.67	20.00	40.00	N/A	100.00	40.00
65 & Over	100.00	46.67	29.41	100.00	100.00	N/A	N/A	100.00

As shown above, we are recommending maintain the current retirement rates for Safety Probation (3.0% @ 50 under §31664.1) members, both with less than 30 years of service and 30 or more years of service. As discussed above this recommendation is related to the extraordinary number of retirements during 2020 as a result of the VIP.

Chart 11 compares actual experience with the current and proposed rates of retirement for Safety Probation (3.0% @ 50 under §31664.1) members with less than 30 years of service.

Chart 12 compares actual experience with the current and proposed rates of retirement for Safety Probation (3.0% @ 50 under §31664.1) members with 30 or more years of service.

For General SJC under (2.0% @ 57 under §31676.12), Safety Law Enforcement (3.0% @ 55 under §31664.2) and Safety Fire (3.0% @ 55 under §31664.2), we do not have credible experience from the past three years to propose new rates based on actual retirement from members of these newer plans. However, we are recommending revising some of the rates currently used for those plans to commensurate with the overall changes to the retirement rates that we observed and are recommending for the other older plans.

The following are the current and proposed rates of retirement for General SJC (31676.12), Safety Law Enforcement (31664.2), and Safety Fire (31664.2) members:

Rate of Retirement (%)

Age	General SJC (31676.12)		Safety Law Enforcement (31664.2)		Safety Fire (31664.2)	
	Current Rate	Proposed Rate	Current Rate	Proposed Rate	Current Rate	Proposed Rate
50	4.00	4.00	11.50	12.00	8.00	8.00
51	4.00	4.00	12.00	12.50	9.00	9.00
52	4.00	4.00	12.70	13.00	10.00	10.00
53	4.00	4.00	17.90	18.00	12.00	12.00
54	4.00	4.00	18.80	19.00	14.00	14.00
55	4.00	4.00	35.00	35.00	23.00	24.00
56	5.00	5.00	25.00	25.00	22.00	23.00
57	6.00	6.00	25.00	25.00	25.00	25.00
58	7.00	7.00	25.00	25.00	25.00	25.00
59	9.00	9.00	30.00	30.00	35.00	35.00
60	10.00	10.00	40.00	40.00	40.00	40.00
61	12.00	12.00	40.00	40.00	40.00	40.00
62	13.00	13.00	40.00	40.00	40.00	40.00
63	13.00	13.00	40.00	40.00	40.00	40.00
64	19.00	19.00	40.00	40.00	40.00	40.00
65	20.00	22.00	100.00	100.00	100.00	100.00
66	25.00	26.00	100.00	100.00	100.00	100.00
67	25.00	26.00	100.00	100.00	100.00	100.00
68	25.00	26.00	100.00	100.00	100.00	100.00
69	25.00	26.00	100.00	100.00	100.00	100.00
70	45.00	45.00	100.00	100.00	100.00	100.00
71	45.00	45.00	100.00	100.00	100.00	100.00
72	45.00	45.00	100.00	100.00	100.00	100.00
73	45.00	45.00	100.00	100.00	100.00	100.00
74	45.00	45.00	100.00	100.00	100.00	100.00
75 & Over	100.00	100.00	100.00	100.00	100.00	100.00

Chart 13 compares the current rates with the proposed rates of retirement for General SJC under (2.0% @ 57 under §31676.12).

Chart 14 compares the current rates with the proposed rates of retirement for Safety Law Enforcement (3.0% @ 55 under §31664.2).

Chart 15 compares the current rates with the proposed rates of retirement for Safety Fire (3.0% @ 55 under §31664.2).

On January 1, 2013, new CalPEPRA formulas were implemented for new General and Safety tiers. For these new formulas, we do not have credible experience from the past three years to propose new rates based on actual retirement from members of the newer plans. However, we

have revised some of our recommended rates for CalPEPRA General and Safety formulas so that those rates will remain comparable to the proposed retirement rates we are recommending for the non-CalPEPRA General and Safety formulas.

Rate of Retirement (%)

	CalPEPRA - General		CalPEPRA - Safety Law Enforcement		CalPEPRA - Safety Fire		CalPEPRA – Safety Probation	
Age	Current Rate	Proposed Rate	Current Rate	Proposed Rate	Current Rate	Proposed Rate	Current Rate	Proposed Rate
50	0.00	0.00	11.00	11.50	6.00	6.00	3.00	3.00
51	0.00	0.00	11.50	12.00	6.50	6.50	3.00	3.00
52	6.00	5.50	12.00	12.50	8.00	8.00	3.50	3.50
53	2.00	2.00	16.00	16.50	10.00	10.00	3.50	3.50
54	2.00	2.00	17.00	17.50	11.50	12.00	6.00	6.00
55	2.50	2.75	29.00	30.00	20.00	20.00	12.00	12.00
56	3.50	3.75	19.00	20.00	19.00	19.00	12.00	12.00
57	5.50	5.50	19.00	20.00	21.00	21.00	15.00	15.00
58	7.50	7.50	23.00	25.00	24.00	25.00	25.00	25.00
59	7.50	7.50	26.00	30.00	30.00	30.00	25.00	25.00
60	7.50	7.50	40.00	40.00	40.00	40.00	40.00	40.00
61	7.50	7.50	40.00	40.00	40.00	40.00	40.00	40.00
62	14.00	14.00	40.00	40.00	40.00	40.00	40.00	40.00
63	14.00	14.00	40.00	40.00	40.00	40.00	40.00	40.00
64	14.00	15.00	40.00	40.00	40.00	40.00	40.00	40.00
65	20.00	20.00	100.00	100.00	100.00	100.00	100.00	100.00
66	22.00	22.00	100.00	100.00	100.00	100.00	100.00	100.00
67	23.00	23.00	100.00	100.00	100.00	100.00	100.00	100.00
68	23.00	23.00	100.00	100.00	100.00	100.00	100.00	100.00
69	23.00	23.00	100.00	100.00	100.00	100.00	100.00	100.00
70	25.00	25.00	100.00	100.00	100.00	100.00	100.00	100.00
71	25.00	25.00	100.00	100.00	100.00	100.00	100.00	100.00
72	25.00	25.00	100.00	100.00	100.00	100.00	100.00	100.00
73	25.00	25.00	100.00	100.00	100.00	100.00	100.00	100.00
74	25.00	25.00	100.00	100.00	100.00	100.00	100.00	100.00
75 & Over	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Chart 16 compares the current rates with the proposed rates of retirement for CalPEPRA General members.

Chart 17 compares the current rates with the proposed rates of retirement for CalPEPRA Safety Law Enforcement members.

Chart 18 compares the current rates with the proposed rates of retirement for CalPEPRA Safety Fire members.

Chart 19 compares the current rates with the proposed rates of retirement for CalPEPRA Safety Probation members.

Deferred Vested Members

Under the current assumptions, deferred vested General members are assumed to retire at age 59 regardless of reciprocity status and Safety members are assumed to retire at age 54 regardless of reciprocity status.

The following table shows the observed deferred vested retirement age for General members based on the actual experience over the past three years, separately for those who went on to work at a reciprocal retirement system and those that did not. Also shown are the current assumed retirement ages and the retirement ages we propose.

General Members' Deferred Vested Retirement Age

	Reciprocal Members	Non-Reciprocal Members
Current Assumption	59.0	59.0
Actual Average Age	60.3	57.8
Proposed Assumption	**60.0**	**58.0**

Based on this experience, we recommend increasing the deferred vested retirement age assumption for General reciprocal members from age 59 to 60 and decreasing the deferred vested retirement age assumption for General non-reciprocal members from age 59 to 58.

The following table shows the observed deferred vested retirement age for Safety members based on the actual experience over the past three years, separately for those who went on to work at a reciprocal retirement system and those that did not. Also shown are the current assumed retirement ages and the retirement ages we propose.

Safety Members' Deferred Vested Retirement Age

	Reciprocal Members	Non-Reciprocal Members
Current Assumption	54.0	54.0
Actual Average Age	53.6	54.5
Proposed Assumption	**54.0**	**54.0**

Based on this experience, we recommend maintaining the deferred vested retirement age assumption for Safety members at age 54 regardless of reciprocity status.

For members who terminate with less than five years of service after January 1, 2003 and are not vested, we assume they would retire at age 70 for both General and Safety if they decide to leave their contributions on deposit as permitted by §31629.5.

Reciprocity

Under the current assumptions, it is assumed that 15% of General and 20% of Safety future deferred vested members would be covered under a reciprocal retirement system. For those covered under a reciprocal retirement system, a General member is assumed to receive 4.00% annual salary increases, while a Safety member is assumed to receive 4.60% annual salary increases from termination until their date of retirement. As of December 31, 2022, about 10.8% of the total General deferred vested members and 16.6% of the total Safety deferred vested members went on to be covered by a reciprocal retirement system.

We recommend decreasing the reciprocal assumption from 15.0% to 12.5% for General members and maintaining the assumption at 20%[1] **for Safety members.** This recommendation reflects the experience of all deferred vested members as of December 31, 2022 instead of just new deferred vested members during the three-year period. This is because there is generally a lag between a member's date of termination and the time that it is known if they have reciprocity with a reciprocal retirement system.

In addition, we recommend 3.90% and 4.50% annual salary increase assumptions for General and Safety members, respectively, be utilized to anticipate salary increases from the date of termination from OCERS to the expected date of retirement for deferred vested members covered by a reciprocal retirement system. These assumptions are based on the ultimate 0.90% and 1.50% merit and promotion salary increase assumptions for General and Safety members, respectively, together with the 2.50% inflation and 0.50% real "across the board" salary increase assumptions that are recommended earlier in Section 3 of this report.

Survivor Continuance under the Unmodified Option

In prior valuations, it was assumed that 75% of all active male members and 55% of all active female members who selected the unmodified option would be married or have an eligible domestic partner when they retired.

We reviewed experience for new retirees during the three-year period and determined the actual percentage of these new retirees that were married or had a domestic partner at retirement. The results of that analysis are shown below.

New Retirees – Actual Percent with Eligible Spouse or Domestic Partner and Selected Unmodified Option

Year Ending December 31	Male	Female
2020	77.4%	60.4%
2021	73.5%	55.1%
2022	76.2%	59.5%
Total	**76.0%**	**58.9%**

According to experience of members who retired during the last three years, about 76.0% of all male members and 58.9% of all female members who selected the unmodified

[1] We are not recommending a reduction in the assumption for Safety members as this assumption was reduced from 25 to 20% in the prior experience study.

option were married or had a domestic partner at retirement. We recommend maintaining the assumption at 75% for male members and 55% for female members.

Since the present value of the survivor's automatic continuance benefit is dependent on the survivor's age and sex, we must also have assumptions for the age and sex of the survivor. Based on the experience for members who retired during the most recent three-year period (results shown in the table below) and studies done for other retirement systems, **we recommend the following:**

1. Since most the survivors are the opposite sex, even with the inclusion of domestic partners, **we will continue to assume that the survivor's sex is the opposite of the member.**

2. **We recommend the current assumptions for the age of the survivors for all active and inactive members (shown below) be maintained.** These assumptions will continue to be monitored in future experience studies.

Member's Age as Compared to Spouse's Age

	Male Retiree	Female Retiree
Current Assumption	3 years older	2 years younger
Actual Experience	2.7 years older	2.5 years younger
Proposed Assumption	3 years older	2 years younger

Chart 3: Retirement Rates
General Enhanced Members with Less than 30 Years of Service

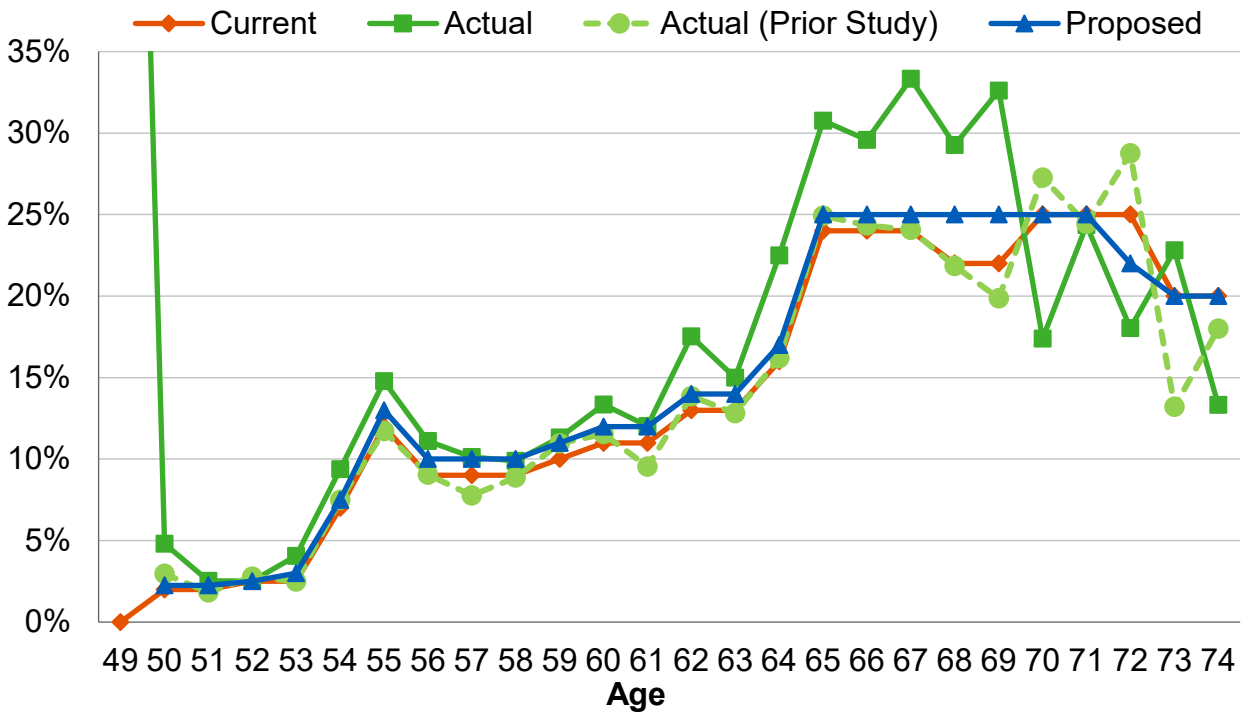


Chart 4: Retirement Rates
General Enhanced Members with More than 30 Years of Service

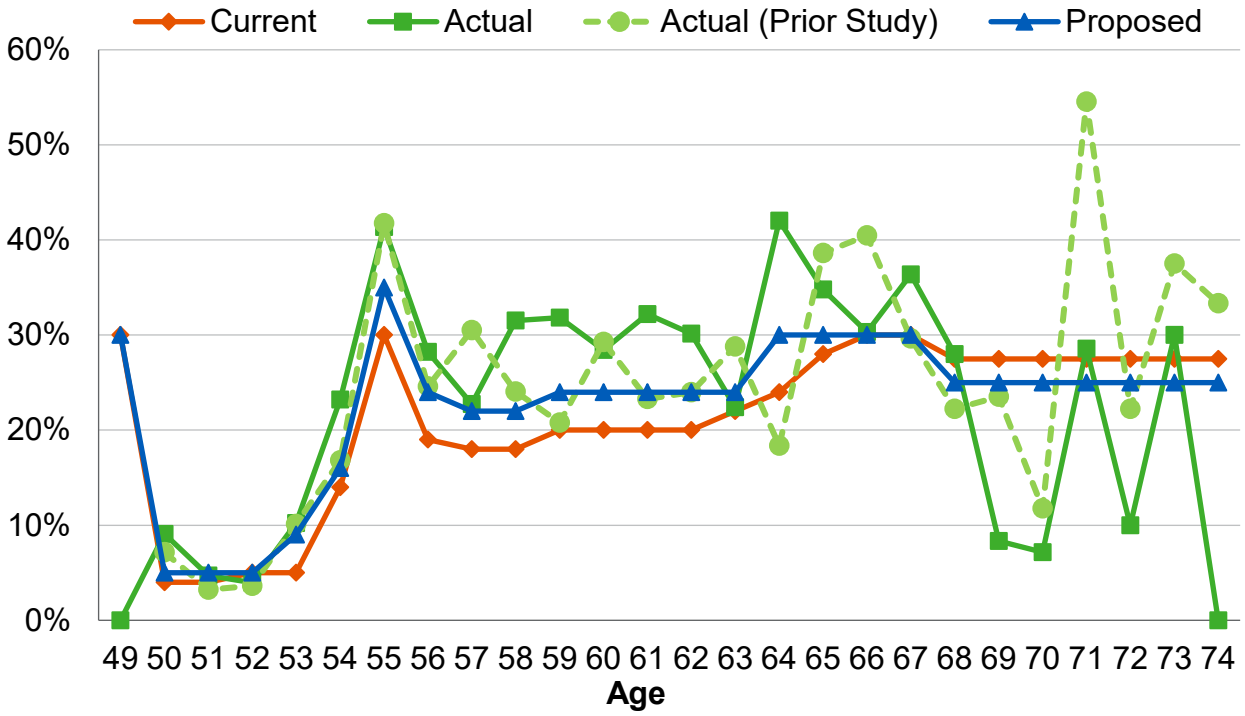


Chart 5: Retirement Rates
General Non-Enhanced Members with Less than 30 Years of Service

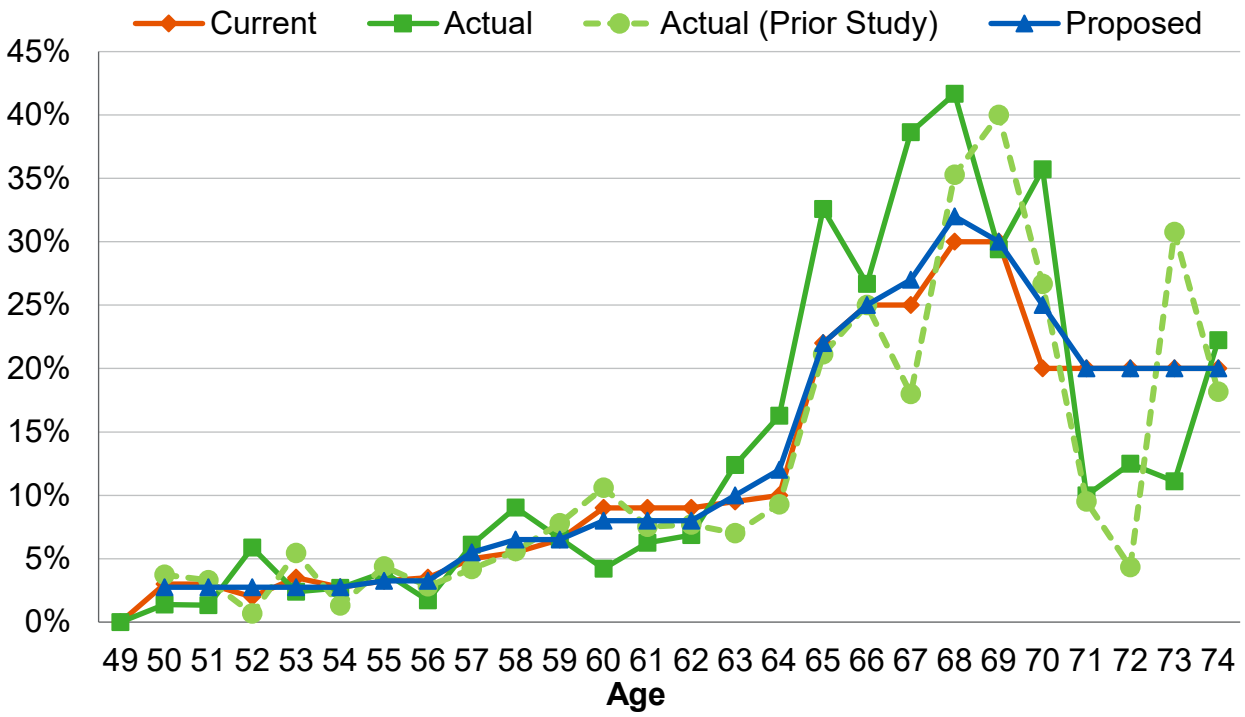


Chart 6: Retirement Rates
General Non-Enhanced Members with More than 30 Years of Service

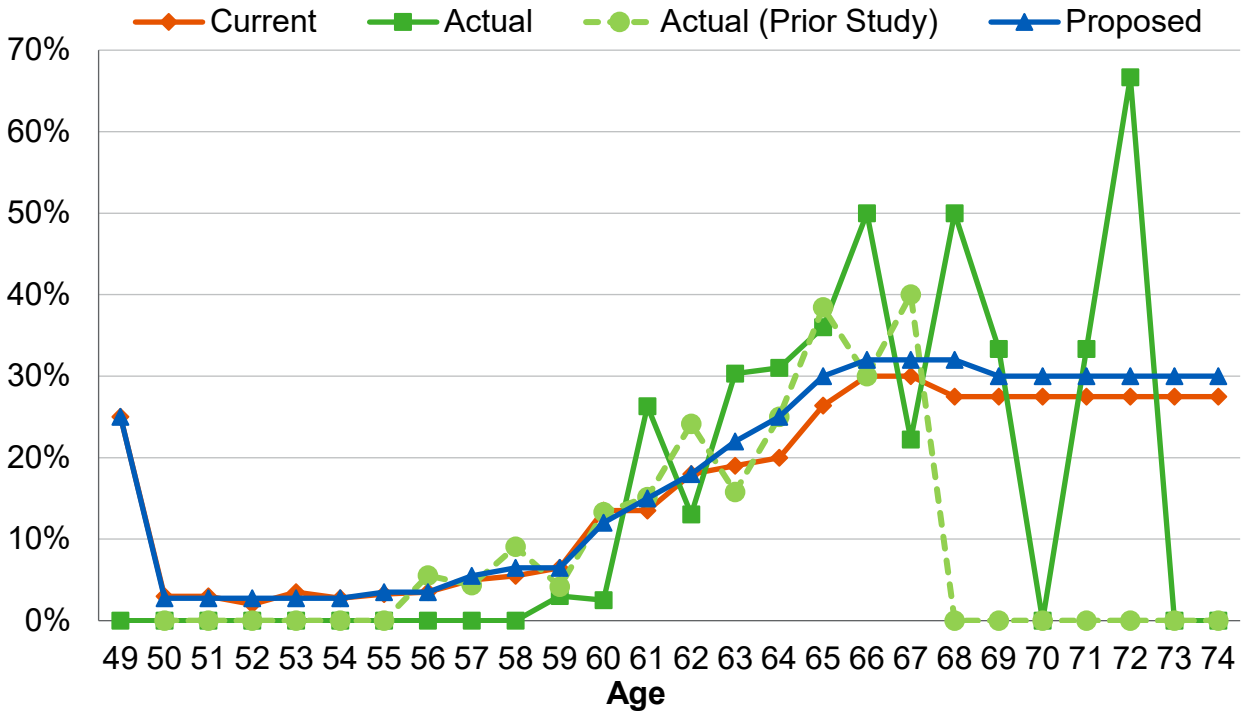


Chart 7: Retirement Rates
Safety Law Enforcement Members (31664.1) with Less than 30 Years of Service

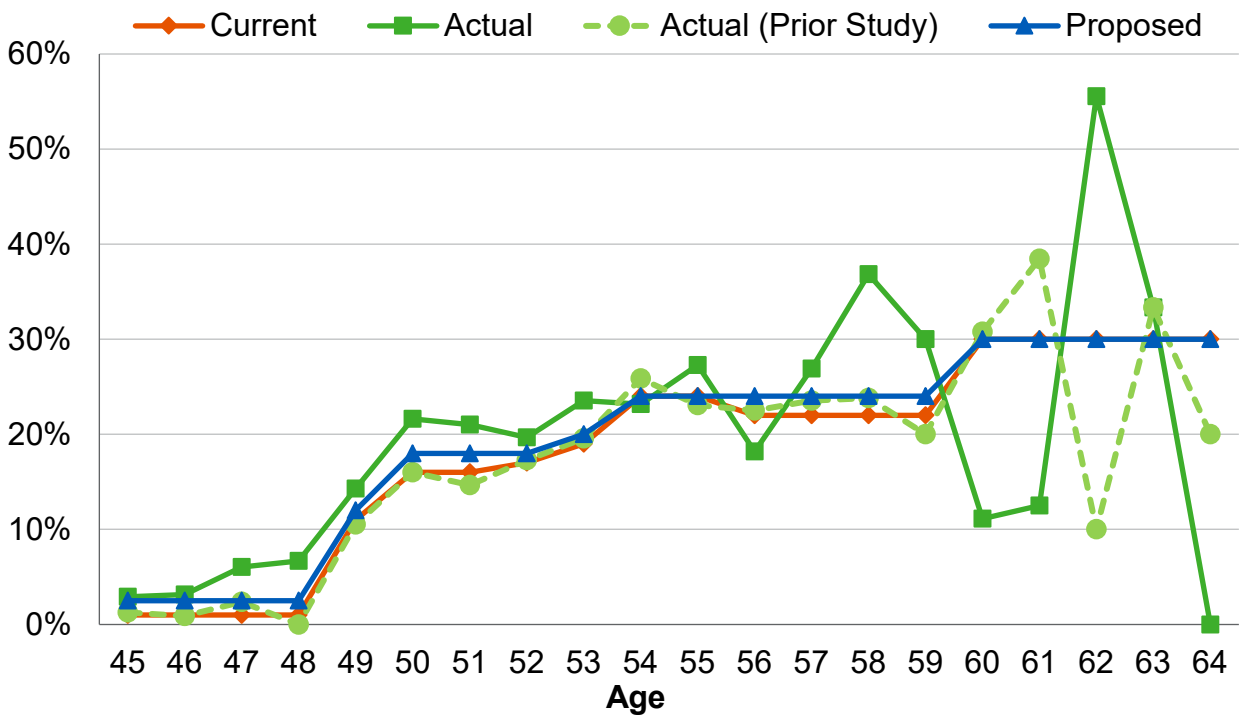


Chart 8: Retirement Rates
Safety Law Enforcement Members (31664.1) with More than 30 Years of Service

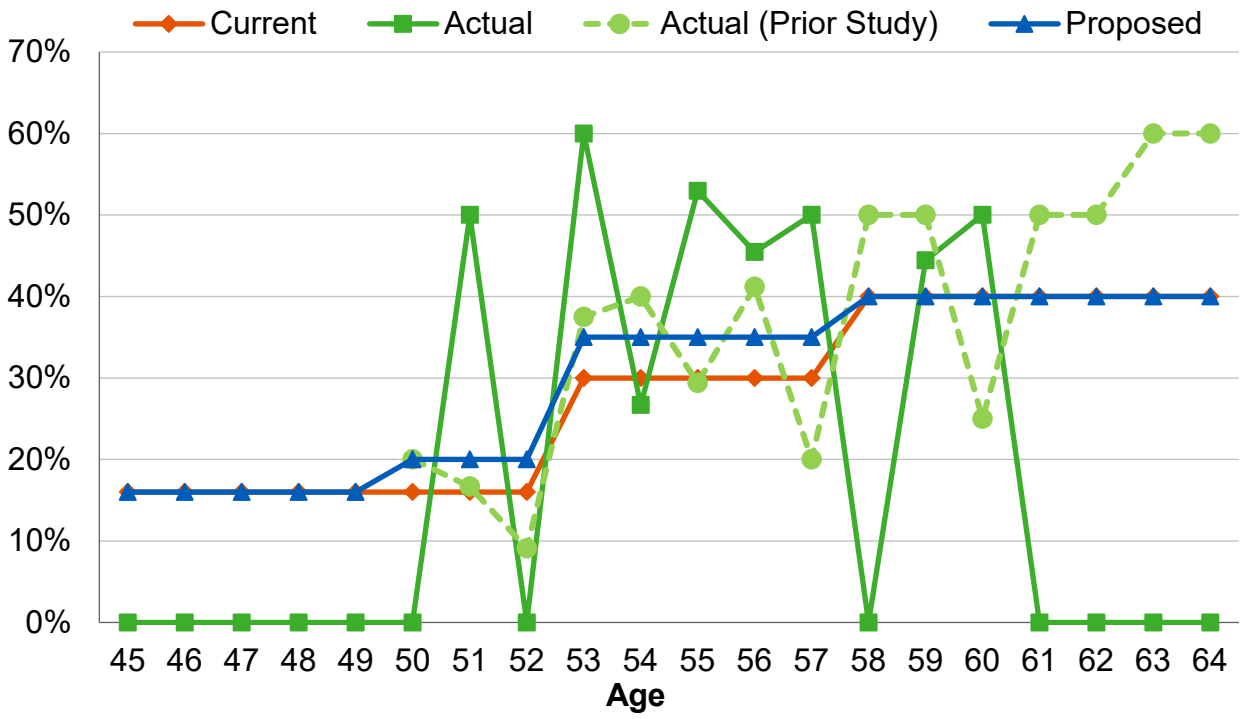


Chart 9: Retirement Rates
Safety Fire (3.0% @ 50 under §31664.1) with Less than 30 Years of Service

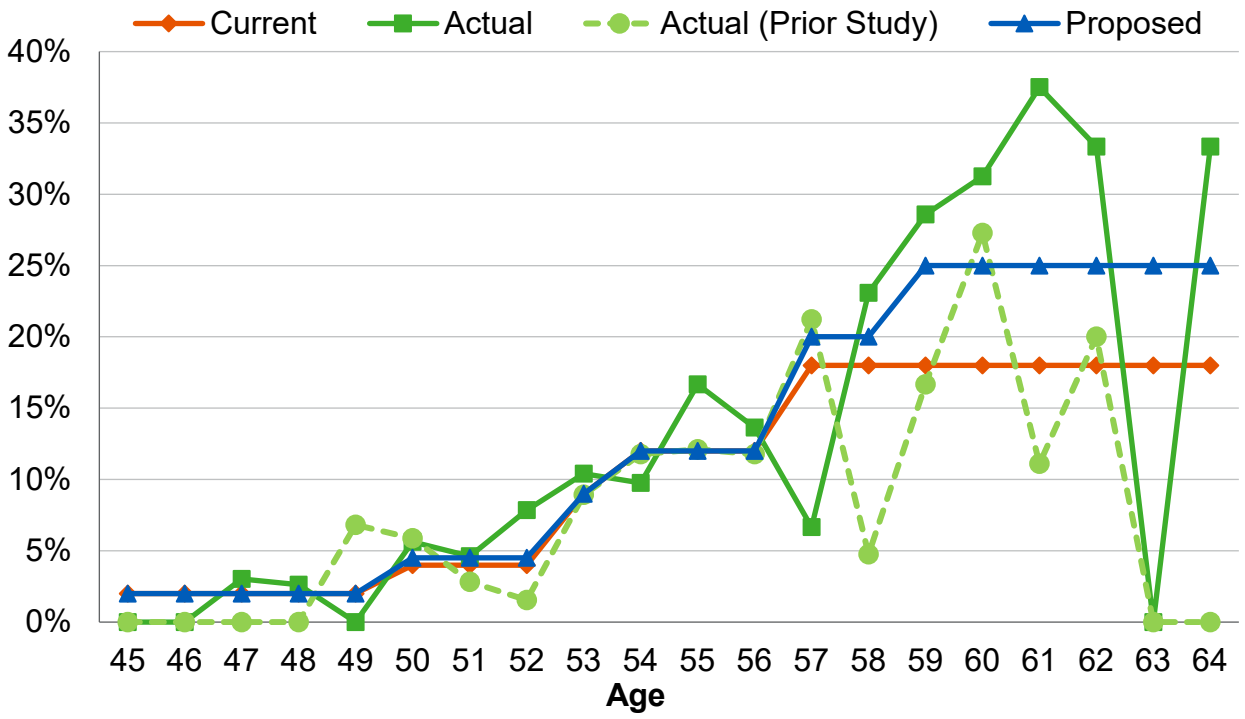


Chart 10: Retirement Rates
Safety Fire (3.0% @ 50 under §31664.1) with More than 30 Years of Service

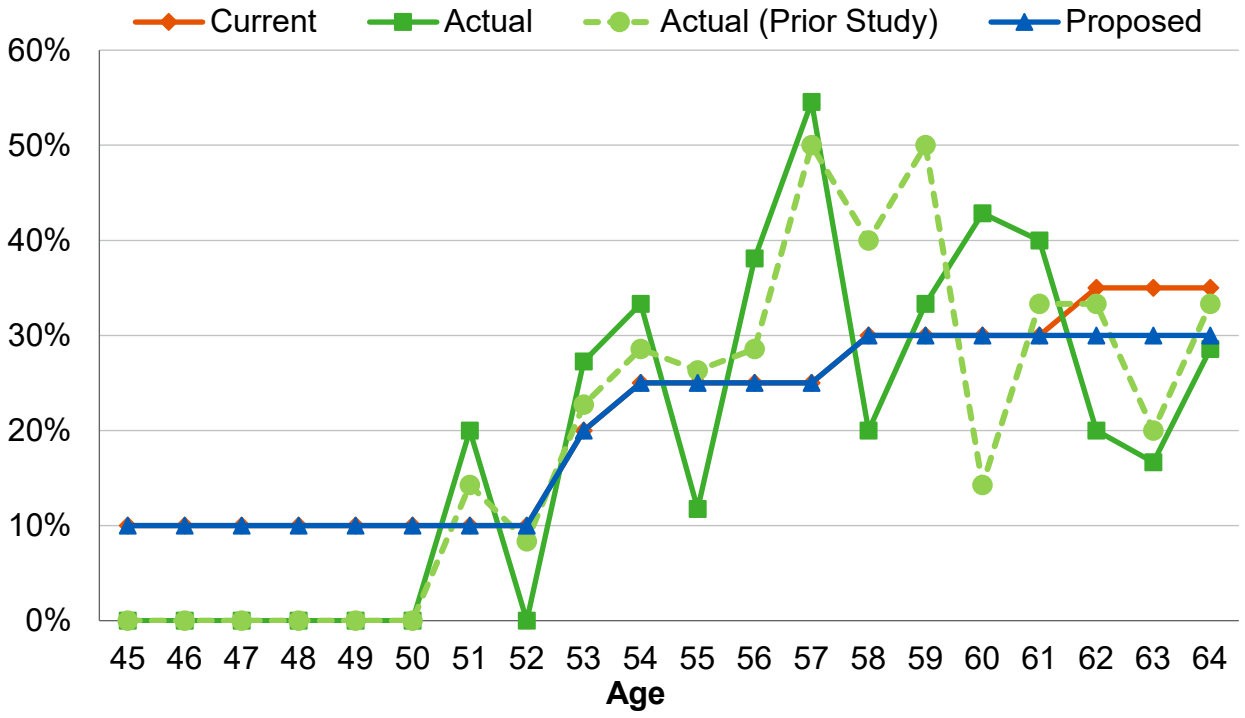


Chart 11: Retirement Rates

Safety Probation (3.0% @ 50 under §31664.1) with Less than 30 Years of Service

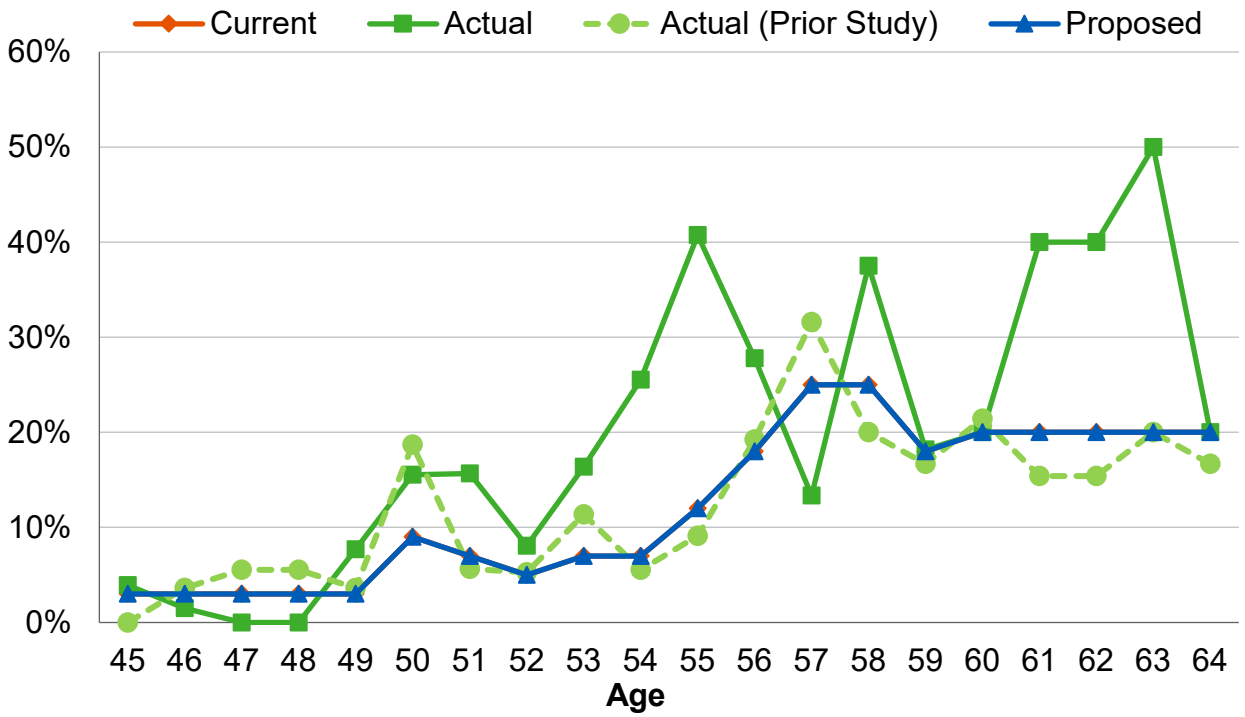


Chart 12: Retirement Rates

Safety Probation (3.0% @ 50 under §31664.1) with More than 30 Years of Service

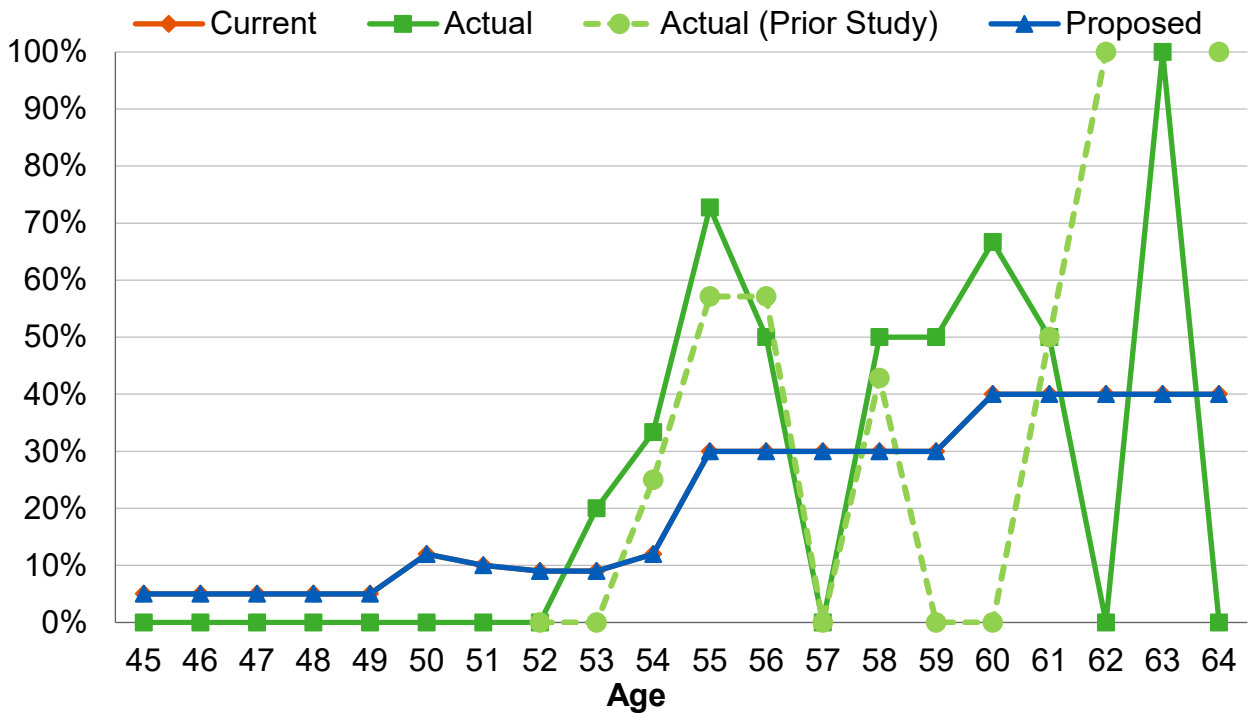


Chart 13: Retirement Rates
General SJC Members (31676.12)

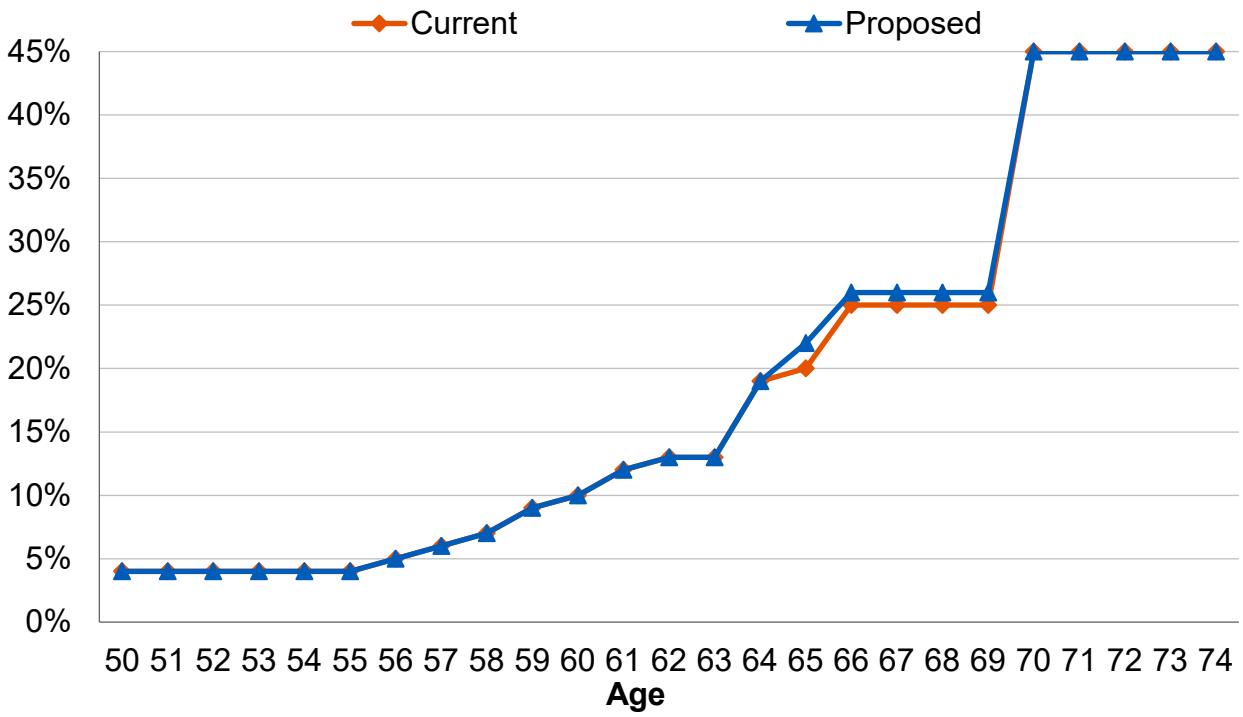


Chart 14: Retirement Rates
Safety Law Enforcement Members (31664.2)

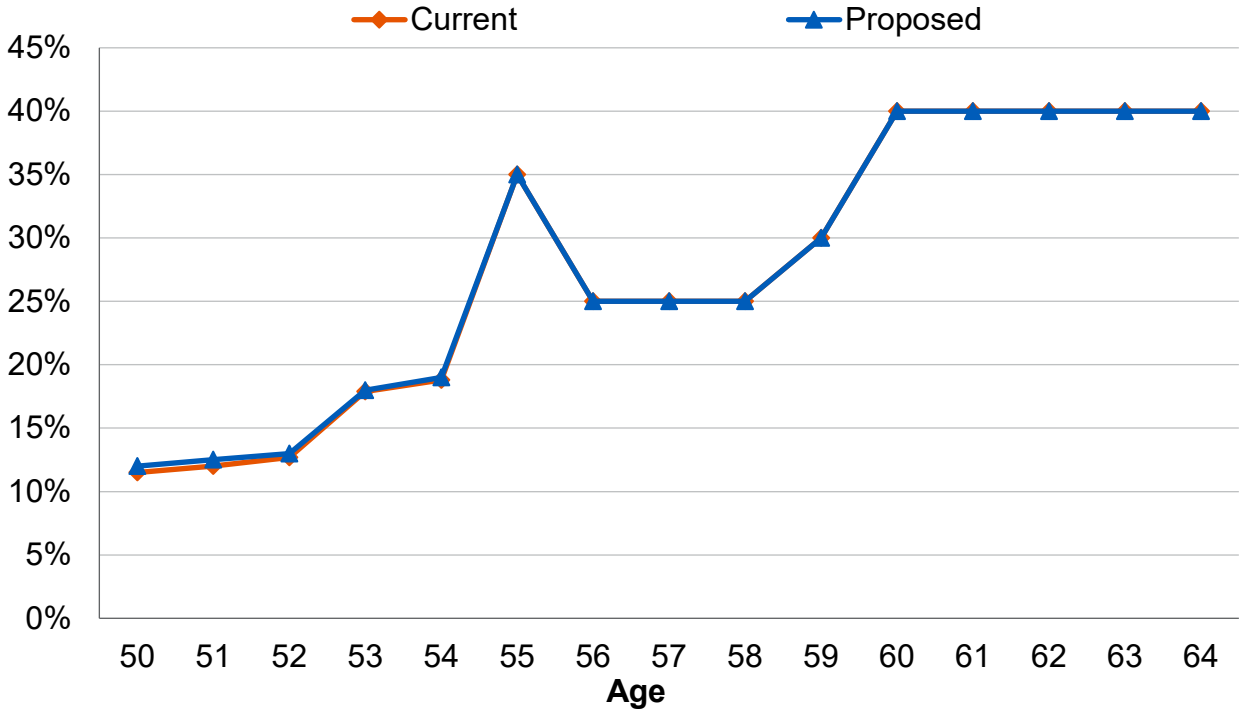


Chart 15: Retirement Rates
Safety Fire Authority Members (31664.2)

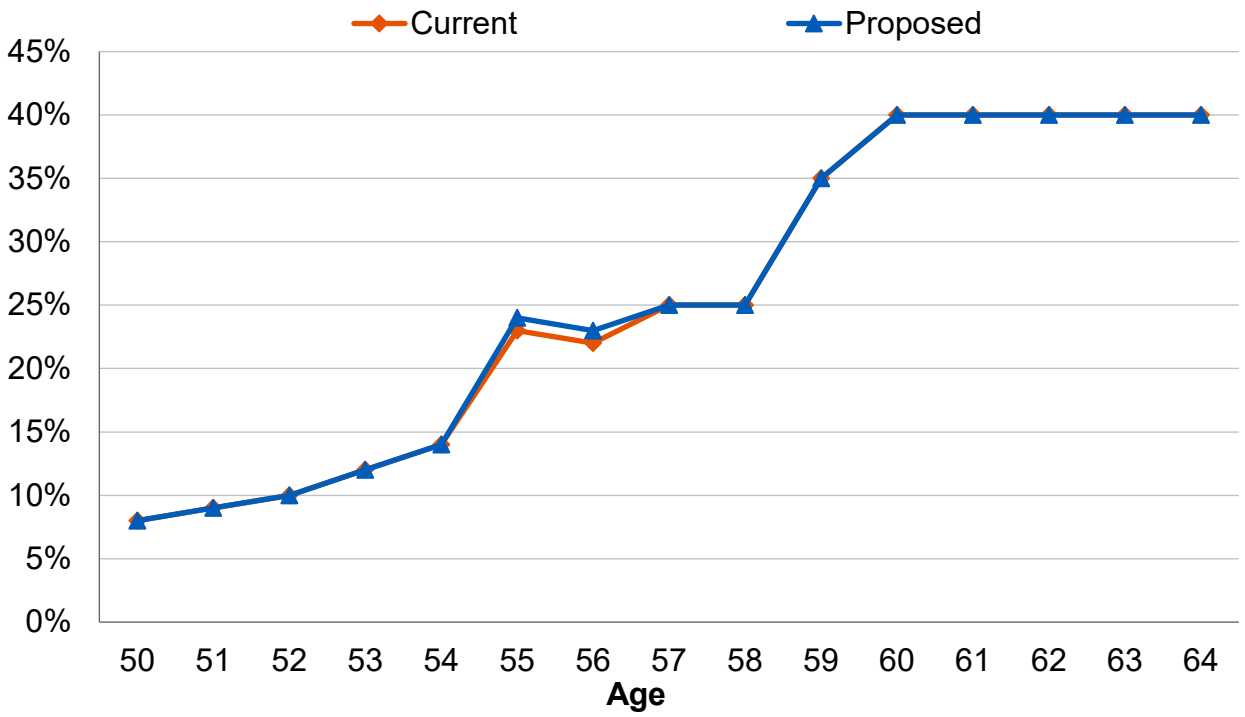


Chart 16: Retirement Rates
CalPEPRA General Members

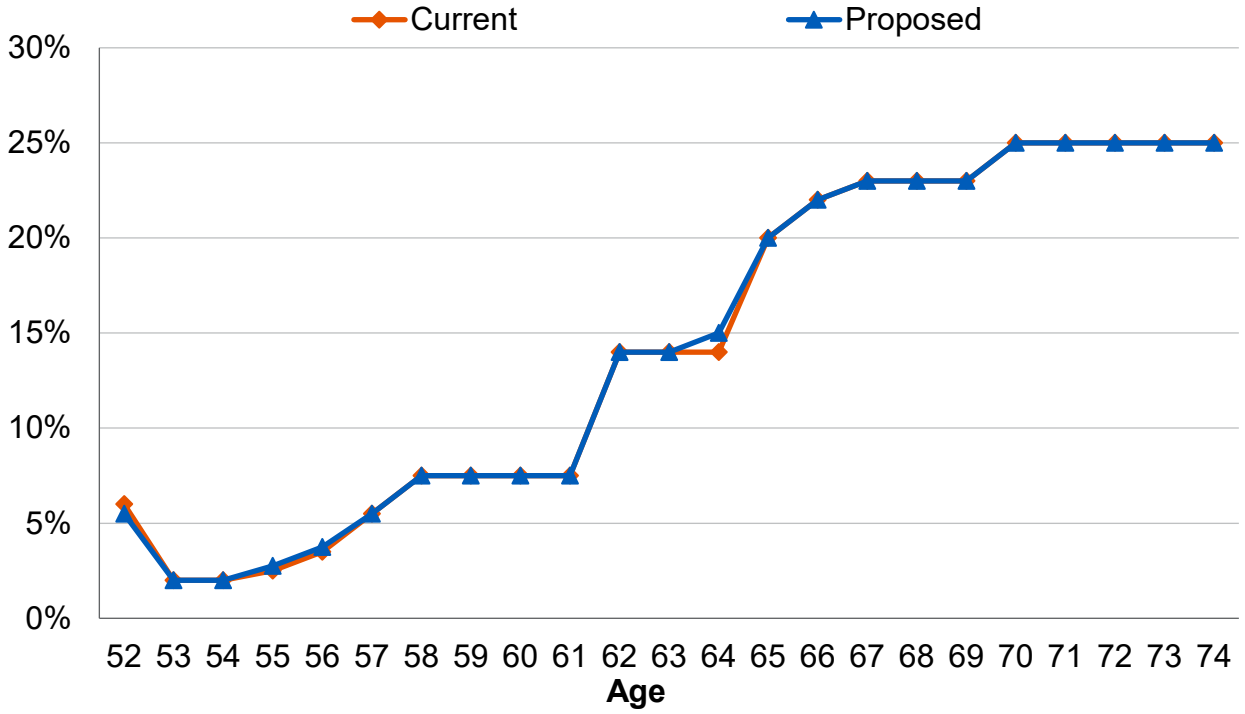


Chart 17: Retirement Rates
CalPEPRA Safety Law Enforcement Members

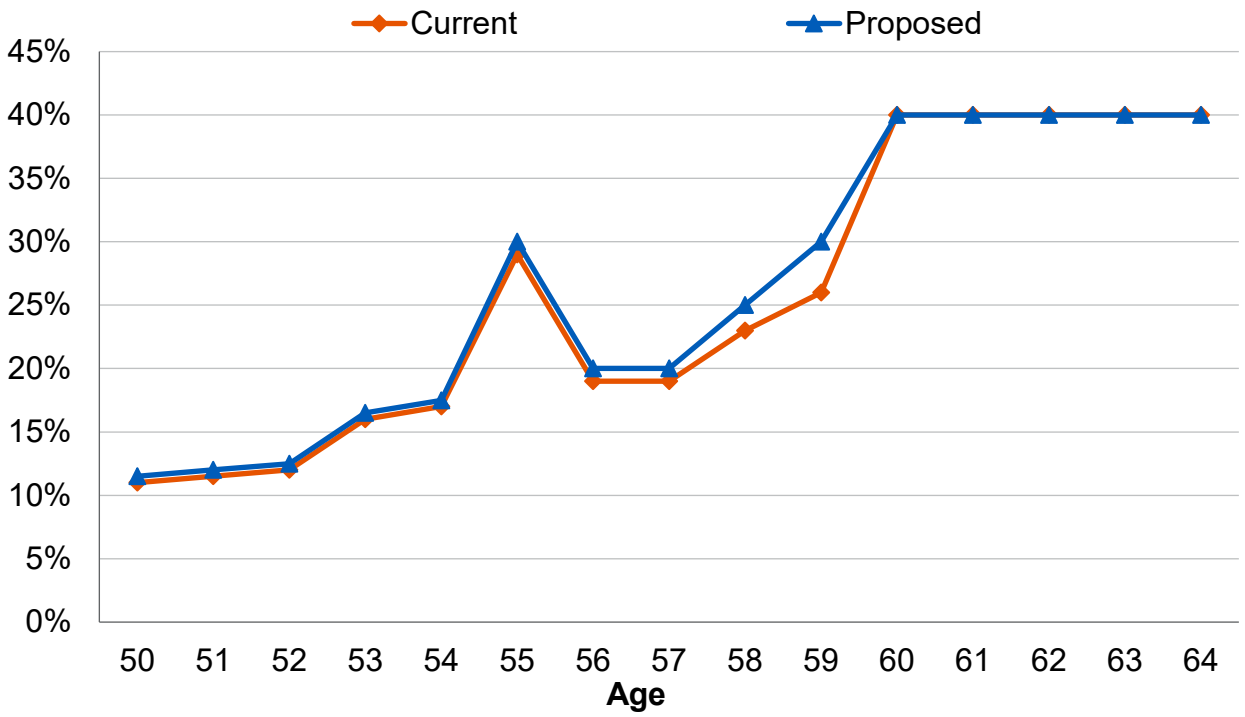


Chart 18: Retirement Rates
CalPEPRA Safety Fire Authority Members

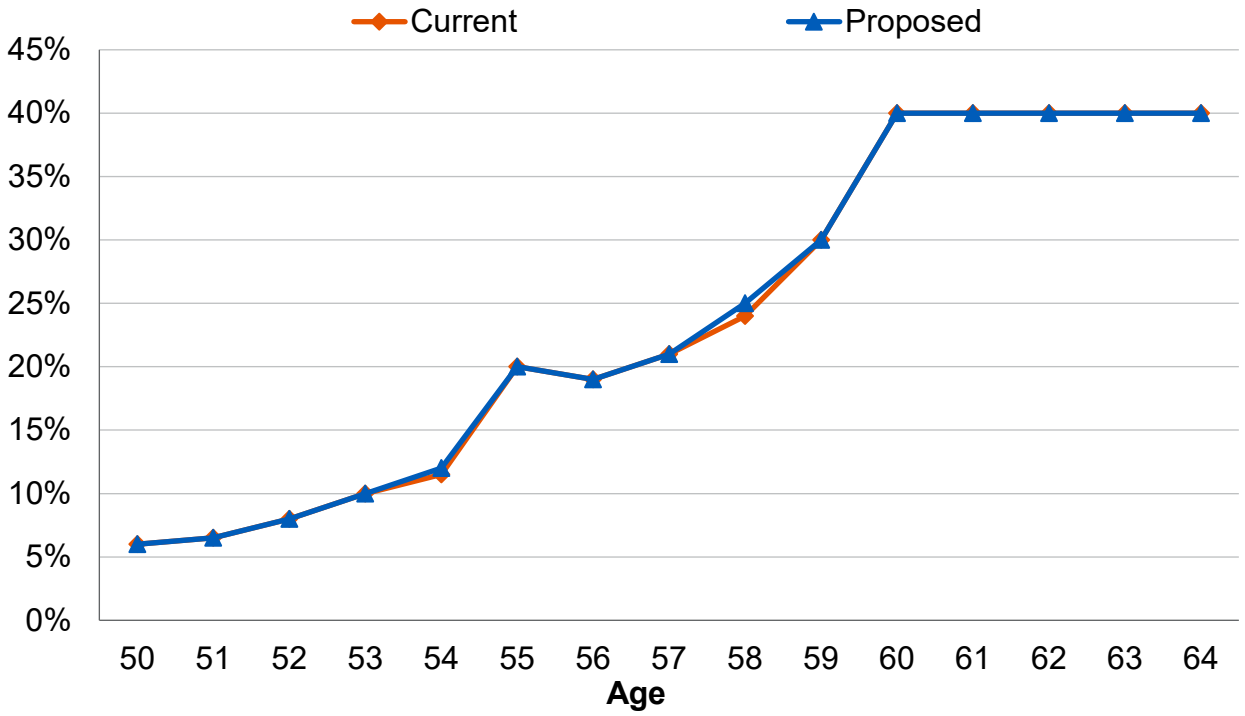
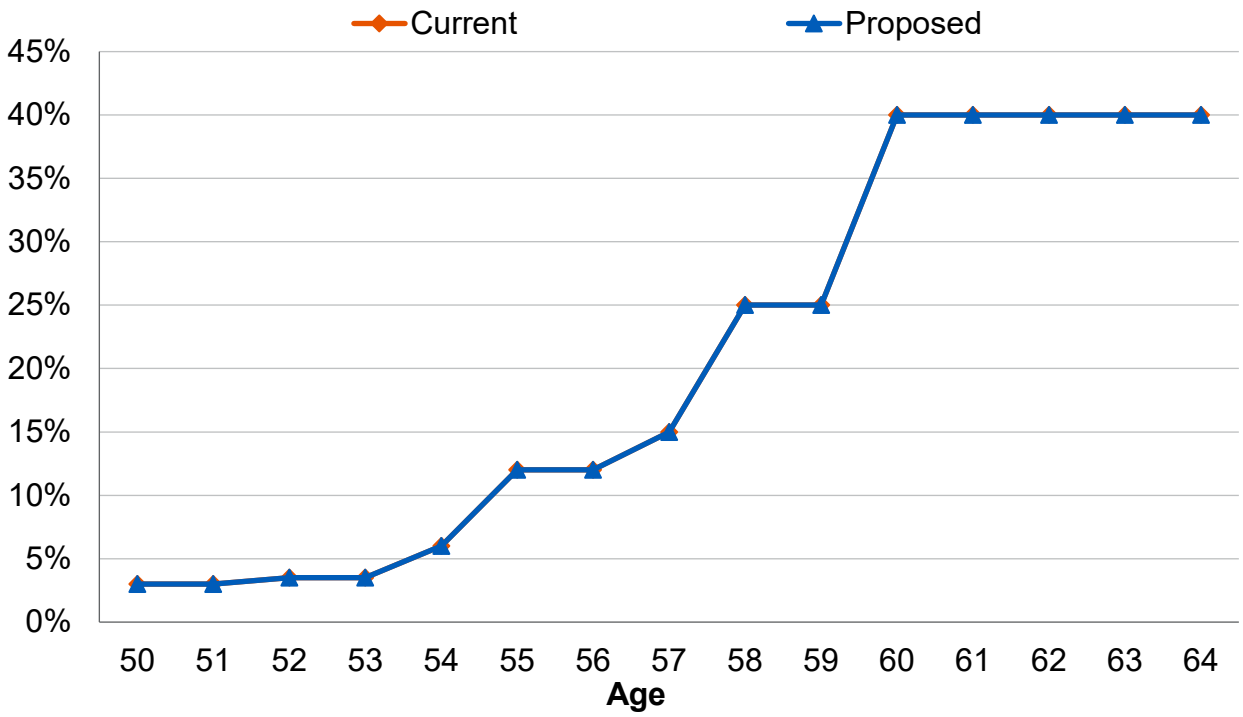


Chart 19: Retirement Rates
CalPEPRA Safety Probation Members



B. Mortality Rates - Healthy

The “healthy” mortality rates project the life expectancy of a member who retires from service (i.e., who did not retire on a disability pension). Also, the “healthy” pre-retirement mortality rates project what proportion of members will die before retirement. For General members, the table currently being used for post-service retirement mortality rates is the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019. For Safety members, the table currently being used for post-service retirement mortality rates is the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019. For all beneficiaries, the table currently being used is the Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

The Public Retirement Plans Mortality tables (Pub-2010) were published by the Retirement Plans Experience Committee (RPEC) of the SOA in 2019. For the first time, the published mortality tables are based exclusively on public sector pension plan experience in the United States. Within the Pub-2010 family of mortality tables, there are separate tables by job categories of General, Safety and Teachers. Included with the mortality tables is the analysis prepared by RPEC that continues to observe that benefit amount for healthy retirees and salary for employees are the most significant predictors of mortality differences within the job categories. Therefore, Pub-2010 includes mortality rates developed for annuitants on a “benefit” weighted basis, with higher credibility assigned to experience from annuitants receiving larger benefits. We continue to recommend using the "amount weighted" above-median version of the Pub-2010 mortality tables (adjusted for OCERS experience as discussed herein).

We also continue to recommend that the mortality improvement scale be applied generationally where each future year has its own mortality table that reflects the forecasted improvements, using the published improvement scales. The “generational” approach is now the established practice within the actuarial profession.

A generational mortality table provides dynamic projections of mortality experience for each cohort of retirees. For example, the mortality rate for someone who is 65 next year will be slightly less than for someone who is 65 this year. In general, using generational mortality anticipates increases in the cost of the Plan over time as participants’ life expectancies are projected to increase.

We understand that RPEC intends to publish annual updates to their mortality improvement scales. Improvement scale MP-2021 is the latest improvement scale available as RPEC decided not to release an updated projection scale in 2022. According to RPEC, they have been relying on the most recent population mortality experience in their model to project future mortality trends. In 2022, if they were to follow their past practice, they would have relied on the newest mortality data available from 2020 to prepare their “MP-2022” mortality improvement scale. However, population data from 2020 was severely affected by the COVID-19 pandemic. They believed it would not be appropriate to incorporate, without adjustment, the substantially higher rates of population mortality experience from 2020 into their graduation and projection

models used to forecast future mortality. As a result, they elected not to release a new mortality improvement scale for 2022. We recommend that the Board adopt the Amount-Weighted Above-Median Pub-2010 mortality tables (adjusted for OCERS experience as discussed herein), and project the mortality improvement generationally using the MP-2021 mortality improvement scale.

In order to reflect more OCERS experience in our analysis, we have used experience for a twelve-year period by using data from the current (from January 1, 2020 through December 31, 2022) and the last three (from January 1, 2017 to December 31, 2019; from January 1, 2014 to December 31, 2016; and from January 1, 2011 to December 31, 2013) experience study periods in order to analyze this assumption. Based on our analysis of the January 1, 2020 through December 31, 2022 data, we observed that the actual deaths weighted by benefits were somewhat lower than expected by the current assumptions. Accordingly, we concluded that there was no significant impact to the data by COVID-19[1] that would have made the data unreliable and therefore have included all twelve years of data in the mortality study.

Even with the use of twelve years of experience, based on standard statistical theory the data is only partially credible especially under the recommended benefit-weighted basis when dispersion of retirees' benefit amounts is taken into account. In 2008 the SOA published an article recommending that mortality assumptions include an adjustment for credibility. Under this approach, the number of deaths needed for full credibility for a headcount-weighted mortality table is just over 1,000, where full credibility means a 90% confidence that the actual experience will be within 5% of the expected value. Therefore, in our recommended assumptions, we have only partially adjusted the Pub-2010 mortality tables to fit OCERS' experience. In future experience studies, more data will be available which may further increase the credibility of the OCERS experience.

Post-Retirement Mortality (Service Retirements)

Among all retired members, the actual deaths weighted by benefit amounts under the current assumptions for the twelve-year period are shown in the table below. We also show the deaths weighted by benefit amount under the proposed assumptions. We continue to recommend the use of a generational mortality table, which incorporates a more explicit assumption for future mortality improvement. Accordingly, the goal is to start with a mortality table that closely matches the current experience (without a margin for future mortality improvement), and then reflect mortality improvement by projecting lower mortality rates in future years.

The proposed mortality table also reflects current experience to the extent that the experience is credible based on standard statistical theory. For OCERS, the volume of General member data makes it relatively credible. In contrast, there is much less Safety data, so it is given substantially less credibility. The proposed mortality tables (as shown in the table below) after adjustments for partial credibility have actual to expected ratios of 99% and 92% for General and Safety, respectively. In future years the ratio should remain around 99% and 92% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the last twelve years are as follows:

[1] We were provided data by OCERS that identified which of the deaths in 2020-2022 were a result of COVID-19.

Healthy Retiree Mortality Experience – Benefit Weighted
(Dollars in millions)

Gender	General Members			Safety Members		
	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	$61.96	$57.32	$58.90	$17.88	$16.72	$17.83
Female	48.56	49.34	48.34	1.75	1.28	1.65
Total	**$110.53**	**$106.65**	**$107.23**	**$19.63**	**$18.00**	**$19.47**
Actual / Expected	**96%**		**99%**[1]	**92%**		**92%**[2]

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased members.
2. Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For General members, we recommend updating the post-retirement mortality to follow the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety members, we recommend updating the post-retirement mortality to follow the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 20 that follows later in this section compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for Service Retirement General members.

Chart 21 compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for Service Retirement Safety members.

Chart 22 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for General members on a benefit-weighted basis. Life expectancies under the proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase as a result of the mortality improvement scale.

Chart 23 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for Safety members on a benefit-weighted basis. Life expectancies under the

[1] If we use the benchmark Pub-2010 General table without any adjustment, the proposed actual to expected ratio would be 102%.
[2] If we use the benchmark Pub-2010 Safety table without any adjustment, the proposed actual to expected ratio would still round to 92%.

proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase as a result of the mortality improvement scale.

Beneficiaries Mortality

The Pub-2010 Contingent Survivors Table is developed based only on contingent survivor data after the death of the retirees. This is consistent with the mortality experience that we have available for beneficiaries. The Pub-2010 Contingent Survivor mortality rates are comparable to OCERS' actual mortality experience for beneficiaries. However, in contrast to service retirees, there is much less beneficiary data, so it is given little credibility when adjusting the base table. As shown in the table below, the proposed mortality tables have an actual to expected ratio of 104%, after adjustments for partial credibility. In future years the ratio should remain around 104% as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the twelve-year period are as follows:

Beneficiary Mortality Experience – Benefit Weighted

(Dollars in millions)

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	$39.84	$49.19	$41.69
Female	208.86	199.98	198.28
Total	**$248.70**	**$249.17**	**$239.98**
Actual / Expected	**100%**		**104%[1]**

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased beneficiaries.
2. Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For all beneficiaries, we recommend updating the beneficiary mortality to follow the Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 10% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

As noted above, the Contingent Survivor mortality tables are developed based on contingent survivor data only after the death of the retirees (i.e., it does not reflect any contingent survivor data before the death of the retirees). In the last experience study, we recommended that the Board apply the Contingent Survivor mortality tables to predict the mortality rates for the beneficiaries both before and after the death of the retirees. According to analysis provided by

[1] If we used the benchmark Pub-2010 Contingent Survivor table without any adjustment, the proposed actual to expected ratio would be 105%.

RPEC, the mortality rates for the beneficiaries could be somewhat overstated before the death of the retirees as the Contingent Survivor mortality tended to be higher than retiree mortality and the difference was statistically significant. Based on this analysis, for the purposes of the actuarial valuations (for funding and financial reporting), when calculating the liability for the continuance to a beneficiary of a surviving member, we recommend that the General Healthy Retiree mortality tables be used for beneficiary mortality both before and after the expected death of the General or Safety member. Upon the actual death of the member (i.e., for all beneficiaries in pay status as of the valuation date), we recommend for the purposes of the actuarial valuations that we use the Contingent Survivor mortality tables as stated above. We note that the use of different mortality tables (before and after the death of the member) has been found by the RPEC to be reasonable.

Pre-Retirement Mortality

For General members, the table currently being used for pre-retirement mortality rates is the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional scale MP 2019. For Safety members, the table currently being used for pre-retirement mortality rates is the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional scale MP 2019.

When analyzing pre-retirement mortality, there is much less data available, so it is given little credibility when adjusting the base table. As shown in the table below, the proposed mortality tables have an actual to expected ratio of 146% and 84% for General and Safety, respectively, after adjustments for partial credibility. In future years the ratio should remain around 146% and 84% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by annual salary for the last twelve years are as follows:

Pre-Retirement Mortality Experience – Salary Weighted
($ in millions)

Gender	General Members: Current Expected Weighted Deaths	General Members: Actual Weighted Deaths	General Members: Proposed Expected Weighted Deaths	Safety Members: Current Expected Weighted Deaths	Safety Members: Actual Weighted Deaths	Safety Members: Proposed Expected Weighted Deaths
Male	$8.75	$11.85	$8.75	$3.10	$2.38	$3.11
Female	6.51	10.27	6.45	0.36	0.53	0.36
Total	**$15.26**	**$22.12**	**$15.20**	**$3.46**	**$2.90**	**$3.46**
Actual / Expected	**145%**		**146%**	**84%**		**84%**

Notes:

1. Experience shown above is weighted by annual salary for deceased members.
2. Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

For General members, we recommend updating the pre-retirement mortality to follow the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety members, we recommend updating the pre-retirement mortality to follow the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

Currently, our assumption is that 100% of General member pre-retirement deaths are non-service connected. For Safety members, 10% are assumed to be service connected deaths and 90% are assumed to be non-service connected.

Observed experience over the past three years for active member deaths are shown in the table below. In particular, there were 82 General member pre-retirement deaths and only 8 Safety member pre-retirement deaths, and all were non-service connected.

Service vs. Non-Service Connected Death

Service Connected Death %	General	Safety
Current Assumption	0%	10%
Actual Experience	0%	0%
Proposed Assumption	**0%**	**10%**

We recommend maintaining the current assumption that 100% of General member pre-retirement deaths are non-service connected and that 10% of Safety member pre-

retirement deaths are service connected while 90% are assumed to be non-service connected.[1]

Mortality Table for Member Contributions, Optional Forms of Payment, and Reserves

There are administrative reasons why a generational mortality table is more difficult to implement for determining member contributions for the legacy tiers (i.e., non-CalPEPRA), optional forms of payment and reserves. For determining member contributions, one emerging practice is to approximate the use of a generational mortality table by the use of a static table with projection of the mortality improvement from the measurement year over a period that is close to the duration of the benefit payments for active members. We would recommend the use of this approximation for determining member contributions for employees in the legacy tiers.

For General members, we recommend that the mortality table used for determining contributions be updated to a blended table based on the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 40% male and 60% female.

For Safety members, we recommend that the mortality table used for determining contributions be updated to a blended table based on the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 85% male and 15% female.

For optional forms of payment, there are some administrative issues that we may need to resolve with the System and its vendor maintaining the pension administration software before we would recommend a comparable generational scale to anticipate future mortality improvement. We will provide a recommendation to the System for use in reflecting mortality improvement for determining optional forms of payment after we have those discussions with the System and its vendor.

[1] While it is possible that COVID-19 deaths for members in certain industries may be considered service connected, we do not recommend a change in our assumption to reflect this possible short-term increase in service connected deaths.

Chart 20: Post-Retirement Benefit-Weighted Deaths (In Millions)
Service Retirement General Members
(January 1, 2011 through December 31, 2022)

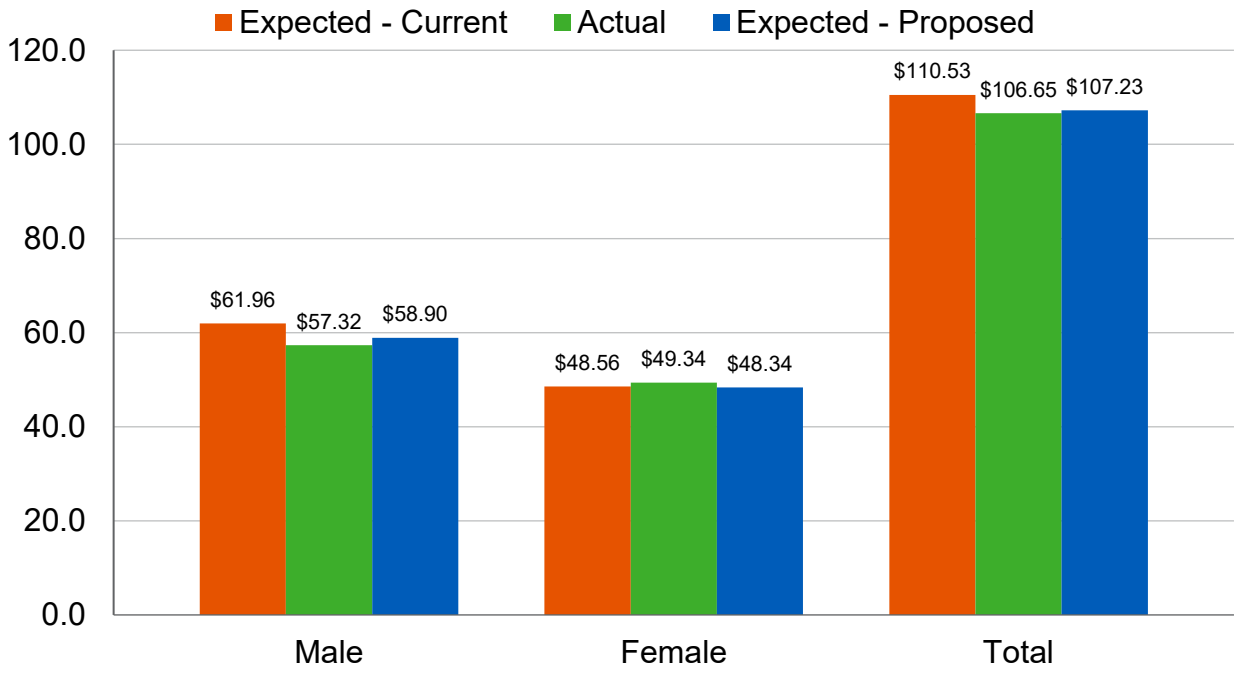


Chart 21: Post-Retirement Benefit-Weighted Deaths ($ In Millions)
Service Retirement Safety Members
(January 1, 2011 through December 31, 2022)

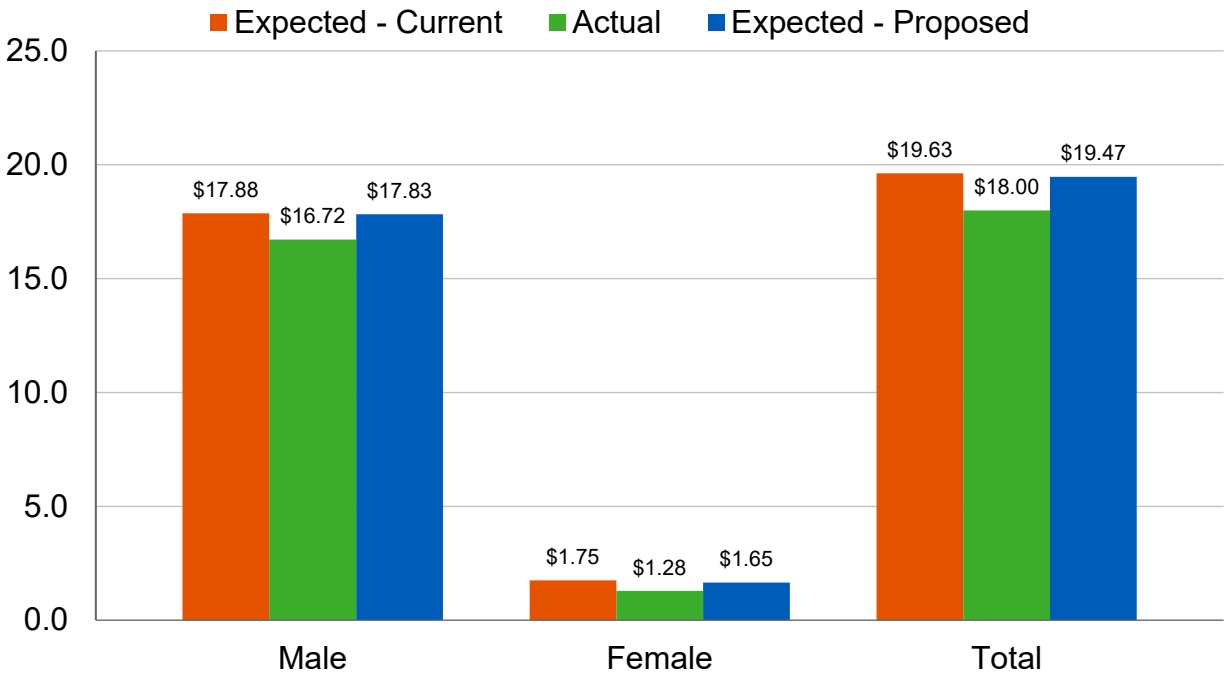


Chart 22: Benefit-Weighted Life Expectancies
Service Retirement General Members

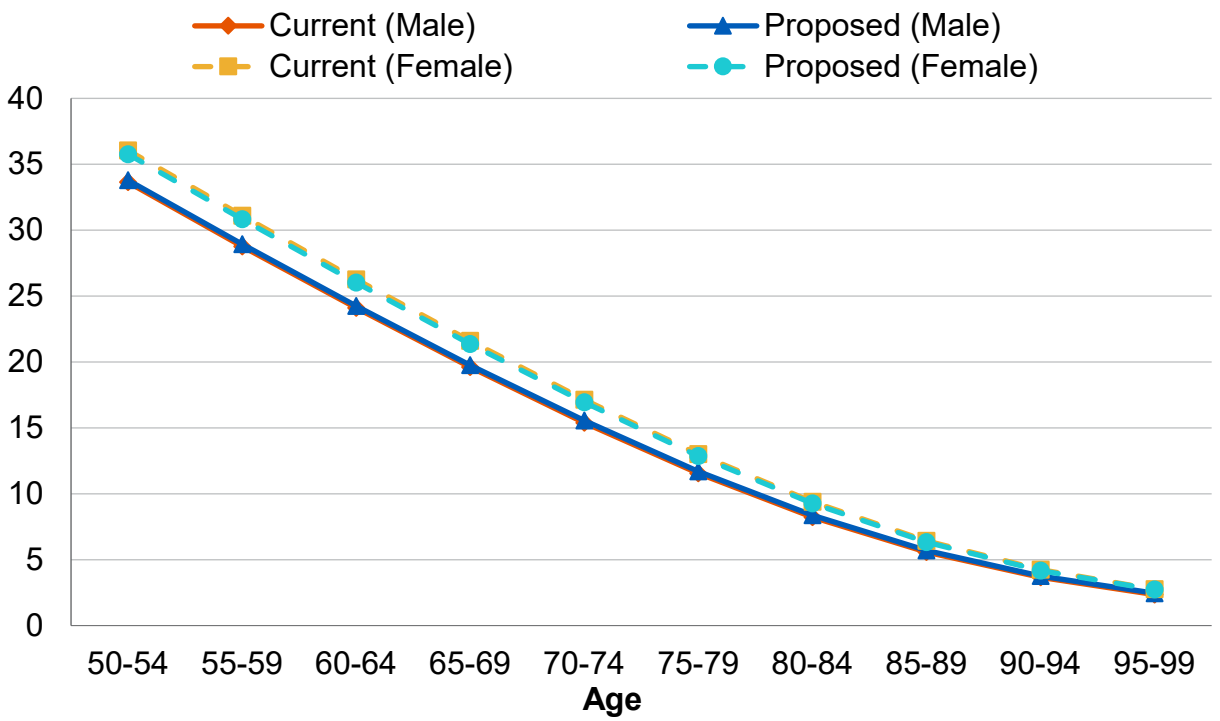
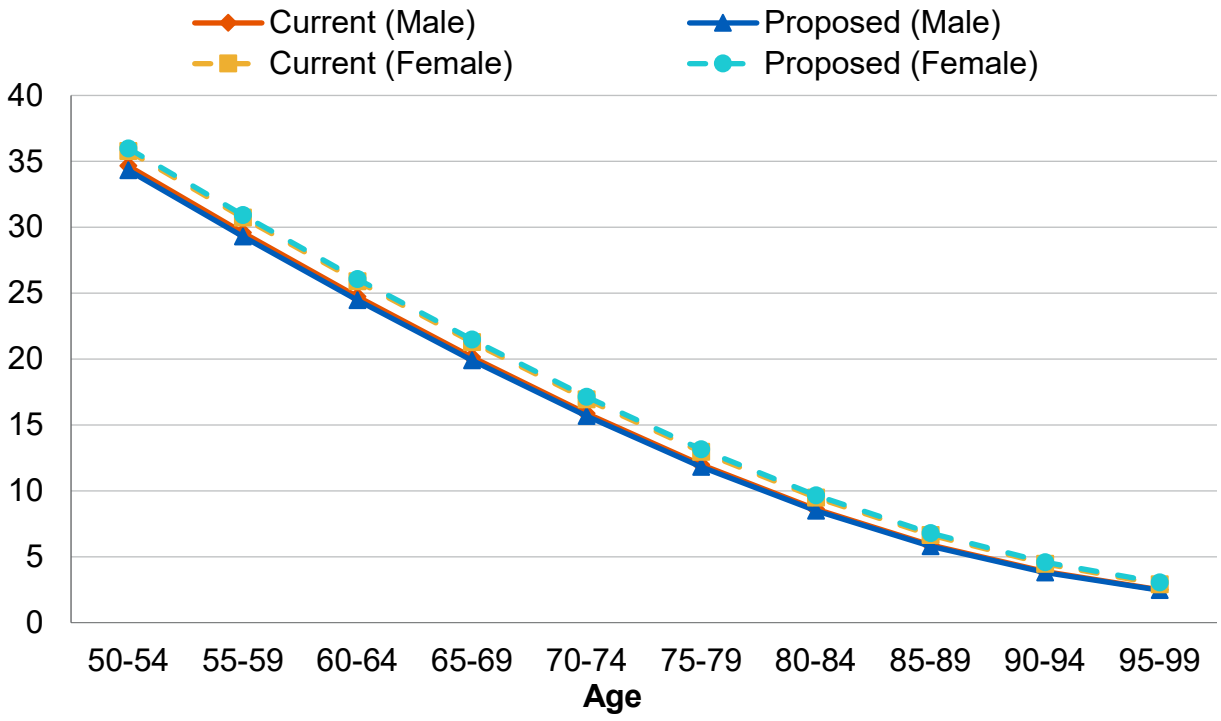


Chart 23: Benefit-Weighted Life Expectancies
Service Retirement Safety Members



C. Mortality Rates - Disabled

Since mortality rates for disabled members can vary from those of healthy members, a different mortality assumption is often used. For General members the table currently being used is the Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), with rates decreased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019. For Safety members, the table currently being used is the Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) projected generationally with the two-dimensional mortality improvement scale MP-2019.

Similar to mortality rates for service retirees, the proposed mortality table reflects current experience to the extent that the experience is credible based on standard statistical theory. For OCERS, there is far less data for disabled retirees, so it is given little credibility, even using experience for a twelve-year period. As shown in the table below, the proposed mortality tables have actual to expected ratios of 90% and 94% for General and Safety respectively, after adjustments for partial credibility. In future years the ratio should remain around 90% and 94% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables. The number of actual deaths compared to the number expected under the current and proposed assumptions weighted by benefit amounts for the twelve-year period are as follows:

Disabled Retiree Mortality Experience – Benefit Weighted

(Dollars in millions)

	General Members			Safety Members		
Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	$5.84	$5.29	$5.83	$5.23	$5.11	$5.22
Female	4.50	3.94	4.47	0.46	0.19	0.43
Total	**$10.33**	**$9.23**	**$10.29**	**$5.69**	**$5.30**	**$5.65**
Actual / Expected	**89%**		**90%**[1]	**93%**		**94%**[2]

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased members.
2. Expected amounts under the proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the experience study period.
3. Results may not add due to rounding.

[1] If we use the benchmark Pub-2010 General disabled table without any adjustment, the proposed actual to expected ratio would be 85%.

[2] If we use the benchmark Pub-2010 Safety disabled table without any adjustment, the proposed actual to expected ratio would be 93%.

For General disabled members, we recommend updating the disabled mortality to follow the Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

For Safety disabled members, we recommend updating the disabled mortality to follow the Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 24 compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for disabled General members.

Chart 25 compares the number of actual to expected deaths on a benefit-weighted basis over the twelve-year period for the current and proposed assumptions for disabled Safety members.

Chart 26 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for disabled General members on a benefit-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, life expectancies will be assumed to increase as a result of the mortality improvement scale.

Chart 27 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for disabled Safety members on a benefit-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, life expectancies will be assumed to increase as a result of the mortality improvement scale.

Chart 24: Post-Retirement Benefit-Weighted Deaths (In Millions)
Disabled General Members (January 1, 2011 through December 31, 2022)

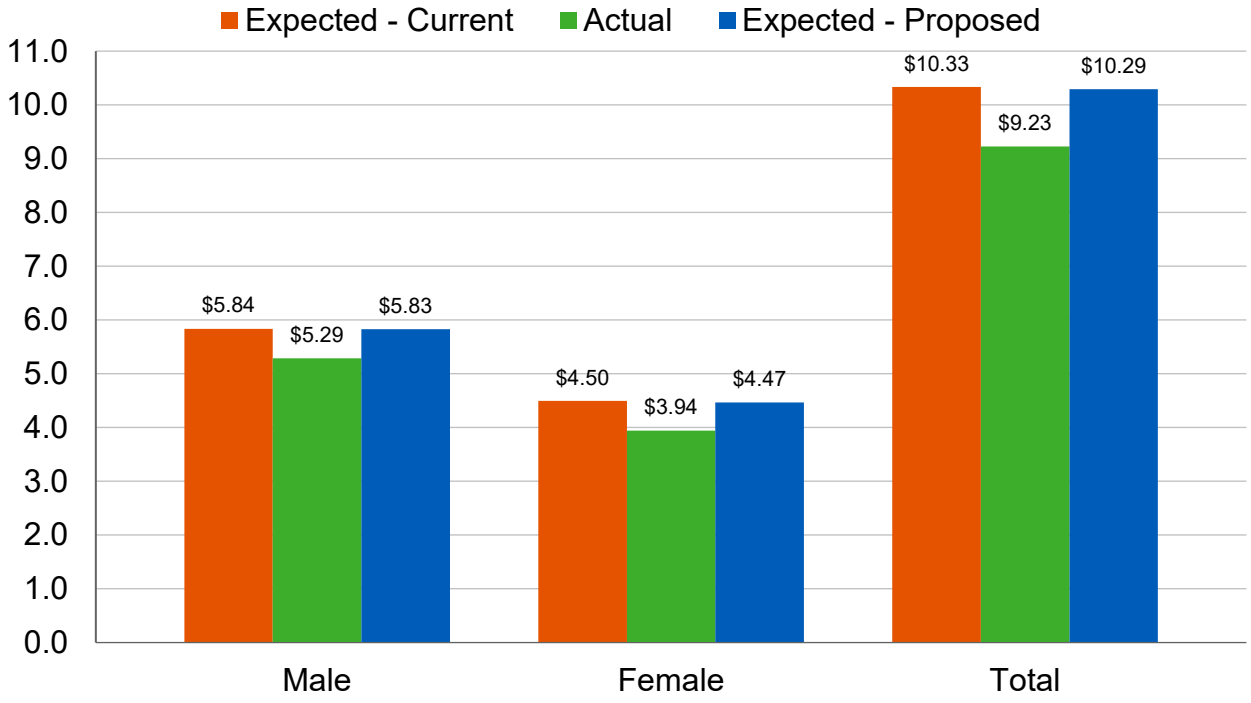


Chart 25: Post-Retirement Benefit-Weighted Deaths (In Millions)
Disabled Safety Members (January 1, 2011 through December 31, 2022)

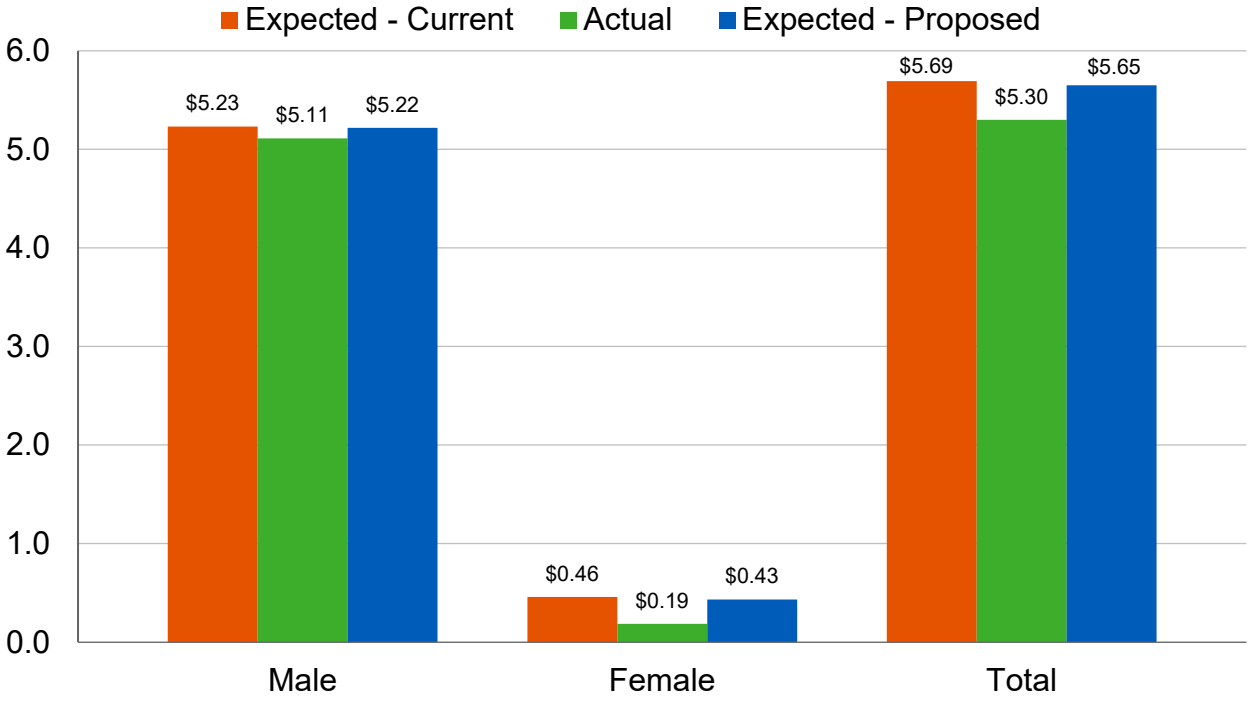


Chart 26: Benefit-Weighted Life Expectancies
Disabled General Members

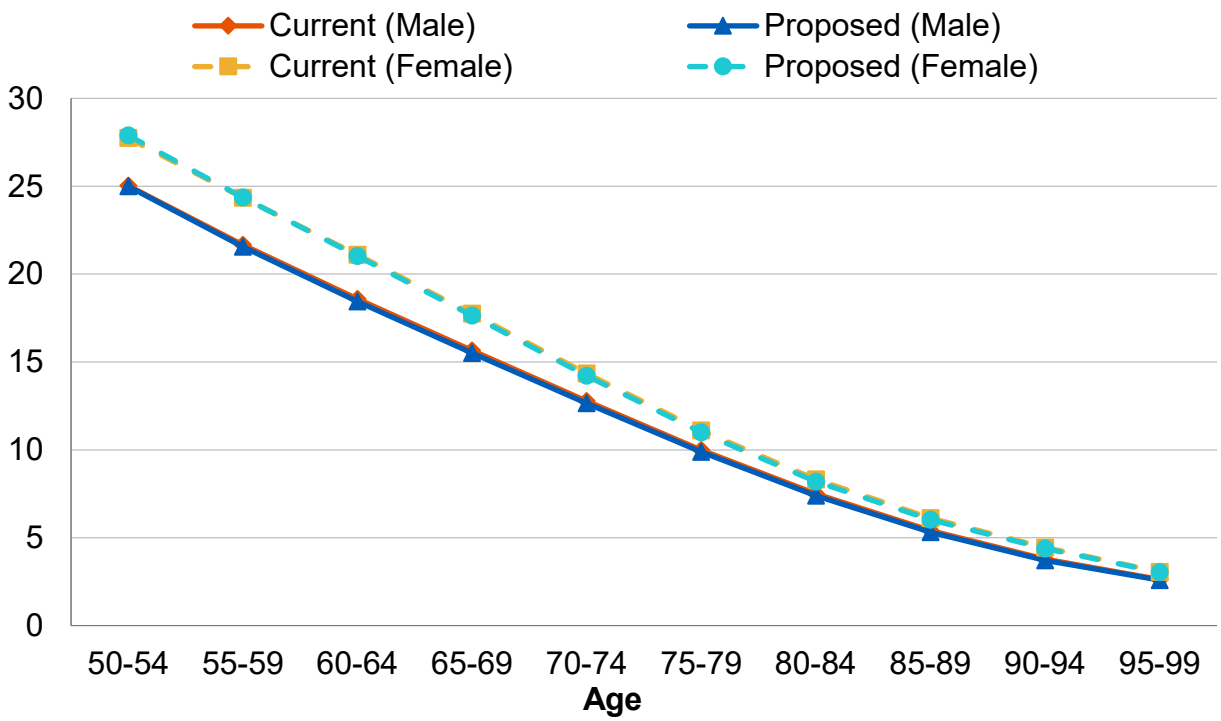
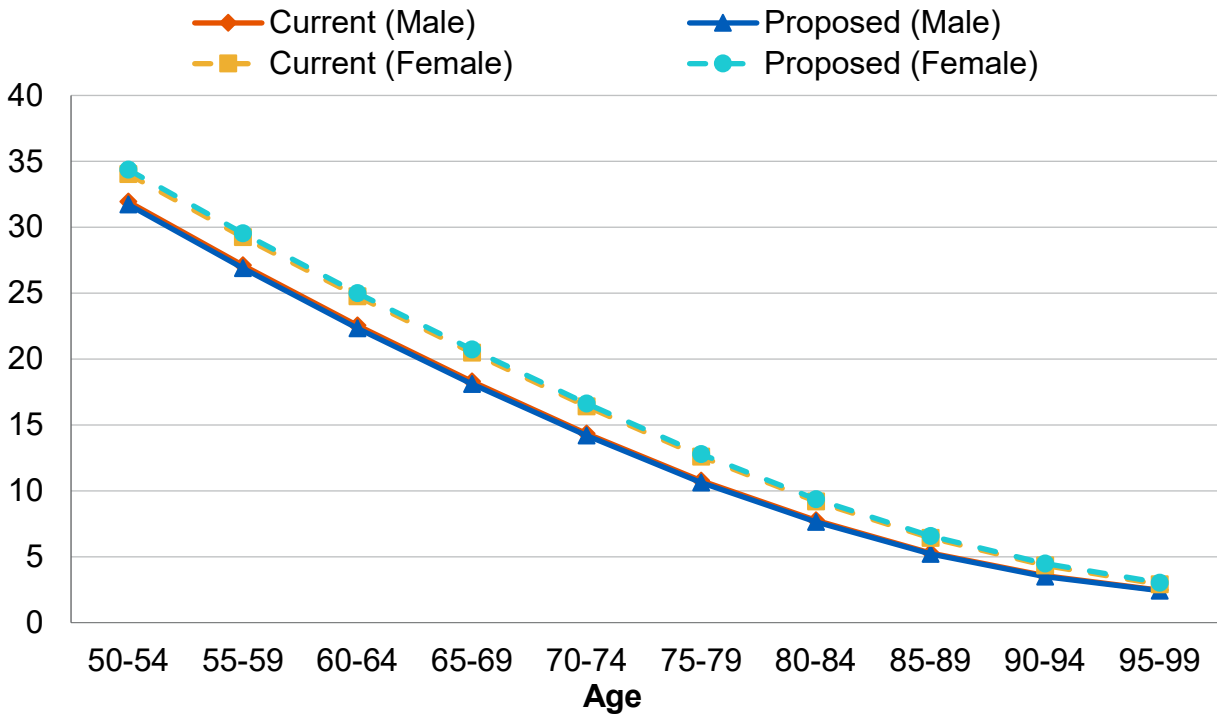


Chart 27: Benefit-Weighted Life Expectancies
Disabled Safety Members



D. Termination Rates

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions there is an overall incidence of termination assumed, combined with assumptions, based on the plan membership and years of service. There is also another set of assumptions to anticipate the percentage of members who will withdraw their contributions and members who will leave their contributions on deposit and receive a deferred vested benefit.

We understand that the County's VIP also provided some incentive to members who resigned during a certain window in 2020. However, when we average out the number of terminations during each month of 2020, we do not observe a significant increase in the number of terminations during that window. Therefore, we have not made any adjustments to the process we use to select the proposed assumptions.

We have developed rates for the following four groups: (1) General All Other, (2) General OCTA, (3) Safety Law Enforcement and Fire and (4) Safety Probation. The termination experience over the last three years is shown by years of service in the following tables. We also show the current and proposed assumptions.

Rates of Termination – General

Rates (%)

	General All Other			General OTA		
Years of Service	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
Less than 1	11.00	11.45	11.25	17.00	15.94	16.50
1 – 2	7.25	7.44	7.25	11.50	11.15	11.50
2 – 3	6.50	6.38	6.50	9.00	10.85	9.25
3 – 4	5.50	5.47	5.50	8.50	4.23	8.25
4 – 5	5.00	5.44	5.25	8.00	4.29	7.75
5 – 6	4.50	5.33	4.75	7.00	5.93	6.50
6 – 7	4.00	5.09	4.25	4.25	6.57	4.25
7 – 8	3.50	5.22	4.00	4.00	1.55	4.00
8 – 9	3.25	5.04	3.50	3.25	5.88	3.50
9 – 10	3.00	3.35	3.00	3.00	2.60	2.75
10 – 11	2.50	2.86	2.50	2.75	1.75	2.75
11 – 12	2.00	3.13	2.00	2.50	3.17	2.50
12 – 13	2.00	1.68	1.75	2.50	4.00	2.50
13 – 14	2.00	1.67	1.75	2.25	3.50	2.25
14 – 15	1.50	2.25	1.60	2.25	1.94	2.25
15 – 16	1.40	1.53	1.50	2.25	1.86	2.00
16 – 17	1.30	1.51	1.40	2.00	2.75	2.00
17 – 18	1.20	1.79	1.30	1.80	1.05	1.75
18 – 19	1.10	1.47	1.20	1.60	2.73	1.75
19 – 20	1.00	1.26	1.00	1.40	0.76	1.25
20 & Over	0.75	0.39	0.50	1.20	0.48	0.75

Rates of Termination – Safety

Rates (%)

	Safety Law and Fire			Safety Probation		
Years of Service	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
Less than 1	4.25	2.45	4.00	14.00	8.51	12.50
1 – 2	2.75	4.96	3.00	13.00	6.12	11.50
2 – 3	2.25	3.61	2.50	11.00	4.26	9.50
3 – 4	1.75	3.98	2.25	5.00	8.11	5.00
4 – 5	1.50	2.23	2.00	4.00	0.00	4.00
5 – 6	1.25	3.25	1.75	3.25	5.88	3.25
6 – 7	1.00	2.06	1.25	2.75	0.00	2.75
7 – 8	0.95	0.78	1.20	2.75	0.00	2.75
8 – 9	0.90	1.64	1.15	2.50	0.00	2.50
9 – 10	0.85	1.86	1.10	1.75	9.09	1.75
10 – 11	0.80	1.36	1.05	1.50	0.00	1.50
11 – 12	0.75	1.42	1.00	1.50	8.33	1.50
12 – 13	0.70	1.47	0.95	1.25	0.00	1.25
13 – 14	0.65	0.49	0.65	1.00	1.03	1.00
14 – 15	0.60	0.67	0.60	0.75	0.71	0.75
15 – 16	0.55	0.00	0.55	0.75	1.71	0.75
16 – 17	0.50	0.84	0.50	0.75	0.00	0.75
17 – 18	0.45	0.00	0.45	0.75	0.00	0.75
18 – 19	0.40	0.91	0.40	0.50	0.61	0.50
19 – 20	0.30	0.78	0.30	0.25	0.00	0.25
20 & Over	0.15	0.05	0.15	0.15	0.25	0.20

Based upon the recent experience, we have increased the termination rates slightly overall for General All Other members and Safety Law and Fire members while decreasing the termination rates slightly overall for General OCTA members and Safety Probation members.

The next two tables show the currently assumed, actual and proposed assumed percentages for members who withdraw their contributions. The assumed percentages for members who leave their contributions on deposit and receive a deferred vested benefit is equal to 100% minus the percentage of those assumed to withdraw.

Proportion of Total Termination Assumed to Withdraw Contributions – General

Rates (%)

	General All Other			General OTA		
Years of Service	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
Less than 5	30.00	16.38	25.00	40.00	23.66	35.00
5 – 9	25.00	14.04	17.50	30.00	28.57	30.00
10 – 14	25.00	16.86	17.50	25.00	13.33	25.00
15 & Over	17.50	14.84	15.00	15.00	15.00	15.00

Proportion of Total Termination Assumed to Withdraw Contributions – Safety

Rates (%)

	Safety Law and Fire			Safety Probation		
Years of Service	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
Less than 5	20.00	25.64	25.00	25.00	N/A	20.00
5 – 9	20.00	25.64	25.00	25.00	33.33	20.00
10 – 14	10.00	18.75	12.50	25.00	N/A	20.00
15 & Over	10.00	0.00	12.50	15.00	20.00	15.00

For General All Other, General OCTA, and Safety Probation members, the overall actual rates for electing a refund of contributions are lower than the current assumptions for the past three years while the overall actual rates for electing a refund of contributions are higher than the current assumptions for Safety Law and Fire. **We recommend decreasing the rates of electing a refund of contributions for most service bands as shown above for General All Other members, General OCTA members and Safety Probation members. We recommend increasing the rates of electing a refund of contributions as shown above for Safety Law and Fire members.**

Chart 38 compares actual to expected terminations over the past three years for both the current and proposed assumptions for General All Other, General OCTA, Safety Law Enforcement and Fire and Safety Probation members.

Chart 39 shows the actual termination rates over the past three years compared to the current and proposed assumptions for General All Other members.

Chart 40 - 42 shows the same information as Chart 39, but for General OCTA, Safety Law and Fire and Safety Probation members.

Chart 38: Actual Number of Terminations Compared to Expected

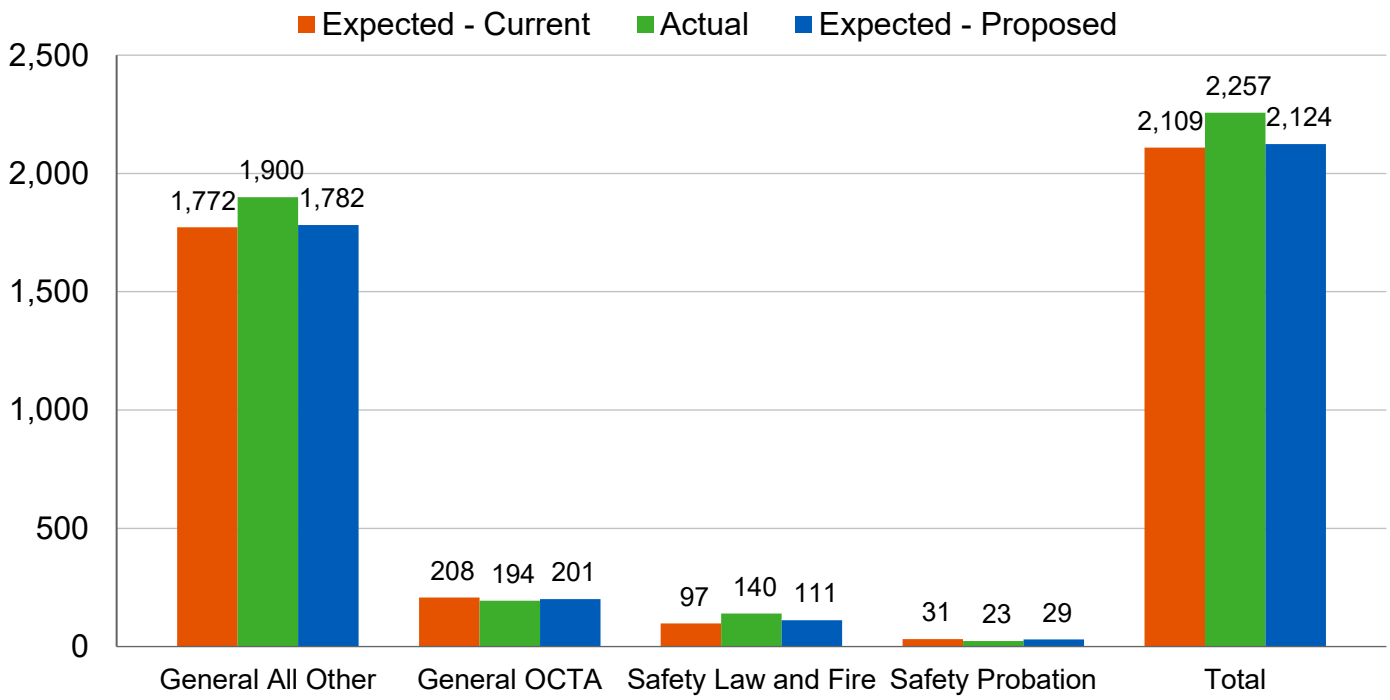


Chart 39: Termination Rates – General All Other Members

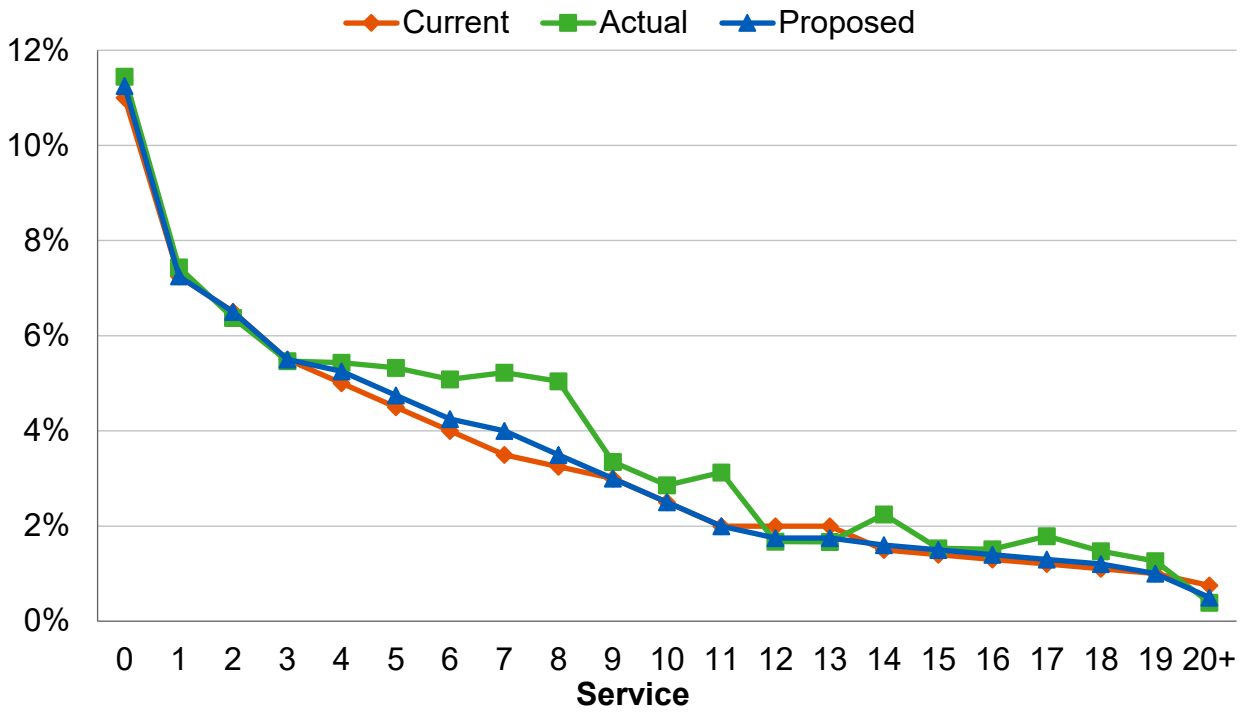


Chart 40: Termination Rates – General OCTA Members

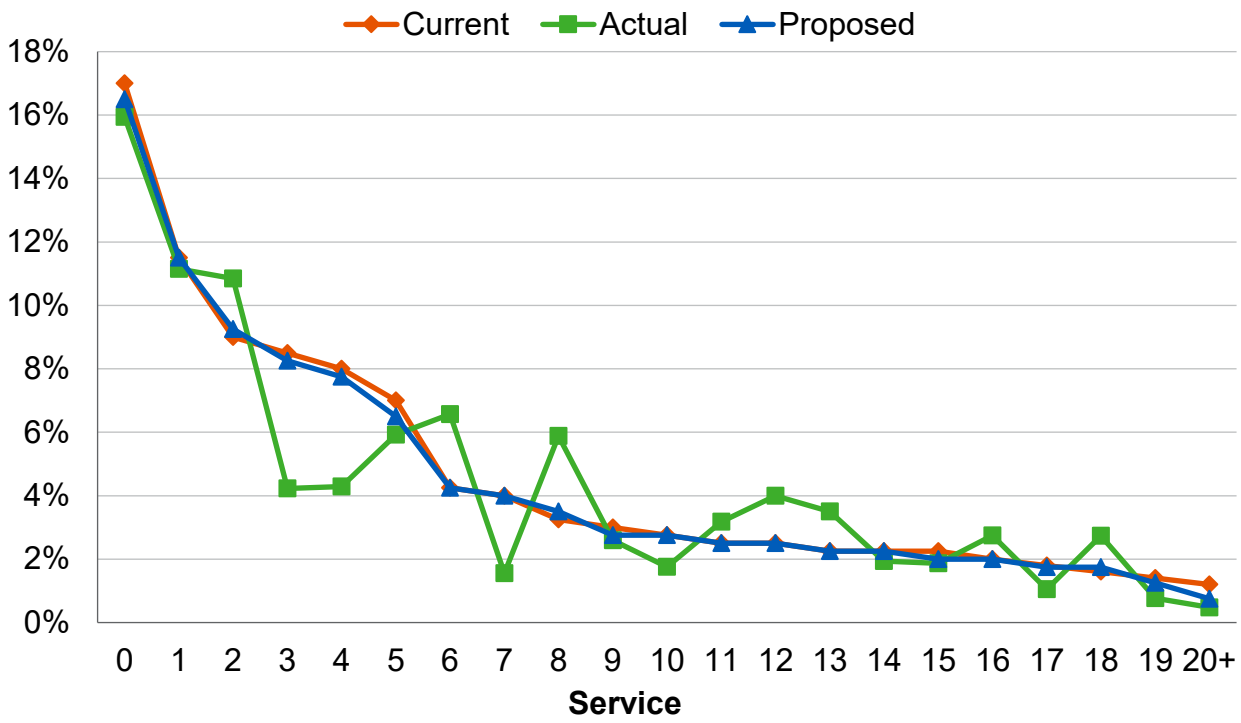


Chart 41: Termination Rates – Safety Law and Fire Members

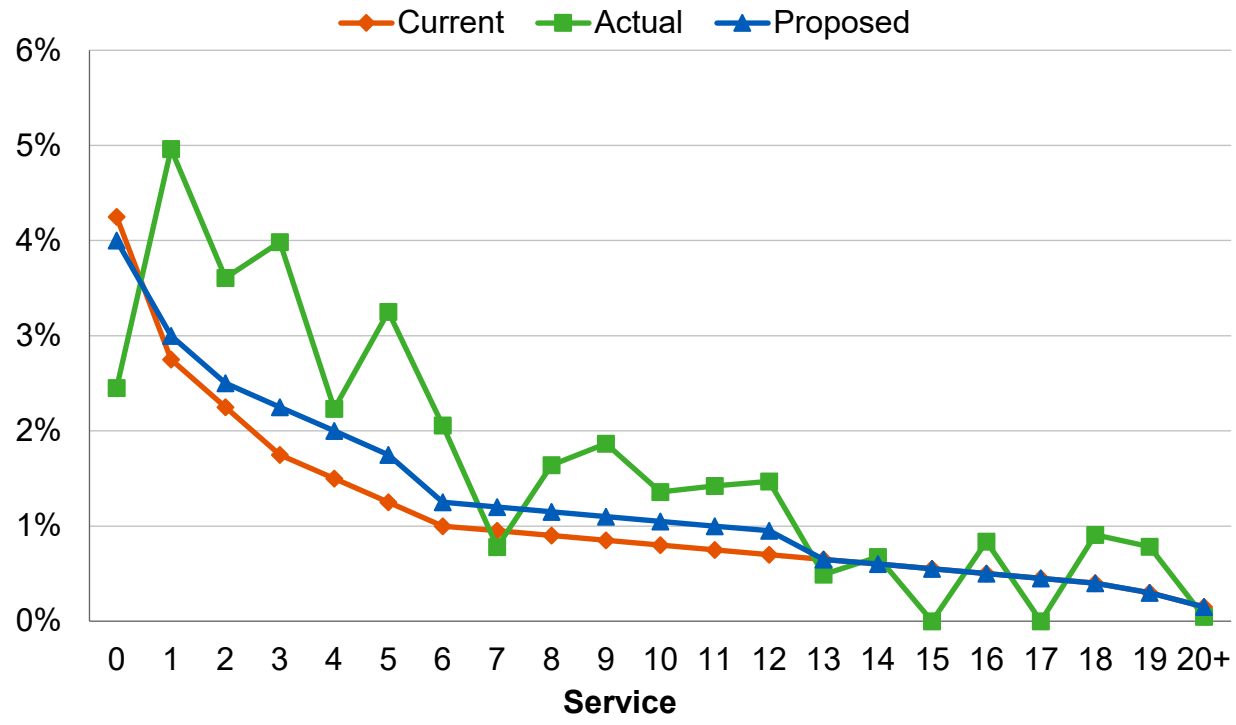
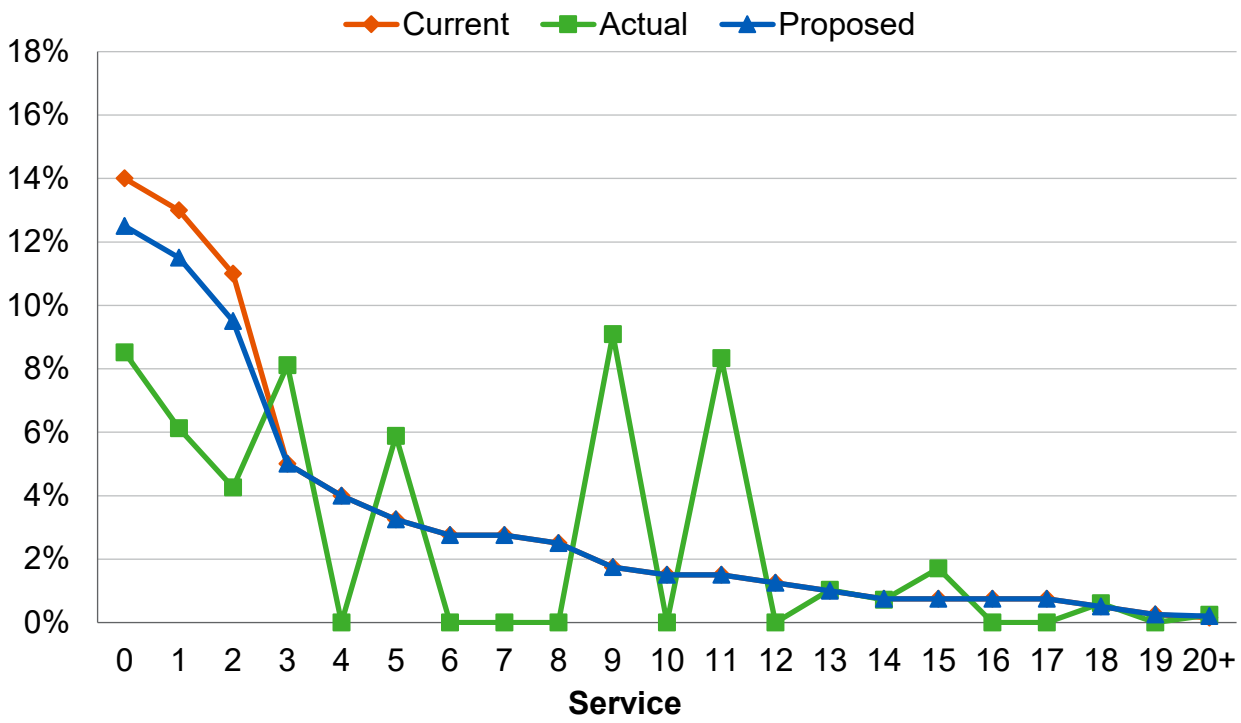


Chart 42: Termination Rates – Safety Probation Members



E. Disability Incidence Rates

When a member becomes disabled, he or she may be entitled to at least a 50% of pay pension (service connected disability), or a pension that depends upon the member's years of service (non-service connected disability).

The following summarizes the actual incidence of combined service and non-service connected disabilities over the past three years and six years compared to the current and proposed assumptions for both service connected and non-service connected disability incidence:

Disability Incidence

Rates (%)

	General All Other				General OCTA			
Age	Current Rate	Actual Rate (3 years)	Actual Rate (6 years)	Proposed Rate	Current Rate	Actual Rate (3 years)	Actual Rate (6 years)	Proposed Rate
20 – 24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25 – 29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30 – 34	0.01	0.00	0.00	0.01	0.05	0.00	0.00	0.05
35 – 39	0.05	0.06	0.06	0.05	0.30	0.34	0.16	0.30
40 – 44	0.10	0.04	0.06	0.08	0.45	0.22	0.34	0.40
45 – 49	0.16	0.16	0.17	0.16	0.50	0.58	0.66	0.50
50 – 54	0.22	0.25	0.24	0.24	0.55	0.76	0.67	0.60
55 – 59	0.30	0.18	0.27	0.30	0.80	0.70	0.80	0.80
60 – 64	0.35	0.20	0.27	0.30	1.50	0.68	0.93	1.20
65 – 69	0.35	0.15	0.34	0.30	1.75	2.10	2.14	2.00

	Safety Law and Fire				Safety Probation			
Age	Current Rate	Actual Rate (3 years)	Actual Rate (6 years)	Proposed Rate	Current Rate	Actual Rate (3 years)	Actual Rate (6 years)	Proposed Rate
20 – 24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25 – 29	0.02	0.10	0.05	0.04	0.05	0.00	0.00	0.05
30 – 34	0.10	0.06	0.17	0.10	0.10	0.00	0.00	0.10
35 – 39	0.25	0.24	0.29	0.25	0.10	0.45	0.16	0.15
40 – 44	0.35	0.49	0.53	0.40	0.15	0.96	0.51	0.20
45 – 49	0.50	0.62	0.44	0.50	0.25	0.34	0.44	0.30
50 – 54	1.50	2.42	1.94	1.70	0.30	0.53	0.43	0.40
55 – 59	3.50	6.35	5.35	4.50	0.50	0.85	0.39	0.55
60 – 64	6.00	7.61	6.16	6.00	0.00	0.00	0.00	0.00
65 – 69	8.00	10.34	11.71	8.50	0.00	0.00	3.33	0.00

Based on this experience, we recommend slightly decreasing the disability incidence rate assumption for General All Other and General OCTA members, while slightly increasing the disability incidence for Safety Law and Fire and Safety Probation members.

Chart 43 compares the actual number of non-service connected and service connected disabilities over the past three years to that expected under both the current and proposed assumptions.

Chart 44 shows actual disablement rates, compared to the assumed and proposed rates for General All Other members. Charts 45-47 graph the same information as Chart 44, but for General OCTA, Safety Law and Fire and Safety Probation members. Also shown is the actual disability rates based on an average of both the current and previous three-year experience periods.

The following table shows the currently assumed, actual and proposed assumed percentages for service versus non-service connected disability over the past three years for the groups.

Service vs. Non-Service Connected Disability

Service Connected %	General All Other	General OCTA	Safety Law and Fire	Safety Probation
Current Assumption	65%	80%	100%	75%
Actual Experience	76%	88%	99%	100%
Proposed Assumption	**75%**	**85%**	**100%**	**85%**

Based upon the recent experience, we have increased the assumed percentages for service connected disability for General All Other, General OCTA, and Safety Probation members while maintaining the assumed percentages for Safety Law and Fire members.

Chart 43: Actual Number of Service and Non-service Disability Retirements Compared to Expected

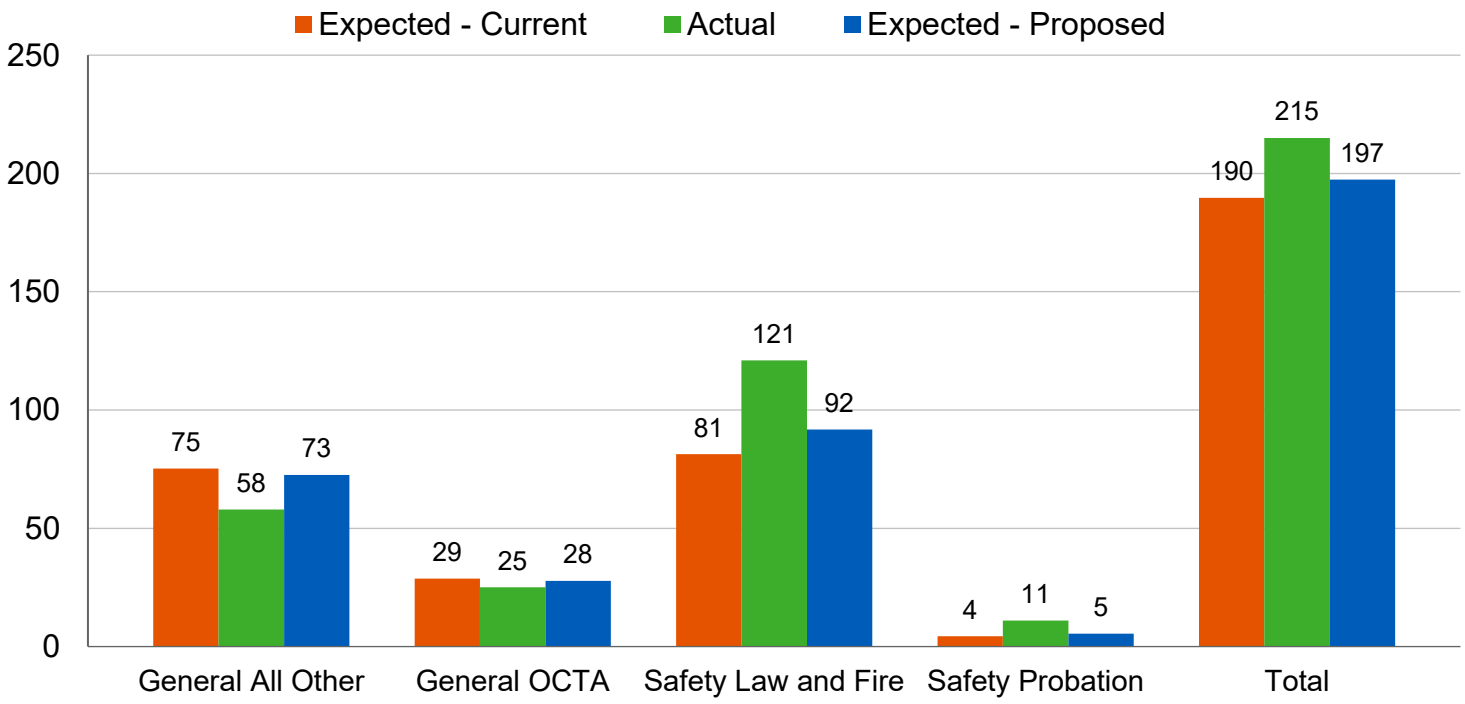


Chart 44: Disability Incidence Rates
General All Other Members

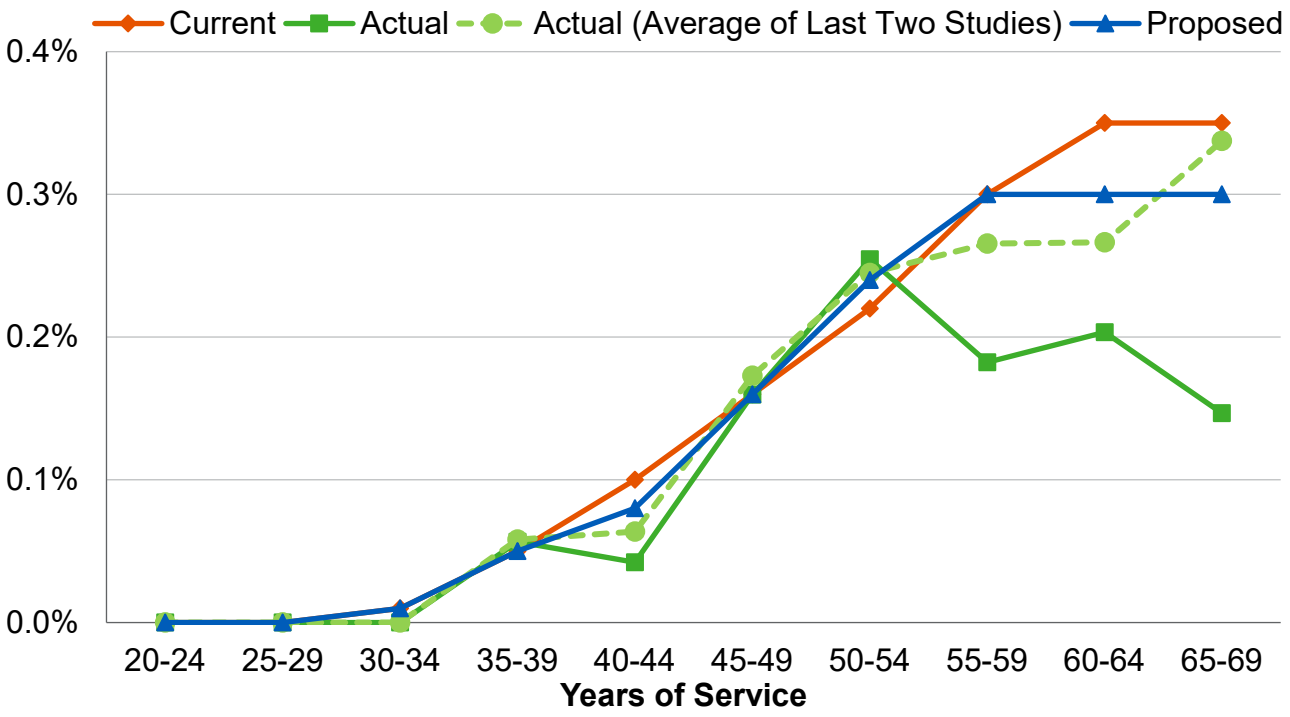


Chart 45: Disability Incidence Rates
General OCTA Members

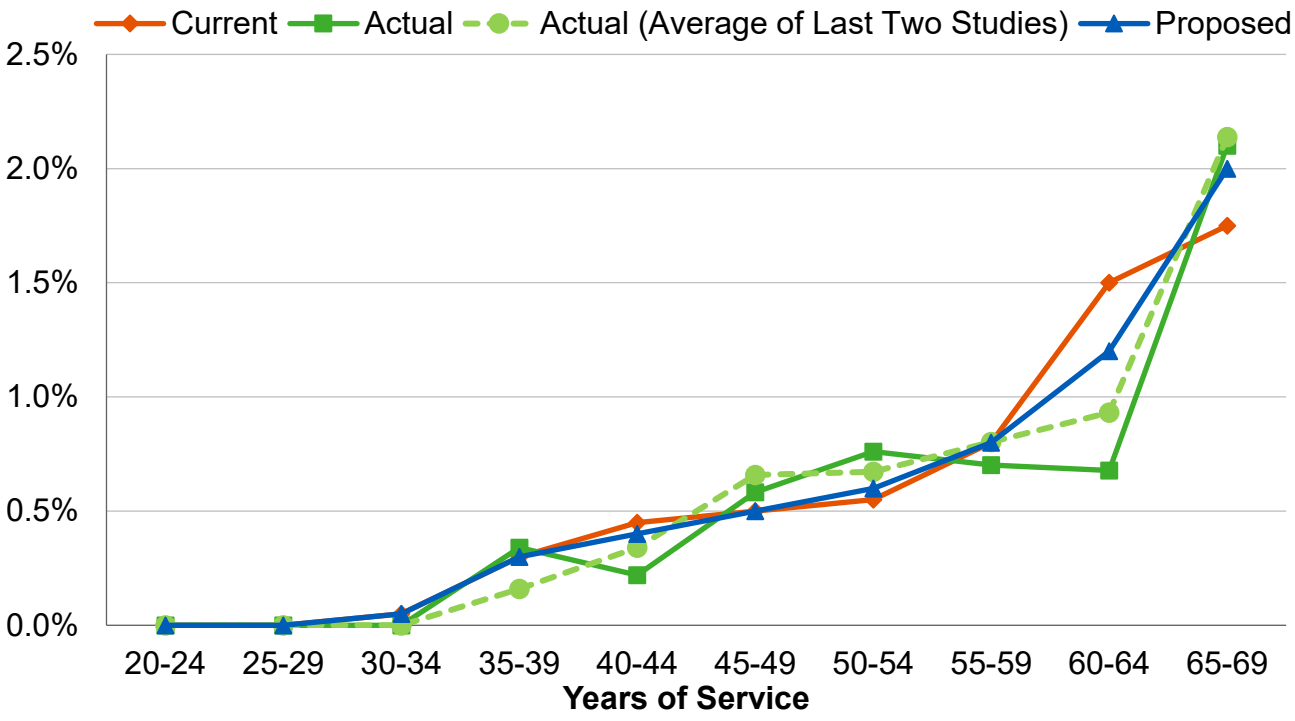


Chart 46: Disability Incidence Rates
Safety Law and Fire Members

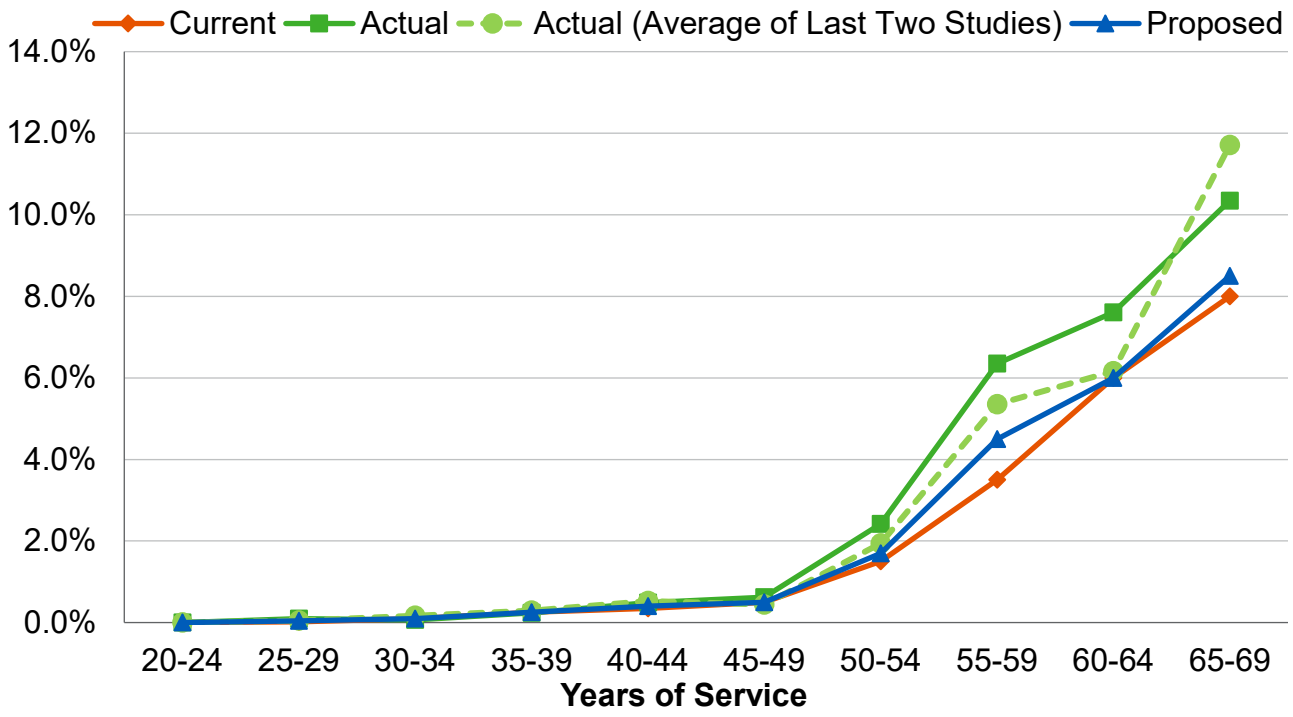
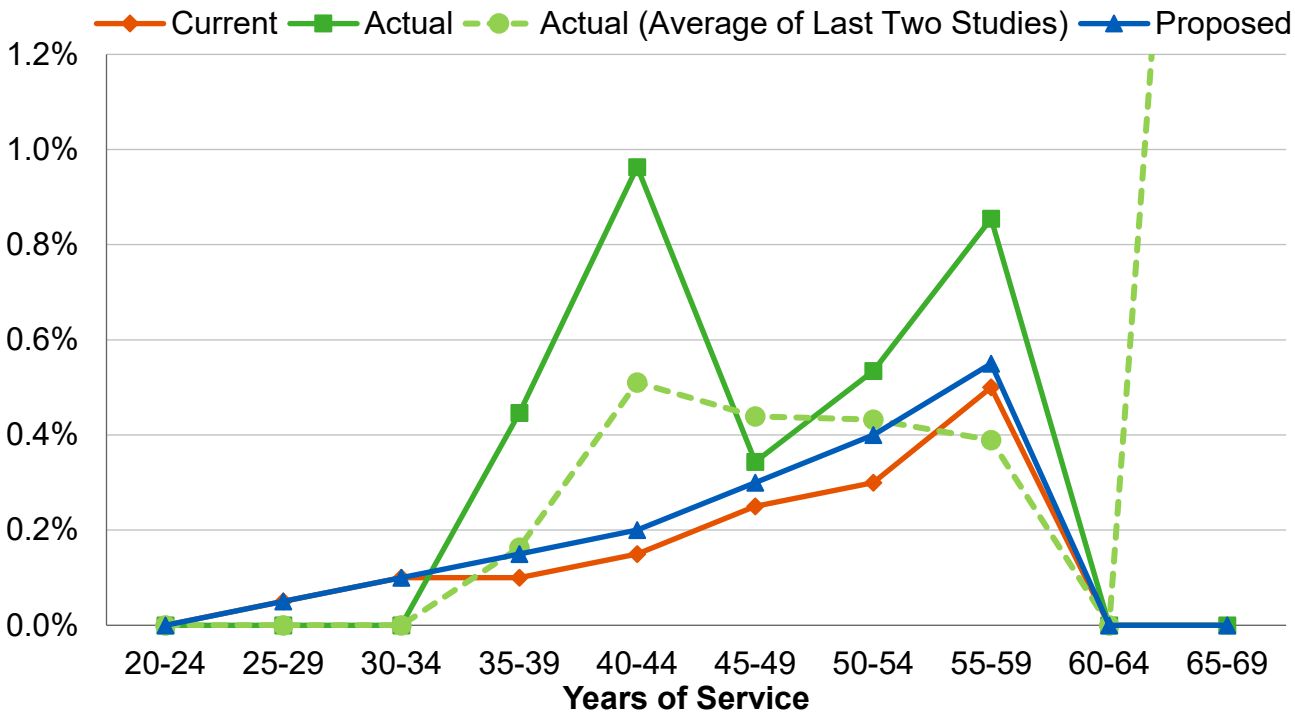


Chart 47: Disability Incidence Rates
Safety Probation Members



F. Additional Cashouts

Certain OCERS legacy members are eligible for additional cashouts on an annual basis. These cashouts are included as part of a member's Earnable Compensation at retirement. These additional pay elements fall into two categories:

- Ongoing Pay Elements – Those that are expected to be received relatively uniformly over a member's employment years; and
- Terminal Pay Elements – Those that are expected to be received only during the member's final average earnings pay period.

The first category is recognized in the actuarial calculations by virtue of being included in the current pay of active members. Any year-to-year fluctuation in the amount of additional cashouts would be incorporated in the salary scale assumptions discussed in the prior section of this report. The second category requires a separate actuarial assumption to anticipate its impact on a member's retirement benefit.

In this study, we have been provided with final average salaries determined by OCERS before ("FAS - Base")[1] as well as after ("FAS - Final")[2] including the terminal pay elements for members who retired during the last three years. We have studied the impact of including these pay elements by taking the ratio of "FAS - Final" to "FAS - Base". Members covered under CalPEPRA plans are not eligible to receive leave cashouts.

The current and recommended additional cashout assumptions are provided in the following table:

	Final One-Year Salary			Final Three-Year Salary		
Membership	Current Assumption	Actual Rate	Proposed Assumption	Current Assumption	Actual Rate	Proposed Assumption
General Members	3.00%	4.62%	3.00%	2.90%	3.64%	3.20%
Safety Probation	3.80%	N/A	N/A	3.40%	3.75%	3.50%
Safety Law Enforcement	N/A	N/A	N/A	6.90%	6.07%	6.60%
Safety Fire	N/A	N/A	N/A	1.50%	1.61%	1.50%

Note that the Safety Probation, Safety Law Enforcement, and Safety Fire Tiers 1 no longer have any active members and there are only 12 General Tier 1 active members as of the December 31, 2022 valuation.

Based on the above experience, we recommend increasing the cashout assumption slightly for General and Safety Probation and decreasing the cashout assumption slightly for Safety Law Enforcement for the Final Three-Year Salary tiers.

[1] Per OCERS, this is calculated by the System using base earnable salary plus those reported pensionable pay items (regularly included in the annual actuarial valuation) based on the highest system-calculated FAS period.

[2] Per OCERS, this is equal to "FAS - Base" plus all eligible pensionable pay items that had not been formerly transmitted to OCERS from the employer.

G. Change in Allocation of the Cost of COLA Benefits for Legacy Safety members with 30 Years of Service and Other Technical Changes Under the Entry Age Cost Allocation Method

With this experience study and starting with the December 31, 2023 valuation, we recommend a change to allocate the suspended COLA normal cost contributions for legacy Safety (Probation, Law and OCFA) members with at least 30 years of service to the employers instead of to the remaining legacy Safety members with less than 30 years of service. This is consistent with the current practice to allocate the suspended basic normal cost contributions for legacy Safety members with over 30 years of service to the employer normal cost.

Based on our understanding of the 1937 CERL, the basic normal cost for legacy Safety members with at least 30 years of service has been allocated to the employer. In contrast, in prior actuarial valuations one-half of the COLA normal cost for legacy Safety members with at least 30 years of service has been allocated to the legacy Safety members with less than 30 years of service. This prior practice has produced stable member rates as long as there have been (1) relatively few Safety members who continue to work after 30 years of service and (2) relatively small changes in the proportions of payroll for members with less than 30 years of service compared to payroll for members with at least 30 years of service.

However, the proportions of payroll could continue to shift over time with the enrollment of new Safety members in the CalPEPRA instead of the Legacy plans. For that reason, we believe it would be practical and reasonable to treat suspended COLA member contributions the same as current practice for suspended basic member contributions.

This change would result in a net increase in the average employer contribution rate for Rate Groups #6, #7 and #8 of about: 0.9%, 0.3% and 0.2% of total (legacy and CalPEPRA) member payrolls, respectively, and a corresponding net decrease in the average member contribution rates of about the same amount. We note that the rate impact is a larger percentage of only the legacy member payroll for members with less than 30 years of service for Rate Groups #6, #7 and #8, i.e., about 1.1%, 0.5% and 0.4% of payroll, respectively. (The variability in the rate increases among the three Rate Groups is due to the different proportions of payroll for members with less than 30 years compared to payroll for members with over 30 years of service.)

We are also recommending two other technical changes to the application of the Entry Age cost allocation method. One is an improvement in reflecting the timing of decrements in calculating the total normal cost rate for each plan and the other is to use the individual (instead of the aggregate) version of the Entry Age cost allocation method to determine the normal cost of the COLA benefits.

5. Cost Impact

We have estimated the impact of all the recommended demographic and economic assumptions as if they were applied to the December 31, 2022 actuarial valuation. The table below shows the changes in the employer and member contribution rates due to the proposed assumption changes separately for the recommended economic assumption changes including the recommended merit and promotion salary increases (as recommended in Section 3 of this report) and the recommended demographic assumption and method changes (as recommended in Section 4 of this report).

Cost Impact of the Recommended Assumptions Based on December 31, 2022 Actuarial Valuation

Assumption	Impact on Average Employer Contribution Rates
Decrease due to changes in economic assumptions	(0.15%)
Increase due to changes in demographic assumptions and methods[1]	1.06%
Total increase in average employer rate	**0.91%**
Total estimated decrease in annual dollar amount ($000s)[2]	**$18,422**

Assumption	Impact on Weighted Average Member Contribution Rates
Decrease due to changes in economic assumptions	(0.01%)
Decrease due to changes in demographic assumptions and methods[3]	(0.13%)
Total decrease in average member rate	**(0.14%)**
Total estimated decrease in annual dollar amount ($000s)[2]	**$(3,081)**

Assumption	Impact on UAAL ($000s)
Decrease due to changes in economic assumptions	$(42,218)
Increase due to changes in demographic assumptions and methods[4]	193,621
Total increase in UAAL ($000s)	**$151,403**

[1] The increase in the average employer contribution rate due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 78, is 0.08% of payroll.
[2] Based on December 31, 2022 projected annual payroll as determined under each set of assumptions.
[3] The decrease in the average member contribution rate due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service, as discussed in more detail on page 78, is 0.07% of payroll.
[4] There is no impact on the UAAL due to the change in allocation of the cost of COLA benefits after legacy Safety members reach 30 years of service.

	Impact on Funded Percentage on VVA Basis
Change in Funded Percentage	81.5% to 81.0%

Of the various assumption changes, the most significant rate increase for employer is due to the retirement assumption followed by the mortality assumption.

We have also analyzed in the tables below the average employer and member contribution rate impacts for each cost group due to the recommended assumption and method changes as if they were applied to the December 31, 2022 actuarial valuation.

Employer Contribution Rate Increases/(Decreases)
(% of Payroll)

	Normal Cost	UAAL	Total	Annual Amount[1] ($000s)
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	0.05%	0.18%	0.23%	$174
Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	0.41%	0.88%	1.29%	15,591
Rate Group #3 – Plans B, G, H and U (OCSD)[2]	0.31%	0.00%	0.31%	246
Rate Group #5 – Plans A, B and U (OCTA)	0.21%	0.59%	0.80%	900
Rate Group #9 – Plans M, N and U (TCA)	0.21%	0.00%	0.21%	14
Rate Group #10 – Plans I, J, M, N and U (OCFA)	0.28%	0.59%	0.87%	299
Rate Group #11 – Plans M and N, future service, and U (Cemetery)	0.20%	0.61%	0.81%	16
Rate Group #12 – Plans G, H, future service, and U (Law Library)	0.69%	0.00%	0.69%	8
Rate Group #6 – Plans E, F and V (Probation)	1.03%	0.28%	1.31%	731
Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	0.05%	0.06%	0.11%	382
Rate Group #8 – Plans E, F, Q, R and V (OCFA)	(0.01%)	0.04%	0.03%	61
All Categories Combined	**0.31%**	**0.60%**	**0.91%**	**$18,422**

[1] Based on December 31, 2022 projected annual payroll as determined under each set of assumptions.
[2] There is no increase or decrease in UAAL rates for Rate Groups #3, #9 and #12 because these three rate groups are overfunded both before and after the assumption changes.

Average Member Contribution Rate Increases/(Decreases)

(% of Payroll)

	Total	Annual Amount[1] ($000s)
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	(0.04%)	$(75)
Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	(0.03%)	(588)
Rate Group #3 – Plans B, G, H and U (OCSD)	(0.03%)	(29)
Rate Group #5 – Plans A, B and U (OCTA)	(0.02%)	(40)
Rate Group #9 – Plans M, N and U (TCA)	0.04%	2
Rate Group #10 – Plans I, J, M, N and U (OCFA)	(0.04%)	(15)
Rate Group #11 – Plans M and N, future service, and U (Cemetery)	(0.05%)	(1)
Rate Group #12 – Plans G, H, future service, and U (Law Library)	(0.01%)	(0)
Rate Group #6 – Plans E, F and V (Probation)	(0.97%)	(552)
Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	(0.48%)	(1,366)
Rate Group #8 – Plans E, F, Q, R and V (OCFA)	(0.25%)	(417)
All Categories Combined	**(0.14%)**	**$(3,081)**

[1] Based on December 31, 2022 projected annual payroll as determined under each set of assumptions.

Appendix A: Current Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.00%, net of administrative and investment expenses.
Member Contribution Crediting Rate:	5.00%, compounded semi-annually.
Inflation Assumption:	2.50%
Cost of Living Adjustments (COLA):	Retiree COLA increases of 2.75% per year. For members that have COLA banks, we assume they receive 3.00% COLA increases until their COLA banks are exhausted and 2.75% thereafter.
Payroll Growth:	Inflation of 2.50% per year plus “across the board” real salary increases of 0.50% per year.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.50% per year from the valuation date.

Salary Increases:

The annual rate of compensation increase includes:

- Inflation at 2.50%, plus
- "Across the board" salary increases of 0.50% per year, plus
- The following merit and promotion increases:

Years of Service	Rate (%)[1]	
	General	Safety
Less than 1	8.00	12.00
1 – 2	7.25	10.00
2 – 3	6.25	8.50
3 – 4	5.25	7.50
4 – 5	4.25	6.50
5 – 6	3.50	5.50
6 – 7	2.75	5.00
7 – 8	2.50	4.00
8 – 9	1.70	3.00
9 – 10	1.70	2.50
10 – 11	1.60	1.85
11 – 12	1.60	1.85
12 – 13	1.50	1.85
13 – 14	1.50	1.85
14 – 15	1.25	1.85
15 – 16	1.25	1.60
16 – 17	1.00	1.60
17 – 18	1.00	1.60
18 – 19	1.00	1.60
19 – 20	1.00	1.60
20 & Over	1.00	1.60

[1] In addition to the individual salary increase assumptions, we have applied an average of two hours of additional salary annually for leap-year salary adjustment.

Demographic Assumptions

Post-Retirement Mortality Rates:	*Healthy* • **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5%, projected generationally with the two-dimensional mortality improvement scale MP-2019 • **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019 *Disabled* • **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5%, projected generationally with the two-dimensional mortality improvement scale MP-2019 • **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019 *Beneficiary* • **All Beneficiaries:** Pub-2010 General Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5%, projected generationally with the two-dimensional mortality improvement scale MP-2019

Pre-Retirement Mortality Rates:

- **General Members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2019

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

All General pre-retirement deaths are assumed to be non-service connected. For Safety, 90% of pre-retirement deaths are assumed to be non-service connected. The other 10% are assumed to be service connected. Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

Mortality Rates for Member Contributions:

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5%, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 40% male and 60% female
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2019, weighted 80% male and 20% female

Disability Incidence Rates:

Age	Rate (%) General All Other[1]	General OCTA[2]	Safety Law & Fire[3]	Safety Probation[4]
20	0.00	0.00	0.00	0.00
25	0.00	0.00	0.01	0.03
30	0.01	0.03	0.07	0.08
35	0.03	0.20	0.19	0.10
40	0.08	0.39	0.31	0.13
45	0.14	0.48	0.44	0.21
50	0.20	0.53	1.10	0.28
55	0.27	0.70	2.70	0.42
60	0.33	1.22	5.00	0.20

[1] 65% of General All Other disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected.

[2] 80% of General OCTA disabilities are assumed to be service connected disabilities. The other 20% are assumed to be non-service connected.

[3] 100% of Safety Law Enforcement and Fire disabilities are assumed to be service connected disabilities.

[4] 75% of Safety Probation disabilities are assumed to be service connected disabilities. The other 25% are assumed to be non-service connected.

Termination Rates:

Years of Service	Rate (%) General All Other	General OCTA	Safety Law and Fire	Safety Probation
Less than 1	11.00	17.00	4.25	14.00
1 – 2	7.25	11.50	2.75	13.00
2 – 3	6.50	9.00	2.25	11.00
3 – 4	5.50	8.50	1.75	5.00
4 – 5	5.00	8.00	1.50	4.00
5 – 6	4.50	7.00	1.25	3.25
6 – 7	4.00	4.25	1.00	2.75
7 – 8	3.50	4.00	0.95	2.75
8 – 9	3.25	3.25	0.90	2.50
9 – 10	3.00	3.00	0.85	1.75
10 – 11	2.50	2.75	0.80	1.50
11 – 12	2.00	2.50	0.75	1.50
12 – 13	2.00	2.50	0.70	1.25
13 – 14	2.00	2.25	0.65	1.00
14 – 15	1.50	2.25	0.60	0.75
15 – 16	1.40	2.25	0.55	0.75
16 – 17	1.30	2.00	0.50	0.75
17 – 18	1.20	1.80	0.45	0.75
18 – 19	1.10	1.60	0.40	0.50
19 – 20	1.00	1.40	0.30	0.25
20 & Over	0.75	1.20	0.15	0.15

Election for Withdrawal of Contributions

Years of Service	Rate (%) General All Other	General OCTA	Safety Law and Fire	Safety Probation
Less than 5	30.00	40.00	20.00	25.00
5 – 9	25.00	30.00	20.00	25.00
10 – 14	25.00	25.00	10.00	25.00
15 & over	17.50	15.00	10.00	15.00

Retirement Rates:

Age	Rate (%)[1]			
	General Enhanced		General Non-Enhanced[2]	
	Less than 30 Years of Service	Greater than 30 Years of Service	Less than 30 Years of Service	Greater than 30 Years of Service
49	0.00	30.00	0.00	25.00
50	2.00	4.00	3.00	3.00
51	2.00	4.00	3.00	3.00
52	2.50	5.00	2.00	2.00
53	2.50	5.00	3.50	3.50
54	7.00	14.00	2.75	2.75
55	12.00	30.00	3.25	3.25
56	9.00	19.00	3.50	3.50
57	9.00	18.00	5.00	5.00
58	9.00	18.00	5.50	5.50
59	10.00	20.00	6.50	6.50
60	11.00	20.00	9.00	13.50
61	11.00	20.00	9.00	13.50
62	13.00	20.00	9.00	18.00
63	13.00	22.00	9.50	19.00
64	16.00	24.00	10.00	20.00
65	24.00	28.00	22.00	26.40
66	24.00	30.00	25.00	30.00
67	24.00	30.00	25.00	30.00
68	22.00	27.50	30.00	27.50
69	22.00	27.50	30.00	27.50
70	25.00	27.50	20.00	27.50
71	25.00	27.50	20.00	27.50
72	25.00	27.50	20.00	27.50
73	20.00	27.50	20.00	27.50
74	20.00	27.50	20.00	27.50
75	100.00	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.
[2] These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (Plan T and Plan W).

Retirement Rates (continued):

Age	Rate (%)[1]					
	Safety Law (31664.1)		Safety Fire (31664.1)		Safety Probation (31664.1)	
	Less than 30 Years of Service	Greater than 30 Years of Service	Less than 30 Years of Service	Greater than 30 Years of Service	Less than 30 Years of Service	Greater than 30 Years of Service
45	1.00	16.00	2.00	10.00	3.00	5.00
46	1.00	16.00	2.00	10.00	3.00	5.00
47	1.00	16.00	2.00	10.00	3.00	5.00
48	1.00	16.00	2.00	10.00	3.00	5.00
49	11.00	16.00	2.00	10.00	3.00	5.00
50	16.00	16.00	4.00	10.00	9.00	12.00
51	16.00	16.00	4.00	10.00	7.00	10.00
52	17.00	16.00	4.00	10.00	5.00	9.00
53	19.00	30.00	9.00	20.00	7.00	9.00
54	24.00	30.00	12.00	25.00	7.00	12.00
55	24.00	30.00	12.00	25.00	12.00	30.00
56	22.00	30.00	12.00	25.00	18.00	30.00
57	22.00	30.00	18.00	25.00	25.00	30.00
58	22.00	40.00	18.00	30.00	25.00	30.00
59	22.00	40.00	18.00	30.00	18.00	30.00
60	30.00	40.00	18.00	30.00	20.00	40.00
61	30.00	40.00	18.00	30.00	20.00	40.00
62	30.00	40.00	18.00	35.00	20.00	40.00
63	30.00	40.00	18.00	35.00	20.00	40.00
64	30.00	40.00	18.00	35.00	20.00	40.00
65	100.00	100.00	100.00	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.

Retirement Rates (continued):

Age	Rate (%)[1] General SJC (31676.12)	Safety Law (31664.2)	Safety Fire (31664.2)
50	4.00	11.50	8.00
51	4.00	12.00	9.00
52	4.00	12.70	10.00
53	4.00	17.90	12.00
54	4.00	18.80	14.00
55	4.00	35.00	23.00
56	5.00	25.00	22.00
57	6.00	25.00	25.00
58	7.00	25.00	25.00
59	9.00	30.00	35.00
60	10.00	40.00	40.00
61	12.00	40.00	40.00
62	13.00	40.00	40.00
63	13.00	40.00	40.00
64	19.00	40.00	40.00
65	20.00	100.00	100.00
66	25.00	100.00	100.00
67	25.00	100.00	100.00
68	25.00	100.00	100.00
69	25.00	100.00	100.00
70	45.00	100.00	100.00
71	45.00	100.00	100.00
72	45.00	100.00	100.00
73	45.00	100.00	100.00
74	45.00	100.00	100.00
75	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.

Retirement Rates (continued):

Age	Rate (%)[1] CalPEPRA 2.5% @ 67 General Formula	CalPEPRA 2.7% @ 57 Safety Formula Probation	CalPEPRA 2.7% @ 57 Safety Formula Law	CalPEPRA 2.7% @ 57 Safety Formula Fire
50	0.00	3.00	11.00	6.00
51	0.00	3.00	11.50	6.50
52	6.00	3.50	12.00	8.00
53	2.00	3.50	16.00	10.00
54	2.00	6.00	17.00	11.50
55	2.50	12.00	29.00	20.00
56	3.50	12.00	19.00	19.00
57	5.50	15.00	19.00	21.00
58	7.50	25.00	23.00	24.00
59	7.50	25.00	26.00	30.00
60	7.50	40.00	40.00	40.00
61	7.50	40.00	40.00	40.00
62	14.00	40.00	40.00	40.00
63	14.00	40.00	40.00	40.00
64	14.00	40.00	40.00	40.00
65	20.00	100.00	100.00	100.00
66	22.00	100.00	100.00	100.00
67	23.00	100.00	100.00	100.00
68	23.00	100.00	100.00	100.00
69	23.00	100.00	100.00	100.00
70	25.00	100.00	100.00	100.00
71	25.00	100.00	100.00	100.00
72	25.00	100.00	100.00	100.00
73	25.00	100.00	100.00	100.00
74	25.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.

Retirement Age and Benefit for Deferred Vested Members:	General Retirement Age: 59 Safety Retirement Age: 54 Future deferred vested members who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit. 15% of future General and 20% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 4.00% and 4.60% compensation increases are assumed per annum for General and Safety, respectively.
Liability Calculation for Current Deferred Vested Members:	Liability for a current deferred vested member is calculated based on salary (adjusted with the additional cashout assumptions for non-CalPEPRA members), service, and eligibility for reciprocal benefit as provided by the Retirement System. For those members without salary information that have 3 or more years of service, we used an average salary. For those members without salary information that have less than 3 years of service or for those members without service information, we assumed a refund of account balance.
Future Benefit Accruals:	1.0 year of service per year of employment. There is no assumption to anticipate conversion of unused sick leave at retirement.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Form of Payment:	All active and inactive members are assumed to elect the unmodified option at retirement.
Percent Married:	For all active and inactive members, 75% of male members and 55% of female members are assumed to be married at pre-retirement death or retirement.
Age and Gender of Spouse:	For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.
Cashout Assumptions:	Additional compensation amounts are expected to be received during a member's final average earnings period. The percentages used in this valuation are:

	Rate (%)	
Years of Service	**Final One Year Salary**	**Final Three Year Salary**
General Non-CalPEPRA	3.00%	2.90%
Safety Probation Non-CalPEPRA	3.80%	3.40%
Safety Law Non-CalPEPRA	N/A	6.90%
Safety Fire Non-CalPEPRA	N/A	1.50%
General CalPEPRA	N/A	N/A
Safety Probation CalPEPRA	N/A	N/A
Safety Law CalPEPRA	N/A	N/A
Safety Fire CalPEPRA	N/A	N/A

The additional cashout assumptions are the same for service and disability retirements.

Appendix B: Proposed Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.00%, net of administrative and investment expenses.
Member Contribution Crediting Rate:	5.00%, compounded semi-annually.
Inflation Assumption:	2.50%
Cost of Living Adjustments (COLA):	Retiree COLA increases of 2.75% per year. For members that have COLA banks, we assume they receive 3.00% COLA increases until their COLA banks are exhausted and 2.75% thereafter.
Payroll Growth:	Inflation of 2.50% per year plus “across the board” real salary increases of 0.50% per year.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.50% per year from the valuation date.

Salary Increases:

The annual rate of compensation increase includes:

- Inflation at 2.50%, plus
- "Across the board" salary increases of 0.50% per year, plus
- The following merit and promotion increases:

Years of Service	Rate (%)[1]	
	General	Safety
Less than 1	5.00	12.00
1 – 2	7.25	10.00
2 – 3	6.50	8.75
3 – 4	5.50	7.75
4 – 5	4.50	6.75
5 – 6	3.75	5.75
6 – 7	3.00	5.00
7 – 8	2.75	3.75
8 – 9	2.00	3.00
9 – 10	1.80	2.75
10 – 11	1.60	2.00
11 – 12	1.50	1.85
12 – 13	1.40	1.85
13 – 14	1.30	1.85
14 – 15	1.25	1.85
15 – 16	1.25	1.60
16 – 17	1.15	1.60
17 – 18	1.10	1.60
18 – 19	1.10	1.60
19 – 20	0.90	1.50
20 & Over	0.90	1.50

[1] In addition to the individual salary increase assumptions, we have applied an average of two hours of additional salary annually for leap-year salary adjustment.

Demographic Assumptions

Post-Retirement Mortality Rates:	*Healthy* • **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021 • **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021 *Disabled* • **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5%, projected generationally with the two-dimensional mortality improvement scale MP-2021 • **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021 *Beneficiary* • **Beneficiaries not currently in Pay Status:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021 • **Beneficiaries in Pay Status:** Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 10% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021 The Pub-2010 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

Pre-Retirement Mortality Rates:

- **General Members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021

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

All General pre-retirement deaths are assumed to be non-service connected. For Safety, 90% of pre-retirement deaths are assumed to be non-service connected. The other 10% are assumed to be service connected. Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

Mortality Rates for Member Contributions:

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 40% male and 60% female
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) decreased by 5% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted 85% male and 15% female

Disability Incidence Rates:

Age	Rate (%) General All Other[1]	General OCTA[2]	Safety Law & Fire[3]	Safety Probation[4]
20	0.00	0.00	0.00	0.00
25	0.00	0.00	0.02	0.03
30	0.01	0.03	0.08	0.08
35	0.03	0.20	0.19	0.13
40	0.07	0.36	0.34	0.18
45	0.13	0.46	0.46	0.26
50	0.21	0.56	1.22	0.36
55	0.28	0.72	3.38	0.49
60	0.30	1.04	5.40	0.22
65	0.30	1.68	7.50	0.00

[1] 75% of General All Other disabilities are assumed to be service connected disabilities. The other 25% are assumed to be non-service connected.

[2] 85% of General OCTA disabilities are assumed to be service connected disabilities. The other 15% are assumed to be non-service connected.

[3] 100% of Safety Law Enforcement and Fire disabilities are assumed to be service connected disabilities.

[4] 85% of Safety Probation disabilities are assumed to be service connected disabilities. The other 15% are assumed to be non-service connected.

Termination Rates:

Years of Service	Rate (%) General All Other	General OCTA	Safety Law and Fire	Safety Probation
Less than 1	11.25	16.50	4.00	12.50
1 – 2	7.25	11.50	3.00	11.50
2 – 3	6.50	9.25	2.50	9.50
3 – 4	5.50	8.25	2.25	5.00
4 – 5	5.25	7.75	2.00	4.00
5 – 6	4.75	6.50	1.75	3.25
6 – 7	4.25	4.25	1.25	2.75
7 – 8	4.00	4.00	1.20	2.75
8 – 9	3.50	3.50	1.15	2.50
9 – 10	3.00	2.75	1.10	1.75
10 – 11	2.50	2.75	1.05	1.50
11 – 12	2.00	2.50	1.00	1.50
12 – 13	1.75	2.50	0.95	1.25
13 – 14	1.75	2.25	0.65	1.00
14 – 15	1.60	2.25	0.60	0.75
15 – 16	1.50	2.00	0.55	0.75
16 – 17	1.40	2.00	0.50	0.75
17 – 18	1.30	1.75	0.45	0.75
18 – 19	1.20	1.75	0.40	0.50
19 – 20	1.00	1.25	0.30	0.25
20 & Over	0.50	0.75	0.15	0.20

Election for Withdrawal of Contributions

Years of Service	Rate (%) General All Other	General OCTA	Safety Law and Fire	Safety Probation
Less than 5	25.00	35.00	25.00	20.00
5 – 9	17.50	30.00	25.00	20.00
10 – 14	17.50	25.00	12.50	20.00
15 & over	15.00	15.00	12.50	15.00

Retirement Rates:

Age	Rate (%)[1]			
	General Enhanced		General Non-Enhanced[2]	
	Less than 30 Years of Service	Greater than 30 Years of Service	Less than 30 Years of Service	Greater than 30 Years of Service
49	0.00	30.00	0.00	25.00
50	2.25	5.00	2.75	2.75
51	2.25	5.00	2.75	2.75
52	2.50	5.00	2.75	2.75
53	3.00	9.00	2.75	2.75
54	7.50	16.00	2.75	2.75
55	13.00	35.00	3.25	3.50
56	10.00	24.00	3.25	3.50
57	10.00	22.00	5.50	5.50
58	10.00	22.00	6.50	6.50
59	11.00	24.00	6.50	6.50
60	12.00	24.00	8.00	12.00
61	12.00	24.00	8.00	15.00
62	14.00	24.00	8.00	18.00
63	14.00	24.00	10.00	22.00
64	17.00	30.00	12.00	25.00
65	25.00	30.00	22.00	30.00
66	25.00	30.00	25.00	32.00
67	25.00	30.00	27.00	32.00
68	25.00	25.00	32.00	32.00
69	25.00	25.00	30.00	30.00
70	25.00	25.00	25.00	30.00
71	25.00	25.00	20.00	30.00
72	22.00	25.00	20.00	30.00
73	20.00	25.00	20.00	30.00
74	20.00	25.00	20.00	30.00
75	100.00	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.
[2] These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (Plan T and Plan W).

Retirement Rates (continued):

	Rate (%)[1]					
	Safety Law (31664.1)		Safety Fire (31664.1)		Safety Probation (31664.1)	
Age	Less than 30 Years of Service	Greater than 30 Years of Service	Less than 30 Years of Service	Greater than 30 Years of Service	Less than 30 Years of Service	Greater than 30 Years of Service
45	2.50	16.00	2.00	10.00	3.00	5.00
46	2.50	16.00	2.00	10.00	3.00	5.00
47	2.50	16.00	2.00	10.00	3.00	5.00
48	2.50	16.00	2.00	10.00	3.00	5.00
49	12.00	16.00	2.00	10.00	3.00	5.00
50	18.00	20.00	4.50	10.00	9.00	12.00
51	18.00	20.00	4.50	10.00	7.00	10.00
52	18.00	20.00	4.50	10.00	5.00	9.00
53	20.00	35.00	9.00	20.00	7.00	9.00
54	24.00	35.00	12.00	25.00	7.00	12.00
55	24.00	35.00	12.00	25.00	12.00	30.00
56	24.00	35.00	12.00	25.00	18.00	30.00
57	24.00	35.00	20.00	25.00	25.00	30.00
58	24.00	40.00	20.00	30.00	25.00	30.00
59	24.00	40.00	25.00	30.00	18.00	30.00
60	30.00	40.00	25.00	30.00	20.00	40.00
61	30.00	40.00	25.00	30.00	20.00	40.00
62	30.00	40.00	25.00	30.00	20.00	40.00
63	30.00	40.00	25.00	30.00	20.00	40.00
64	30.00	40.00	25.00	30.00	20.00	40.00
65	100.00	100.00	100.00	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.

Retirement Rates (continued):

Age	Rate (%)[1] General SJC (31676.12)	Safety Law (31664.2)	Safety Fire (31664.2)
50	4.00	12.00	8.00
51	4.00	12.50	9.00
52	4.00	13.00	10.00
53	4.00	18.00	12.00
54	4.00	19.00	14.00
55	4.00	35.00	24.00
56	5.00	25.00	23.00
57	6.00	25.00	25.00
58	7.00	25.00	25.00
59	9.00	30.00	35.00
60	10.00	40.00	40.00
61	12.00	40.00	40.00
62	13.00	40.00	40.00
63	13.00	40.00	40.00
64	19.00	40.00	40.00
65	22.00	100.00	100.00
66	26.00	100.00	100.00
67	26.00	100.00	100.00
68	26.00	100.00	100.00
69	26.00	100.00	100.00
70	45.00	100.00	100.00
71	45.00	100.00	100.00
72	45.00	100.00	100.00
73	45.00	100.00	100.00
74	45.00	100.00	100.00
75	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.

Retirement Rates (continued):

Age	Rate (%)[1] CalPEPRA 2.5 @ 67 General Formula	CalPEPRA 2.7 @ 57 Safety Formula Probation	CalPEPRA 2.7 @ 57 Safety Formula Law	CalPEPRA 2.7 @ 57 Safety Formula Fire
50	0.00	3.00	11.50	6.00
51	0.00	3.00	12.00	6.50
52	5.50	3.50	12.50	8.00
53	2.00	3.50	16.50	10.00
54	2.00	6.00	17.50	12.00
55	2.75	12.00	30.00	20.00
56	3.75	12.00	20.00	19.00
57	5.50	15.00	20.00	21.00
58	7.50	25.00	25.00	25.00
59	7.50	25.00	30.00	30.00
60	7.50	40.00	40.00	40.00
61	7.50	40.00	40.00	40.00
62	14.00	40.00	40.00	40.00
63	14.00	40.00	40.00	40.00
64	15.00	40.00	40.00	40.00
65	20.00	100.00	100.00	100.00
66	22.00	100.00	100.00	100.00
67	23.00	100.00	100.00	100.00
68	23.00	100.00	100.00	100.00
69	23.00	100.00	100.00	100.00
70	25.00	100.00	100.00	100.00
71	25.00	100.00	100.00	100.00
72	25.00	100.00	100.00	100.00
73	25.00	100.00	100.00	100.00
74	25.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00

[1] The retirement rates only apply to members that are eligible to retire at the age shown.

Retirement Age and Benefit for Deferred Vested Members:

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

General Retirement Age

Reciprocal members: 60

Other members: 58

Safety Retirement Age

Reciprocal members: 54

Other members: 54

Future deferred vested members who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit.

12.5% of future General and 20% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 3.90% and 4.50% compensation increases are assumed per annum for General and Safety, respectively.

Liability Calculation for Current Deferred Vested Members:

Liability for a current deferred vested member is calculated based on salary (adjusted with the additional cashout assumptions for non-CalPEPRA members), service, and eligibility for reciprocal benefit as provided by the Retirement System. For those members without salary information that have 3 or more years of service, we used an average salary. For those members without salary information that have less than 3 years of service or for those members without service information, we assumed a refund of account balance.

Future Benefit Accruals:

1.0 year of service per year of employment. There is no assumption to anticipate conversion of unused sick leave at retirement.

Unknown Data for Members:

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

Form of Payment:

All active and inactive members are assumed to elect the unmodified option at retirement.

Percent Married:

For all active and inactive members, 75% of male members and 55% of female members are assumed to be married at pre-retirement death or retirement.

Age and Gender of Spouse:

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

Cashout Assumptions:

Additional compensation amounts are expected to be received during a member's final average earnings period. The percentages used in this valuation are:

	Rate (%)	
Years of Service	**Final One Year Salary**	**Final Three Year Salary**
General Non-CalPEPRA	3.00%	3.20%
Safety Probation Non-CalPEPRA	N/A	3.50%
Safety Law Non-CalPEPRA	N/A	6.60%
Safety Fire Non-CalPEPRA	N/A	1.50%
General CalPEPRA	N/A	N/A
Safety Probation CalPEPRA	N/A	N/A
Safety Law CalPEPRA	N/A	N/A
Safety Fire CalPEPRA	N/A	N/A

The additional cashout assumptions are the same for service and disability retirements.