City of Los Angeles Fire and
Police Pension Plan

Actuarial Experience Study

Analysis of Actuarial Experience During the Period July 1, 2019 through June 30, 2022

Segal

Segal

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

May 10, 2023

Board of Fire and Police Pension Commissioners
City of Los Angeles Fire and Police Pension Plan
701 East 3rd Street, Suite 200
Los Angeles, CA 90013

Re: Review of Actuarial Assumptions for the June 30, 2023 Actuarial Valuation

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience for the City of Los Angeles Fire and Police Pension Plan. This study utilizes the census data for the period July 1, 2019 to June 30, 2022 and provides the proposed actuarial assumptions, both economic and demographic, to be used in the June 30, 2023 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
Vice President and Actuary

EK/

Table of Contents

1. Introduction, Summary, and Recommendations

To project the cost and liabilities of the pension and retiree health plan, 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 July 1, 2019 through June 30, 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 inflation, merit and promotion salary increases, administrative expenses, retirement from active employment, DROP payments suspension months for members who enter DROP on or after February 1, 2019, pre-retirement

[1] An analysis of the ongoing impact of COVID-19 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.

mortality, post-retirement healthy and disabled life mortality, beneficiary mortality, termination, disability incidence and percentage of service connected disability retirements among disability retirement. For the health (OPEB) plan related assumptions, we are recommending changes in the assumptions for retiree medical coverage election, retiree dental coverage election, spousal/domestic partner coverage election, and family coverage election.

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

Page #	Actuarial Assumption Categories	Recommendation
11	**Inflation:** Future increases in the Consumer Price Index (CPI), which drives investment returns and active member salary increases.	Reduce the inflation assumption from 2.75% to 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 current assumption of 2.75% per annum as discussed in Section (3)(A).
15	**Investment Return:** The estimated average future net rate of return on current and future assets of the Plan as of the valuation date. This rate is used to discount liabilities.	Maintain the 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	Reduce the current inflationary salary increase assumption from 2.75% to 2.50% and maintain the current real "across the board" salary increase assumption of 0.50%. This means that the combined inflationary and real "across the board" salary increases will decrease from 3.25% to 3.00%. We recommend adjusting the merit and promotion rates of salary increase as developed in Section (3)(C) to reflect past experience. Overall future merit and promotion salary increases are slightly higher under the proposed assumptions. The recommended total rates of salary increase anticipate lower increases overall than the current assumptions.
29	**Administrative Expenses:** Fees for administration, legal, accounting, and actuarial services, and other functions carried out by the Plan.	Increase the total administrative expense load from 1.40% to 1.45% of projected payroll as discussed in Section (3)(D). The portion allocation to the Retirement Plan and the Health Plan is 1.32% and 0.13% projected payroll, respectively.

Page #	Actuarial Assumption Categories	Recommendation
30	**Mortality Rates:** The probability of dying at each age. Mortality rates are used to project life expectancies.	**Healthy Retirees:** Current & recommended base table: Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and unadjusted for females. **All Beneficiaries:** Current base table: Both not in pay status at the valuation and in pay status at the valuation - Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and females. Recommended base table: Not in pay status at the valuation - No change. In pay status at the valuation - Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and 10% for females. 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 Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and females be used for beneficiary mortality both before and after the expected death of the member. Upon the actual death of the member (i.e. for all beneficiaries in pay status as of the valuation date), we recommend that we use the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and 10% for females, as stated above. **Pre-Retirement Mortality:** Current & recommended base table: Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table. **Disabled Retirees:** Current & recommended base table: Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table. **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. The above mortality rates are recommended for use in the retirement plan valuations. For recommended mortality rates for use in the health plan valuations, please see pages 32, 35, 36 and 40 of this report.
42	**Disability Incidence Rates:** The probability of becoming disabled at each age.	We recommend adjusting the disability rates to those developed in Section (4)(C) to reflect lower incidence of disability. Increase the current assumption from 80% to 85% of all disability retirement will be service connected disability retirement. Maintain the anticipated level of disability benefit (that reflects severity of disability) payable upon disability retirement.

Page #	Actuarial Assumption Categories	Recommendation
47	**Termination Rates:** The probability of leaving employment at each age and receiving either a refund of member contributions or a deferred vested retirement benefit.	We recommend adjusting the termination rates to those developed in Section (4)(D) to reflect a slightly higher incidence of termination.
53	**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 • DROP elections • 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)(E). The retirement rate assumptions anticipate later retirements for Fire members and earlier retirements for Police members overall. For deferred vested members, maintain the assumed retirement age at age 50. Maintain the probability of electing DROP prior to retirement at 95% and maintain the expected period of participation in DROP at 5 years. Decrease the assumption that DROP payments will be suspended from an average of 4.5 months to 3.5 months over the course of the time enrolled in DROP for members who enter DROP on or after February 1, 2019. For active and deferred vested members, maintain the percent married at retirement assumption at 85% for males and 55% for females. Maintain the spouse age difference assumption that male retirees are three years older than their spouses and maintain the assumption that female retirees are two years younger than their spouses.
65	**Retiree Health Assumptions:** Assumptions related to the OPEB plan	We recommend updating the retiree health assumptions to those developed in Section (4)(G). Decrease the retiree medical coverage election assumption at the 10-14 and 15-19 service levels for under age 65, and at the 10-14 and 15-19 service levels for age 65 and over. Increase the retiree medical coverage election assumption at the 25 and over service level for age 65 and over. Increase the retiree dental coverage election assumption from 85% to 90%. Increase the spousal/domestic partner coverage election from 75% to 80%. Increase the percentage of retirees electing family coverage (i.e., spouse and children) from 25% to 35%. Assume that retirees will cover families until the member is age 65.

We have estimated the impact of all the recommended economic and demographic assumptions as if they were applied to the June 30, 2022 retirement plan and health (OPEB) plan actuarial valuations. The table below shows the changes in the employer contribution rates, changes in the Unfunded Actuarial Accrued Liability and changes in the Funding Ratio due to the proposed assumption changes recommended in this report.

Cost Impact of the Recommended Assumptions Based on June 30, 2022 Actuarial Valuation

Impact on Employer Contribution Rate	Retirement Plan	Health Plan	Total
Change in Average Employer Contribution Rate[1]	-1.12%	+0.67%	-0.45%
Change in Average Employer Contribution Amount	-$19.6 Million	+$10.9 Million	-$8.7 Million
Change in Unfunded Actuarial Accrued Liability	-$231.8 Million	+$70.4 Million	-$161.4 Million
Change in Funding Ratio	+0.89%	-1.41%	+0.53%

Of the various assumption changes, the most significant rate decrease is due to the reduction in the salary increase assumption caused by the 0.25% reduction in the inflation 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 is detailed in Section 5.

[1] For the Retirement Plan, the recommended changes in economic assumptions decreased the average employer contribution rate by 0.87% and the recommended changes in demographic assumptions decreased the average employer contribution rate by 0.25%.

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, salary increases, and administrative expenses. 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 and spousal age difference. There are also health (OPEB) plan related assumptions (e.g., percentage of eligible retirees who chose to be covered by the health plan) that we have studied in this report.

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 Plan's investments after accounting for certain investment 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.
- **Administrative Expenses:** These include expenses incurred in connection with the Plan's operation.

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.

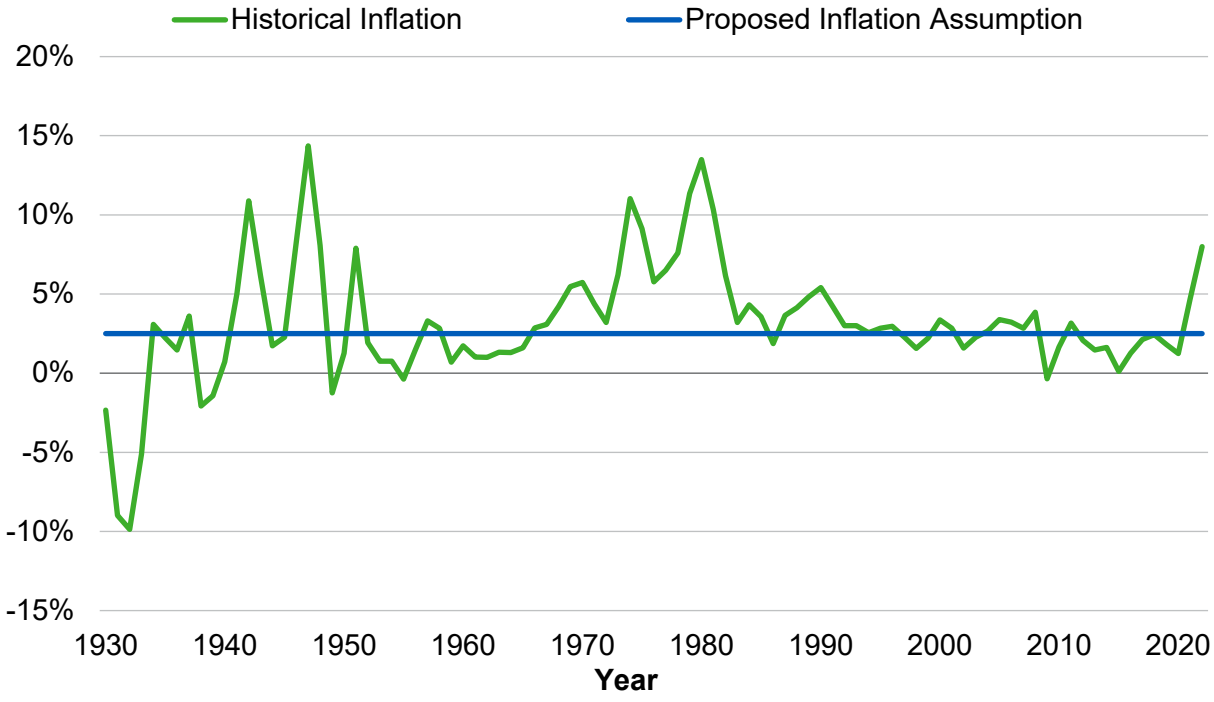
3. Economic Assumptions

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 been relatively steady since the Federal Reserve began to increase interest rates starting around the second quarter of 2022.

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 assumption used by 194 large public retirement funds in their 2021 fiscal year valuations was

[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).

2.50%.[1] In California, CalSTRS and ten[2] 1937 Act CERL systems currently use an inflation assumption of 2.75%, ten 1937 Act CERL systems use an inflation assumption of 2.50%[3] and CalPERS uses an inflation assumption of 2.30%.

LAFPP's investment consultant, RVK, anticipates an annual inflation rate of 2.50% while the average inflation assumption provided by RVK 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 actuarial valuation.[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 thirty-year inflation indexed U.S. Treasury bonds to comparable traditional U.S. Treasury bonds.[7] This "break-even rate" is commonly regarded as a market-based gauge of future inflation expectations. As of April 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 ten 1937 Act CERL Systems, five of those are served by Segal and we would generally expect to recommend 2.50% as the inflation assumption in their next experience study. LAFPP is included in this count.

[3] Four 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 LAFPP.

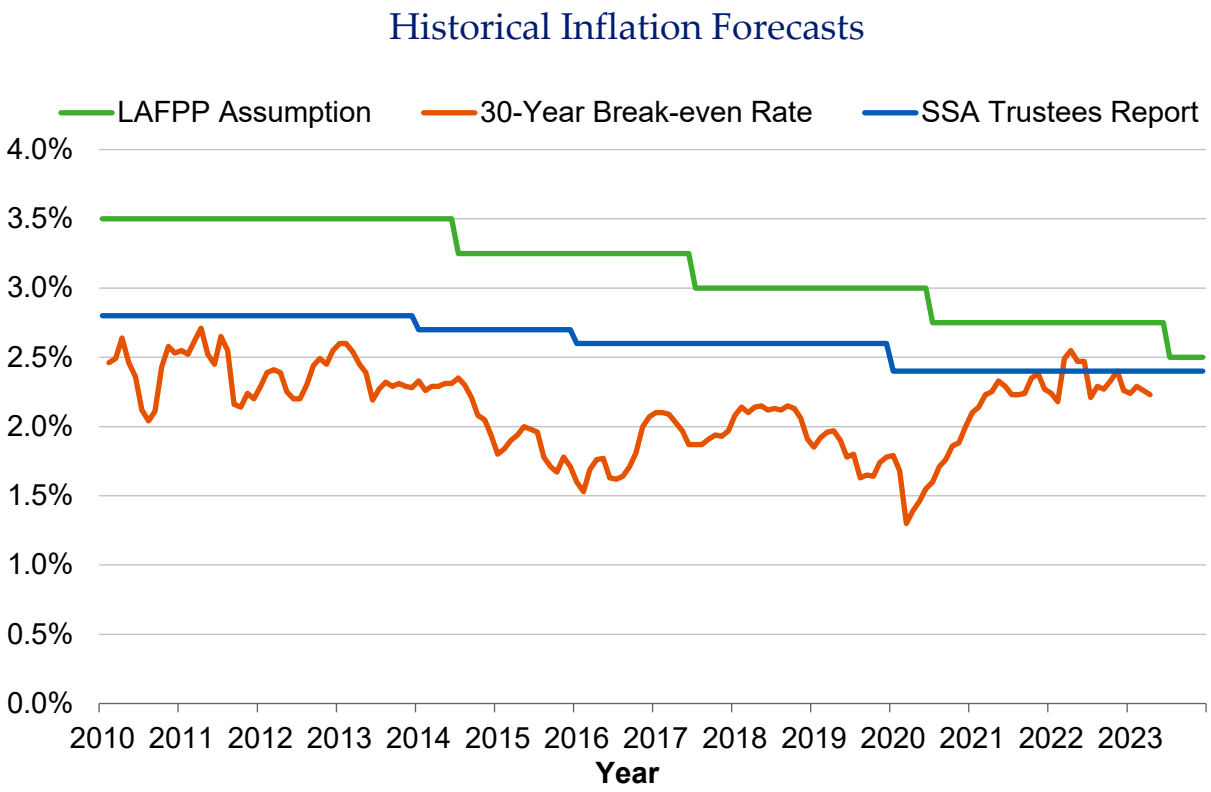
[5] The time horizon used by the six investment consultants included in our review, with the exception of one investment consultant that uses a 1-year horizon, generally ranges from 20 years to 30 years.

[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
May 2021	2.33%	May 2022	2.47%
June 2021	2.29%	June 2022	2.47%
July 2021	2.23%	July 2022	2.21%
August 2021	2.23%	August 2022	2.29%
September 2021	2.24%	September 2022	2.27%
October 2021	2.35%	October 2022	2.33%
November 2021	2.38%	November 2022	2.40%
December 2021	2.27%	December 2022	2.26%
January 2022	2.24%	January 2023	2.24%
February 2022	2.18%	February 2023	2.29%
March 2022	2.49%	March 2023	2.26%
April 2022	2.55%	April 2023	2.23%

The following graph shows Segal's historical and proposed inflation assumptions compared to the two other measures just discussed, going back to 2010. In effect, this compares Segal's assumption to two separate independent forecasts, one based on market observations and one developed by economists at the SSA. The graph shows that over this period, Segal's 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 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 reducing the annual inflation assumption from 2.75% to 2.50%.

Retiree Cost of Living Increases

In our last experience study as of June 30, 2019, consistent with the 2.75% annual inflation assumption adopted by the Board, the Board adopted 2.75% as the assumption for retiree cost-of-living adjustments (COLA).

In the last experience study, we set the recommended post-retirement COLA assumption to be equal to our recommended inflation assumption. However, we observed in the table below that during the most recent 5-year, 10-year and 20-year periods ending before December 31, 2022, the changes in the Annual CPI based on Los-Angeles-Long Beach-Anaheim area used by the Board to set COLAs have generally exceeded those of the December-to-December CPI for the U.S. City Average.

	Change in Annual CPI for Los Angeles–Long Beach–Anaheim Area	Changes in Annual 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%

In order to reflect this experience and to mitigate actuarial losses which may arise from future COLA increases greater than the inflation assumption, we believe it is reasonable for the Board to consider adopting an extra margin above the general price inflation in anticipating future COLAs. Accordingly, **our recommended COLA assumption of 2.75% includes a 0.25% margin above our recommended inflation assumption, which leaves the COLA assumption unchanged for retirees in all tiers.**

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% 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 assumptions consistent with the long-term annual inflation assumptions as we have in prior years.

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 Plan'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 RVK's total or "nominal" 2023 return assumptions by their assumed 2.50% inflation rate. The second column of returns (except for Unconstrained Fixed Income and REIT) 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 RVK 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.

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

Asset Class	Percentage of Portfolio	RVK'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]
Large Cap U.S. Equity	23.00%	4.25%	6.00%
Small Cap U.S. Equity	6.00%	4.75%	6.65%
Developed International Equity	16.00%	6.00%	7.01%
Emerging Markets Equity	5.00%	8.75%	8.80%
U.S Core Fixed Income	9.90%	1.50%	1.97%
High Yield Bonds	2.75%	4.75%	4.63%
Global Credit	2.75%	(0.25%)	0.89%
TIPS	4.40%	1.50%	1.77%
Real Estate	7.00%	3.25%	3.86%
Commodities	1.00%	3.50%	4.21%
Cash Equivalents	1.00%	0.00%	0.63%
Private Equity	14.00%	7.50%	9.84%
Private Credit	2.00%	5.50%	6.48%
Unconstrained Fixed Income	2.20%	2.50%	2.50%[3]
REITS	3.00%	5.25%	5.25%[3]
Total	**100.0%**	**4.63%**	**5.80%**

Generally, the above are representative of "indexed" returns for securities that are publicly traded, returns net of investment management 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 supporting data, that such superior or inferior returns represent a reasonable expectation over the long term."

[1] The rates shown have been estimated by Segal by taking RVK's nominal projected arithmetic returns and reducing by RVK's assumed 2.50% inflation rate to develop the assumed real rate of return shown.

[2] These are based on the projected arithmetic returns provided by RVK and five other investment advisory firms serving the LAFPP 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 these asset classes, RVK's assumptions are applied in lieu of the average because there are larger disparity in returns for these asset classes among the firms surveyed and using RVK's assumption should more closely reflect the underlying investments made specifically for LAFPP.

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 Plan'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 5.80% portfolio net real rate of return be used to determine LAFPP's investment return assumption, but with some caution. This return is 0.81% higher than the 4.99% gross return that was used three years ago in the review of the recommended investment return assumption for the June 30, 2020 valuation even before we consider the approximately 0.30% in investment management expense that, as discussed in the next section, will no longer be subtracted from the 5.80% gross return.
5. The 0.81% increase in the portfolio net real rate of return since the 2020 review is due to changes in the real rate of return assumptions provided to us by the investment advisory firms (+0.69% under the 2020 asset allocation), changes in LAFPP's target asset allocation (+0.13%) and the interaction effect between these changes (-0.01%). We believe the increase in the real rates of return may be due to the very low returns earned in the 2021-2022 plan 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.

Investment Expenses

For funding purposes, the real rate of return assumption for the portfolio needs to be adjusted for investment expenses expected to be paid from investment income. In the prior experience studies, we had adjusted the gross real rate of return developed using the target asset allocation by the investment expenses expected to be paid by LAFPP.

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 but exclude investment manager fees. During 2021/2022, the above expenses totaled $3 million which is only about 0.01% in relation to the actuarial value of assets as of the beginning of the year. While we have not investigated whether other investment expenses reported on LAFPP's financial statements should be added to the $3 million, we have observed somewhat greater value than 0.01% of assets at other systems. Even though our recommended investment return is not directly driven by this percentage, we have decided to use an assumption of 0.10% (which is still reduced from the 0.40% that we used in the last experience study when we included all investment expenses) to provide some margin until we can collect more information to fine tune this assumption in the future experience studies.

Based on the above experience, we recommend reducing the investment expense component of the investment return assumption from 0.40% to 0.10%.

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. LAFPP's asset allocation determines this portfolio risk, since risk levels are driven by the variability of returns for the various asset classes and the 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 5.80% 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 actuarial assumptions are met in the future.[2] That is the basis used in Segal's previous experience studies for LAFPP.

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 plan 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

[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.

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 0.34%, corresponding to a 15-year confidence level of 54%, based on an annual portfolio return standard deviation of 12.20% provided by RVK 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 12.70% provided by RVK, the corresponding risk adjustment would be 0.35%. 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 7.55%, 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 2021-2022 plan year, as well as the increase in the federal funds rate during 2022, and so could be overly optimistic for use in selecting a long-term investment return assumption. For that reason, for this comparison value we considered a net investment return assumption of 7.00% which, together with the other investment return components, would produce a risk adjustment of 0.90% which corresponds to a confidence level of 60% under the model and expense adjustment used in prior studies. We believe this increase in confidence level is appropriate given the concerns stated.

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 12.70% provided by RVK, the adjustment to an expected geometric average return reduces the expected return by 0.75%.

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 7.45%, which is higher than the current assumption of 7.00%. In applying this model to LAFPP for the first time we again considered a net investment return assumption of 7.00% which, together with the other investment return components, would produce a risk adjustment of 0.45% which under the expected geometric average return model corresponds to a confidence level of 55%.

[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.

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.

Assumption Component	June 30, 2023 Recommended Value	June 30, 2023 Comparison Values	June 30, 2020 Adopted Value
Inflation	2.50%	2.50%	2.75%
Portfolio Expected Arithmetic Real Rate of Return	5.80%	5.80%	4.99%
Expense Adjustment	(0.10)%	(0.40)%[1]	(0.40)%
Adjustment to Expected Geometric Real Rate of Return	(0.75)%	N/A	N/A
Risk Adjustment	(0.45)%	(0.90)%	(0.34)%
Total	**7.00%**	**7.00%**	**7.00%**
Confidence Level	**55%**	**60%**	**54%**

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

The table below shows LAFPP's 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 June 30	Investment Return[2]	Risk Adjustment	Corresponding Confidence Level
2007 - 2010	8.00%	1.35%	65%
2011 - 2013	7.75%	1.03%	62%
2014 - 2016	7.50%	0.52%	56%
2017 - 2019	7.25%	0.46%	55%
2020 - 2022	7.00%	0.34%	54%
2023 (Comparison)	7.00%	0.90%	60%
2023 (Recommended)	7.00%	0.45%	55%

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 LAFPP has positioned itself

[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] The investment returns starting in 2014 are gross of administrative expenses.

relative to risk over periods of time.[1] The use of either a 55% or 60% confidence level should be considered in context with other factors, including:

- 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 RVK. 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."

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.[2] 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.[3] 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 LAFPP 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 comparable confidence levels.

[1] 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."

[2] 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.

[3] 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 management investment 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 51% 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 on their most recent survey published in August 2022. While the above likelihood of 51% is substantially less than the corresponding likelihood of 58% that we observed in this comparison during the review of 2020, some of the investment advisory firms that participated in the 2022 Horizon survey have since raised their capital market assumptions. We believe it is reasonable to expect the likelihood of 51% to increase if we were to revise these results using the updated capital market assumptions when the 2023 Horizon survey becomes available.

Comparison 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 LAFPP 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. In particular, of the twenty 1937 Act CERL systems, seven use a 7.00% investment return assumption, eight use 6.75%, two use 6.50% and one uses 6.25%. The remaining two 1937 Act CERL systems currently use a 7.25% earnings assumption. Furthermore, CalSTRS currently uses a 7.00% earnings assumption and CalPERS uses a 6.80% earnings assumptions, 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 LAFPP'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	**LAFPP**	**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.

In summary, we believe the recommended assumption of 7.00% provides for an appropriate risk margin within the risk adjustment model and is consistent with LAFPP's historical practice

[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).

relative to other public systems. However, the Board should note that, because of the reduction in the inflation component from 2.75% to 2.50%, this 7.00% assumption implicitly reflects an increase in the net real return assumption from 4.25% to 4.50%[1]. The Board should also be aware that some systems have reduced their investment return assumption by 0.25% or more in their recent experience studies, primarily because of the same reduction in the inflation component.

[1] That is, from 7.00% - 2.75% = 4.25% currently to 7.00% - 2.50% = 4.50% recommended.

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 reducing the annual inflation assumption from 2.75% to 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 LAFPP's active members, the actual average inflation plus "across the board" increase (i.e., wage inflation) over the three-year period ending June 30, 2022 was 3.7%, which is lower than the change in CPI of 3.9% during that same period, largely as a result of the inflation spike discussed above and the agreements between the employer and the employees to defer some wage increase:

Valuation Date	Actual Average Increase[1]	Actual Annual-to-Annual Change in CPI[2]
June 30, 2020	5.7%	3.4%
June 30, 2021	6.0%	1.0%
June 30, 2022	-0.6%	7.4%
Three-Year Average	**3.7%**	**3.9%**

[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.

[2] Based on the change in the February CPI for the Los Angeles-Long Beach- Anaheim Region compared to the prior year.

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 decrease from 3.25% to 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 LAFPP, there are service-specific merit and promotion increase assumptions.

   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. 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 decreases during any particular year;
   c. Categorizing these increases into groups by years of service;
   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 from the current 3-year study period and the prior 3-year period from the prior study for the past six years. We believe that when the experience from the current and prior studies are reviewed together, it provides a more reasonable representation of potential future merit and promotion salary increases over the long term.

   We observed some spike in salary increases when member reaches about 10, 15 and 20 years of service. Upon consultation with LAFPP, we understand that there are some longevity bonuses that are paid to certain classification of members at those years of service. Based on this information and the data we observed, we have proposed higher increases in the assumption for those three service groups.

The following table shows the actual average merit and promotion increases by years of service over the three-year period from July 1, 2019 through June 30, 2022 and the three-year period from July 1, 2016 through June 30, 2019. 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 (3.7% on average for the current three-year period, 2.9% on average for the prior three-year period).

Merit and Promotion Increases (%)

Years of Service	Current Assumption	Actual Average Increase from Current Study (Last 3 Years)	Actual Average Increase from Prior Study (Prior 3 Years)	Proposed Assumption
Less than 1	9.00	7.88	10.40	9.00
1 – 2	7.50	5.64	8.08	7.00
2 – 3	6.50	5.79	7.00	6.50
3 – 4	5.50	5.83	5.63	5.50
4 – 5	4.00	4.76	3.91	4.00
5 – 6	2.60	3.26	2.53	2.75
6 – 7	2.20	1.84	1.96	2.00
7 – 8	2.00	1.17	1.58	2.00
8 – 9	2.00	1.86	2.50	2.00
9 – 10	2.00	2.86	3.38	2.50
10 – 11	1.90	0.83	1.89	1.90
11 – 12	1.80	1.03	1.99	1.80
12 – 13	1.70	1.12	1.82	1.70
13 – 14	1.60	1.43	2.27	1.60
14 – 15	1.50	2.18	2.67	2.00
15 – 16	1.40	1.14	1.65	1.40
16 – 17	1.30	0.89	1.53	1.30
17 – 18	1.20	0.60	1.44	1.20
18 – 19	1.20	0.79	1.77	1.20
19 – 20	1.10	1.54	2.22	1.60
20 – 21	1.00	1.21	1.30	1.00
21 – 22	1.00	0.99	1.21	1.00
22 – 23	1.00	0.72	1.24	1.00
23 – 24	1.00	1.22	1.07	1.00
24 – 25	1.00	0.79	1.35	1.00
25 & Over	0.90	0.76	1.03	0.90

Based on this experience, overall we recommend increasing the merit and promotion salary increase assumptions. The overall salary increase assumptions will decrease after taking into account the lower inflation component of the salary increase assumption.

Chart 1 compares the actual merit and promotion increase experience with the current and proposed assumptions.

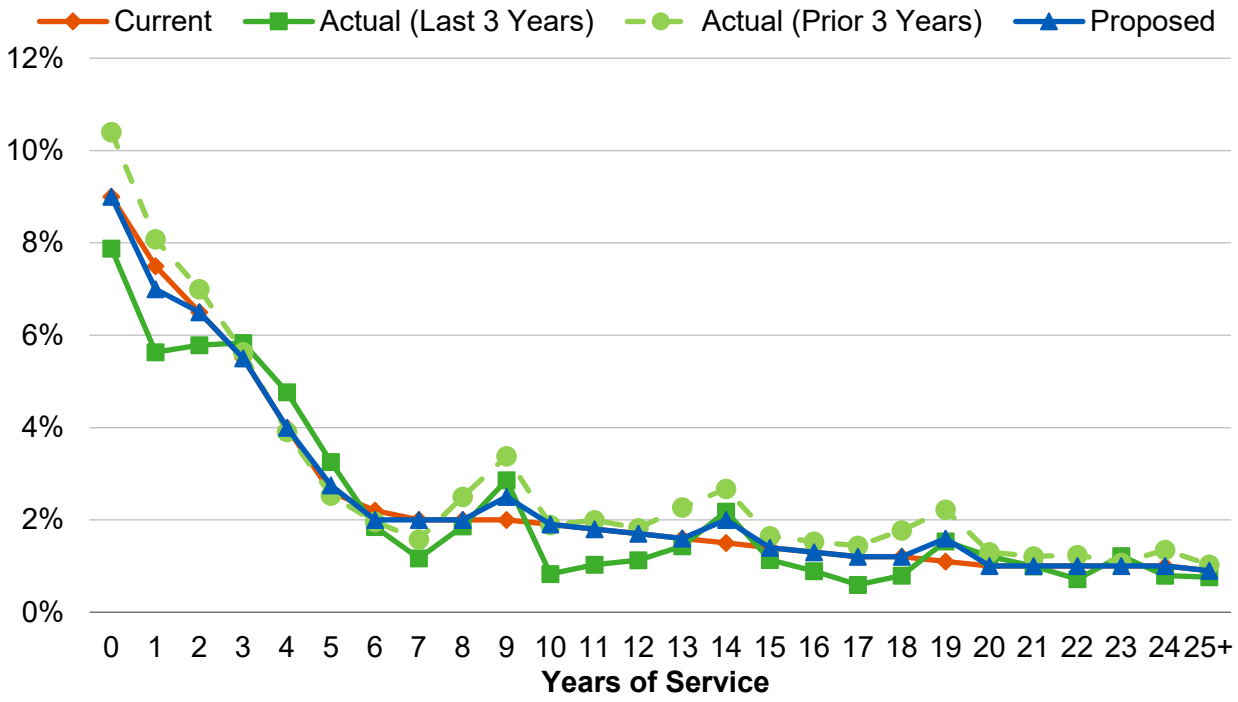
Active Member Payroll

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 reducing the payroll growth assumption from 3.25% to 3.00% annually.

Chart 1: Merit and Promotion Salary Increase Rates



D. Administrative Expenses

Like benefit payments made to members, expenses incurred in connection with the plan's operation are paid from Plan assets. These expenses include fees for administrative, legal, accounting, and actuarial services, as well as routine costs for printing, mailings, computer-related activities, and other functions carried out by the plan. They do not include investment-related expenses.

To reflect future administrative expenses in the contribution rates, the total assumed administrative expense load is included in the employer contribution rates in each actuarial valuation.

The following table shows actual administrative expenses for both the Retirement and Health plans combined as a percent of covered payroll for the five-year period ending June 30, 2022.

Administrative Expenses as a Percentage of Covered Payroll ($ in 000's)

Year Ending June 30	Covered Payroll	Administrative Expenses	Administrative %
2018	$1,450,114	$21,654	1.49%
2019	1,487,978	22,100	1.49%
2020	1,509,613	22,668	1.50%
2021	1,603,349	23,513	1.47%
2022	1,598,685	24,442	1.53%
Five-Year Average			**1.50%**
Current Assumption			**1.40%**
Proposed Assumption			**1.45%**

Based on this experience, we recommend increasing the administrative expense assumption from 1.40% to 1.45% of projected payroll.

This expense will be allocated to the employer contribution rates for the retirement and health plans in the amounts of 1.32% and 0.13%, respectively if paid biweekly. This breakdown is proportional to the expenses allocated to the retirement and health plans in the five-year period ending June 30, 2022.

4. Demographic Assumptions

A. 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). The "healthy" pre-retirement (employee) mortality rates project what proportion of members will die before retirement.

The Public Retirement Plans Mortality tables (Pub-2010) were published by the Retirement Plans Experience Committee (RPEC) of the SOA in 2019. These were the first published mortality tables 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 on an "amount weighted" basis, with higher credibility assigned to experience from annuitants and employees receiving larger benefits and salaries, respectively.

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 and is now the established practice within the actuarial profession.

Periodically[1] RPEC publishes updates to their mortality improvement scales. The two-dimensional mortality improvement scale MP-2021 is the latest improvement scale available as of the date of this report.

For the retirement plan, we continue to recommend using the "amount weighted" above-median version of the Pub-2010 mortality tables (adjusted for LAFPP experience as discussed herein).

We also continue to recommend that the mortality improvement scale be adopted and applied generationally where each future year has its own mortality table that reflects the forecasted improvements. We recommend that the MP-2021 mortality improvement scale be used.

In order to reflect more LAFPP experience in our analysis of the mortality assumption, we have used experience over a twelve-year period by using data from the current experience study period (from July 1, 2019 through June 30, 2022) and the last three experience study periods (from July 1, 2016 through June 30, 2019, from July 1, 2013 to June 30, 2016, and from July 1, 2010 to June 30, 2013). LAFPP has provided us with listing of COVID-19 related deaths

[1] We understand that RPEC generally publishes an update to their mortality improvement scale annually based on the newest mortality data available. However, the mortality data observed during 2020 (which would have been the newest data available to develop a mortality improvement scale for 2022) was severely impacted by the COVID-19 pandemic and RPEC elected to not release a new mortality improvement scale for 2022 that would have incorporated the substantially higher rate of mortality experience from 2020. Therefore, the MP-2021 remains the most recent mortality improvement scale published.

which approximated about 30 deaths over each of 2020-2021 and 2021-2022. While those deaths caused a spike in actual mortality experience for those two years, the impact could be considered relatively minor when averaged over the twelve-year experience we used in our study.

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[1], where full credibility means a 90% confidence that the actual experience will be within 5% of the expected value. In our recommended assumptions, we have adjusted the Pub-2010 mortality tables to fit LAFPP's experience based on the full or partial credibility for the given retiree group.

Post-Retirement Mortality (Service Retirements) – Retirement Plan

The current mortality table used for post-retirement mortality is as follows:

- Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and unadjusted for females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

The following table shows the observed benefit weighted deaths for heathy retired members based on the actual experience during the twelve years studied. Also shown are the expected benefit weighted deaths under the current and proposed assumptions. This information is shown separately by gender.

As discussed, 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.

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

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	$161.5	$160.8	$161.3
Female	$4.1	$3.5	$4.0
Total	**$165.6**	**$164.3**	**$165.3**
Actual / Expected	**99%**		**99%[2]**

[1] The number of deaths needed for full credibility for an "amount" weighted mortality table is generally higher and based on the dispersion of the benefit amount for a given retiree group.

[2] If we use the benchmark Pub-2010 Safety table without any adjustment, the proposed actual to expected ratio would be 104%.

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased members.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

Based on standard statistical theory, the data used in our analysis for female retired member post-retirement mortality is only partially credible under the recommended "amount-weighted" basis when dispersion of retirees' benefit amounts is considered. Therefore, the proposed mortality table reflects only a partial adjustment for actual LAFPP experience. Conversely, due to the volume of data used in our analysis for male retired member post-retirement mortality, the data is fully credible and a full adjustment has been made to reflect actual LAFPP experience.

We recommend updating the mortality table used for post-retirement mortality to the following:

- Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and unadjusted for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 2 compares the number of actual to expected deaths on an amount-weighted basis for Service Retirement members over the past twelve years for the current and proposed assumptions.

Chart 3 shows the life expectancies (i.e., expected future lifetime) under the current and proposed tables for Service Retirement members on an amount-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase in accordance with the mortality improvement scale.

Post-Retirement Mortality (Service Retirements) – Health Plan

The above mortality tables developed on a benefit-weighted basis are recommended for use in the valuation for the retirement plan. As health benefits provided by LAFPP are not dependent on the level of retirement income received by the retirees or beneficiaries, mortality tables developed on a headcount-basis are recommended for use in the valuation for the health plan. In particular, we recommend using the same rate adjustments from the benefit-weighted basis table that we recommended for the retirement plan valuation.

The current mortality table used for post-retirement mortality is as follows:

- Pub-2010 Safety Healthy Retiree Headcount-Weighted Above-Median Mortality Table increased by 5% for males and unadjusted for females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Healthy Retiree Mortality Experience – Headcount Weighted

Gender	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	2,507	2,564	2,504
Female	69	62	69
Total	**2,576**	**2,626**	**2,573**
Actual / Expected	**102%**		**102%**

Notes:

1. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
2. Results may not add due to rounding.

We recommend updating the mortality table used for post-retirement mortality for the health plan to the following:

- Pub-2010 Safety Healthy Retiree Headcount-Weighted Above-Median Mortality Table increased by 5% for males and unadjusted for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Beneficiary Mortality – Retirement Plan

The current mortality table used for beneficiary mortality is as follows:

- Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

In studying the mortality for the beneficiaries in our prior and the current studies, we reviewed the actual death compared to the expected deaths and recommended using the General Healthy Retiree table for the beneficiaries. This is the case even though in performing beneficiary mortality studies recently for some of our other clients, we have considered the Pub-2010 Contingent Survivor mortality table that was developed based only on contingent survivor data after the death of the retirees.

The following table shows the observed benefit weighted deaths for beneficiaries during the twelve years studied. Also shown are the expected benefit weighted deaths under the current and proposed assumptions. This information is shown separately by gender.

Beneficiary Mortality Experience – Benefit Weighted
($ in millions)

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	$0.6	$1.1	$0.6
Female	$77.2	$84.6	$80.7
Total	$77.7	$85.7	$81.3
Actual / Expected	**110%**		**105%**[1]

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased beneficiaries.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

The proposed mortality table reflects current experience to the extent that the experience is credible based on standard statistical theory. For LAFPP, there is less data available for beneficiaries, particularly for male beneficiaries, so it is only given partial credibility and the proposed tables are only slightly adjusted.

We recommend updating the mortality table used for beneficiary mortality to the following:

- **Not in Pay Status at the Valuation**: Continuation of the current Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and females, but projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **In Pay Status at the Valuation**: Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

As noted above, we have recently begun to recommend the Contingent Survivor mortality tables (with higher mortality rates) for beneficiaries after the death of the member, but the General Healthy Retirees tables (with lower mortality rates) for beneficiaries before the death of the member. However, as we do not have mortality experience for beneficiaries before the death of the member reported in the data for the annual valuation, we have chosen to retain the General Healthy Retirees mortality tables for predicting mortality for beneficiaries both before and after the death of the member. We recommend that before the next experience study, we work with LAFPP to collect data on beneficiary deaths while the member is still alive so that we can study the mortality experience for beneficiaries before the member's death. At that time, we will also consider using the Contingent Survivor mortality tables for beneficiaries in pay status at the date of the valuation.

[1] If we used the benchmark Pub-2010 General Healthy Retiree table without any adjustment, the proposed actual to expected ratio would be 116%.

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 member but increased by 5% for males and females. 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 General Healthy Retiree mortality tables increased by 5% for males and 10% for females. 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.

Beneficiary Mortality – Health Plan

The current mortality table used for all beneficiary mortality (both before and after the member's death) is as follows:

- Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Table increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2019.

Beneficiary Mortality Experience – Headcount Weighted

Gender	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	14	26	14
Female	1,574	1,751	1,647
Total	**1,588**	**1,777**	**1,661**
Actual / Expected	**112%**		**107%**

Notes:

1. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
2. Results may not add due to rounding.

We recommend updating the mortality table used for beneficiary mortality for the health plan to the following:

- **Not in Pay Status at the Valuation**: Continuation of the current Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Table increased by 5% for males and females, but projected generationally with the two-dimensional mortality improvement scale MP-2021.

- **In Pay Status at the Valuation**: Pub-2010 General Healthy Retiree Headcount-Weighted Above-Median Mortality Table increased by 5% for males and 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Pre-Retirement Mortality – Retirement Plan

The current mortality table used for pre-retirement mortality is as follows:

- Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional mortality improvement scale MP-2019.

We have included six years' of data (3 years in this study and 3 years from the prior study). Even with six years of data, there is much less data available, so it is given little credibility when adjusting the base table.

The following table shows the observed salary weighted deaths for active members during the twelve years studied. Also shown are the expected salary weighted deaths under the current and proposed assumptions. This information is shown separately by gender. As shown in the table below, the proposed mortality table have an actual to expected ratio of 104% after adjustment 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.

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

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	$6.68	$6.37	$6.68
Female	$0.80	$1.41	$0.78
Total	**$7.48**	**$7.78**	**$7.46**
Actual / Expected[1]	**104%**		**104%**

Notes:

1. Experience shown above is weighted by annual salary for deceased members.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

The proposed mortality table reflects current experience to the extent that the experience is credible based on standard statistical theory. For LAFPP, there is less data available for active members, so it is only given partial credibility and the proposed tables are only slightly adjusted.

We recommend updating the mortality table used for pre-retirement mortality to the following:

- Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Pre-Retirement Mortality – Health Plan

The current mortality table used for pre-retirement mortality is as follows:

- Pub-2010 Safety Employee Headcount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional mortality improvement scale MP-2019.

[1] We observed some spike in actual mortality rates in 2020-2021. If we exclude the 2020-2021 data in our analysis, the proposed actual to expected ratio would be 90%.

Pre-Retirement Mortality Experience – Headcount Weighted

Gender	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	59.3	53.0	59.3
Female	7.2	12.0	7.1
Total	**66.5**	**65.0**	**66.4**
Actual / Expected	**98%**		**98%**

Notes:

1. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
2. Results may not add due to rounding.

We recommend updating the mortality table used for pre-retirement mortality for the health plan to the following:

- Pub-2010 Safety Employee Headcount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 2: Post-Retirement Benefit-Weighted Deaths ($ in Millions)
Service Retirement Members (July 1, 2010 through June 30, 2022)

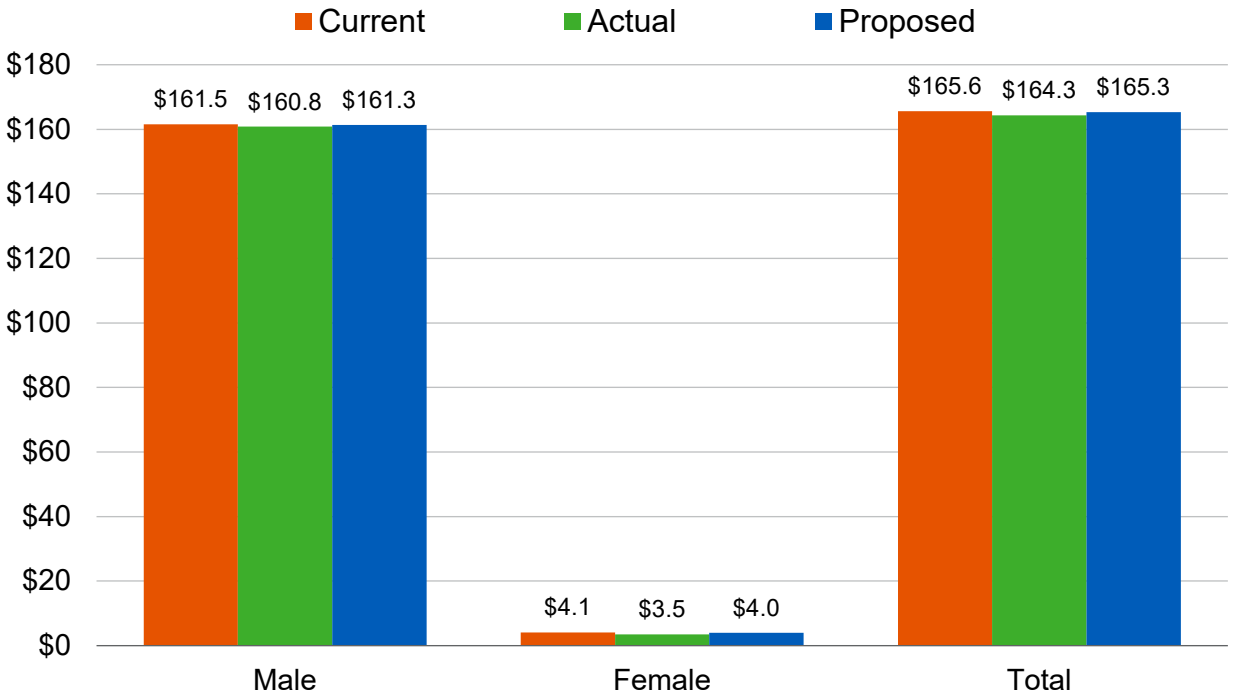
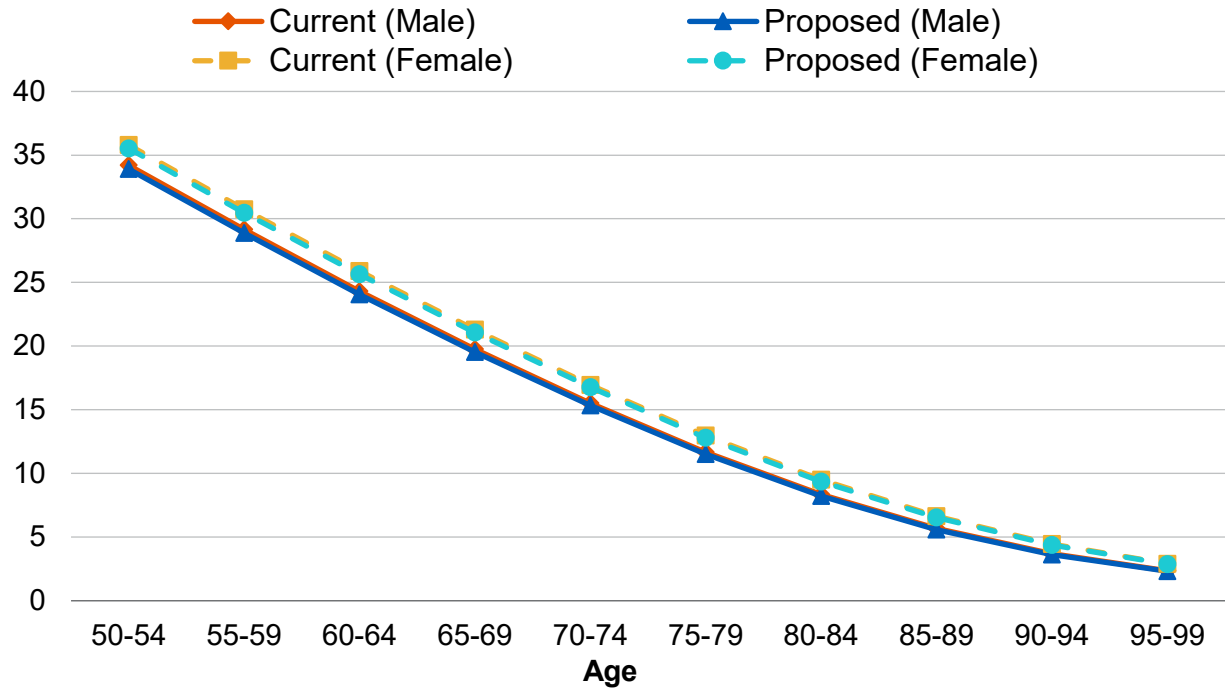


Chart 3: Benefit-Weighted Life Expectancies
Service Retirement Members



B. Mortality Rates - Disabled

Since mortality rates for disabled members can vary from those of healthy members, a different mortality assumption is often used.

Post-Retirement Mortality (Disability Retirements) – Retirement Plan

The current mortality table used for disabled mortality is as follows:

- Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table projected generationally with the two dimensional mortality improvement scale MP-2019.

The following table shows the observed benefit weighted deaths for disabled retired members over the twelve years studied. Also shown are the expected benefit weighted deaths under the current and proposed assumptions. This information is shown separately by gender.

Disabled Retiree Mortality Experience – Benefit Weighted
($ in millions)

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	$43.0	$43.0	$43.0
Female	$1.0	$0.8	$1.0
Total	**$44.0**	**$43.8**	**$43.9**
Actual / Expected	**99%**		**100%**

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased members.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

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 LAFPP, there is less data available for disabled retirees, particularly for females, so it is only given partial credibility and ultimately the proposed tables are not adjusted.

We recommend updating the mortality table used for disabled mortality to the following:

- Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table projected generationally with the two dimensional mortality improvement scale MP-2021.

Chart 4 compares the number of actual to expected deaths on an amount-weighted basis for Disabled members over the past twelve years for the current and proposed assumptions.

Chart 5 shows the life expectancies (i.e., expected future lifetime) under the current and proposed tables for Disabled members on an amount-weighted basis. Life expectancies under

the current and proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase in accordance with the mortality improvement scale.

Post-Retirement Mortality (Disability Retirements) – Health Plan

The current mortality table used for disabled mortality is as follows:

- Pub-2010 Safety Disabled Retiree Headcount-Weighted Mortality Table projected generationally with the two dimensional mortality improvement scale MP-2019.

Disabled Retiree Mortality Experience – Headcount Weighted

Gender	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	792	741	791
Female	26	20	25
Total	**818**	**761**	**816**
Actual / Expected	**93%**		**93%**

Notes:

1. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
2. Results may not add due to rounding.

We recommend updating the mortality table used for disabled mortality to the following:

- Pub-2010 Safety Disabled Retiree Headcount-Weighted Mortality Table projected generationally with the two dimensional mortality improvement scale MP-2021.

Chart 4: Post-Retirement Benefit-Weighted Deaths ($ in Millions)
Disabled Members (July 1, 2010 through June 30, 2022)

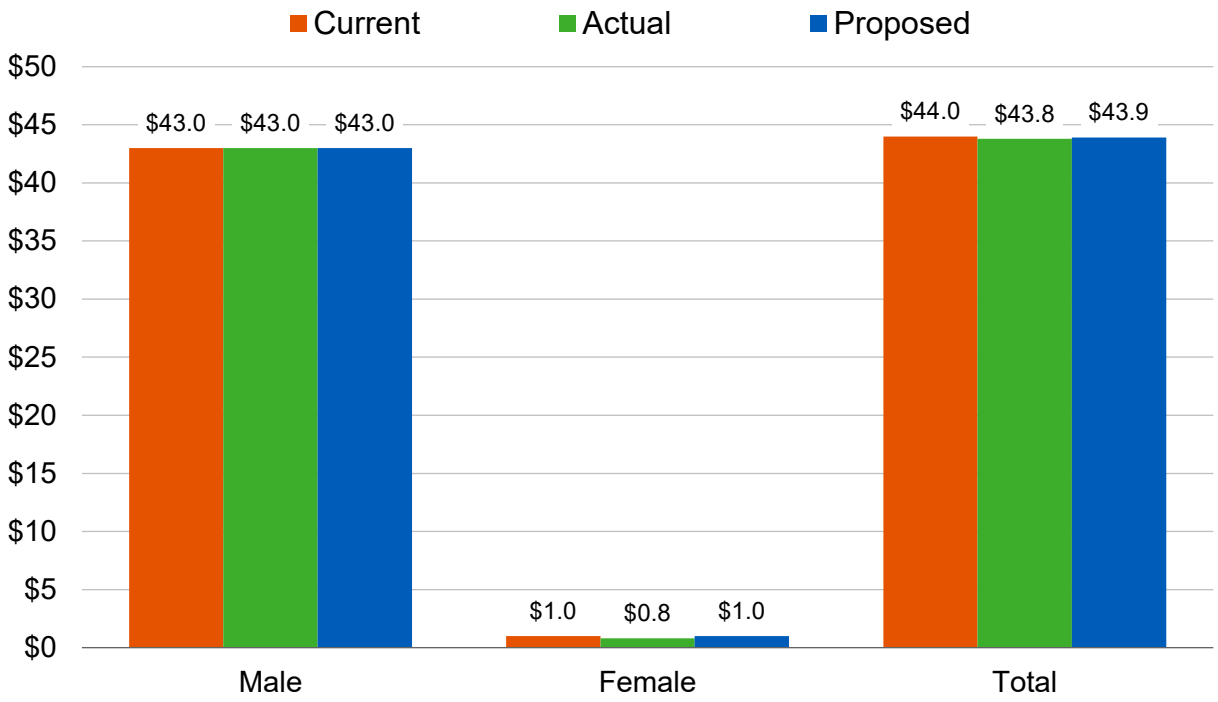
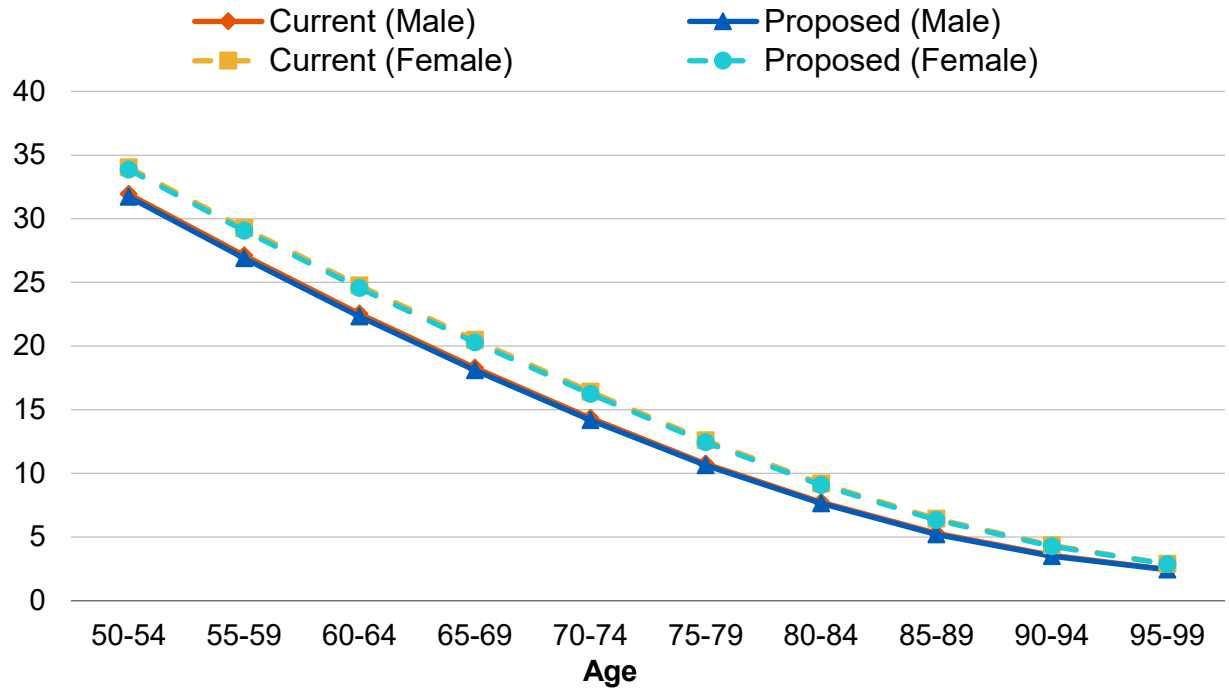


Chart 5: Benefit-Weighted Life Expectancies
Disabled Members



C. Disability Incidence Rates

When a member becomes disabled, they may be entitled to a service connected disability benefit or a non-service connected disability benefit.

The current disability assumptions are a function of age and they have been developed separately for Fire and Police members. Additionally, they are only applied to members not eligible for the DROP and the actual rates below have been calculated consistent with this methodology. **We recommend maintaining the current structure and methodology for the disability incidence rates.**

The following table shows the observed disability incidence rates for Fire members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. Please note that we have combined service and non-service connected disability incidence in the table below.

Disability Incidence[1] Rates (%) – Fire

Age	Current Rate	Actual Rate	Proposed Rate
20 – 24	0.01	0.00	0.01
25 – 29	0.01	0.00	0.01
30 – 34	0.03	0.00	0.02
35 – 39	0.08	0.06	0.07
40 – 44	0.10	0.06	0.09
45 – 49	0.15	0.07	0.12
50 – 54	0.20	0.00	0.15
55 – 59	1.00	0.00	0.50
60 – 64	1.00	0.00	0.50
65 – 69	0.00	0.00	0.00

Based on this experience, we recommend slightly decreasing the disability incidence rate assumption for Fire members.

Chart 6 compares the number of actual to expected service and non-service connected disabilities for Fire members over the past three years for the current and proposed assumptions.

Chart 7 compares the actual disability incidence experience for Fire members with the current and proposed assumptions.

The following table shows the observed disability incidence rates for Police members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. Please note that we have combined service and non-service connected disability incidence in the table below.

[1] Total rate for service connected and non-service connected disabilities.

Disability Incidence[1] Rates (%) – Police

Age	Current Rate	Actual Rate	Proposed Rate
20 – 24	0.01	0.00	0.01
25 – 29	0.03	0.00	0.01
30 – 34	0.05	0.03	0.04
35 – 39	0.09	0.12	0.10
40 – 44	0.20	0.26	0.23
45 – 49	0.25	0.28	0.27
50 – 54	0.35	0.25	0.30
55 – 59	0.50	0.32	0.40
60 – 64	0.75	0.71	0.75
65 – 69	0.00	0.00	0.00

Based on this experience, we recommend slightly decreasing the disability incidence rate assumption for Police members.

Chart 8 compares the number of actual to expected service and non-service connected disabilities for Police members over the past three years for the current and proposed assumptions.

Chart 9 compares the actual disability incidence experience for Police members with the current and proposed assumptions.

Service vs. Non-Service Connected Disability

The following table shows the observed percentage of new disabled members that received a service connected disability based on the actual experience over the past three years. Also shown are the current and proposed assumptions.

Disabled Members Receiving a Service Connected Disability

Current Assumption	80%
Actual Experience	93%
Proposed Assumption	**85%**

Based on this experience, we recommend increasing the current assumption from 80% to 85% of disabilities will be service connected disabilities. The remaining 15% are assumed to be non-service connected disabilities.

Level of Disability Benefit

The level of disability benefit (expressed as a percentage of Final Average Salary) is dependent on the severity of disability.

[1] Total rate for service connected and non-service connected disabilities.

For those members who started to receive a disability benefit during the last 3 years, we estimated the percentage of final average salary paid by dividing the disability benefit paid upon retirement by the approximate final average salary reported in the valuation data file immediately preceding the date of disability retirement.

Non-Service Connected Disability Benefits
(as a % of Final Average Salary)

Current Assumption	45%
Actual Experience	45%
Proposed Assumption	**45%**

Service Connected Disability Benefits
(as a % of Final Average Salary)

	Less than 20 Years of Service	20 – 30 Years of Service	More than 30 Years of Service
Current Assumption	55%	60%	75%
Actual Experience	57%	62%	No Data
Proposed Assumption	**55%**	**60%**	**75%**

Based on this experience, we recommend maintaining all the current assumptions.

Chart 6: Actual Number of Disabilities Compared to Expected – Fire

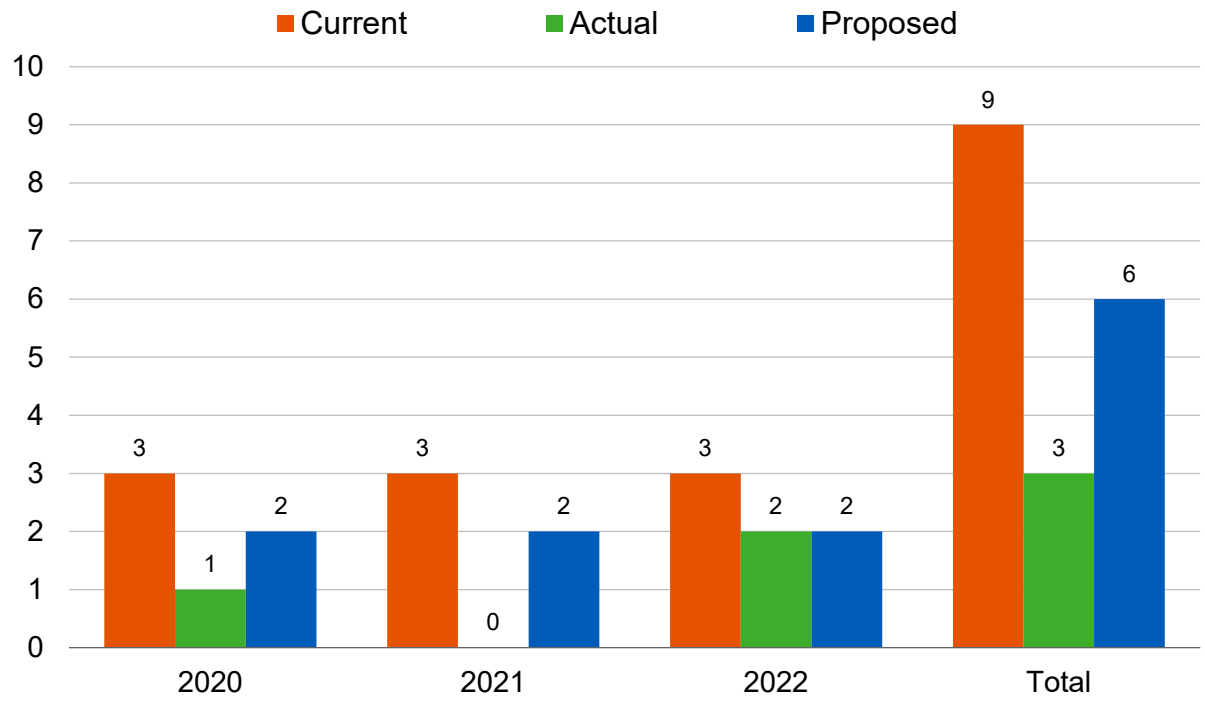


Chart 7: Disability Incidence Rates – Fire

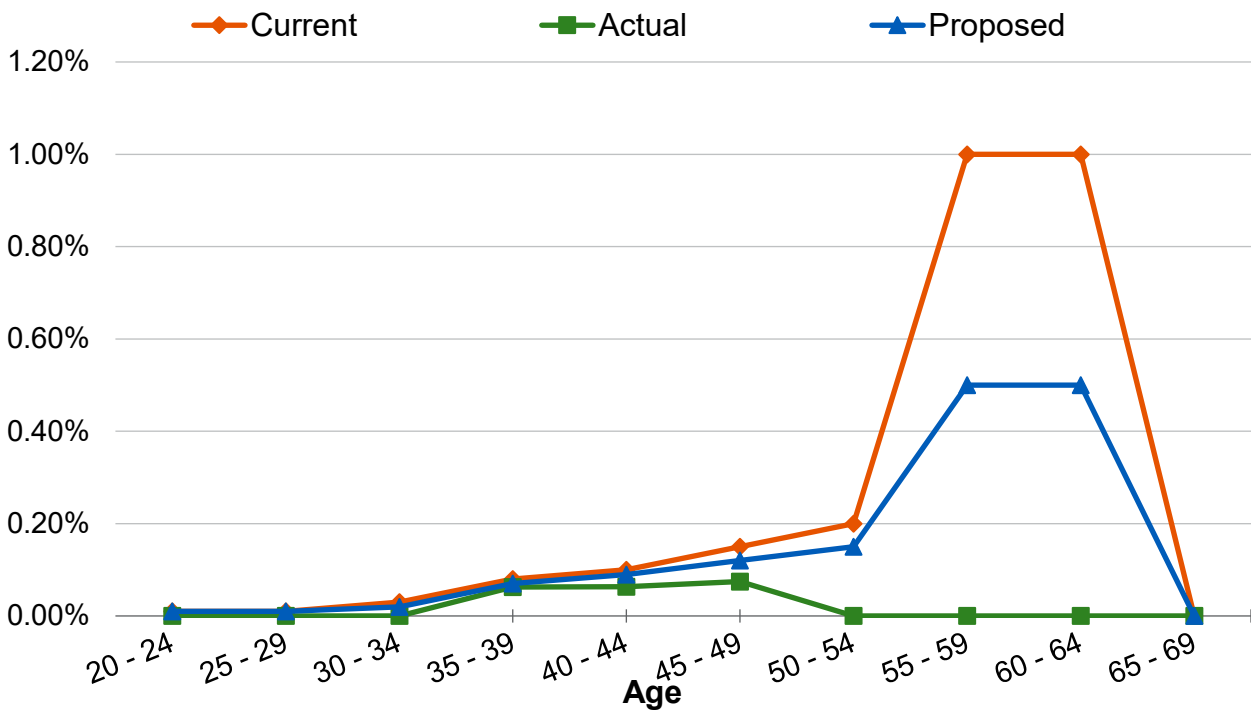
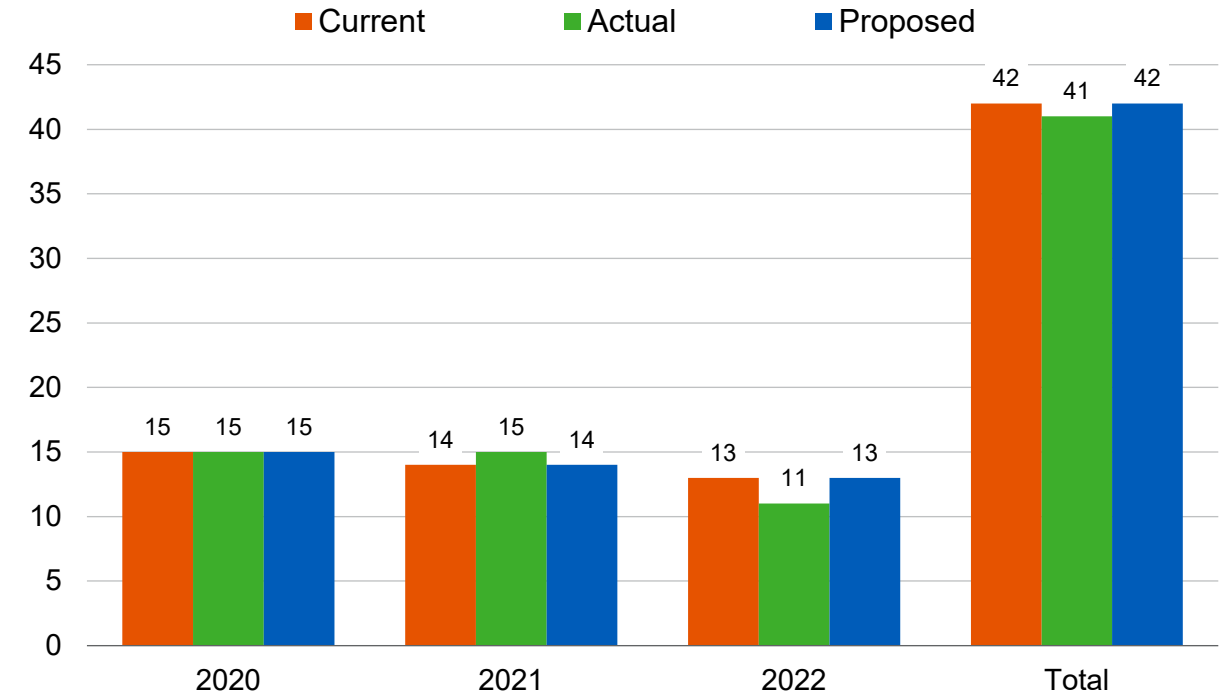
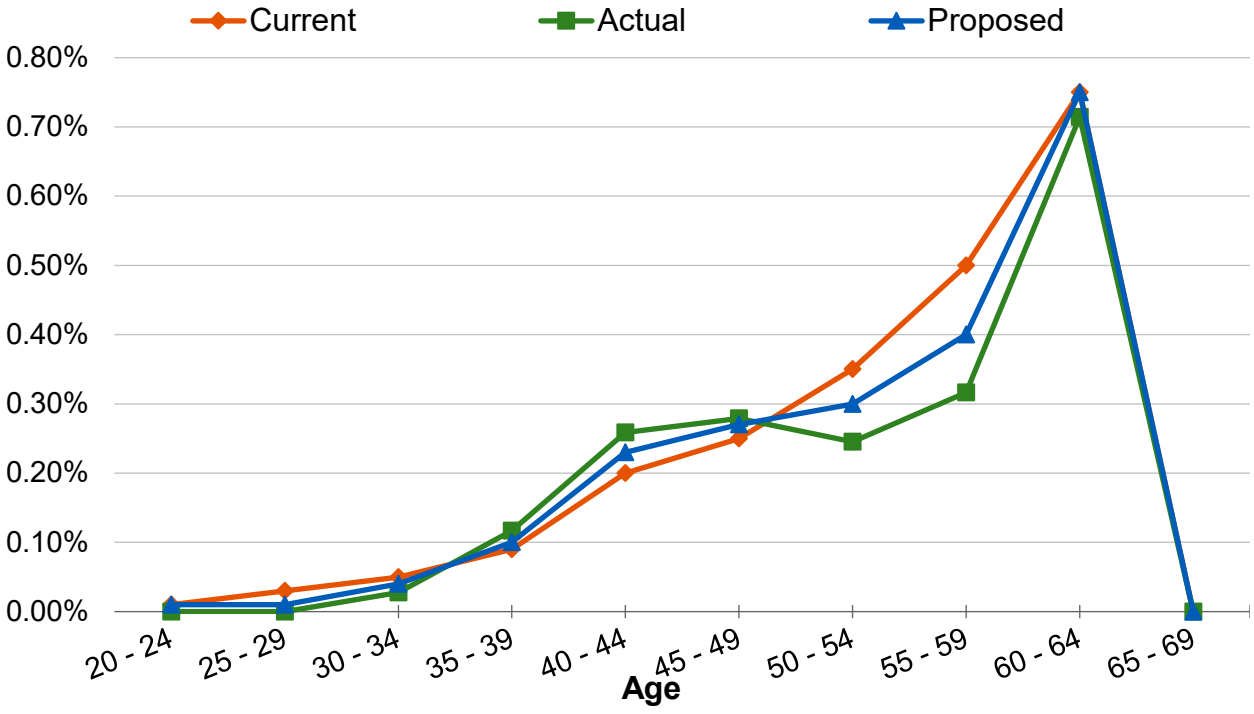


Chart 8: Actual Number of Disabilities Compared to Expected – Police



Note: Expected and actual disabilities exclude members eligible to enter the DROP, including 3 actual disabilities in 2019-2020.

Chart 9: Disability Incidence Rates – Police



D. Termination Rates

Termination rates include all terminations for reasons other than death, disability, or retirement. Consistent with plan provisions which vary by Tier, in the valuation members who are not expected to be eligible to receive a deferred vested benefit are assumed to withdraw their contributions upon termination (except for Tier 4 members who are not eligible for a withdrawal).

The current termination rate assumptions are a function of both the member's age and service. For those members with less than 5 years, termination rate assumptions were developed based on the member's service. For those members with five or more years of service, the termination rate assumptions were developed based on the member's age. Since the majority of LAFPP members are 'career employees' (80% of current active members entered LAFPP before age 30), the termination rates correlate well with ages for members with five or more years of service. **Therefore, we recommend maintaining the current structure to develop termination rates as a function of the member's age and service.**

The current termination assumptions are applied until the member is first assumed to retire. That is, we assume that members eligible to retire at termination will retire in accordance with the retirement rate assumptions rather than terminate and defer their benefit. **We recommend maintaining the assumption that members who are eligible to retire will elect to receive their retirement benefit in lieu of a deferred vested benefit.**

The following table shows the observed[1] termination rates for members with less than 5 years of service based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. This information is shown separately for Fire and Police members.

Termination Rates (%) – Less than Five Years of Service

	Fire			Police		
Service	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
Less than 1	7.00	8.99	7.50	8.50	10.33	9.00
1 – 2	2.00	1.66	1.80	3.25	3.26	3.25
2 – 3	1.00	1.20	1.10	3.25	3.82	3.25
3 – 4	0.75	1.22	1.00	3.00	4.13	3.25
4 – 5	0.50	0.47	0.50	2.00	4.50	2.50

Based on this experience, we recommend increasing the termination rates for Fire and Police members who have less than five years of service.

Chart 10 compares the number of actual to expected terminations for Fire members with less than five years of service over the past three years for the current and proposed assumptions.

Chart 11 compares the number of actual to expected terminations for Police members with less than five years of service over the past three years for the current and proposed assumptions.

Chart 12 compares the actual termination experience for Fire members with less than five years of service with the current and proposed assumptions.

[1] Please note that we have excluded any members that were eligible for retirement.

Chart 13 compares the actual termination experience for Police members with less than five years of service with the current and proposed assumptions.

The following table shows the observed[1] termination rates for members with 5 or more years of service based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. This information is shown separately for Fire and Police members. We observed substantially higher incidence of termination for both Fire and Police members with 5 or more years of service for 2021-2022 during the height of the COVID-19 pandemic. As we are uncertain whether the higher incidence of termination would continue for the long term, we have excluded that data in our analysis.

Termination Rates (%) – Five or More Years of Service

	Fire			Police		
Age	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
20 - 24	0.60	N/A	0.60	1.80	N/A	2.50
25 - 29	0.60	0.00	0.60	1.80	2.90	2.50
30 - 34	0.45	0.43	0.45	1.45	2.20	1.80
35 - 39	0.25	0.00	0.25	0.85	1.01	0.95
40 - 44	0.25	0.10	0.25	0.65	0.37	0.60
45 - 49	0.10	0.11	0.10	0.55	0.78	0.60
50 - 54	0.05	0.00	0.05	0.35	0.64	0.55
55 - 59	0.00	0.00	0.00	0.35	0.91	0.50

Based on this experience, we recommend maintaining the termination rates for Fire members who have five or more years of service and increasing the termination rates for Police member who have five or more years of service.

It is important to note that not every age category has enough exposures and/or decrements such that the results in that category are statistically credible even if we look at multiple years' worth of experience. This is mainly the case for those members in the highest age categories because most members in those categories are eligible to retire and have been excluded from our review of this termination experience as mentioned above.

Chart 14 compares the number of actual to expected terminations for Fire members with five or more years of service over the past three years for the current and proposed assumptions.

Chart 15 compares the number of actual to expected terminations for Police members with five or more years of service over the past three years for the current and proposed assumptions.

Chart 16 compares the actual termination experience for Fire members with five or more years of service with the current and proposed assumptions.

Chart 17 compares the actual termination experience for Police members with five or more years of service with the current and proposed assumptions.

[1] Please note that we have excluded any members that were eligible for retirement.

Chart 10: Actual Number of Terminations Compared to Expected – Fire – Less than 5 Years of Service

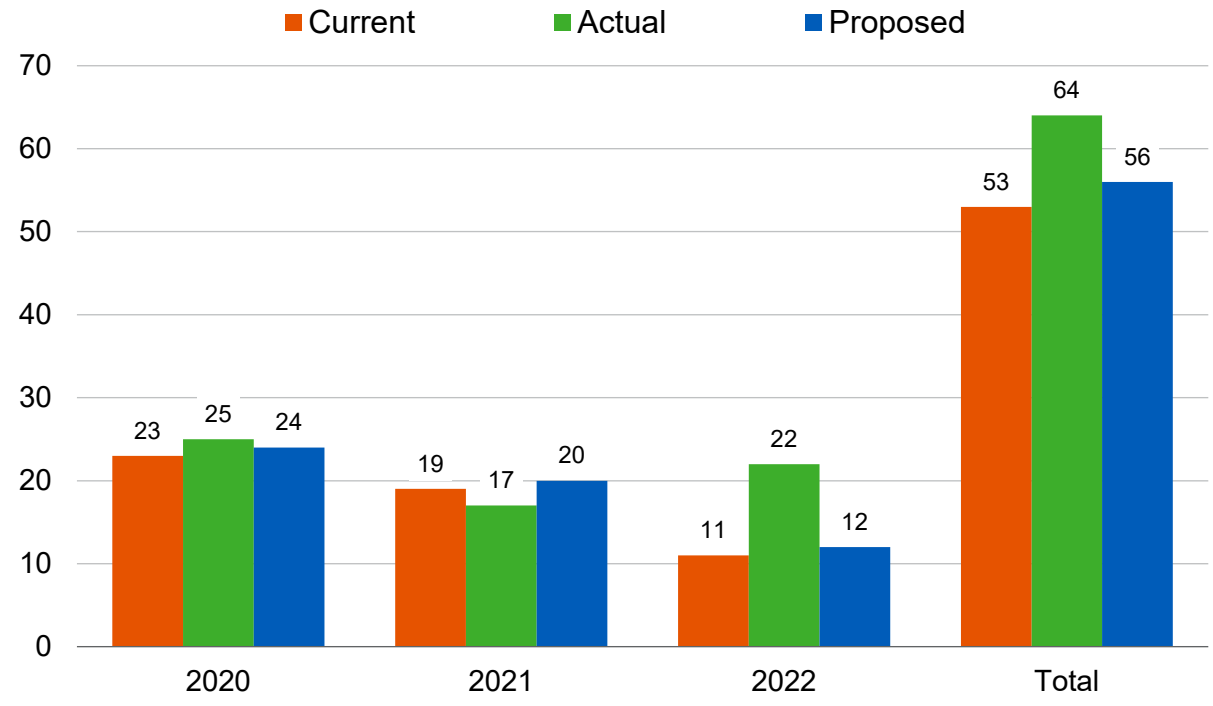


Chart 11: Actual Number of Terminations Compared to Expected – Police – Less than 5 Years of Service

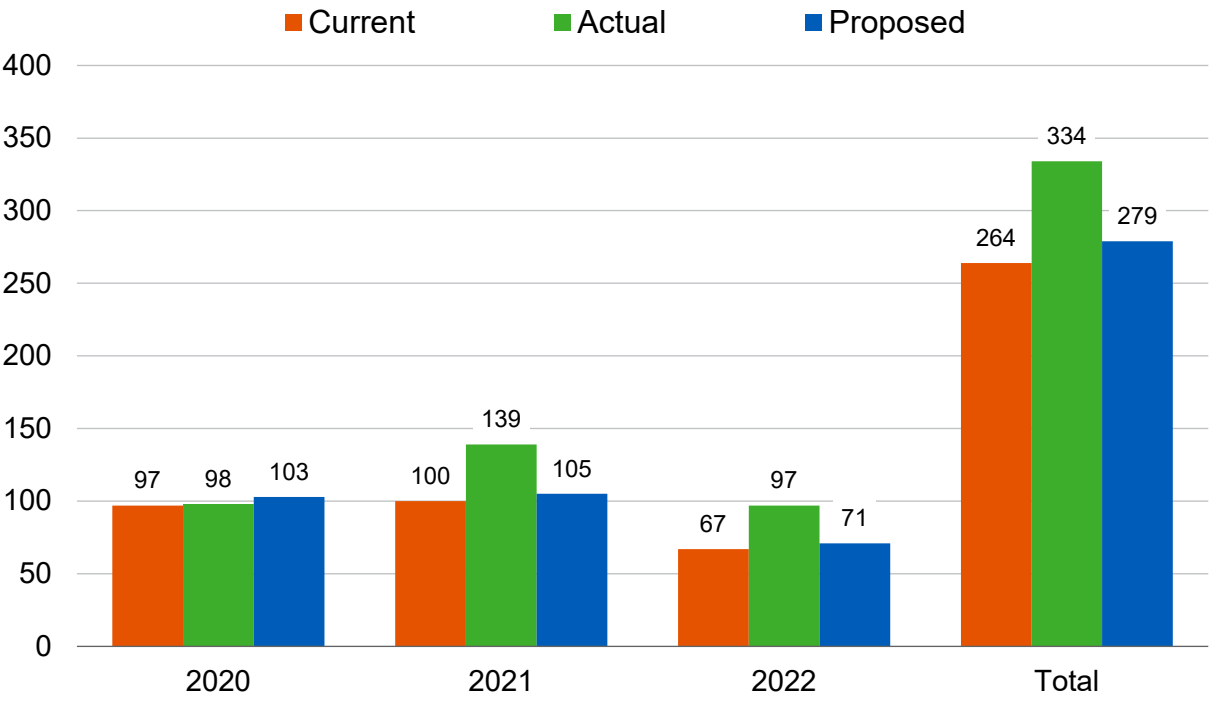


Chart 12: Termination Rates
Fire – Less than 5 Years of Service

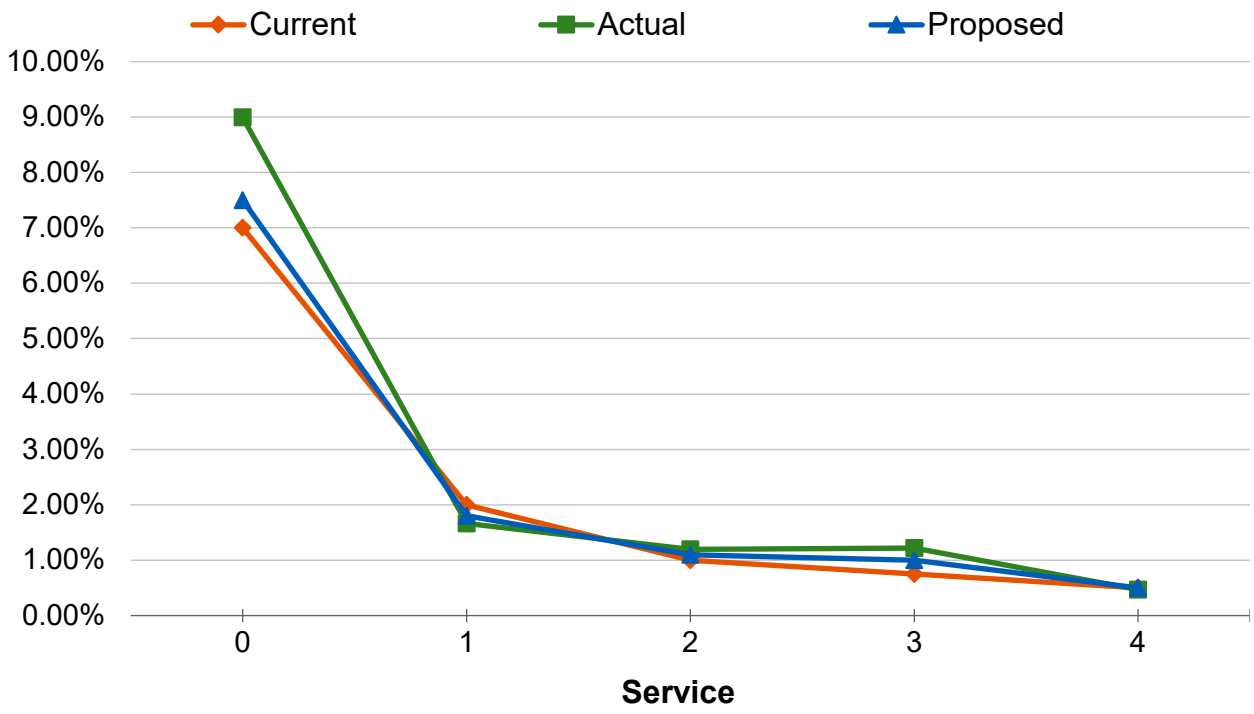


Chart 13: Termination Rates
Police – Less than 5 Years of Service

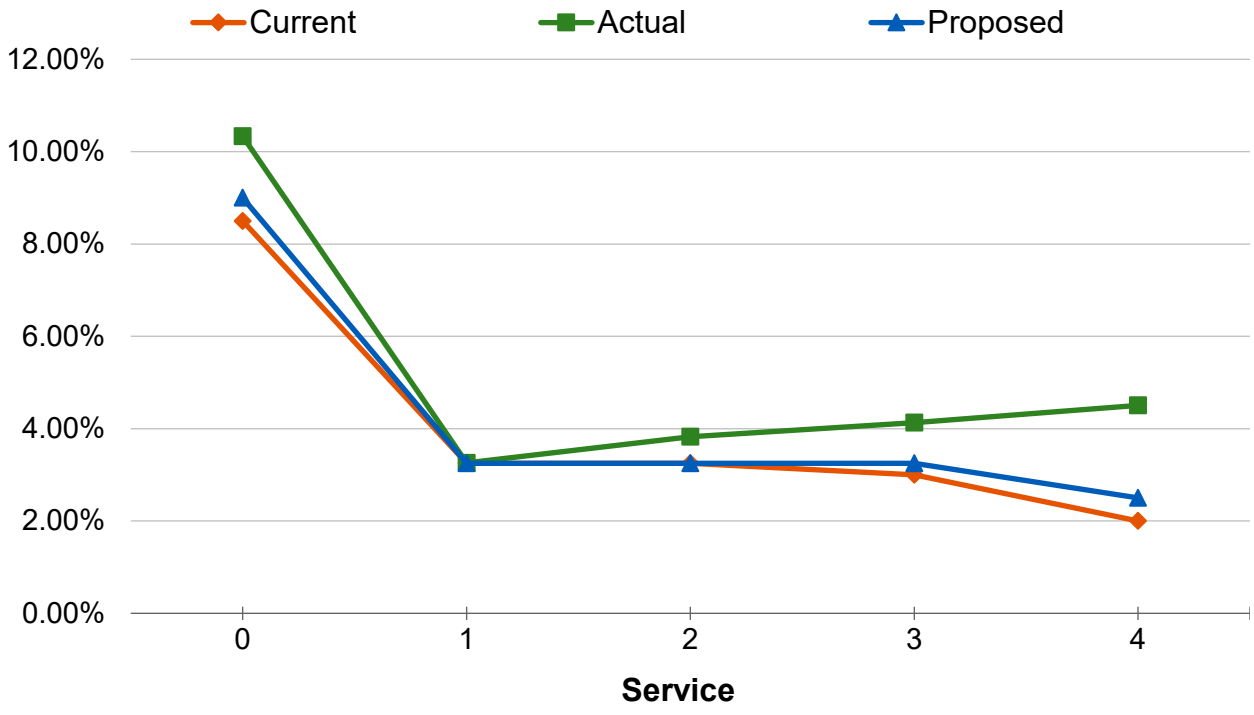


Chart 14: Actual Number of Terminations Compared to Expected – Fire –5 or More Years of Service

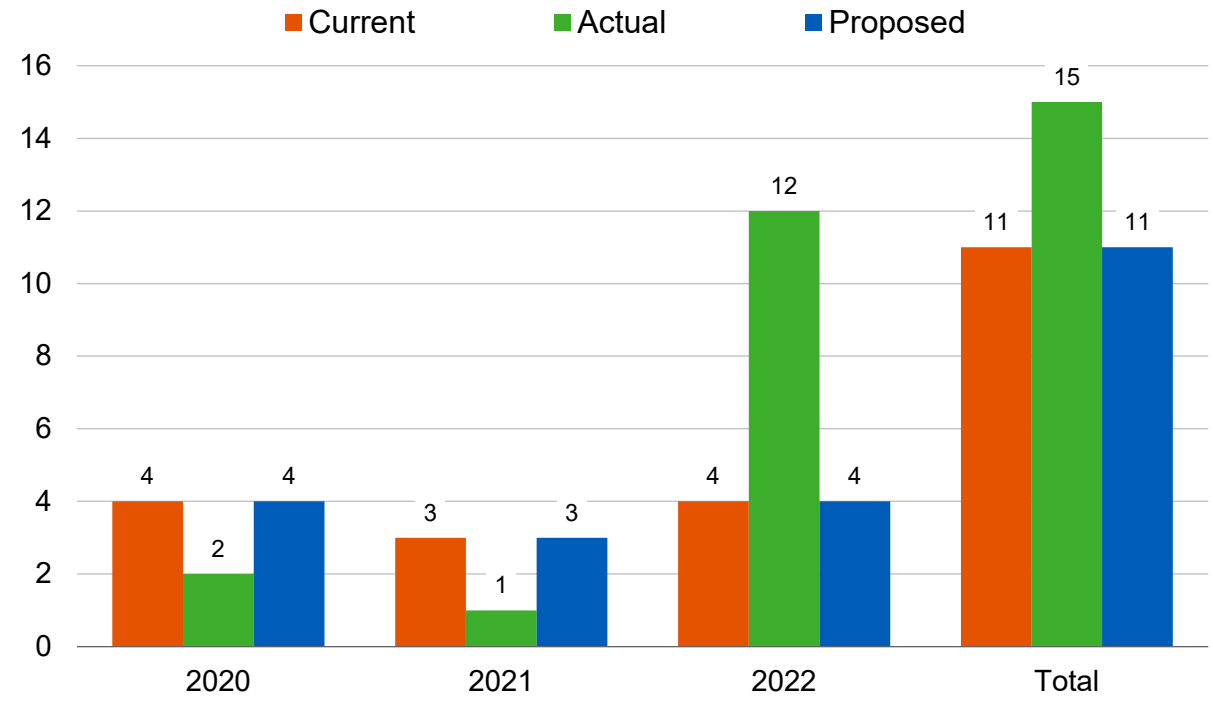


Chart 15: Actual Number of Terminations Compared to Expected – Police –5 or More Years of Service

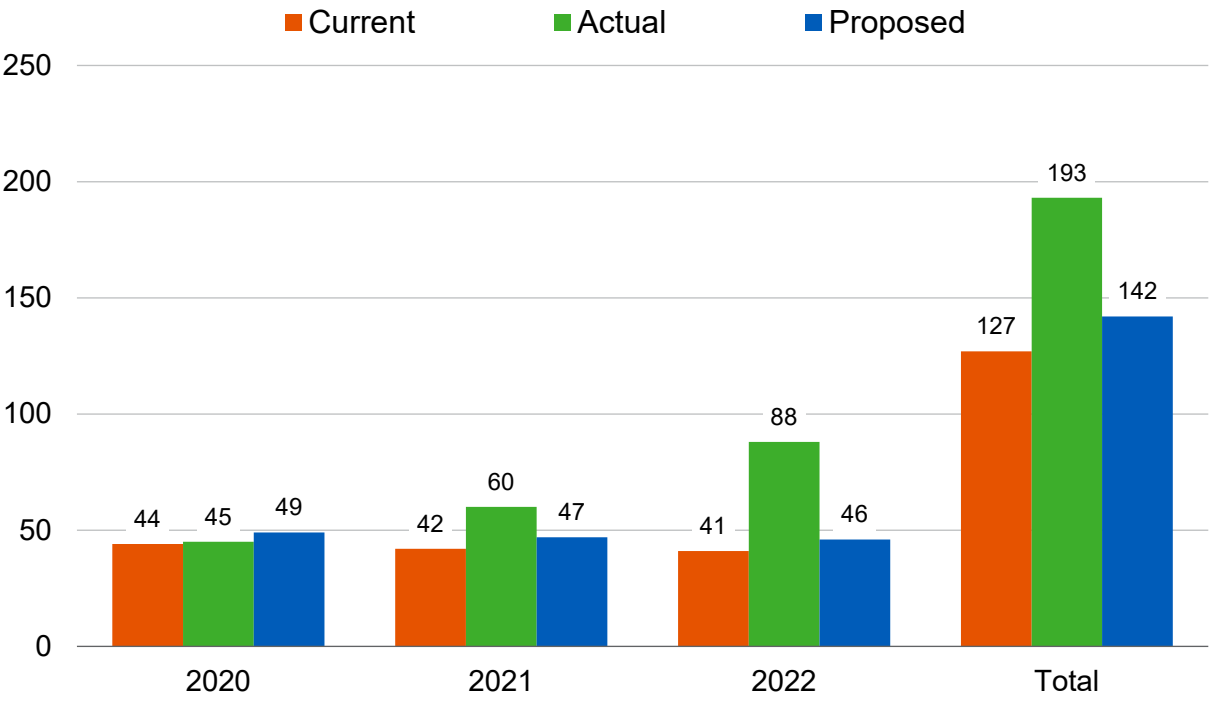


Chart 16: Termination Rates
Fire – 5 or More Years of Service

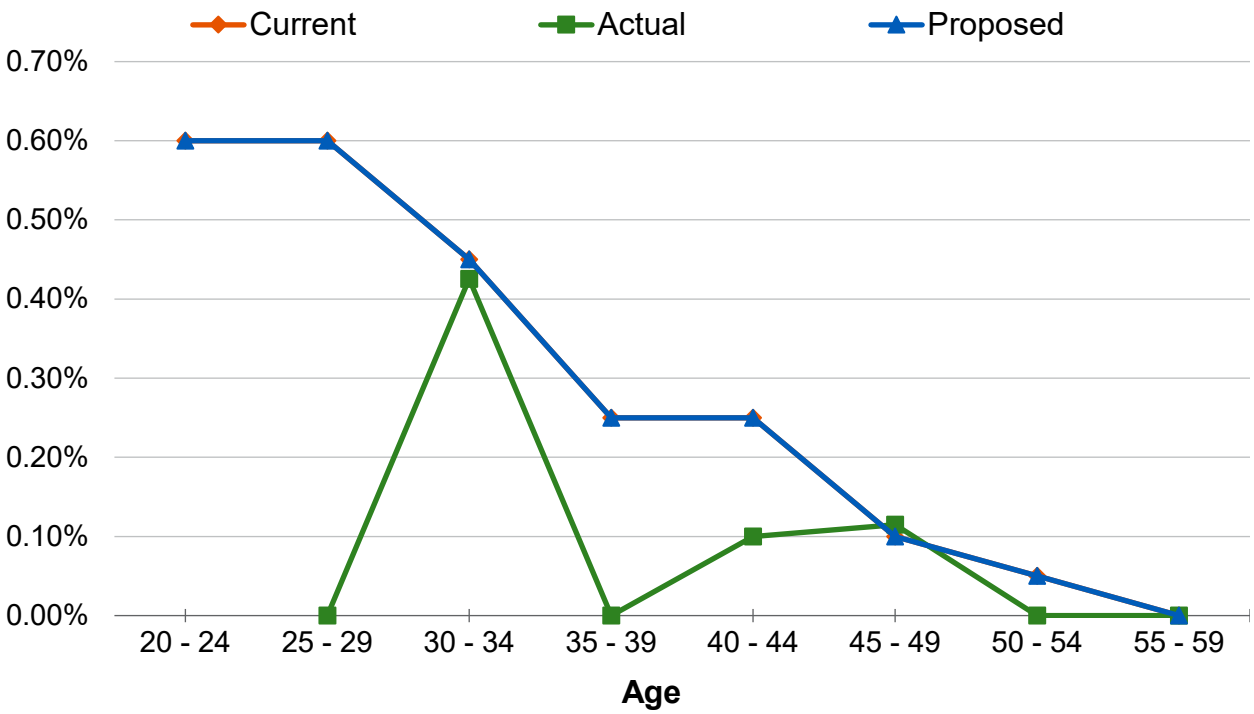
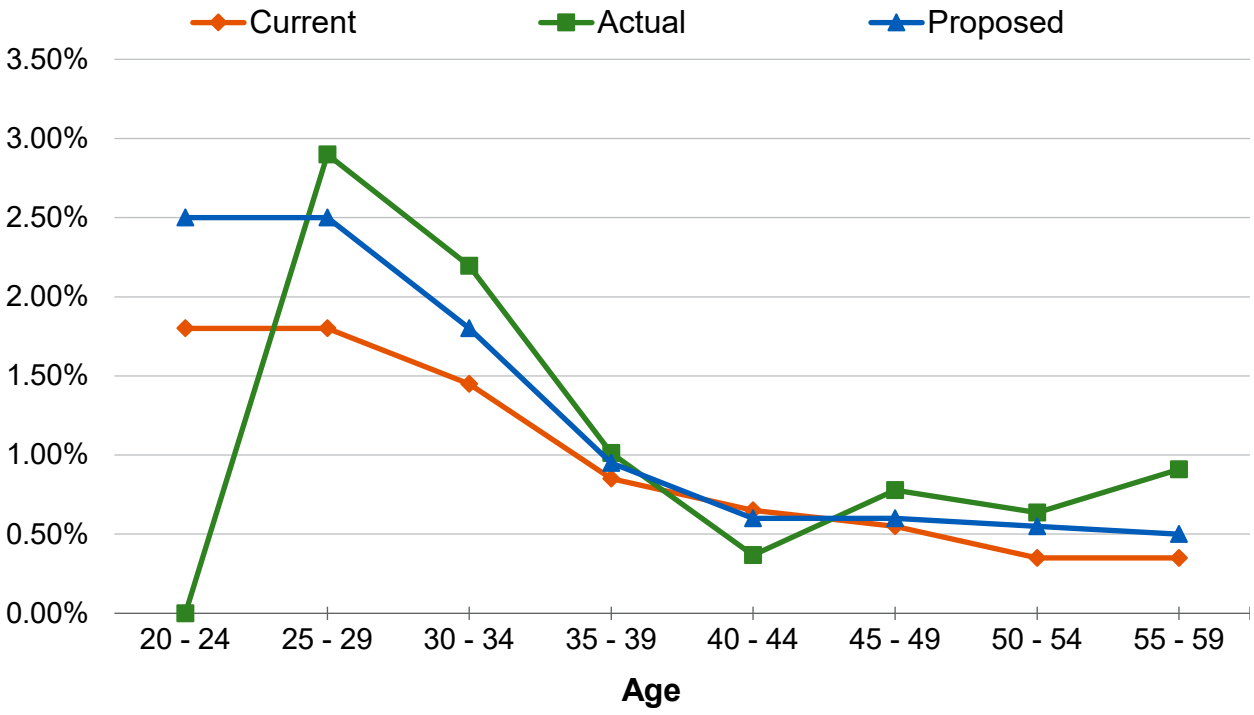


Chart 17: Termination Rates
Police – 5 or More Years of Service



E. 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 current retirement rate assumptions are a function of the member's age and tier. During this experience study, we continued our practice from the prior study and we analyzed recent years' retirement experience both as a function of age and years or service. Our review concludes that the majority of LAFPP members are 'career employees' with relatively fewer retirements happening at lower years of service. The below table shows the actual retirements occurring during the experience study period of July 1, 2019 through June 30, 2022 broken down by years of service.

Years of Service	Actual Retirements
Less than 25	262
25 – 30	442
30 & Over	775

Based on this experience, we recommend maintaining the current structure to develop the retirement rates as a function of the member's age and tier only.

For this experience study, consistent with prior practice, retirement experience for those members who retire after having participated in the DROP is combined with those members who have never participated in the DROP. This is based on the notion that DROP participants are considered active members until they leave the DROP and begin receiving retirement benefits. However, at the assumed date of retirement, there are additional assumptions applied to reflect the probability that a member had previously elected to enter the DROP before retirement, and if so, how many years the member is assumed to have been in the DROP. These DROP specific assumptions are described in more detail later in this Section.

Tier 2 and Tier 4

The following table shows the observed service retirement rates for Tier 2 & Tier 4 members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. This information is shown separately by Fire and Police members.

Retirement Rates (%) – Tier 2 and Tier 4

	Fire			Police		
Age	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
41	1.00	N/A	0.00	10.00	50.00	10.00
42	1.00	N/A	0.00	10.00	22.22	10.00
43	1.00	0.00	0.00	10.00	5.26	10.00
44	1.00	0.00	0.00	10.00	12.50	10.00
45	1.00	0.00	1.00	10.00	4.76	10.00
46	1.00	0.00	1.00	7.00	6.82	7.00
47	1.00	16.67	2.00	7.00	6.67	7.00
48	2.00	0.00	2.00	5.00	10.34	7.00
49	2.00	0.00	2.00	5.00	0.00	5.00
50	3.00	0.00	3.00	10.00	5.26	10.00
51	5.00	25.00	6.00	10.00	6.25	10.00
52	8.00	16.67	10.00	12.00	23.08	15.00
53	10.00	100.00	15.00	20.00	13.33	20.00
54	20.00	0.00	20.00	30.00	45.16	32.00
55	20.00	0.00	20.00	35.00	28.57	35.00
56	20.00	60.00	20.00	30.00	43.75	30.00
57	20.00	0.00	20.00	30.00	50.00	30.00
58	20.00	0.00	20.00	30.00	33.33	30.00
59	20.00	0.00	20.00	30.00	0.00	30.00
60	25.00	0.00	20.00	30.00	33.33	30.00
61	25.00	0.00	20.00	30.00	50.00	30.00
62	25.00	0.00	20.00	30.00	0.00	30.00
63	25.00	33.33	25.00	30.00	0.00	30.00
64	30.00	0.00	30.00	40.00	0.00	40.00
65	50.00	N/A	40.00	50.00	0.00	50.00
66	50.00	N/A	40.00	50.00	N/A	50.00
67	50.00	N/A	40.00	50.00	N/A	50.00
68	50.00	50.00	50.00	50.00	N/A	50.00
69	50.00	0.00	50.00	50.00	N/A	50.00
70 & Over	100.00	0.00	100.00	100.00	100.00	100.00

Based on this experience, we recommend overall decreases in the retirement rates for Fire Tier 2 and Tier 4 members and overall increases for Police Tier 2 and Tier 4 members.

Chart 18 compares the actual retirement experience for Fire Tiers 2 and 4 members with the current and proposed assumptions.

Chart 19 compares the actual retirement experience for Police Tiers 2 and 4 members with the current and proposed assumptions.

Tier 3 and Tier 5

The following table shows the observed service retirement rates for Tier 3 and Tier 5 members based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. This information is shown separately by Fire and Police members.

The City implemented a Retirement Incentive Pay (RIP) Program to allow sworn employees retiring or entering DROP to include deferred salary increases as part of their pension benefit calculation or to apply them toward their accrued leave payment at retirement. As of the June 30, 2022 valuation, about 600 employees who elected to participate in RIP had entered DROP, retired from active employment or retired from DROP.

When studying the retirement assumptions for Police Tiers 3 & 5, we observed that there was a higher number of retirements in 2020-2021 and 2021-2022. While it is unclear if more members retired solely because of the RIP, we observed that out of the 1,125 actual retirements over the 3-year period, there are about 250 who retired from active status or retired from DROP and have elected to participate in RIP (excluding members who elected to participate in RIP and signed up for the DROP but have not yet retired). Therefore, we have considered both the data from this study and the last study and have only made modest adjustments to the retirement rates.

Retirement Rates (%) – Tier 3 and Tier 5

	Fire				Police			
Age	Current Rate	Actual Rate Current Study	Actual Rate Prior Study	Proposed Rate	Current Rate	Actual Rate Current Study	Actual Rate Prior Study	Proposed Rate
50	1.00	0.80	0.63	1.00	8.00	11.36	8.48	9.00
51	1.00	1.30	1.02	1.00	4.00	7.33	3.89	5.00
52	1.00	2.45	0.42	1.00	4.00	5.96	4.96	5.00
53	1.00	1.60	1.05	1.00	5.00	7.74	4.56	6.00
54	6.00	3.57	3.85	5.00	12.00	15.85	11.19	13.00
55	14.00	17.34	12.42	14.00	20.00	26.72	21.25	22.00
56	15.00	9.43	10.68	14.00	20.00	23.50	17.01	22.00
57	16.00	11.48	10.37	14.00	20.00	24.04	18.08	22.00
58	20.00	15.17	13.49	17.00	20.00	22.55	18.35	22.00
59	22.00	14.66	14.19	20.00	20.00	32.24	18.58	25.00
60	25.00	15.85	24.07	22.00	25.00	30.06	25.00	25.00
61	27.00	24.80	24.24	25.00	25.00	31.20	25.23	25.00
62	33.00	25.35	23.68	30.00	25.00	23.16	22.67	25.00
63	35.00	28.57	30.00	35.00	25.00	35.82	26.23	30.00
64	40.00	37.50	36.84	40.00	35.00	37.50	40.00	35.00
65	50.00	23.08	30.00	45.00	50.00	37.93	50.00	45.00
66	50.00	41.67	20.00	45.00	50.00	31.25	18.18	45.00
67	50.00	14.29	0.00	45.00	50.00	40.00	33.33	45.00
68	50.00	25.00	66.67	50.00	50.00	40.00	50.00	45.00
69	50.00	50.00	N/A	50.00	50.00	0.00	0.00	45.00
70 & Over	100.00	N/A	N/A	100.00	100.00	11.11	33.33	100.00

Based on this experience, we recommend overall decreases in the retirement rates for Fire Tier 3 and Tier 5 members and increases for Police Tier 3 and Tier 5 members.

Chart 20 compares the actual retirement experience for Fire Tiers 3 and 5 members with the current and proposed assumptions.

Chart 21 compares the actual retirement experience for Police Tiers 3 and 5 members with the current and proposed assumptions.

Tier 6

The following table shows the current assumed rates and the rates we propose for Tier 6 members. This information is shown separately by Fire and Police members.

Even though there is no actual experience available for Tier 6, we are recommending adjustments to maintain consistency with the changes for Tiers 2 through 5, as the rates for

Tier 6 were originally based on the rates for Tiers 2 and 4 for ages below 55 and for Tiers 3 and 5 for ages above 55.

Retirement Rates (%) – Tier 6

	Fire		Police	
Age	Current Rate	Proposed Rate	Current Rate	Proposed Rate
50	2.00	2.00	6.00	7.00
51	2.00	3.00	5.00	5.00
52	2.00	3.00	5.00	5.00
53	2.00	4.00	5.00	5.00
54	5.00	5.00	15.00	17.00
55	10.00	10.00	20.00	22.00
56	12.00	11.00	20.00	22.00
57	15.00	13.00	20.00	22.00
58	18.00	15.00	20.00	22.00
59	20.00	18.00	20.00	25.00
60	25.00	22.00	25.00	25.00
61	27.00	25.00	25.00	25.00
62	30.00	27.00	25.00	25.00
63	35.00	35.00	25.00	30.00
64	40.00	40.00	35.00	35.00
65	50.00	45.00	50.00	45.00
66	50.00	45.00	50.00	45.00
67	50.00	45.00	50.00	45.00
68	50.00	50.00	50.00	45.00
69	50.00	50.00	50.00	45.00
70 & Over	100.00	100.00	100.00	100.00

Based on the experience of members in Tiers 2 & 4 and Tiers 3 & 5, we recommend overall decreases in the retirement rates for Fire Tier 6 members and increases for Police Tier 6 members.

Chart 22 shows the current and proposed assumptions for Fire Tier 6 members.

Chart 23 shows the current and proposed assumptions for Police Tier 6 members.

DROP

Eligible members electing to participate in the DROP are considered active members until they leave the DROP and begin receiving retirement benefits in cash. While in the DROP, DROP benefits (calculated using age, service, and salary at the commencement date of participation in DROP) are credited monthly to a DROP account and adjusted with interest at 5% annually. Members may participate in the DROP for up to five years.

For members who enter the DROP on or after February 1, 2019, their participation in the DROP will be suspended for any calendar month in which they do not spend at least 112 hours on active duty status. If participation is suspended, the member is eligible to participate in the DROP for a maximum of 30 additional months beyond the original participation period.

Percentage Electing the DROP

Currently, 95% of all members expected to retire with service retirement benefit are assumed to have elected the DROP before retirement if they also satisfy the requirements for participating in the DROP for 5 years. The average participation rate over the prior three years was 91%.

Members who Elected DROP Prior to Retirement

Current Assumption	95%
Actual Experience[1]	91%
Proposed Assumption	**95%**

We recommend maintaining the current assumption.

Years in DROP

Currently, members are assumed to remain in the DROP for 5 years. The average length of time in the DROP over the prior three years was 4 years and 1 month (versus 4 years and 3 months observed in the last study).

Years Spent in DROP

Current Assumption	5 years
Actual Experience	4 years 1 month
Proposed Assumption	**5 years**

We recommend maintaining the current assumption. We would report back if a reduction is warranted at the next study should the length of stay in the DROP decrease in the next few years.

DROP Suspension

Ordinance 185935 was adopted by the City Council and amended the DROP provisions of the Plan. For members who enter the DROP on or after February 1, 2019 their participation in DROP will be suspended for any calendar month in which they do not spend at least 112 hours on active duty status, with eligibility to extend DROP participation for a maximum of 30 additional months.

Based on information collected at the time that the Ordinance was adopted, we estimated that members will have DROP payments suspended for an average of 4.5 months over the course of the time spent in DROP due to the minimum hours per month needed for participation if they enter DROP on or after February 1, 2019.

[1] The lower actual percentage electing DROP is partially due to the observation that there are higher number of retirement directly from active status in 2020-2021 and 2021-2022.

The average number of months that a member had their DROP benefits suspended over the prior three years was 2.1 months.

Months Suspended Per Year due to Ordinance 185935

Current Assumption	0.9 months per year
Actual Experience	0.41 months per year
Proposed Assumption	**0.7 months per year**

We recommend reducing the assumption that DROP payments will be suspended from an average of 4.5 months to 3.5 months over the course of the time spent in DROP for members who enter DROP on or after February 1, 2019.

Deferred Vested Members

Under the current assumptions, deferred vested members are assumed to retire at age 50.

The following table shows the observed deferred vested retirement age based on the actual experience over the past three years. Also shown are the current and proposed assumptions.

Deferred Vested Retirement Age

Current Assumption	50.0
Actual Experience	50.0
Proposed Assumption	**50.0**

Based on this experience, along with our understanding that the Plan would pay retirement benefits retroactively to age 50, we recommend maintaining the current assumption.

Inactive Non-Vested Members

Under the current assumptions, inactive non-vested members are assumed to receive an immediate refund of member contributions, except for those in Tier 4 who are not eligible for a refund. **As these members do not meet eligibility requirements to receive a deferred benefit, we recommend maintaining the current assumption.**

Chart 18: Retirement Rates – Fire Tier 2 and Tier 4

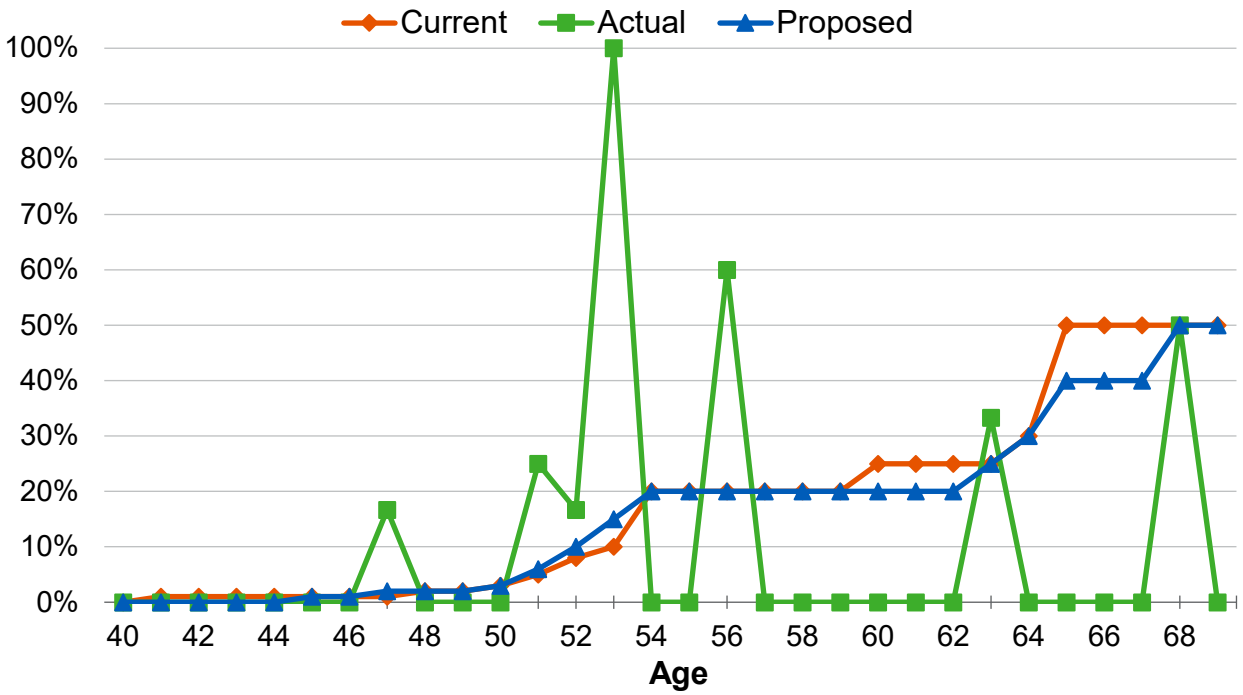


Chart 19: Retirement Rates – Police Tier 2 and Tier 4

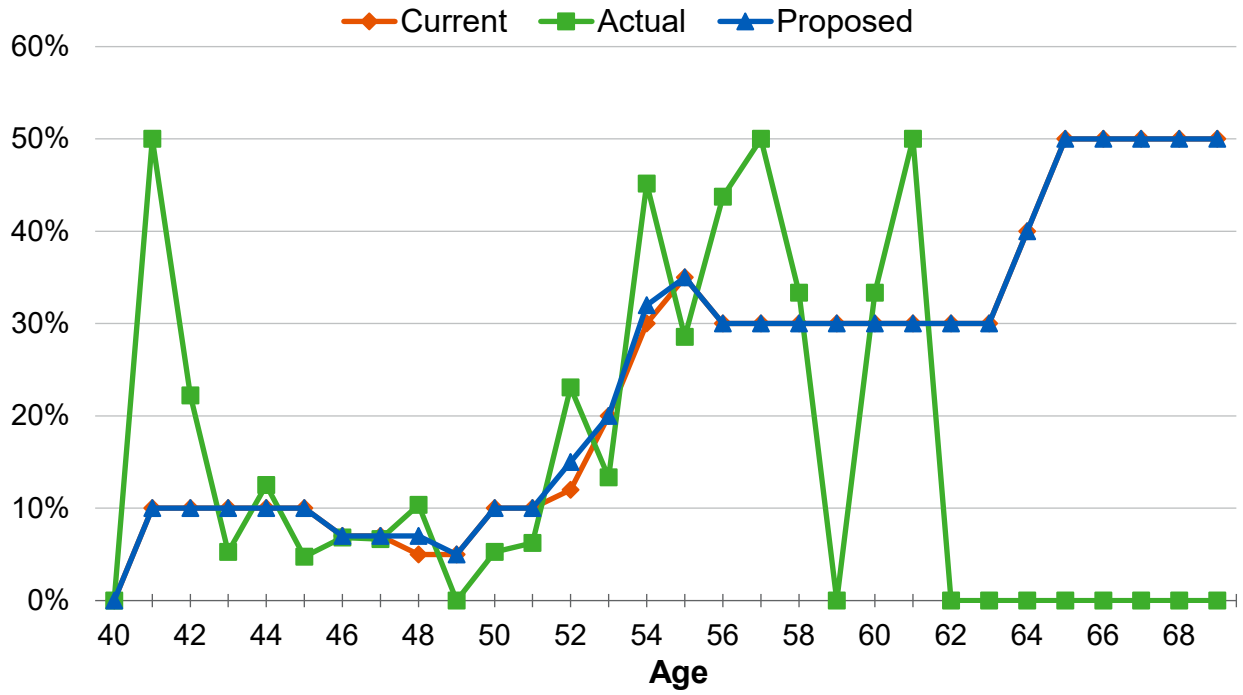


Chart 20: Retirement Rates – Fire Tier 3 and Tier 5

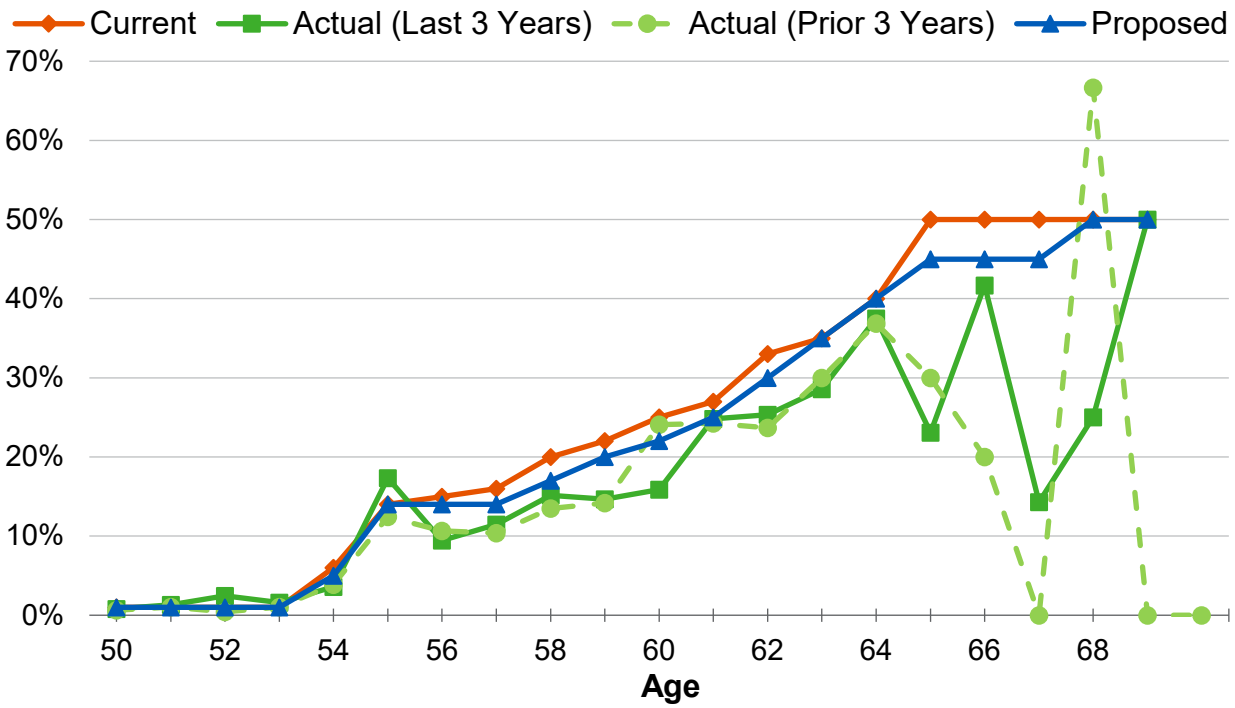


Chart 21: Retirement Rates – Police Tier 3 and Tier 5

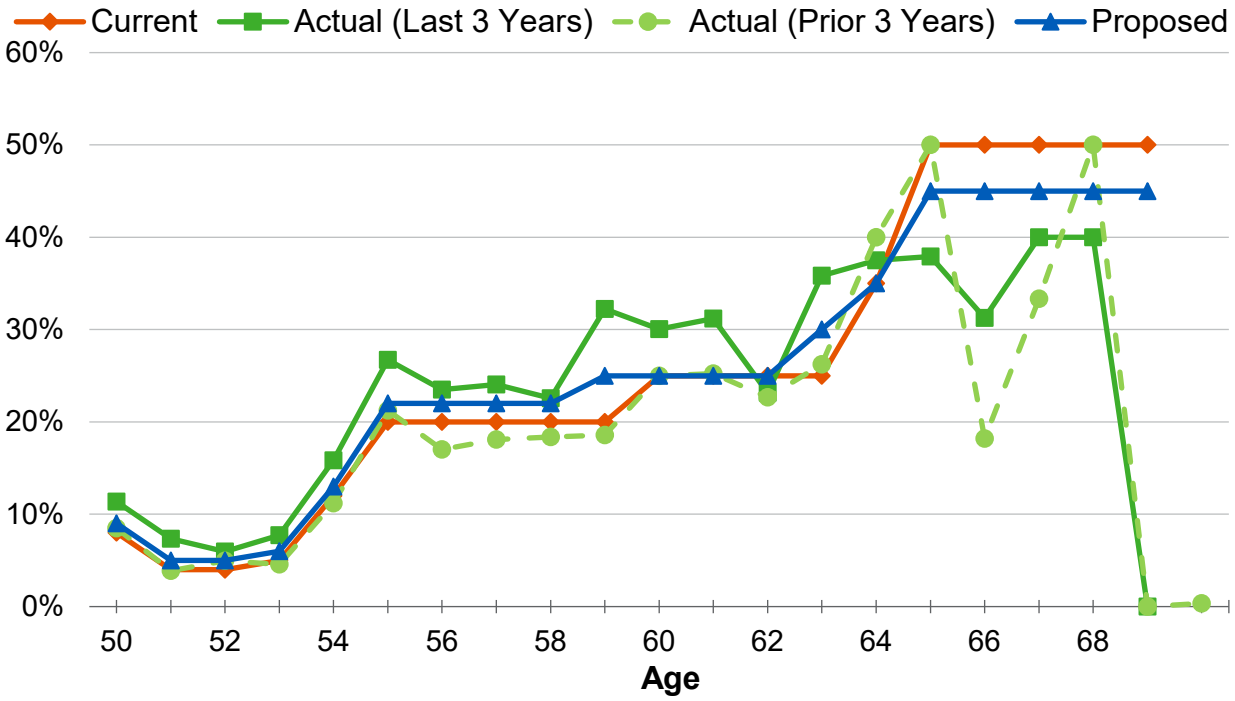


Chart 22: Retirement Rates – Fire Tier 6

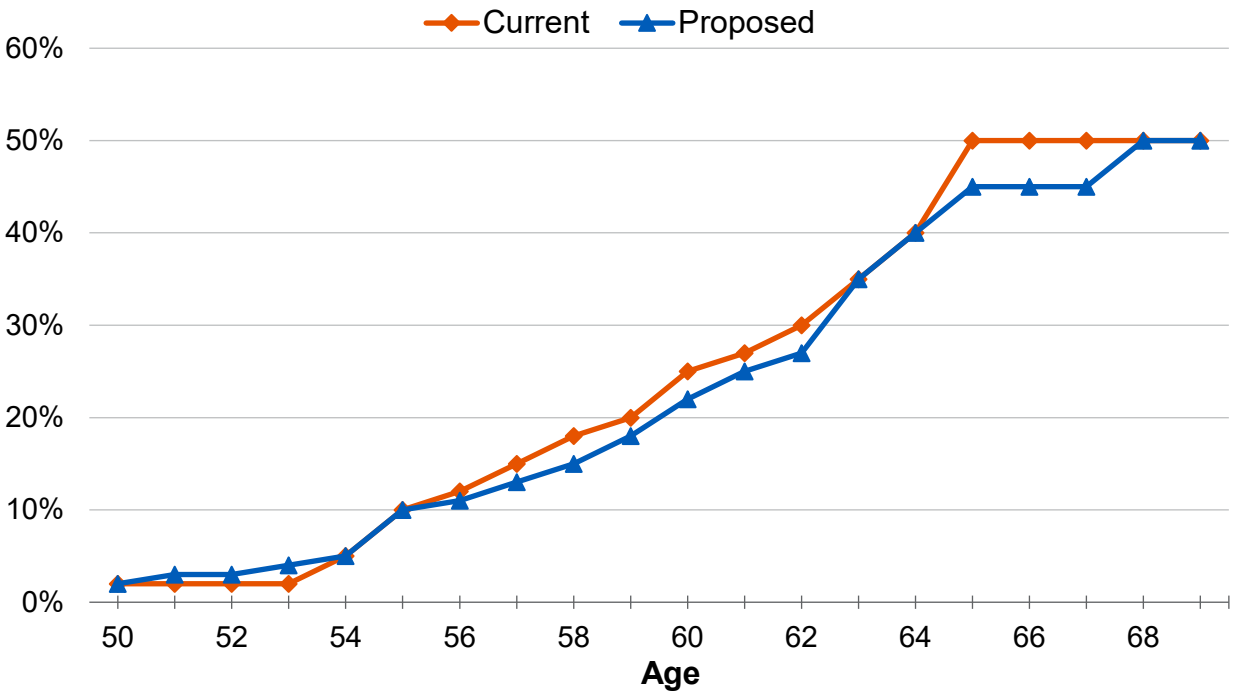
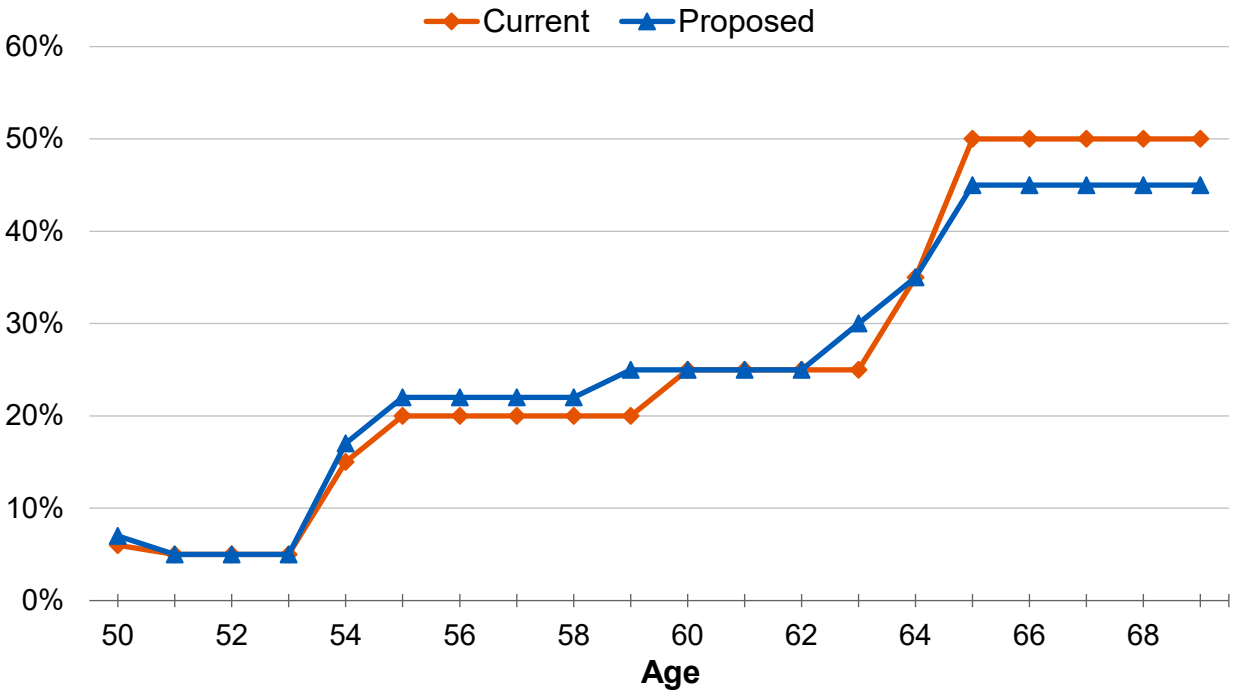


Chart 23: Retirement Rates – Police Tier 6



F. Miscellaneous Assumptions

Form of Payment

Under the plan provisions, an eligible survivor of a deceased member who has elected the unmodified option is eligible to receive a benefit continuance upon the member's death.

If a member elects a payment option other than the unmodified option, the member's benefit is reduced on an actuarially equivalent basis generally using valuation assumptions. Therefore, the present value of the alternate option is expected to be equivalent to the unmodified option and so we assume that all members will elect the unmodified option. **We recommend maintaining this assumption.**

Percent with Eligible Survivor

The value of a member's retirement, disability, or death benefit depends on the percentage of members who are assumed to have an eligible spouse or domestic partner.

The following table shows the observed percentage of new retirees who were reported with an Eligible Spouse or Domestic Partner at the time of retirement based on the actual experience over the past three years. Also shown are the current and proposed assumptions. This information is shown separately by the member's gender.

New Retirees with Eligible Spouse or Domestic Partner

	Male Member	Female Member
Current Assumption	85%	55%
Actual Experience	81%	57%
Proposed Assumption	**85%**	**55%**

Based on this experience, we recommend maintaining the current assumptions.

Eligible Survivor Age and Gender

Since the value of the survivor's continuance benefit is dependent on the eligible survivor's age and gender, we must also have assumptions for the age and gender of the survivor.

The following tables show the observed survivor's age based on the actual experience over the past three years. Also shown are the current and proposed assumptions. This information is shown separately by the member's gender.

Eligible Survivor's Age Compared to the Member's Age

	Male Member	Female Member
Current Assumption	3 years younger	2 years older
Actual Experience	2.7 years younger	2.2 years older
Proposed Assumption	**3 years younger**	**2 years older**

Based on this experience, we recommend maintaining the current assumptions.

While we do not receive eligible survivor gender information while a member is in pay status, based on recent studies done for other similar retirement systems, almost all of the survivors are the opposite gender of the member. **Therefore, we continue to recommend that for all active, inactive, and pay status members the survivor's gender is assumed to be the opposite of the member's (a male member is assumed to have a female survivor and a female member is assumed to have a male survivor).**

Unknown Data for Members

When various elements of valuation data are not available, an assumption must be made in order to project benefits and determine liabilities.

The following table shows the gender of Active members based on actual experience over the past three years. Also shown are the current and proposed assumptions for members with unknown gender.

Active Member's Gender

	Male Member	Female Member
Current Assumption	100% Male	0% Female
Actual Experience	85% Male	15% Female
Proposed Assumption	**100% Male**	**0% Female**

Based on this experience, we recommend maintaining the assumption that members with unknown gender are male. We note that this assumption rarely applies as we generally receive gender information for all member records from LAFPP.

Future Benefit Accruals

Benefits under the Plan are based on the Service Credit and compensation earned by the member. In order to project benefits and determine the liabilities, an assumption about the amount of Service Credit earned by members each year is necessary.

Over the past three years, the average Service Credit earned by continuing active members from one valuation date to the next was 1.01 years.

We recommend maintaining the current assumption that all members earn full-time service (or 1.00 year of Service Credit) per year in the future.

G. Retiree Health Assumptions

The member's retiree health subsidy amount varies depending on whether the retiree enrolls in a Board approved health carrier, the coverage tier elected, the service level attained at retirement, and age under versus over 65. Therefore we need to make assumptions regarding health plan elections based on the characteristics related to age and service.

Retiree Medical Coverage Election

The following table shows the average participation rate over the prior three years by service level and age. Also shown are the current and proposed assumptions.

Eligible Retirees who Elected Medical

Under Age 65

Service Range	Current Rate	Actual Rate	Proposed Rate
10 – 14	45%	35.9%	35%
15 – 19	65%	60.3%	60%
20 – 24	80%	77.8%	80%
25 and over	95%	94.6%	95%

Age 65 and Over

Service Range	Current Rate	Actual Rate	Proposed Rate
10 – 14	80%	55.2%	55%
15 – 19	85%	80.2%	80%
20 – 24	85%	82.1%	85%
25 and over	95%	96.8%	97%[1]

Based on the above, we recommend lowering the percentage for 10 – 14 and 15 – 19 service bands for both age groups, and increasing the percentage in the 25 and over service band for age 65 and over.

[1] The proposed participation assumption for the 25 and over service range uses more precision because roughly 75% of retirees fall in this service band.

Retiree Dental Coverage Election

Currently, 85% of members are assumed to elect dental at retirement. The following table shows the average participation rate over the prior three years. Also shown are the current and proposed assumptions.

Eligible Retirees who Elected Dental

Current Assumption	85%
Actual Experience	88%
Proposed Assumption	**90%**

Based on the above, we recommend increasing the percentage of retirees electing dental coverage from 85% to 90%.

Spousal/Domestic Partner Coverage

The retiree medical subsidy amount varies depending on whether retirees receiving a medical subsidy elect to cover their spouse or domestic partner.

The following table shows the observed percentage of new retirees receiving a medical subsidy who were reported with a covered Spouse or Domestic Partner based on the actual experience over the past three years. Also shown are the current and proposed assumptions.

New Retirees with Spouse/Domestic Partner Coverage

Current Assumption	75%
Actual Experience	79%
Proposed Assumption	**80%**

Based on the above, we recommend increasing the percentage of retirees electing to cover their spouse from 75% to 80%.

Covered Spouse/Domestic Partner Age Difference

The following tables show the observed spouse's age for new retirees who elected to cover their spouse based on the actual experience over the past three years. Also shown are the current and proposed assumptions.

Covered Spouse/Domestic Partner's Age Compared to the Member's Age

Current Assumption	3 years younger
Actual Experience	2.5 years younger
Proposed Assumption	**3 years younger**

Based on the above, we recommend maintaining the current assumption.

Child Coverage

Some non-Medicare retirees will cover children in addition to their spouse or domestic partner and draw the maximum monthly subsidy. We currently assume retirees will cover, if indicated in the data, their children for an additional 2 years. For future retirees, we currently assume that 25% will cover children for 4 years, or until when the retiree attains age 65, if earlier.

All children of retirees age 65 and over are assumed to age out based on the assumption that the short duration of child-related subsidy payments should not result in a significant liability due to the low number of current retirees over age 65 who have covered children.

The following table shows the observed percentage of new retirees receiving a medical subsidy who were reported with family coverage based on the actual experience over the past three years. Also shown are the current and proposed assumptions.

New Retirees with Family Coverage

Current Assumption	25%
Actual Experience	39%
Proposed Assumption	**35%**

Based on the above, we recommend increasing the percentage of retirees electing family coverage (i.e., spouse and children) from 25% to 35%. In addition, we assume that retirees will cover families until the member is age 65.

5. Cost Impact

We have estimated the impact of all the recommended demographic and economic assumptions as if they were applied to the June 30, 2022 actuarial valuation. The table below shows the changes in the employer contribution rates, changes in the Unfunded Actuarial Accrued Liability and changes in the Funding Ratio due to the proposed assumption changes recommended in this report.

Cost Impact of the Recommended Assumptions Based on June 30, 2022 Actuarial Valuation

Impact on Employer Contribution Rate	Retirement Plan	Health Plan	Total
Change in Average Employer Contribution Rate[1]	-1.12%	+0.67%	-0.45%
Change in Average Employer Contribution Amount	-$19.6 Million	+$10.9 Million	-$8.7 Million
Change in Unfunded Actuarial Accrued Liability	-$231.8 Million	+$70.4 Million	-$161.4 Million
Change in Funding Ratio	+0.89%	-1.41%	+0.53%

Of the various assumption changes, the most significant rate decrease is due to the reduction in the salary increase assumption caused by the 0.25% reduction in the inflation assumption.

[1] For the Retirement Plan, the recommended changes in economic assumptions decreased the average employer contribution rate by 0.87% and the recommended changes in demographic assumptions decreased the average employer contribution rate by 0.25%.

Appendix A: Current Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.00%, net of investment expenses.
Administrative Expenses:	Out of the total 1.40% of payroll in assumed administrative expenses, 1.29% of payroll payable biweekly is allocated to the Retirement Plan. This is equal to 1.25% of payroll payable at beginning of the year.
Interest Crediting Rate on Member Account:	3.00%[1]
Consumer Price Index (CPI) and Cost-of-Living Adjustments (COLA):	CPI Increase of 2.75% per year. Retiree COLA increases of 2.75% per year for Tiers 1 through 6. For Tier 5 and Tier 6 members who have COLA banks, we assume they receive 3.0% COLA increases until their COLA banks are exhausted and 2.75% thereafter.
Payroll Growth:	Inflation of 2.75% per year plus "across the board" real salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.75% per year from the valuation date.

[1] The above rate is only used for valuation purposes. The actual interest crediting rate on member account is determined by the Board every 6 months and is based on earned investment income as defined under the Board's operating policies and procedures.

Salary Increases:

The annual rate of compensation increase includes:

- Inflation at 2.75%, plus
- "Across the board" salary increases of 0.50% per year, plus
- The following merit and promotion increases:

Years of Service	Rate (%)
Less than 1	9.00
1 – 2	7.50
2 – 3	6.50
3 – 4	5.50
4 – 5	4.00
5 – 6	2.60
6 – 7	2.20
7 – 8	2.00
8 – 9	2.00
9 – 10	2.00
10 – 11	1.90
11 – 12	1.80
12 – 13	1.70
13 – 14	1.60
14 – 15	1.50
15 – 16	1.40
16 – 17	1.30
17 – 18	1.20
18 – 19	1.20
19 – 20	1.10
20 – 25	1.00
25 & Over	0.90

Increases are assumed to occur beginning of the year for future salary increases. We annualized biweekly pay (by multiplying by 365 and dividing by 14), supplied by LAFPP.

Demographic Assumptions

Post-Retirement Mortality Rates:	*Healthy*[1] • Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2019. *Disabled* • Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table projected generationally with the two dimensional mortality improvement scale MP-2019. *Beneficiary*[2] • Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table multiplied by 105%, projected generationally with the two-dimensional mortality improvement scale MP-2019. [1] The Pub-2010 Healthy Retiree Amount-Weighted Above-Median Mortality Tables only have rates for ages 45 and later for the Safety table. To develop the post-retirement mortality rates for ages 36 through 44 for Safety members, we have smoothed the difference between the rates at age 35 from the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Tables and the rates at age 45 from the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality tables. To develop the post-retirement mortality rates before age 36 for the Safety table, we have used the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Tables rates. This methodology for developing an extended annuitant mortality table is similar to the method used by the IRS to develop the base mortality table for determining minimum funding standards for single-employer defined benefit pension plans under Section 430. While Section 430 is not applicable to LAFPP, we believe this is a reasonable method for developing annuitant mortality rates at earlier ages. [2] The Pub-2010 Healthy Retiree Amount-Weighted Above-Median Mortality Tables only have rates for ages 50 and later for the General table. To develop the post-retirement mortality rates for ages 41 through 49 for General members, we have smoothed the difference between the rates at age 40 from the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Tables and the rates at age 50 from the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality tables. To develop the post-retirement mortality rates before age 41 for the General table, we have used the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Tables rates. This methodology for developing an extended annuitant mortality table is similar to the method used by the IRS to develop the base mortality table for determining minimum funding standards for single-employer defined benefit pension plans under Section 430. While Section 430 is not applicable to LAFPP, we believe this is a reasonable method for developing annuitant mortality rates at earlier ages.

Pre-Retirement Mortality Rates:

- Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional mortality improvement scale MP-2019.

	Rate (%)	
Age	Male	Female
20	0.04	0.02
25	0.03	0.02
30	0.04	0.02
35	0.04	0.03
40	0.05	0.04
45	0.07	0.06
50	0.10	0.08
55	0.15	0.11
60	0.23	0.15

Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

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

Disability Incidence Rates:

	Rate (%)	
Age	Fire	Police
25	0.01	0.02
30	0.02	0.04
35	0.06	0.07
40	0.09	0.16
45	0.13	0.23
50	0.18	0.31
55	0.68	0.44
60	1.00	0.65
65	0.40	0.30
70	0.00	0.00

80% of disabilities are assumed to be service connected disabilities. The other 20% are assumed to be non-service connected disabilities.

Disability rates are not applied to members eligible to enter the DROP.

Termination Rates:

Less Than Five Years of Service

	Rate (%)	
Years of Service	**Fire**	**Police**
Less than 1	7.00	8.50
1 – 2	2.00	3.25
2 – 3	1.00	3.25
3 – 4	0.75	3.00
4 – 5	0.50	2.00

Five or More Years of Service

	Rate (%)	
Age	**Fire**	**Police**
20	0.60	1.80
25	0.60	1.80
30	0.51	1.59
35	0.33	1.09
40	0.25	0.73
45	0.16	0.59
50	0.07	0.43
55	0.02	0.35
60	0.00	0.14

No termination is assumed after a member is eligible for retirement. This includes all active members currently in Tier 2. Members in Tiers 3, 5 and 6 who are not eligible to receive a deferred vested retirement benefit are assumed to receive a refund of member contributions.

Retirement Rates:

Age	Rate (%) Fire Tiers 2 & 4	Fire Tiers 3 & 5	Fire Tier 6
41	1.00	0.00	0.00
42	1.00	0.00	0.00
43	1.00	0.00	0.00
44	1.00	0.00	0.00
45	1.00	0.00	0.00
46	1.00	0.00	0.00
47	1.00	0.00	0.00
48	2.00	0.00	0.00
49	2.00	0.00	0.00
50	3.00	1.00	2.00
51	5.00	1.00	2.00
52	8.00	1.00	2.00
53	10.00	1.00	2.00
54	20.00	6.00	5.00
55	20.00	14.00	10.00
56	20.00	15.00	12.00
57	20.00	16.00	15.00
58	20.00	20.00	18.00
59	20.00	22.00	20.00
60	25.00	25.00	25.00
61	25.00	27.00	27.00
62	25.00	33.00	30.00
63	25.00	35.00	35.00
64	30.00	40.00	40.00
65	50.00	50.00	50.00
66	50.00	50.00	50.00
67	50.00	50.00	50.00
68	50.00	50.00	50.00
69	50.00	50.00	50.00
70 & Over	100.00	100.00	100.00

Retirement Rates (continued):

Age	Rate (%) Police Tiers 2 & 4	Police Tiers 3 & 5	Police Tier 6
41	10.00	0.00	0.00
42	10.00	0.00	0.00
43	10.00	0.00	0.00
44	10.00	0.00	0.00
45	10.00	0.00	0.00
46	7.00	0.00	0.00
47	7.00	0.00	0.00
48	5.00	0.00	0.00
49	5.00	0.00	0.00
50	10.00	8.00	6.00
51	10.00	4.00	5.00
52	12.00	4.00	5.00
53	20.00	5.00	5.00
54	30.00	12.00	15.00
55	35.00	20.00	20.00
56	30.00	20.00	20.00
57	30.00	20.00	20.00
58	30.00	20.00	20.00
59	30.00	20.00	20.00
60	30.00	25.00	25.00
61	30.00	25.00	25.00
62	30.00	25.00	25.00
63	30.00	25.00	25.00
64	40.00	35.00	35.00
65	50.00	50.00	50.00
66	50.00	50.00	50.00
67	50.00	50.00	50.00
68	50.00	50.00	50.00
69	50.00	50.00	50.00
70 & Over	100.00	100.00	100.00

DROP Program:

DROP participants are considered active members until they leave DROP and begin receiving retirement benefits. Members are assumed to remain in the DROP for 5 years. For current DROP participants, we have rounded up the number of years they have been in DROP for purposes of determining the number of years they are expected to remain in the DROP as of the valuation date.

For members who enter DROP on or after February 1, 2019, it is assumed they will have DROP payments suspended for an average of 4.5 months (or 0.9 months for each remaining year in DROP for current DROP members) due to the minimum hours per month needed for participation.

For active members who are not in the DROP as of the valuation date and are expected to retire with a service retirement benefit, we assume 95% will have elected DROP prior to retirement if they will have also satisfied the requirements for participating in the DROP for 5 years (starting on or after the valuation date).

Retirement Age for Deferred Vested Members:

50

Benefit for Inactive Non-Vested Members:	Immediate refund of member contributions.
Future Benefit Accruals:	1.0 year of service per year.
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, 85% 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.
Service Connected Disability Benefits:	**Years of Service** / **Benefit** Less than 20 / 55% of Final Average Salary 20 – 30 / 60% of Final Average Salary More than 30 / 75% of Final Average Salary
Non-Service Connected Disability Benefits:	45% of Final Average Salary.

Retiree Health Assumptions

Participation

Service Range (Years)	(a) Participation for Future Retirees Under 65	(b) Participation for Future Retirees Over 65	Participation Upon Attaining Age 65 for Current Retirees aged 55-64 Without Subsidy [(b-a)/(1-a)]
10–14	45%	80%	63.64%
15–19	65	85	57.14
20–24	80	85	25.00
25 and over	95	95	0.00

Dental Coverage	85% of future retirees are assumed to elect dental coverage.
Age and Gender of Spouse/Domestic Partner:	For all non-retired members, male members are assumed to have a female spouse or domestic partner who is 3 years younger than the member and female members are assumed to have a male spouse or domestic partner who is 3 years older than the member.
Spousal/Domestic Partner Coverage	Of future retirees receiving a medical subsidy 75% are assumed to elect coverage for married and surviving spouses or domestic partners. For those retired on valuation date with a subsidy, spousal or domestic partner coverage is based on census data.
Child Coverage	Some non-Medicare retirees will cover children in addition to their spouse or domestic partner and draw the maximum monthly subsidy. Current retirees are assumed to cover, if indicated in the data, their children for an additional 2 years. For future retirees, 25% are assumed to cover children for 4 years, or until when the retiree attains age 65, if earlier.

Appendix B: Proposed Actuarial Assumptions

Economic Assumptions

Net Investment Return:	7.00%, net of investment expenses.
Administrative Expenses:	Out of the total 1.45% of payroll in assumed administrative expenses, 1.32% of payroll payable biweekly is allocated to the Retirement Plan. This is equal to 1.28% of payroll payable at beginning of the year.
Interest Crediting Rate on Member Account:	3.00%[1]
Consumer Price Index (CPI or Inflation):	CPI Increase of 2.50% per year.
Cost-of-Living Adjustments (COLA):	Retiree COLA increases of 2.75% per year for Tiers 1 through 6. For Tier 5 and Tier 6 members who have COLA banks, we assume they receive 3.0% 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, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.50% per year from the valuation date.

[1] The above rate is only used for valuation purposes. The actual interest crediting rate on member account is determined by the Board every 6 months and is based on earned investment income as defined under the Board's operating policies and procedures.

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 (%)
Less than 1	9.00
1 – 2	7.00
2 – 3	6.50
3 – 4	5.50
4 – 5	4.00
5 – 6	2.75
6 – 7	2.00
7 – 8	2.00
8 – 9	2.00
9 – 10	2.50
10 – 11	1.90
11 – 12	1.80
12 – 13	1.70
13 – 14	1.60
14 – 15	2.00
15 – 16	1.40
16 – 17	1.30
17 – 18	1.20
18 – 19	1.20
19 – 20	1.60
20 – 25	1.00
25 & Over	0.90

Increases are assumed to occur beginning of the year for future salary increases. We annualized biweekly pay (by multiplying by 365 and dividing by 14), supplied by LAFPP.

Demographic Assumptions

Post-Retirement Mortality Rates:	*Healthy* • Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and unadjusted for females, projected generationally with the two-dimensional mortality improvement scale MP-2021. *Disabled* • Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table projected generationally with the two dimensional mortality improvement scale MP-2021. *Beneficiary* • **Not In Pay Status as of Valuation:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2021. • **In Pay Status as of Valuation:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table increased by 5% for males and increased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021. **Notes:** The above listed *Safety Healthy Retiree* table only provides rates for ages 45 and older. To develop mortality rates for ages 36 through 44, we have smoothed the difference between the rates at age 35 from the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Tables and the rates at age 45 from the Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Tables. To develop the mortality rates before age 36, we have used the Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Tables rates. The above listed *General Healthy Retiree* table only provides rates for ages 50 and older. To develop mortality rates for ages 41 through 49, we have smoothed the difference between the rates at age 40 from the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Tables and the rates at age 50 from the Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Tables. To develop the mortality rates before age 41, we have used the Pub-2010 General Employee Amount-Weighted Above-Median Mortality Tables rates. This methodology for developing extended annuitant mortality tables is similar to the method used by the IRS to develop the base mortality table for determining minimum funding standards for single-employer defined benefit pension plans under Internal Revenue Code Section 430. While Section 430 is not applicable to LAFPP, we believe this is a reasonable method for developing annuitant mortality rates at earlier ages.

Pre-Retirement Mortality Rates:

- Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table, projected generationally with the two-dimensional mortality improvement scale MP-2021.

	Rate (%)	
Age	Male	Female
20	0.04	0.02
25	0.03	0.02
30	0.04	0.02
35	0.04	0.03
40	0.05	0.04
45	0.07	0.06
50	0.10	0.08
55	0.15	0.11
60	0.23	0.15
65	0.35	0.20

Note that generational projections beyond the base year (2010) are not reflected in the above mortality rates.

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

Disability Incidence Rates:

	Rate (%)	
Age	Fire	Police
25	0.01	0.01
30	0.02	0.03
35	0.05	0.08
40	0.08	0.18
45	0.11	0.25
50	0.14	0.29
55	0.36	0.36
60	0.50	0.61
65	0.20	0.30
70	0.00	0.00

85% of disabilities are assumed to be service connected disabilities. The other 15% are assumed to be non-service connected disabilities.

Disability rates are not applied to members eligible to enter the DROP.

Termination Rates:

Less Than Five Years of Service

	Rate (%)	
Years of Service	**Fire**	**Police**
Less than 1	7.50	9.00
1 – 2	1.80	3.25
2 – 3	1.10	3.25
3 – 4	1.00	3.25
4 – 5	0.50	2.50

Five or More Years of Service

	Rate (%)	
Age	**Fire**	**Police**
25	0.60	2.50
30	0.51	2.08
35	0.33	1.29
40	0.25	0.74
45	0.16	0.60
50	0.07	0.57
55	0.02	0.52
60	0.00	0.20
65	0.00	0.00

No termination is assumed after a member is eligible for retirement. This includes all active members currently in Tier 2. Members in Tiers 3, 5 and 6 who are not eligible to receive a deferred vested retirement benefit are assumed to receive a refund of member contributions.

Retirement Rates:

Age	Rate (%)		
	Fire Tiers 2 & 4	Fire Tiers 3 & 5	Fire Tier 6
45	1.00	0.00	0.00
46	1.00	0.00	0.00
47	2.00	0.00	0.00
48	2.00	0.00	0.00
49	2.00	0.00	0.00
50	3.00	1.00	2.00
51	6.00	1.00	3.00
52	10.00	1.00	3.00
53	15.00	1.00	4.00
54	20.00	5.00	5.00
55	20.00	14.00	10.00
56	20.00	14.00	11.00
57	20.00	14.00	13.00
58	20.00	17.00	15.00
59	20.00	20.00	18.00
60	20.00	22.00	22.00
61	20.00	25.00	25.00
62	20.00	30.00	27.00
63	25.00	35.00	35.00
64	30.00	40.00	40.00
65	40.00	45.00	45.00
66	40.00	45.00	45.00
67	40.00	45.00	45.00
68	50.00	50.00	50.00
69	50.00	50.00	50.00
70 & Over	100.00	100.00	100.00

Retirement Rates (continued):

Age	Rate (%) Police Tiers 2 & 4	Police Tiers 3 & 5	Police Tier 6
41	10.00	0.00	0.00
42	10.00	0.00	0.00
43	10.00	0.00	0.00
44	10.00	0.00	0.00
45	10.00	0.00	0.00
46	7.00	0.00	0.00
47	7.00	0.00	0.00
48	7.00	0.00	0.00
49	5.00	0.00	0.00
50	10.00	9.00	7.00
51	10.00	5.00	5.00
52	15.00	5.00	5.00
53	20.00	6.00	5.00
54	32.00	13.00	17.00
55	35.00	22.00	22.00
56	30.00	22.00	22.00
57	30.00	22.00	22.00
58	30.00	22.00	22.00
59	30.00	25.00	25.00
60	30.00	25.00	25.00
61	30.00	25.00	25.00
62	30.00	25.00	25.00
63	30.00	30.00	30.00
64	40.00	35.00	35.00
65	50.00	45.00	45.00
66	50.00	45.00	45.00
67	50.00	45.00	45.00
68	50.00	45.00	45.00
69	50.00	45.00	45.00
70 & Over	100.00	100.00	100.00

DROP Program:

DROP participants are considered active members until they leave DROP and begin receiving retirement benefits. Members are assumed to remain in the DROP for 5 years. For current DROP participants, we have rounded up the number of years they have been in DROP for purposes of determining the number of years they are expected to remain in the DROP as of the valuation date.

For members who enter DROP on or after February 1, 2019, it is assumed they will have DROP payments suspended for an average of 3.5 months (or 0.7 months for each remaining year in DROP for current DROP members) due to the minimum hours per month needed for participation.

For active members who are not in the DROP as of the valuation date and are expected to retire with a service retirement benefit, we assume 95% will have elected DROP prior to retirement if they will have also satisfied the requirements for participating in the DROP for 5 years (starting on or after the valuation date).

Retirement Age for Deferred Vested Members:

50

Benefit for Inactive Non-Vested Members:	Immediate refund of member contributions.
Future Benefit Accruals:	1.0 year of service per year.
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, 85% 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.
Service Connected Disability Benefits:	**Years of Service** / **Benefit** Less than 20 / 55% of Final Average Salary 20 – 30 / 60% of Final Average Salary More than 30 / 75% of Final Average Salary
Non-Service Connected Disability Benefits:	45% of Final Average Salary.

Retiree Health Assumptions

Participation

Service Range (Years)	(a) Participation for Future Retirees Under 65	(b) Participation for Future Retirees Over 65	Participation Upon Attaining Age 65 for Current Retirees aged 55-64 Without Subsidy [(b-a)/(1-a)]
10–14	35%	55%	30.77%
15–19	60	80	50.00
20–24	80	85	25.00
25 and over	95	97	40.00

Dental Coverage	90% of future retirees are assumed to elect dental coverage.
Age and Gender of Spouse/Domestic Partner:	For all non-retired members, male members are assumed to have a female spouse or domestic partner who is 3 years younger than the member and female members are assumed to have a male spouse or domestic partner who is 3 years older than the member.
Spousal/Domestic Partner Coverage	Of future retirees receiving a medical subsidy 80% are assumed to elect coverage for married and surviving spouses or domestic partners. For those retired on valuation date with a subsidy, spousal or domestic partner coverage is based on census data.
Child Coverage	Some non-Medicare retirees will cover children in addition to their spouse or domestic partner and draw the maximum monthly subsidy. Current retirees under age 65 are assumed to cover, if indicated in the data, their children until the retiree attains age 65. For future retirees, 35% are assumed to cover their children until the retiree attains age 65.

5765496v10/07916.135