City of Los Angeles Fire and
Police Pension Plan

Actuarial Experience Study

Analysis of Actuarial Experience

July 1, 2016 through June 30, 2019

Segal

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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, 2020 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, 2016 to June 30, 2019 and provides the proposed actuarial assumptions, both economic and demographic, to be used in the June 30, 2020 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

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I. Introduction, Summary, and Recommendations

To project the cost and liabilities of the Pension Fund, 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, it is impossible to determine when and to what extent the economy will rebound after the current crisis caused by the COVID-19 pandemic. [1] Changing assumptions reflects a basic change in thinking about the future, and it 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, 2016 through June 30, 2019. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27 "Selection of Economic Assumptions for Measuring Pension Obligations" 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, investment return, merit and promotion salary increases, administrative expense load, retirement from active employment, percentage of members with an eligible spouse or domestic partner, termination, disability incidence and benefit percentage under non-service and service connected disabilities.

[1] An analysis of the ongoing impact of the COVID-19 pandemic is beyond the scope of the current experience study.

Please note that new pre- and post-retirement mortality assumptions were adopted by the Board in December 2019 for the June 30, 2019 valuation as recommended in our mortality experience study for the period July 1, 2010 through June 30, 2019, dated December 12, 2019. For that reason we are not recommending any changes in mortality assumptions at this time.

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

Pg #	Actuarial Assumption Categories	Recommendation
9	**Inflation:** Future increases in the Consumer Price Index (CPI), which drives investment returns and active member salary increases.	Reduce the inflation assumption from 3.00% to 2.75% per annum as discussed in Section (III)(A).
12	**Investment Return:** The estimated average net rate of return on current and future assets of the Plan as of the valuation date. This rate is used to discount liabilities.	Reduce the current investment return assumption from 7.25% to 7.00% per annum as discussed in Section (III)(B).
19	**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 3.00% to 2.75% and maintain the current real "across the board" salary increase assumption at 0.50%. This means that the combined inflationary and real "across the board" salary increases will decrease from 3.50% to 3.25% per annum. We recommend adjusting the merit and promotion rates of salary increase as developed in Section (III) (C) to reflect past experience. Proposed merit and promotion salary increases are higher in some service categories and lower in other service categories under the proposed assumptions. The recommended salary increases anticipate slightly higher salary increases overall.
23	**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 1.25% to 1.40% of projected payroll as discussed in Section (III)(D). The portion allocation to the Retirement Plan and the Health Plan is 1.29% and 0.11% of projected payroll, respectively.
24	**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	Adjust the retirement rates to those developed in Section (IV)(A) to anticipate fewer retirements overall. Maintain the retirement age for deferred vested members of 50. Maintain the probability of electing DROP prior to retirement at 95% and maintain the expected period of participation in DROP at 5 years. Maintain the assumption that DROP payments will be suspended for an average of 4.5 months due to the minimum hours per month needed for participation if members enter DROP on or after February 1, 2019. For active and inactive members, increase the percent married at retirement assumption for males from 80% to 85% and maintain the assumption at 55% for females. For active and inactive members, maintain the assumption that male members are 3 years older than their female spouses and that female members are 2 years younger than their male spouses.
33	**Termination Rates:** The probability of leaving employment at each age and receiving either a refund of member contributions or a deferred vested retirement benefit.	Adjust the current termination rates to those developed in Section (IV)(B) to anticipate fewer terminations overall.

Pg #	Actuarial Assumption Categories	Recommendation
38	**Disability Incidence Rates:** The probability of becoming disabled at each age.	Adjust the current disability rates to those developed in Section (IV)(C) to reflect lower incidence of disability. Lower the current assumption from 85% to 80% of all disability retirements will be service connected disability retirements. Adjust the anticipated level of disability benefit (that reflects severity of disability) payable upon disability retirement to reflect recent experience.

We have estimated the impact of all the recommended economic and demographic assumptions as if they were applied to the June 30, 2019 actuarial valuations. The table below shows the changes in the employer contribution rates due to the proposed assumption changes separately for the recommended inflation and investment return assumption changes (as recommended in Section III of this report) and all other recommended demographic assumption changes (the remaining economic assumptions recommended in Section III as well as the demographic changes recommended in Section IV of this report).

Cost Impact of the Recommended Assumptions Based on June 30, 2019 Actuarial Valuations

Impact on Employer Contribution Rate	Retirement Plan	Health Plan	Total
Increase due to inflation & investment return assumptions	0.13%	0.97%	1.10%
Increase due to all other assumptions	1.35%	-0.12%	1.23%
Total increase in average employer rate	1.48%	0.85%	2.33%

Section II 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 III for the economic assumptions and Section IV for the demographic assumptions. The cost impact of the proposed changes is detailed in Section V.

II. Background and Methodology

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

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 members and drives increases in the allowances of retired members.
- **Investment Return:** Expected long-term rate of return on the Plan's investments after 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 "across the board" real 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. With the exception of Tier 1, payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the price inflation rate plus any real "across the board" pay increases that are assumed.

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

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 terminated 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, say, the age 20-24 category, but very

few decrements (actual deaths); therefore, we would not be able to rely heavily on the probability of death 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.

As noted in Section I, in this study we are not recommending any changes in the pre- and post-retirement mortality assumptions as they were reviewed and updated for the June 30, 2019 valuation, based on a separate study of mortality experience.

III. 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 an analysis of 15 and 30 year moving averages of historical inflation rates:

Historical Consumer Price Index – 1930 to 2019[2]
(U.S. City Average - All Urban Consumers)

	25th Percentile	Median	75th Percentile
15-year moving averages	2.4%	3.3%	4.4%
30-year moving averages	2.9%	3.7%	4.8%

The average inflation rates have continued to decline gradually over the last several years due to the relatively low inflationary period over the past two decades. Also, the later 15-year averages during the period are lower as they do not include the high inflation years of the mid-1970s and early 1980s.

Based on information found in the Public Plans Data website, which is produced in partnership with the National Association of State Retirement Administrators (NASRA), the median inflation assumption used by 174 large public retirement funds in their 2018 fiscal year valuations was 2.65%.[3] In California, CalSTRS, Los Angeles County and nine other 1937 Act CERL systems use an inflation assumption of 2.75%, one 1937 Act CERL system uses an inflation assumption of 2.90%, and two 1937 Act CERL systems use an inflation assumption of 2.50%. CalPERS has lowered their inflation assumption from 2.75% to 2.50% over a three-year period. Seven other 1937 Act CERL systems use an inflation assumption of 3.00%.

LAFPP's investment consultant, RVKuhns & Associates (RVKuhns), anticipates an annual inflation rate of 2.25%,[4] while the average inflation assumption provided by RVKuhns and six other investment advisory firms retained by Segal's California public sector clients was 2.29%.

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

[3] Among 188 large public retirement funds, the inflation assumption was not available for 14 of the public retirement funds in the survey data.

[4] RVKuhns' annual inflation rate of 2.25% is based on their initial capital market assumptions that were provided for 2020. RVKuhns later revised their capital market assumptions after Q1 of 2020 to reflect the COVID-19 pandemic. We have used the initial capital market assumptions in this study.

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) 2020 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%. This 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] As of April 2020, the difference in yields is about 1.39% which provides a measure of market expectations of inflation.

Based on all of the above information, we recommend that the current 3.00% annual inflation assumption be reduced to 2.75% for the June 30, 2020 actuarial valuation.

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 these metrics, since 2018 we have been recommending the same 2.75% inflation assumption in our experience for our California based public retirement system clients. We will continue to review this assumption in future experience studies.

Retiree Cost-of-Living Increases

In our last experience study as of June 30, 2016, consistent with the 3.00% annual inflation assumption adopted by the Board, the Board adopted a 3.00% retiree cost-of-living assumption for all tiers.

We recommend that the current retiree cost-of-living assumption of 3.00% per year be reduced to 2.75% in the June 30, 2020 valuation for 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 under the tiers that provide COLA banks. 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.

[5] The time horizon used by the seven investment consultants in our review generally ranges from 10 years to 30 years.

[6] Source: Social Security Administration: The 2020 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 Association.

- Using a lower long-term COLA assumption based on a stochastic analysis would mean that an actuarial loss would occur even when the inflation assumption of 2.75% 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 assumption, 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 investment expenses and risk.

Real Rate of Investment Return

This component represents the portfolio's incremental investment market returns over inflation. Theory has it that as an investor takes a greater investment risk, the return on the investment is expected to also be greater, at least in the long run. This additional 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 system's portfolio will vary with the Board's asset allocation among asset classes.

The following is the Plan's current target asset allocation and the assumed real rate of return assumptions by asset class. The first column of real rate of return assumptions are determined by reducing RVKuhns' total or "nominal" 2020 return assumptions[8] by their assumed 2.25% inflation rate. The second column of returns (except for Unconstrained Fixed Income, Private Equity, and REITS) 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 RVKuhns and six other investment advisory firms retained by Segal's public sector clients. We believe these averages are a reasonable consensus forecast of long-term future market returns in excess of inflation.

[8] The capital market assumptions provided by RVKuhns were net of investment fees. Because our model includes a separate component for investment expenses, Segal has estimated the fees paid to managers of each investment category, using information provided by LAFPP. Segal then increased RVKuhns' capital market assumptions by those allocated fees so as to adjust those assumptions to be gross of investment fees.

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

Asset Class	Percentage of Portfolio	RVKuhns' Assumed Real Rate of Return[9]	Average Assumed Real Rate of Return from a Sample of Consultants to Segal's California Public Sector Clients[10]
Large Cap U.S. Equity	23%	4.05%	5.40%
Small Cap U.S. Equity	6%	4.96%	6.20%
Developed International Equity	16%	5.80%	6.54%
Emerging Markets Equity	5%	8.31%	8.78%
U.S Core Fixed Income	13%	0.87%	1.07%
TIPS	4%	0.62%	0.62%
High Yield Bonds	3%	3.09%	3.31%
Real Estate	7%	4.15%	4.65%
Commodities	5%	3.14%	3.05%
Cash	1%	0.00%	0.01%
Unconstrained Fixed Income	2%	1.37%	1.37%[11]
Private Equity	12%	8.25%	8.25%[11]
REITS	3%	4.40%	4.40%[11]
Total	**100%**	**4.40%**	**4.99%**

The above are representative of "indexed" returns and do not include any additional returns ("alpha") from active management. This is consistent with the Actuarial Standard of Practice No. 27, Section 3.6.3.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."

The following are some observations about the returns provided above:

1. The investment consultants to our California public sector clients 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 much shorter than the durations of a retirement plan's liabilities.

[9] Derived by reducing RVKuhns' nominal rate of return assumptions by their assumed 2.25% inflation rate. As stated earlier in this section, Segal has used RVKuhns' initial 2020 capital market assumptions adjusted to be gross of fees by increasing those returns by estimated investment fees as calculated by Segal.

[10] These are based on the projected arithmetic returns provided by RVKuhns and six other investment advisory firms serving the LA Fire and Police Pension Plan and 16 other city and county retirement systems in California. These return assumptions are gross of any applicable investment expenses.

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

2. Using a sample average of expected 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.

3. Therefore, we recommend that the 4.99% portfolio real rate of return be used to determine the Plan's investment return assumption. This is 0.12% lower than the return that was used three years ago in the review of the recommended investment return assumption for the June 30, 2017 valuation. Since there were minimal changes to the Plan's target asset allocation, the difference is due to changes in the real rate of return assumptions provided to us by the investment advisory firms.

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. LAFPP previously adopted an explicit administrative expense assumption and used that in the development of employer contributions starting with the June 30, 2014 valuation. The payment of those expenses would not result in a reduction in the net income available from investment return.

The following table provides the investment expenses in relation to the actuarial value of assets for the five-year period ending June 30, 2019.

Investment Expenses as a Percentage of Actuarial Value of Assets (Dollars in 000's)

Year Ending June 30	Actuarial Value of Assets[12]	Investment Expenses[13]	Investment %
2015	$18,114,393	$75,765	0.42%
2016	19,126,148	77,289	0.40
2017	20,317,067	84,963	0.42
2018	21,659,430	95,217	0.44
2019	23,053,913	113,391	0.49
Five-Year Average			**0.43**
Current Assumption			**0.40**
Proposed Assumption			**0.40**

Based on this experience, we have maintained the future investment expense assumption at 0.40%.

Note related to investment expenses paid to active managers – As cited above, under Section 3.6.3.d of ASOP No. 27, the effect of an active investment management strategy should be considered "net of investment expenses" when determining whether "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."

[12] As of end of plan year.
[13] From LAFPP audited financial statements.

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 now, we will continue to use the current methodology that any "alpha" that may be identified would be treated as an increase in the risk adjustment and corresponding confidence level. For example, 0.25% of alpha would increase the confidence level by 3% (see discussions that follow on definitions of risk adjustment and confidence level).

Risk Adjustment

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. The Plan'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.[14] This is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

The 4.99% expected real rate of return developed earlier in this report was based on expected mean or average arithmetic returns. In our model, the confidence level associated with a particular risk adjustment represents the relative likelihood that future investment earnings would equal or exceed the assumed earnings over a 15-year period on an expected value basis.[15] 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. Note that, based on the investment return assumptions recently adopted by systems that have been analyzed under this model, we observe a confidence level generally in the range of 50% to 55%.

Three years ago, the Board adopted an investment return assumption of 7.25%. That return implied a risk adjustment of 0.46%, reflecting a confidence level of 55% that the actual average return over 15 years would not fall below the assumed return, assuming that the distribution of returns over that period follows the normal statistical distribution.[16]

If we use the same 55% confidence level from our last study to set this year's risk adjustment, based on the current long-term portfolio standard deviation of 12.20% provided by RVKuhns & Associates, the corresponding risk adjustment would be 0.43%. Together with the other investment return components, this would result in an investment return assumption of 6.91%, which is lower than the current assumption of 7.25%.

Based on the general practice of using one-quarter percentage point increments for economic assumptions, we evaluated the effect on the confidence level of alternative investment return

[14] This type of risk adjustment is referred to in the Actuarial Standards of Practice as a "margin for adverse deviation."

[15] 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.

[16] Based on an annual portfolio return standard deviation of 12.89% provided by RVKuhns in 2017. Strictly speaking, future compounded long-term investment returns will tend to follow a log-normal distribution. However, we believe the normal distribution assumption is reasonable for purposes of setting this type of risk adjustment.

assumptions. In particular, a net investment return assumption of 7.00%, together with the other investment return components, would produce a risk adjustment of 0.34%, which corresponds to a confidence level of 54%. We believe this analysis supports reducing the current assumption from 7.25% to 7.00%.

The table below shows the recommended investment return assumption, the risk adjustment and corresponding confidence level compared to the values from prior studies.

Year Ending June 30	Investment Return	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 (Recommended)	7.00%	0.34%	54%

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 the Plan has positioned itself relative to risk over periods of time.[17] The use of a 54% confidence level under Segal's model 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.
- The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by RVKuhns. 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.
- A confidence level of 54% is within (and at the top end of) the range of about 50% to 55% that corresponds to the risk adjustments currently used by most of Segal's other California public retirement system clients.
- 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".

Taking into account the factors above, our recommendation is to reduce the net investment return assumption from 7.25% to 7.00%. As noted above, this return implies a 0.34% risk adjustment and reflects a confidence level of 54%.

[17] 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."

Recommended Investment Return Assumption

The following table summarizes the components of the investment return assumption developed in the previous discussion. For comparison purposes, we have also included similar values from the last study.

Calculation of Investment Return Assumption

Assumption Component	June 30, 2020 Recommended Value	June 30, 2017 Adopted Value
Inflation	2.75%	3.00%
Plus Portfolio Real Rate of Return	4.99%	5.11%
Minus Expense Adjustment	(0.40)%	(0.40)%
Minus Risk Adjustment	(0.34)%	(0.46)%
Total	**7.00%**	**7.25%**
Confidence Level	**54%**	**55%**

Based on this analysis, we recommend that the investment return assumption be decreased from 7.25% to 7.00% per annum.

Comparison with Alternative Model used to Review Investment Return Assumption

Since our appointment as actuary for LAFPP, 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.[18] 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 discussed setting investment return assumptions using an alternative "forward looking expected geometric returns" approach.[19] Even though expected geometric returns are lower than expected arithmetic returns, those California public retirement systems that have set investment return assumptions using this alternative approach have in practice adopted investment return assumptions that are comparable to those adopted by the Board for LAFPP. This is because under the model used by those retirement systems, their investment return assumptions are not reduced to anticipate future investment expenses.[20]

For comparison, we evaluated the recommended 7.00% assumption based on the expected geometric return for the entire portfolio, and gross of the investment expenses. Under that

[18] Again, as discussed in the footnote to "Risk Adjustment", 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.

[19] 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.

[20] This means that if the model were to be applied to LAFPP, the expected geometric return would not be adjusted for the approximately 0.40% investment expenses paid by LAFPP.

model, over a 15-year period, there is a 58% likelihood that future average geometric returns will meet or exceed 7.00%.[21]

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.

We note that an investment return of 7.00% or lower is becoming more common among California public sector retirement systems. In particular, eleven of the 1937 Act CERL systems use a 7.00% investment return assumption with one 1937 Act CERL Plan at 6.50% The San Jose and San Diego City retirement systems use investment return assumptions of 6.75% and 6.50%, respectively. Furthermore, both CalPERS and CalSTRS currently use a 7.00% earnings assumption. With the exception of the retirement systems stated above, all other County employees' retirement systems in California are using a 7.25% earnings assumption.

The following table compares LAFPP's recommended net investment return assumption against those of the 188 large public retirement funds in their 2018 fiscal year valuations based on information found in the Public Plans Data website, which is produced in partnership with NASRA:[22]

		Public Plans Data[23]		
Assumption	**LAFPP**	**Low**	**Median**	**High**
Net Investment Return	7.00%	4.50%	7.25%	8.00%

The detailed survey results show that more than 80% of the systems have an investment return assumption in the range of 6.75% to 7.50%. Also, about one-third of the systems have reduced their investment return assumption during the year. 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 that both the risk adjustment model and other considerations indicate a lower earnings assumption. The recommended assumption of 7.00% provides for a risk margin within the risk adjustment model and is consistent with LAFPP's current practice relative to other public systems.

[21] We performed this stochastic simulation using the capital market assumptions included in the 2019 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 2019 survey that included responses from 34 investment advisors.

[22] Among 188 large public retirement funds, the investment return assumption was not available for 6 of the public retirement funds in the survey data.

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

C. Salary Increase

Salary increases impact plan costs in two ways: (i) by increasing members' benefits (since benefits are a function of the members' highest average pay) and future normal cost collections; and (ii) by increasing total active member payroll which in turn generates lower UAAL contribution rates. 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 are recommending that the assumed rate of inflation be reduced from 3.00% to 2.75% per annum. 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 0.4% – 0.7% 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 April 2020. In that report, real "across the board" pay increases are forecast to be 1.1% 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, 2019 was 2.9%, which is equal to the change in CPI during that same period:

Valuation Date	Actual Average Increase[24]	Actual Change in CPI[25]
June 30, 2017	3.4%	2.7%
June 30, 2018	3.8%	3.6%
June 30, 2019	1.6%	2.5%
Three Year Average	**2.9%**	**2.9%**

[24] 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.

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

Considering these factors, 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 3.50% to 3.25%.

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 increases.

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

   a. Measuring each continuing member's actual salary increase over each year of the experience period on a salary-weighted basis, with higher weights assigned to experience from members with larger salaries;
   b. Excluding any members with increases of more than 50% or any decreases during any particular year;
   c. Categorizing these increases 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 3.25% assumed inflation and real "across the board" increases recommended in this study.

The following table shows the actual average merit and promotion increases by years of service over 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 (2.9% on average for the three-year period).

	Rate (%)		
Years of Service	Current Assumption	Actual Average Increase	Proposed Assumption
0 – 1	8.50	10.40	9.00
1 – 2	7.50	8.08	7.50
2 – 3	6.00	7.00	6.50
3 – 4	5.50	5.63	5.50
4 – 5	4.00	3.91	4.00
5 – 6	2.75	2.53	2.60
6 – 7	2.50	1.96	2.20
7 – 8	2.00	1.58	2.00
8 – 9	1.75	2.50	2.00
9 – 10	1.75	3.38	2.00
10 – 11	1.25	1.89	1.90
11 – 12	1.00	1.99	1.80
12 – 13	1.00	1.82	1.70
13 – 14	1.00	2.27	1.60
14 – 15	1.00	2.67	1.50
15 – 16	0.80	1.65	1.40
16 – 17	0.80	1.53	1.30
17 – 18	0.80	1.44	1.20
18 – 19	0.80	1.77	1.20
19 – 20	0.80	2.22	1.10
20 – 21	0.80	1.30	1.00
21 – 22	0.80	1.21	1.00
22 – 23	0.80	1.24	1.00
23 – 24	0.80	1.07	1.00
24 – 25	0.80	1.35	1.00
25 – 26	0.80	1.15	0.90
26 – 27	0.80	1.14	0.90
27 – 28	0.80	1.00	0.90
28 – 29	0.80	0.92	0.90
29 – 30	0.80	1.01	0.90
30 & Over	0.80	1.06	0.90

Chart 1 compares actual experience with the current and proposed rates of merit and promotion increases.

Based on this experience, we are proposing changes in the merit and promotion salary increases, with increases in some service categories and decreases in other service categories. Overall, total salary increases are assumed to be slightly higher under the proposed assumptions.

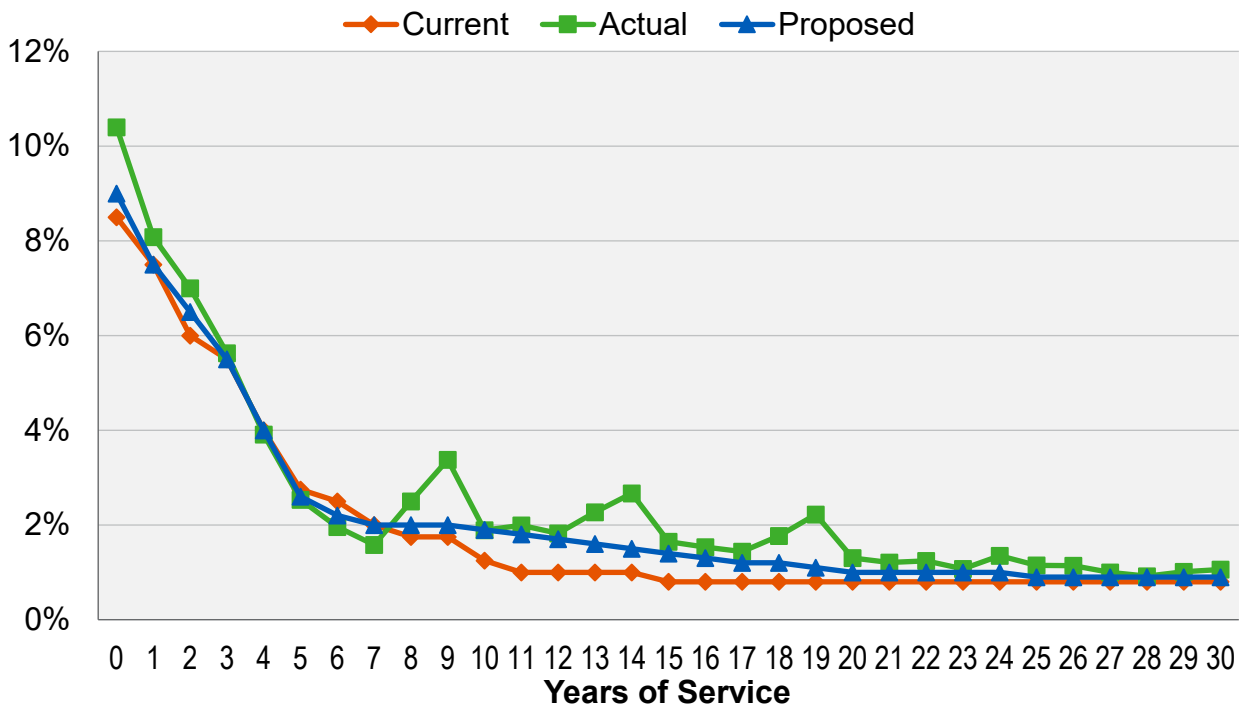
Active Member Payroll

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, except for Tier 1, 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 member's future benefits.

We recommend that the active member payroll increase assumption be reduced from 3.50% to 3.25% annually, consistent with the combined inflation plus real "across the board" salary increase assumptions.

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 LAFPP's assets. These expenses include fees for administrative, legal, accounting, and actuarial services, as well as routine costs for printings, mailings, computer-related activities, and other functions carried out by the plan. They do not include investment-related expenses.

The following table provides the administrative expenses for both the Retirement and Health Plans in relation to the projected payroll for the five-year period ending June 30, 2019.

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

Year Ending June 30	Covered Payroll[26]	Administrative Expenses[27]	Administrative %
2015	$1,314,360	$18,984	1.44%
2016	1,351,788	18,706	1.38
2017	1,397,245	20,711	1.48
2018	1,451,996	20,595	1.42
2019	1,487,978	21,510	1.45
Five-Year Average			**1.43**
Current Assumption			**1.25**
Proposed Assumption			**1.40**

The average administrative expenses percentage over this five-year period is 1.43% of covered payroll. There was an increase in the average percentage during this five-year period as a result of the increase in the amount of administrative expenses as well as an increase in covered payroll that was less than expected by our wage increase assumption. Beginning with FYE 2015, the City now bills LAFPP directly for their respective share of the LACERS pension contributions made on behalf of LAFPP staff. This expense will continue to be paid by the Plan in the future. We have taken this information into consideration in developing our assumption.

We recommend that the administrative expense assumption be increased from 1.25% to 1.40% of payroll.

This expense will be allocated to the employer contribution rates for the Retirement and Health Plans in the amounts of 1.29% and 0.11%, 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, 2019.

[26] Based on the budgeted payroll used to determine prepaid contributions.
[27] Administrative expenses shown were revised by LAFPP to remove any one-time costs that were not expected to continue.

IV. Demographic Assumptions

A. Retirement Rates

The age at which a member retires from service (i.e., who does 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 retirement experience during the current three-year period indicated that there were fewer actual retirements than expected.

Current retirement rate assumptions are a function of the member's age and tier. During this experience study, we also analyzed recent years' retirement experience both as a function of age and years of service. Our review concludes that the majority of LAFPP members are 'career employees' with few retirements happening at lower years of service. Therefore, we have proposed to keep the retirement rates as a function of the member's age and tier only. The below table shows the actual retirements occurring during the experience study period of July 1, 2016 through June 30, 2019 broken down by years of service.

Years of Service	Actual Retirements
Less than 25	171
25 – 30	439
30 & Over	414

In this study, we have adjusted the retirement probabilities to reflect the current three-year experience, as well as prior experience as represented by the current retirement assumptions for Fire and Police members in Tiers 2 through 5. 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.

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 DROP and begin receiving retirement benefits. However, at the date of retirement, there is an assumption that we apply to project the probability that a member has elected DROP before retirement, and if so, how many years the member has been in the DROP.

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

Fire

	Rate of Retirement (%)							
	Fire Tiers 2 and 4			Fire Tiers 3 and 5			Fire Tier 6	
Age	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate	Current Rate	Proposed Rate
41	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
42	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
43	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
44	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
45	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
46	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
47	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
48	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
49	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
50	3.00	20.00	3.00	2.00	0.63	1.00	3.00	2.00
51	5.00	0.00	5.00	2.00	1.02	1.00	3.00	2.00
52	8.00	50.00	8.00	2.00	0.42	1.00	4.00	2.00
53	10.00	0.00	10.00	2.00	1.05	1.00	5.00	2.00
54	20.00	0.00	20.00	7.00	3.85	6.00	5.00	5.00
55	25.00	0.00	20.00	14.00	12.42	14.00	10.00	10.00
56	25.00	0.00	20.00	16.00	10.68	15.00	12.00	12.00
57	25.00	25.00	20.00	18.00	10.37	16.00	15.00	15.00
58	25.00	0.00	20.00	25.00	13.49	20.00	18.00	18.00
59	25.00	0.00	20.00	25.00	14.19	22.00	20.00	20.00
60	25.00	0.00	25.00	30.00	24.07	25.00	25.00	25.00
61	25.00	0.00	25.00	30.00	24.24	27.00	30.00	27.00
62	25.00	0.00	25.00	35.00	23.68	33.00	30.00	30.00
63	25.00	0.00	25.00	40.00	30.00	35.00	35.00	35.00
64	30.00	0.00	30.00	40.00	36.84	40.00	40.00	40.00
65	60.00	0.00	50.00	60.00	30.00	50.00	60.00	50.00
66	60.00	33.33	50.00	60.00	20.00	50.00	60.00	50.00
67	60.00	0.00	50.00	60.00	0.00	50.00	60.00	50.00
68	60.00	0.00	50.00	60.00	66.67	50.00	60.00	50.00
69	60.00	0.00	50.00	60.00	0.00	50.00	60.00	50.00
70	100.00	0.00	100.00	100.00	0.00	100.00	100.00	100.00

As shown above, we are recommending decreases in most of the retirement rates for Fire members.

Police

	Rate of Retirement (%)							
	Police Tiers 2 and 4			Police Tiers 3 and 5			Police Tier 6	
Age	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate	Current Rate	Proposed Rate
41	10.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
42	10.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
43	10.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
44	10.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
45	10.00	9.09	10.00	0.00	0.00	0.00	0.00	0.00
46	7.00	16.67	7.00	0.00	0.00	0.00	0.00	0.00
47	7.00	7.69	7.00	0.00	0.00	0.00	0.00	0.00
48	7.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
49	7.00	4.17	5.00	0.00	0.00	0.00	0.00	0.00
50	12.00	10.26	10.00	7.00	8.48	8.00	8.00	6.00
51	12.00	6.25	10.00	5.00	3.89	4.00	10.00	5.00
52	12.00	11.36	12.00	5.00	4.96	4.00	10.00	5.00
53	20.00	16.67	20.00	5.00	4.56	5.00	15.00	5.00
54	25.00	40.91	30.00	12.00	11.19	12.00	20.00	15.00
55	30.00	50.00	35.00	20.00	21.25	20.00	20.00	20.00
56	30.00	25.00	30.00	20.00	17.01	20.00	20.00	20.00
57	30.00	25.00	30.00	20.00	18.08	20.00	20.00	20.00
58	30.00	0.00	30.00	22.00	18.35	20.00	22.00	20.00
59	30.00	40.00	30.00	22.00	18.58	20.00	22.00	20.00
60	30.00	50.00	30.00	25.00	25.00	25.00	25.00	25.00
61	30.00	33.33	30.00	25.00	25.23	25.00	25.00	25.00
62	30.00	0.00	30.00	25.00	22.67	25.00	25.00	25.00
63	30.00	0.00	30.00	25.00	26.23	25.00	25.00	25.00
64	40.00	0.00	40.00	30.00	40.00	35.00	30.00	35.00
65	60.00	0.00	50.00	60.00	50.00	50.00	60.00	50.00
66	60.00	0.00	50.00	60.00	18.18	50.00	60.00	50.00
67	60.00	0.00	50.00	60.00	33.33	50.00	60.00	50.00
68	60.00	0.00	50.00	60.00	50.00	50.00	60.00	50.00
69	60.00	0.00	50.00	60.00	0.00	50.00	60.00	50.00
70	100.00	0.00	100.00	100.00	33.33	100.00	100.00	100.00

As shown above, we are recommending decreases in most of the retirement rates for Police members, along with increases at some ages.

Charts 2 and 3 on page 30 compare actual experience with the current and proposed rates of retirement for Fire Tiers 2 and 4, and Fire Tiers 3 and 5, respectively. Charts 4 and 5 on page 31 show the same information for Police Tiers 2 and 4, and Police Tiers 3 and 5, respectively.

Chart 6 on page 32 compares the current and proposed rates of retirement for Fire Tier 6. Chart 7 on page 32 shows the same information for Police Tier 6.

Deferred Vested Members

In prior valuations, deferred vested members were assumed to retire at age 50. The average age at retirement over the prior three years was 50.2 for all deferred vested members. (It is our understanding that the Pension Plan would pay retirement benefits retroactively to age 50.)

We recommend maintaining the assumed retirement age at age 50 for deferred vested participants.

DROP Elections

DROP participants are considered active members until they leave the DROP and begin receiving retirement benefits.

In prior valuations, of all members expected to retire with service retirement benefit, we assumed a 95% probability that members have elected 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 94%.

We recommend maintaining the DROP probability at 95%.

In prior valuations, members were assumed to remain in DROP for 5 years. According to experience for the last three years, the average period of participation in DROP was 4 years and 3 months.

We recommend maintaining the expected period of participation in DROP at 5 years.

In the valuation, all events, such as commencement of participation in DROP and retirement after participating in DROP, are always assumed to happen on June 30th. For active members who have never signed up for DROP, we implement the 5 years of participation in DROP by assuming that those members enter DROP on June 30th of a certain valuation date and will retire on June 30th exactly 5 years after that valuation date.

However, for active members who have already signed up for DROP, we have to approximate when they will retire as 5 years after the date of the DROP entry may not fall on a June 30th valuation date. In prior valuations, we have rounded the number of years of DROP participation to the nearest integer. For instance, a member who has already participated in DROP for 4.25 years as of the date of the current valuation will be rounded to assume the member has only participated in DROP for 4.00 years. As that approach has a bias of slightly understating the cost (for the Pension Plan, it is about 0.2% of payroll), we recommend that starting with the next valuation, we round up the number of years those DROP members have already participated in the program. This means that the above sample DROP member will be assumed to have

already been in the DROP for 5 years and will therefore retire immediately as of the date of the valuation.

Ordinance 185935 was adopted by the City Council and amended the Deferred Retirement Option Plan (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 due to the minimum hours per month needed for participation if they enter DROP on or after February 1, 2019.

Since the Ordinance has been in effect for less than a year as of June 30, 2019, no credible data is available to analyze this assumption. Therefore, we recommend maintaining the assumption that DROP payments will be suspended for an average of 4.5 months for members who enter DROP on or after February 1, 2019.

Survivor Continuance under Unmodified Option

In prior valuations, it was assumed that 80% of all active and inactive male members and 55% of all active and inactive female members would be married or have an eligible domestic partner upon retirement. We reviewed experience for new retirees during the three-year period and determined the actual percentage of these new retirees that had an eligible spouse or eligible domestic partner at the time of retirement. The results of that analysis are shown below.

New Retirees – Actual Percent with Eligible Spouse or Domestic Partner		
Year Ending June 30	**Male**	**Female**
2017	88%	63%
2018	83%	63%
2019	80%	49%
Total	83%	59%

Based on the above, we recommend increasing the percent married assumption from 80% to 85% for male members and maintaining the percent married assumption at 55% for female members.

Since the value of the survivor's continuance benefit is dependent on the survivor's age and sex, we must also have assumptions for the age and sex of the survivor. Based on the experience for members who retired during the current three-year period and studies done for other retirement systems, we recommend the following:

1. Since almost all of the spouses are actually the opposite sex, we will continue to assume that for all active and inactive members, the survivor's sex is the opposite of the member.
2. The current and proposed assumptions for the age of the survivor for all active and inactive members are shown below. These assumptions will continue to be monitored in future experience studies.

	Member's Age as Compared to Spouse's Age	
	Male Member	**Female Member**
Current Assumption	3 years older	2 years younger
Actual LAFPP Experience	2.7 years older	1.9 years younger
Proposed Assumption	3 years older	2 years younger

As shown above, we recommend maintaining the age difference that male members are 3 years older than their spouse, and the age difference that female members are 2 years younger than their spouse.

Chart 2: Retirement Rates
Fire Tiers 2 and 4

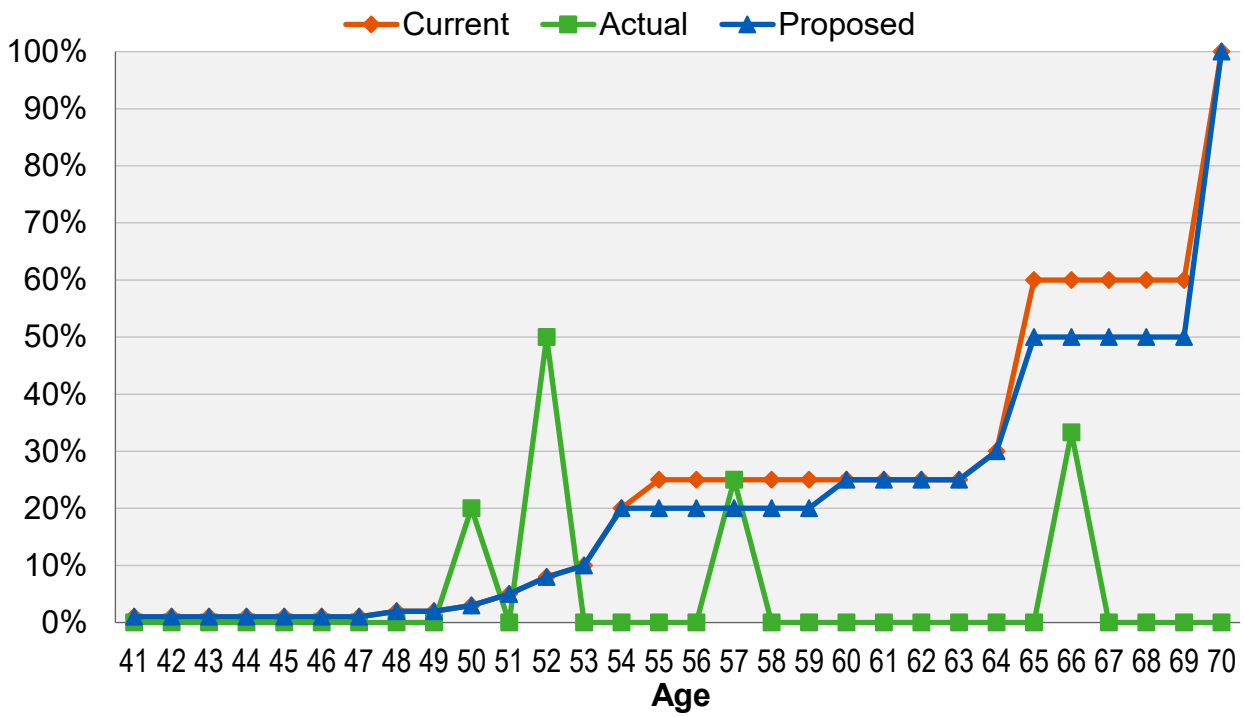


Chart 3: Retirement Rates
Fire Tiers 3 and 5

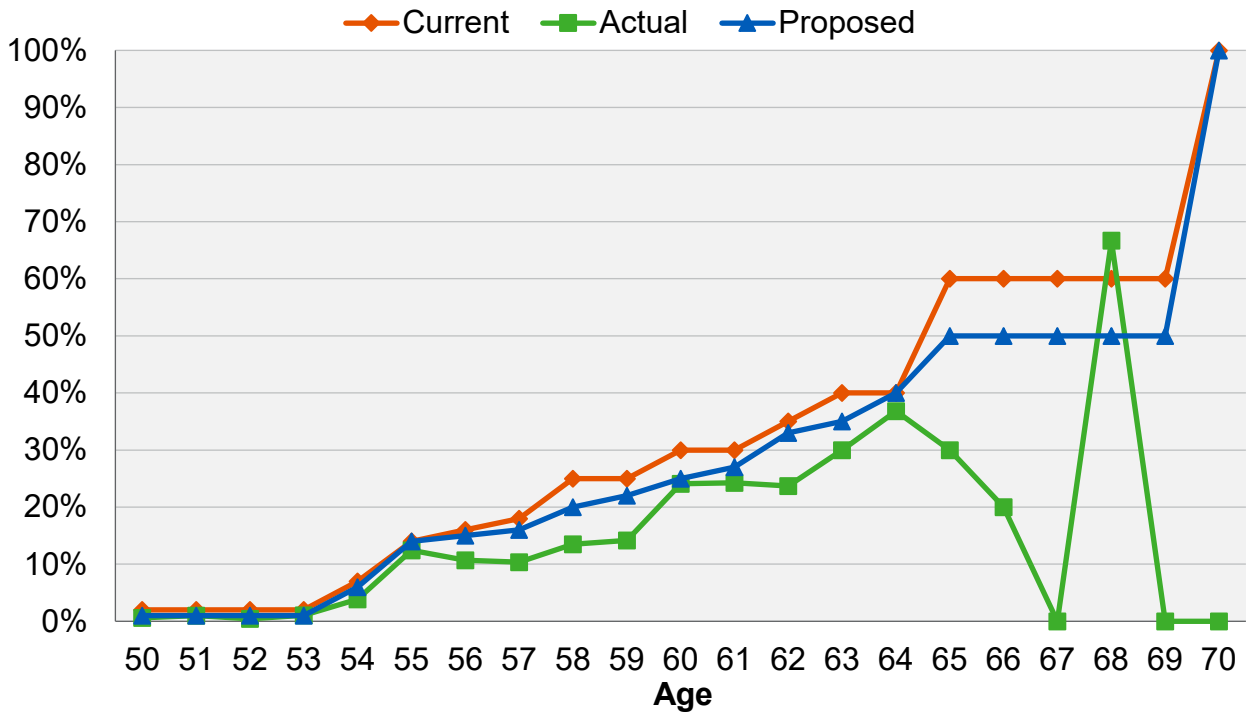


Chart 4: Retirement Rates
Police Tiers 2 and 4

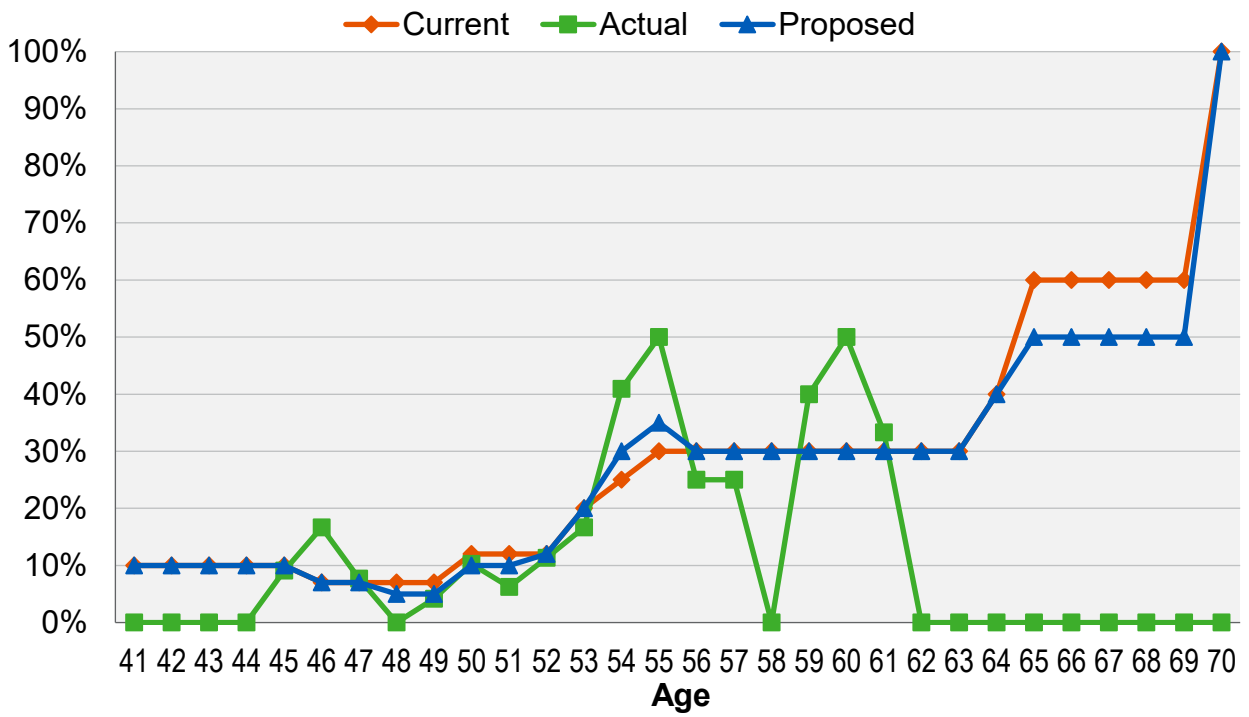


Chart 5: Retirement Rates
Police Tiers 3 and 5

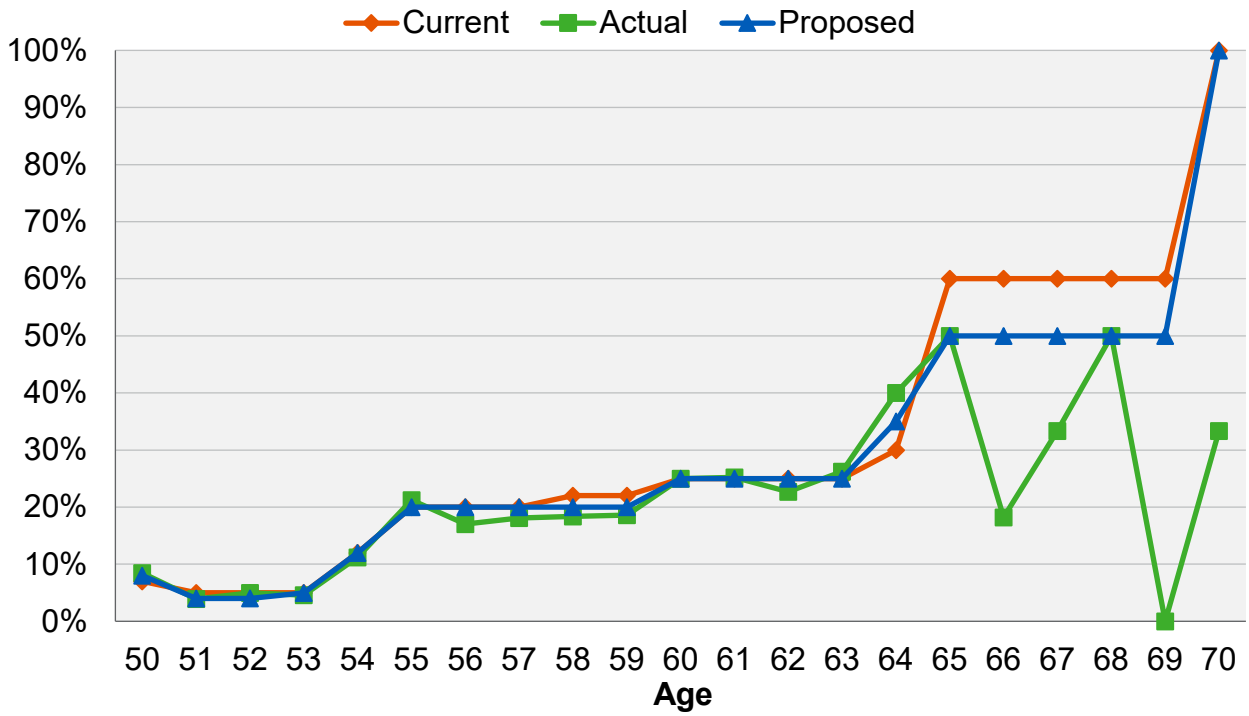


Chart 6: Retirement Rates
Fire Tier 6

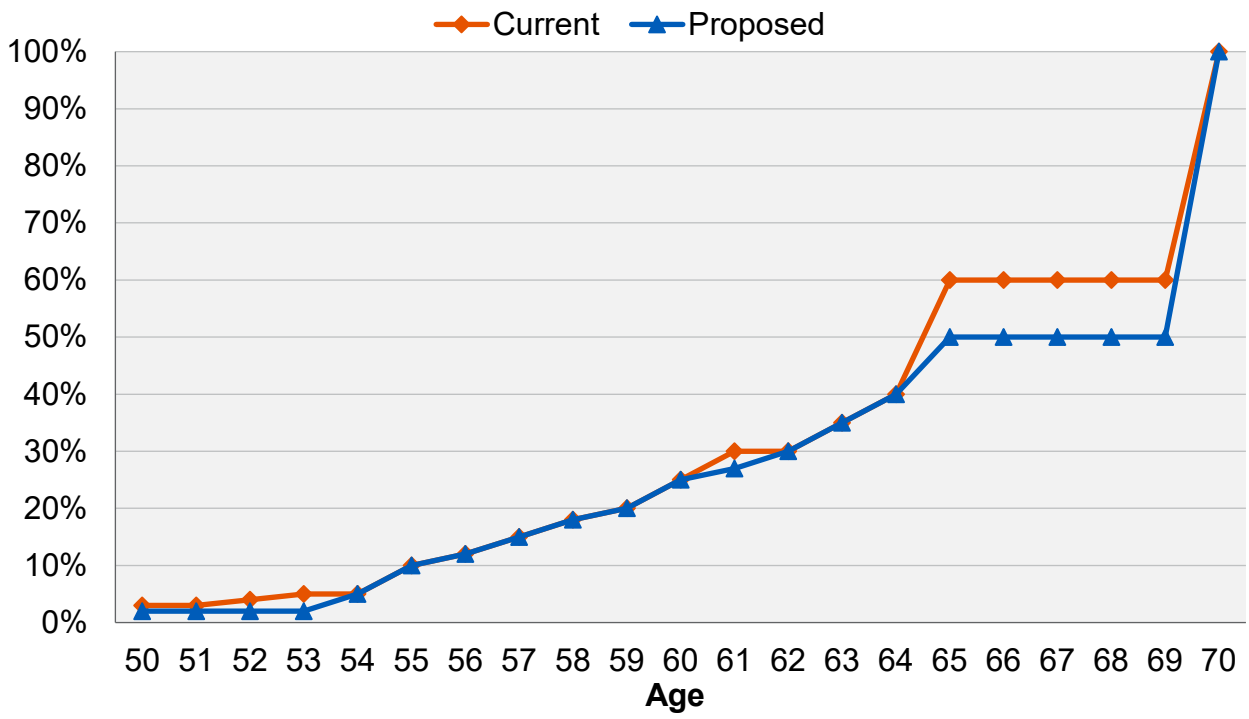
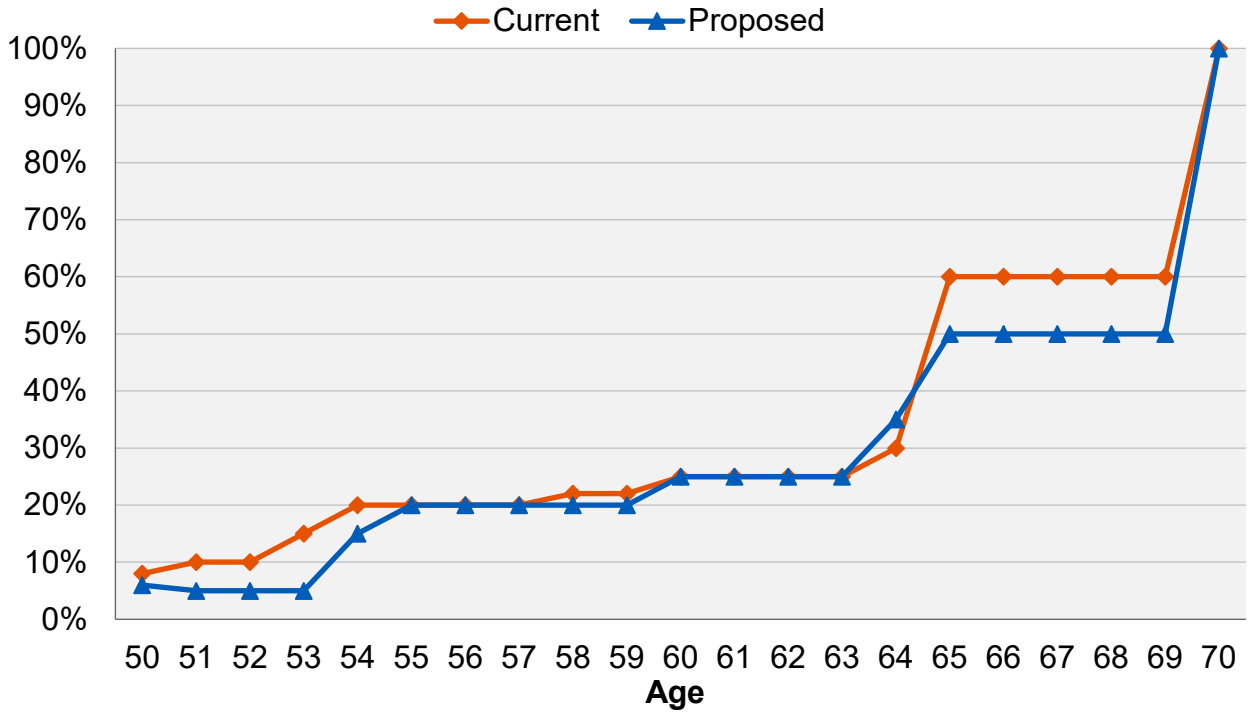


Chart 7: Retirement Rates
Police Tier 6



B. Termination Rates

Termination rates include all terminations for reasons other than death, disability, or retirement. Consistent with plan benefit provisions which vary by Tier, in the valuation program members who would not be expected to be eligible to receive a deferred vested benefit[28] are assumed to withdraw their contributions upon termination (except for Tier 4 members who are not eligible for a withdrawal).

The current termination rate for members with five or more years of service is a function of the member's age. During this experience study, we considered termination based on age and years of service. 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 termination rates as a function of member's age for those with five or more years of service.

The termination experience over the last three years for Fire and Police members separated between those members with less than five years of service and those with five or more years of service is shown below. Please note that we have excluded any members that were eligible for retirement.

Rates of Termination – Less than Five Years of Service

	Rates of Termination (%)					
	Fire			Police		
Years of Service	Current Rate	Observed Rate	Proposed Rate	Current Rate	Observed Rate	Proposed Rate
Less than 1	8.00	5.48	7.00	9.00	7.82	8.50
1 – 2	2.50	0.70	2.00	3.50	2.74	3.25
2 – 3	1.50	0.63	1.00	3.00	3.43	3.25
3 – 4	0.75	0.00	0.75	2.75	3.10	3.00
4 – 5	0.50	0.00	0.50	2.00	2.04	2.00

As shown above, we are recommending overall decreases to the assumed termination rates for both Fire and Police members with less than 5 years of service.

[28] Tiers 5 and 6 are eligible for a deferred retirement benefit after 20 years of service. Tier 3 is eligible for a deferred retirement benefit after 10 years of service.

Rates of Termination – Five or More Years of Service[29]

	Rates of Termination (%)					
	Fire			Police		
Age	Current Rate	Observed Rate	Proposed Rate	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.80	0.00	0.60	1.80	0.00	1.80
25 – 29	0.80	0.00	0.60	1.80	1.74	1.80
30 – 34	0.55	0.13	0.45	1.30	1.61	1.45
35 – 39	0.30	0.21	0.25	0.85	0.89	0.85
40 – 44	0.25	0.21	0.25	0.65	0.61	0.65
45 – 49	0.05	0.15	0.10	0.55	0.53	0.55
50 – 54	0.00	0.64	0.05	0.00	0.69	0.35
55 – 59	0.00	0.00	0.00	0.00	1.21	0.35
60 – 64	0.00	0.00	0.00	0.00	0.00	0.00

As shown above, we are recommending overall decreases to the assumed termination rates for Fire members and overall increases for Police members with 5 or more years of service.

It is important to note that not every service/age category has enough exposures and/or decrements such that the results in that category are statistically credible. This is mainly the case at the older age categories since most members in those categories are eligible to retire and so have been excluded from our review of this experience. It is also the case due to the limited overall experience regarding actual terminations.

We will also continue to assume that termination rates are zero at any age where members are assumed to retire. In other words, at those ages, members will either retire in accordance with the retirement rate assumptions or continue working, rather than terminate and defer their benefit.

Chart 8 compares actual to expected total terminations (withdrawals plus vested terminations) over the past three years for both the current and proposed assumptions for Fire members. Chart 9 shows the same information for Police members.

Chart 10 shows the current and proposed termination rates for Fire members with less than five years of service. Chart 11 shows the same information for Police members.

Chart 12 shows the current and proposed termination rates for Fire members with five or more years of service. Chart 13 shows the same information for Police members.

[29] 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.

Chart 8: Actual Number of Terminations Compared to Expected – Fire

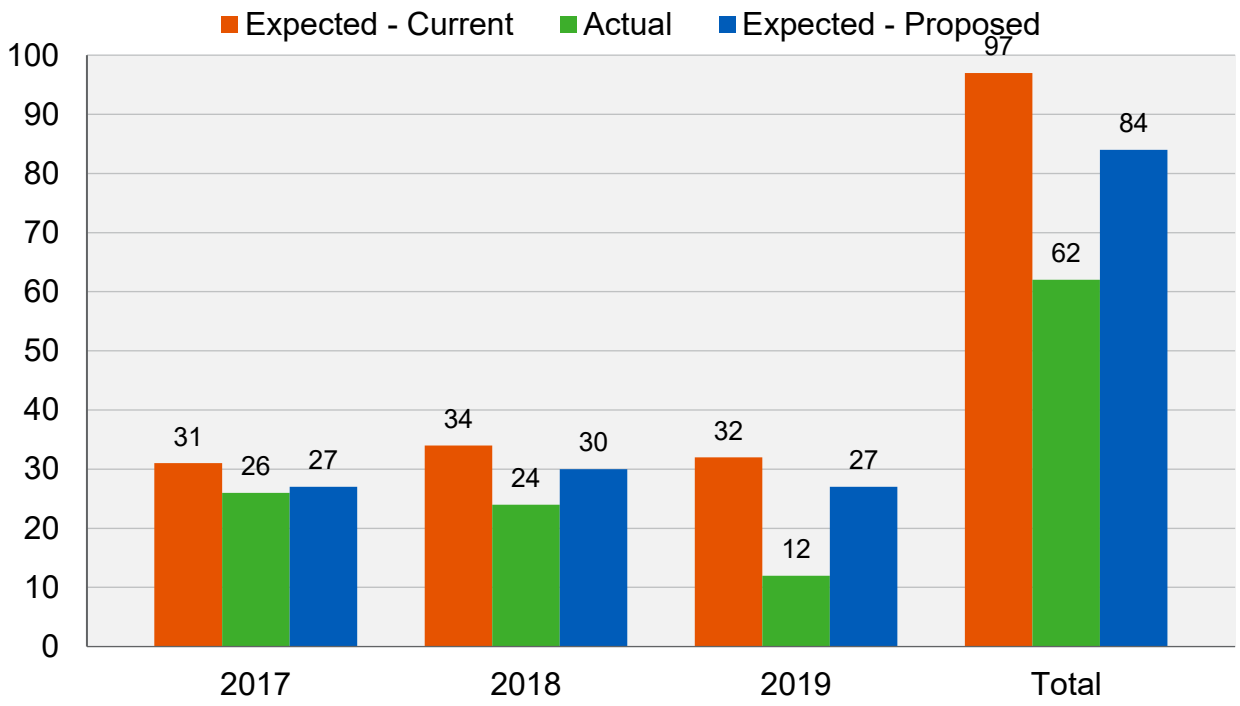


Chart 9: Actual Number of Terminations Compared to Expected – Police

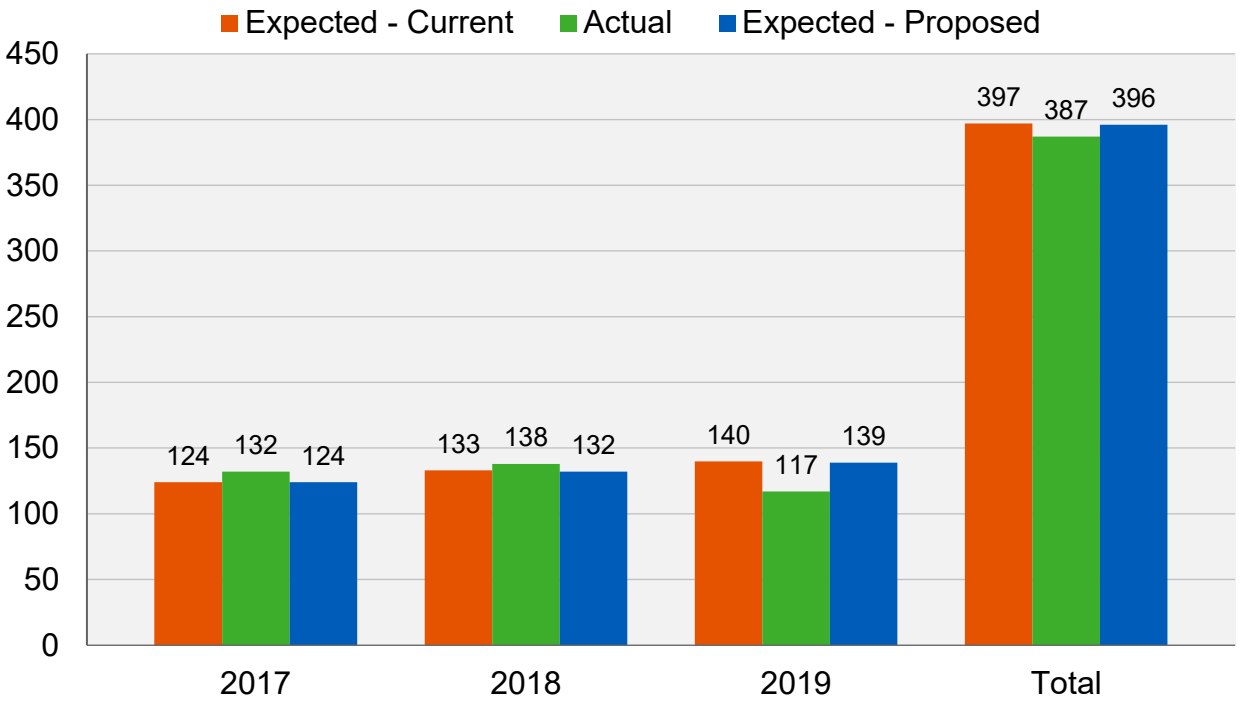


Chart 10: Termination Rates – Fire
Less Than Five Years of Service

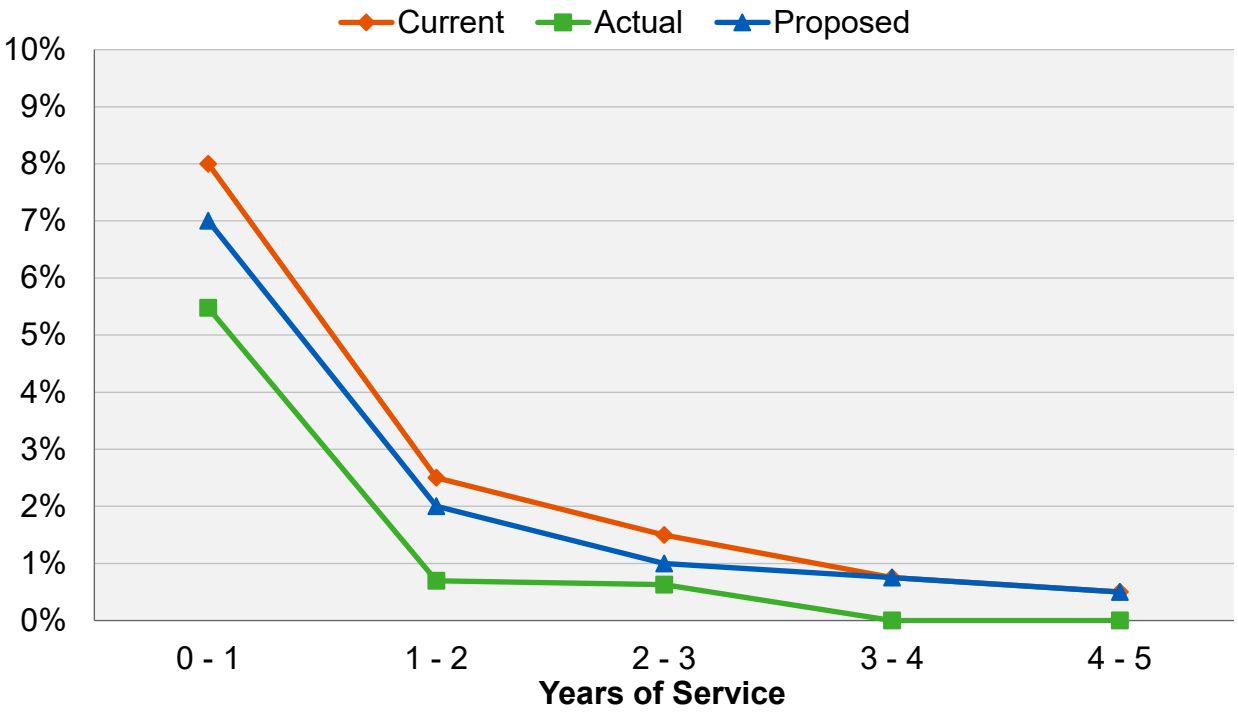


Chart 11: Termination Rates – Police
Less Than Five Years of Service

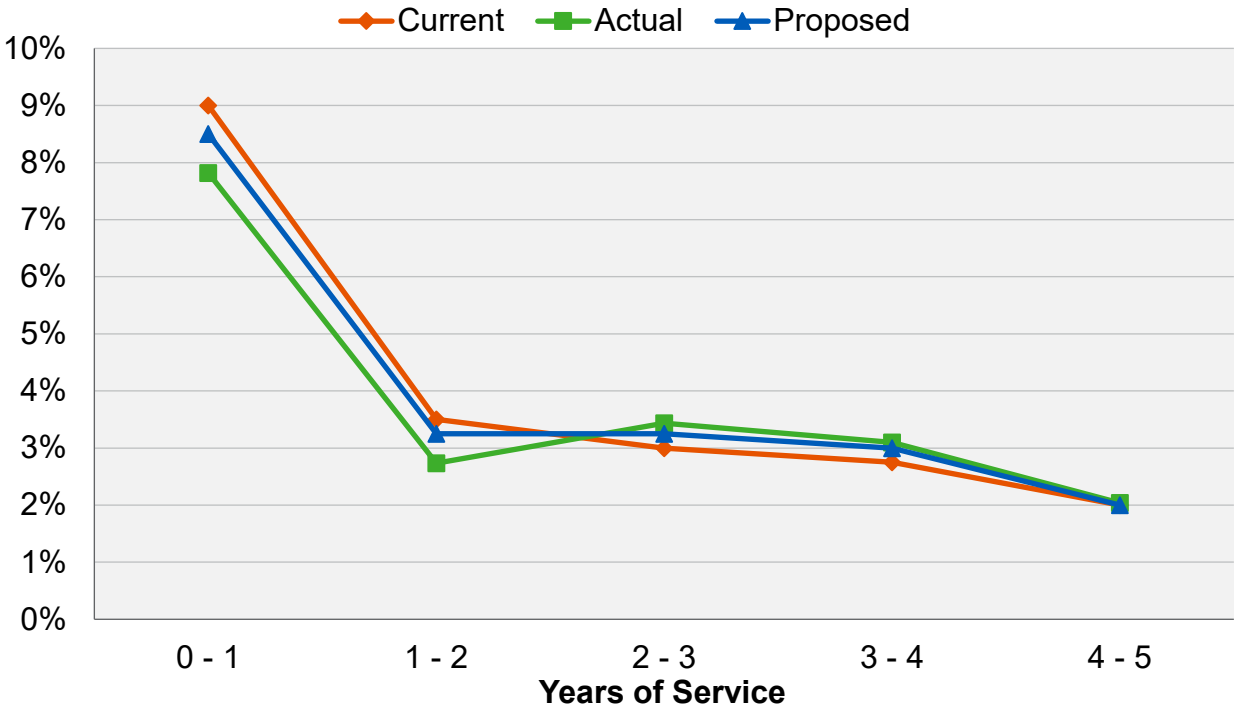


Chart 12: Termination Rates – Fire
Five or More Years of Service

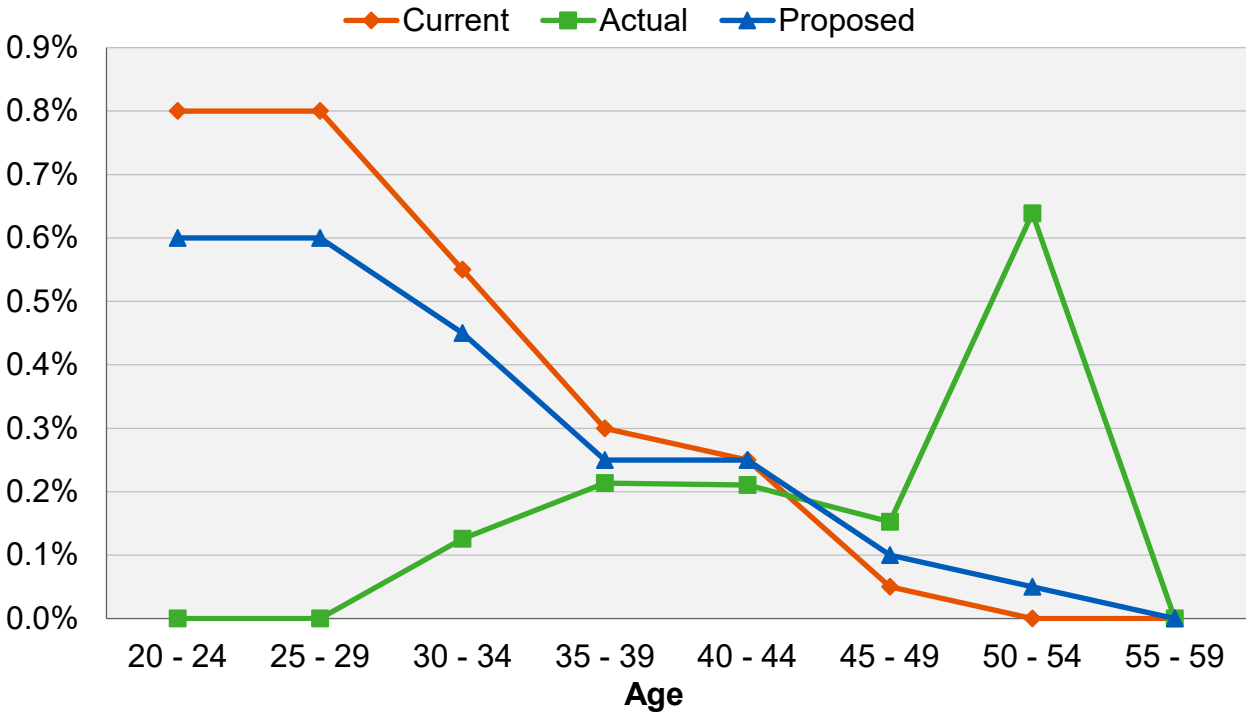
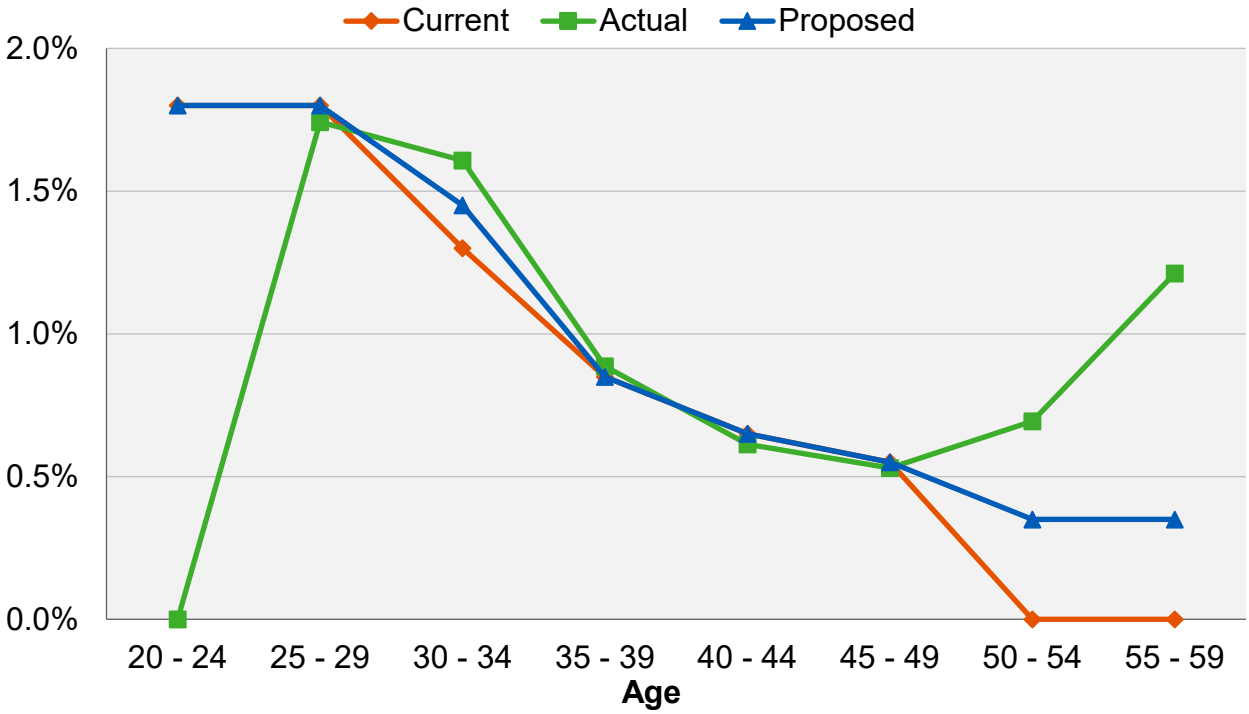


Chart 13: Termination Rates – Police
Five or More Years of Service



C. Disability Incidence Rates

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

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

Rates of Disability Incidence

	Disability Incidence Rate (%)					
	Fire			Police		
Age	Current Rate	Observed Rate	Proposed Rate	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.02	0.00	0.01	0.02	0.00	0.01
25 – 29	0.02	0.00	0.01	0.03	0.00	0.03
30 – 34	0.03	0.00	0.03	0.06	0.05	0.05
35 – 39	0.08	0.00	0.08	0.09	0.05	0.09
40 – 44	0.15	0.00	0.10	0.25	0.17	0.20
45 – 49	0.20	0.00	0.15	0.30	0.05	0.25
50 – 54	0.25	0.00	0.20	0.45	0.22	0.35
55 – 59	1.00	0.00	1.00	0.90	0.00	0.50
60 – 64	3.50	0.00	1.00	1.20	0.00	0.75
65 – 69	0.00	0.00	0.00	0.00	0.00	0.00

As shown above, we are recommending overall decreases to the assumed disability rates for both Fire and Police members.

The current disability assumptions are only applied to members not eligible for the DROP. We still recommend that the disability rates continue to be applied only to members not eligible for the DROP, and the actual rates shown above are calculated consistent with that recommendation. We will monitor this aspect of the data in future studies.

Chart 14 compares the actual number of disabilities for Fire members over the past three years to that expected under both the current and proposed assumptions. There were 0 actual disabilities in the current experience study period versus 1 actual disability in the last experience study period.

Chart 15 shows the same information as Chart 14, but for Police members. There were 20 actual disabilities in the current experience study period versus 34 actual disabilities in the last experience study period.

Chart 16 shows the actual disability incidence rates, compared to the assumed and proposed rates for Fire members. Chart 17 shows the same information, but for Police members.

In prior valuations, it was assumed that 85% of all disabilities would be service connected disabilities.

Since about 76% of disabled members received a service connected disability during the last three years, we recommend lowering the assumption to assume 80% of all disabilities will be 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. 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.

Based upon the recent experience, we recommend increasing the assumption for percentage of final average salary for non-service connected disabilities from 40% to 45%. We recommend decreasing the assumption for service connected disabilities with 20-30 years of service from 65% to 60%.

Non-Service Connected Disabilities			
Years of Service	**Current Assumed Percentage**	**Actual Percentage**	**Proposed Assumed Percentage**
All	40%	44%	45%

Service Connected Disabilities			
Years of Service	**Current Assumed Percentage**	**Actual Percentage[30]**	**Proposed Assumed Percentage**
Less than 20	55%	62%	55%
20 – 30	65%	49%	60%
More than 30	75%	No Data	75%

[30] The corresponding actual percentages over the last six years of experience is 56% for less than 20 years of service and 58% for 20 – 30 years of service.

Chart 14: Actual Number of Disabilities Compared to Expected – Fire

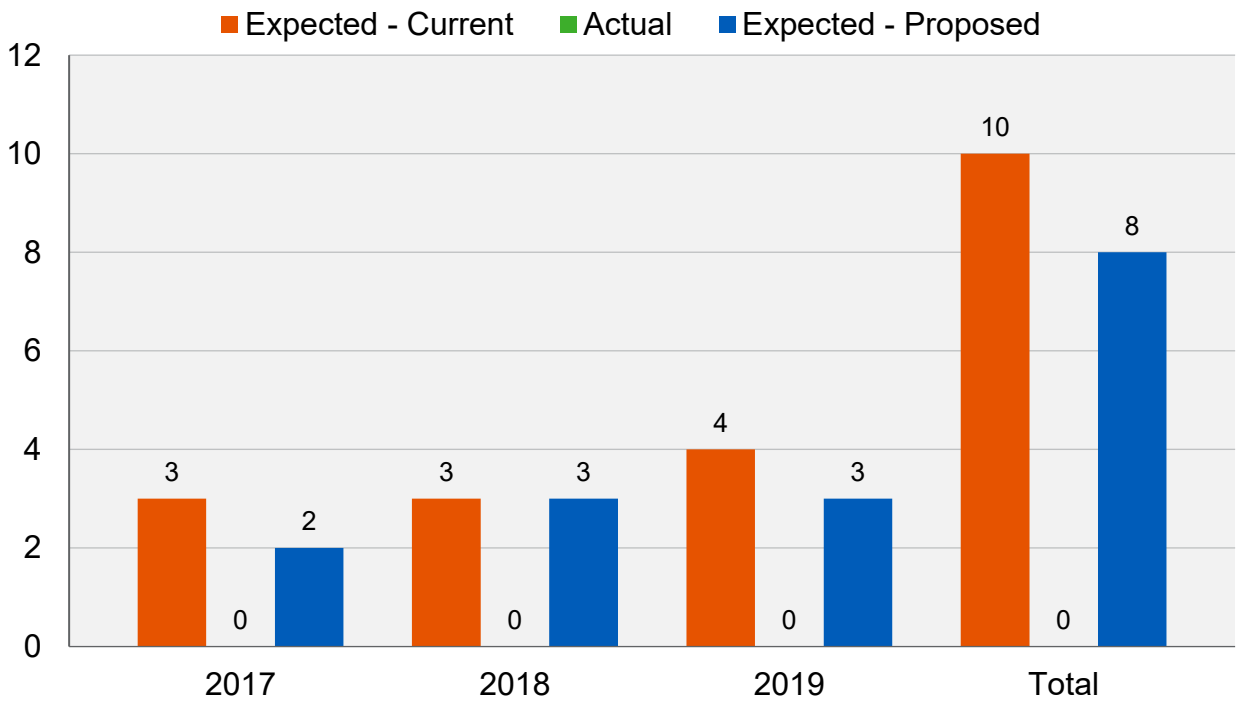


Chart 15: Actual Number of Disabilities Compared to Expected – Police

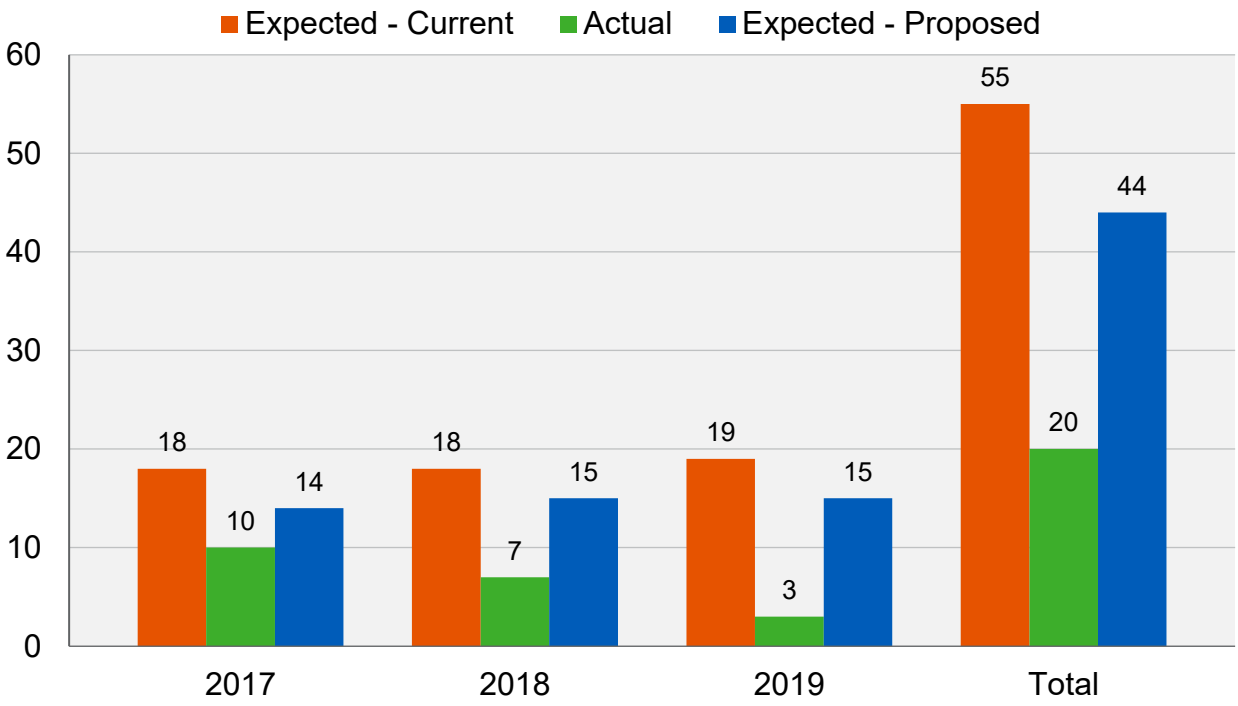


Chart 16: Disability Incidence Rates
Fire

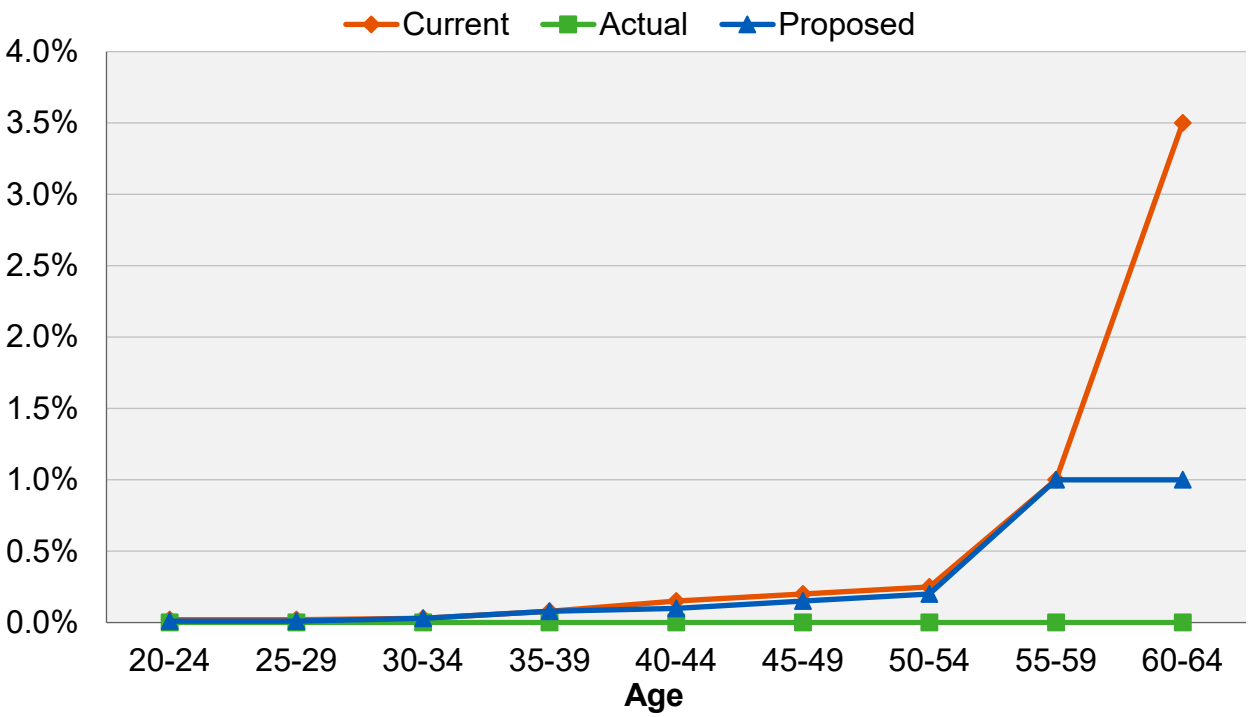
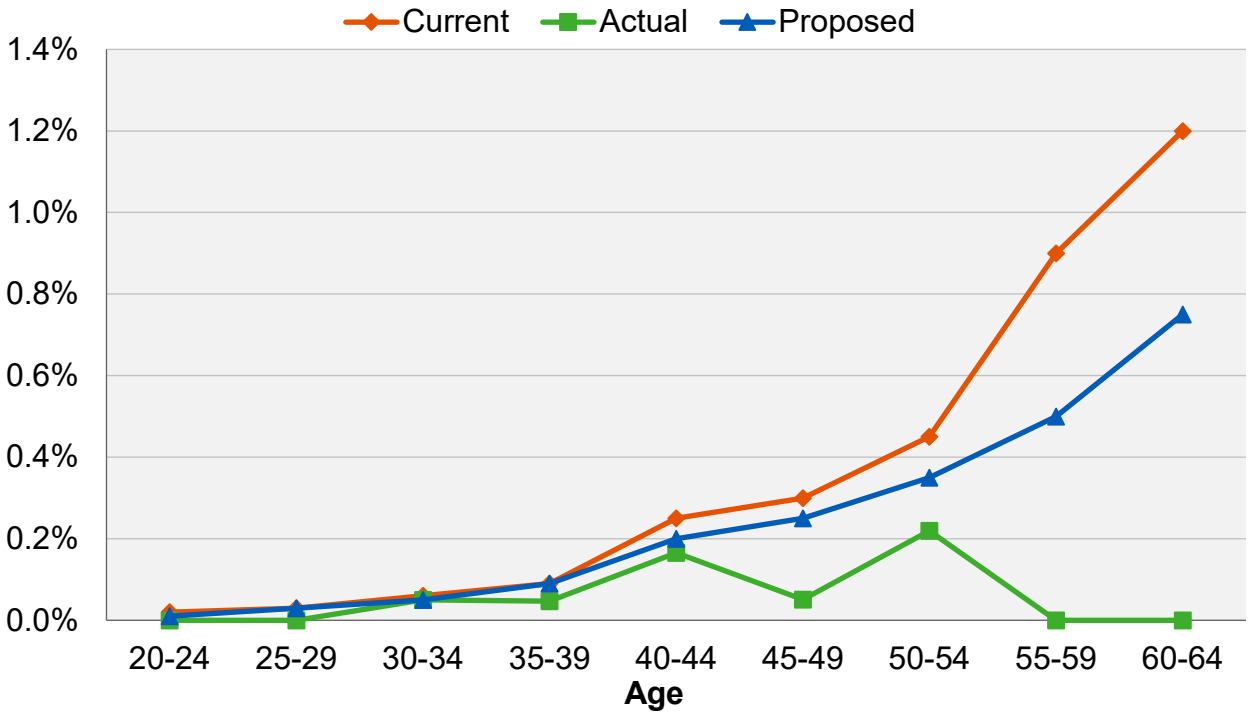


Chart 17: Disability Incidence Rates
Police



V. Cost Impact

We have estimated the impact of all the recommended demographic and economic assumptions as if they were applied to the June 30, 2019 actuarial valuation.

Retirement Plan

The table below shows the changes in the total normal cost and actuarial accrued liability for the Retirement Plan due to the proposed assumption changes, as if they were applied in the June 30, 2019 actuarial valuation. If all of the proposed assumption changes (both economic and demographic) were implemented, the total normal cost for the Retirement Plan would have increased by about $14.4 million and the actuarial accrued liability would have increased by about $111.2 million. The funded percentage would have decreased from 93.6% to 93.1%.

	Change in Plan Liabilities as of June 30, 2019		
	Current Assumptions	Proposed Assumptions	Increase / (Decrease)
Total Normal Cost	$460,138,588	$474,516,047	$14,377,459
Actuarial Accrued Liability	$22,474,125,408	$22,585,338,666	$111,213,258

If all of the proposed assumption changes (both economic and demographic) were implemented, the aggregate beginning-of-the-year employer contribution rate would have increased by 1.48% of payroll. The results include an increase in the administrative expense load allocated to the Retirement Plan from 1.16% to 1.29% (i.e., an increase of 0.13%) if paid biweekly. The increase is also 0.13% if paid at the beginning of the year.

Employer Contribution Rate Impact (% of Payroll at Beginning of the Year)				
Contributions	City	Harbor Port Police	Airport Police	Total
Normal Cost	0.89%	0.81%	0.48%	0.88%
UAAL	0.46%	0.60%	0.04%	0.47%
Administrative Expenses	0.13%	0.13%	0.13%	0.13%
Total	**1.48%**	**1.54%**	**0.65%**	**1.48%**

Health Plan

The table below shows the changes in the total normal cost and actuarial accrued liability for the Health Plan due to the proposed assumption changes, as if they were applied in the June 30, 2019 actuarial valuation. If all of the proposed assumption changes (both economic and demographic) were implemented, the total normal cost for the Health Plan would have increased by about $4.6 million and the actuarial accrued liability would have increased by about $125.2 million. The funded percentage would have decreased 56.2%% to 54.3%.

	Change in Plan Liabilities as of June 30, 2019		
	Current Assumptions	Proposed Assumptions	Increase / (Decrease)
Total Normal Cost	$77,036,694	$81,667,183	$4,630,489
Actuarial Accrued Liability	$3,590,022,768	$3,715,216,639	$125,193,871

If all of the proposed assumption changes (both economic and demographic) were implemented, the aggregate beginning-of-the-year employer contribution rate would have increased by 0.85% of payroll. The results include an increase in the administrative expense load allocated to the Health Plan from 0.09% to 0.11% (i.e., an increase of 0.02%) if paid biweekly. The increase is also 0.02% if paid at the beginning of the year.

Employer Contribution Rate Impact (% of Payroll at Beginning of the Year)				
Contributions	City	Harbor Port Police	Airport Police	Total
Normal Cost	0.29%	0.29%	0.25%	0.29%
UAAL	0.55%	0.28%	0.00%	0.54%
Administrative Expenses	0.02%	0.02%	0.02%	0.02%
Total	**0.86%**	**0.59%**	**0.27%**	**0.85%**

Appendix A: Current Actuarial Assumptions

Economic Assumptions

Net Investment Return	7.25%; net of investment expenses. Expected investment expenses represent about 0.40% of the Actuarial Value of Assets.
Administrative Expenses:	Out of the total 1.25% of payroll in assumed administrative expenses, 1.16% of payroll payable biweekly is allocated to the Retirement Plan. This is equal to 1.12% of payroll payable at beginning of the year.
Member Contribution and Matching Account Crediting Rate:	4.00%
Consumer Price Index:	Increase of 3.00% per year. An annual 3% cost-of-living adjustment is assumed in valuing the benefits for Tiers 1 through 6.
Payroll Growth:	Inflation of 3.00% per year plus “across the board” real salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit	Increase of 3.00% per year from the valuation date.

Salary Increases

The annual rate of compensation increase includes: inflation at 3.00%, plus "across the board" salary increases of 0.50% per year, plus the following merit and promotion increases:

Merit and Promotion Increases	
Years of Service	**Rate (%)**
Less than 1	8.50
1 – 2	7.50
2 – 3	6.00
3 – 4	5.50
4 – 5	4.00
5 – 6	2.75
6 – 7	2.50
7 – 8	2.00
8 – 9	1.75
9 – 10	1.75
10 – 11	1.25
11 – 12	1.00
12 – 13	1.00
13 – 14	1.00
14 – 15	1.00
15 & Over	0.80

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

Demographic Assumptions

Mortality Rates – Healthy

- 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.

  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.

Mortality Rates – Disabled

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

Mortality Rates – Beneficiary

- 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.

  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 beneficiaries, 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 beneficiaries, 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.

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

Mortality Rates – Pre-Retirement

- 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

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	0.02	0.03
30	0.03	0.05
35	0.06	0.08
40	0.12	0.19
45	0.18	0.28
50	0.23	0.39
55	0.70	0.72
60	2.50	1.08
65	1.40	0.48

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	8.00	9.00
1 – 2	2.50	3.50
2 – 3	1.50	3.00
3 – 4	0.75	2.75
4 – 5	0.50	2.00

Termination Rates – Five or More Years of Service

	Rate (%)	
Age	**Fire**	**Police**
20	0.80	1.80
25	0.80	1.80
30	0.65	1.50
35	0.40	1.03
40	0.27	0.73
45	0.13	0.59
50	0.02	0.22
55	0.00	0.00
60	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 refund of member contributions.

Retirement Rates

	Rate (%)					
	Fire			Police		
Age	Tiers 2 & 4	Tiers 3 & 5	Tier 6	Tiers 2 & 4	Tiers 3 & 5	Tier 6
41	1.00	0.00	0.00	10.00	0.00	0.00
42	1.00	0.00	0.00	10.00	0.00	0.00
43	1.00	0.00	0.00	10.00	0.00	0.00
44	1.00	0.00	0.00	10.00	0.00	0.00
45	1.00	0.00	0.00	10.00	0.00	0.00
46	1.00	0.00	0.00	7.00	0.00	0.00
47	1.00	0.00	0.00	7.00	0.00	0.00
48	2.00	0.00	0.00	7.00	0.00	0.00
49	2.00	0.00	0.00	7.00	0.00	0.00
50	3.00	2.00	3.00	12.00	7.00	8.00
51	5.00	2.00	3.00	12.00	5.00	10.00
52	8.00	2.00	4.00	12.00	5.00	10.00
53	10.00	2.00	5.00	20.00	5.00	15.00
54	20.00	7.00	5.00	25.00	12.00	20.00
55	25.00	14.00	10.00	30.00	20.00	20.00
56	25.00	16.00	12.00	30.00	20.00	20.00
57	25.00	18.00	15.00	30.00	20.00	20.00
58	25.00	25.00	18.00	30.00	22.00	22.00
59	25.00	25.00	20.00	30.00	22.00	22.00
60	25.00	30.00	25.00	30.00	25.00	25.00
61	25.00	30.00	30.00	30.00	25.00	25.00
62	25.00	35.00	30.00	30.00	25.00	25.00
63	25.00	40.00	35.00	30.00	25.00	25.00
64	30.00	40.00	40.00	40.00	30.00	30.00
65	60.00	60.00	60.00	60.00	60.00	60.00
66	60.00	60.00	60.00	60.00	60.00	60.00
67	60.00	60.00	60.00	60.00	60.00	60.00
68	60.00	60.00	60.00	60.00	60.00	60.00
69	60.00	60.00	60.00	60.00	60.00	60.00
70 & Over	100.00	100.00	100.00	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 and will have DROP payments suspended for an average of 4.5 months due to the minimum hours per month needed for participation if they enter DROP on or after February 1, 2019. 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, 80% 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 — 65% of Final Average Salary More than 30 — 75% of Final Average Salary
Non-Service Connected Disability Benefits	40% of Final Average Salary.

Appendix B: Proposed Actuarial Assumptions

Economic Assumptions

Net Investment Return	7.00%; net of investment expenses. Expected investment expenses represent about 0.40% of the Actuarial Value of Assets.
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.
Member Contribution and Matching Account Crediting Rate:	3.00%
Consumer Price Index:	Increase of 2.75% per year. An annual 2.75% cost-of-living adjustment is assumed in valuing the benefits for Tiers 1 through 6.
Payroll Growth:	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit	Increase of 2.75% per year from the valuation date.

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:

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 – 21	1.00
21 – 22	1.00
22 – 23	1.00
23 – 24	1.00
24 – 25	1.00
25 & Over	0.90

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

Demographic Assumptions

Mortality Rates – Healthy

- 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.

  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.

Mortality Rates – Disabled

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

Mortality Rates – Beneficiary

- 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.

  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 beneficiaries, 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 beneficiaries, 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.

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

Mortality Rates – Pre-Retirement

- 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

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

Termination Rates – 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 refund of member contributions.

Retirement Rates

	Rate (%)					
	Fire			Police		
Age	Tiers 2 & 4	Tiers 3 & 5	Tier 6	Tiers 2 & 4	Tiers 3 & 5	Tier 6
41	1.00	0.00	0.00	10.00	0.00	0.00
42	1.00	0.00	0.00	10.00	0.00	0.00
43	1.00	0.00	0.00	10.00	0.00	0.00
44	1.00	0.00	0.00	10.00	0.00	0.00
45	1.00	0.00	0.00	10.00	0.00	0.00
46	1.00	0.00	0.00	7.00	0.00	0.00
47	1.00	0.00	0.00	7.00	0.00	0.00
48	2.00	0.00	0.00	5.00	0.00	0.00
49	2.00	0.00	0.00	5.00	0.00	0.00
50	3.00	1.00	2.00	10.00	8.00	6.00
51	5.00	1.00	2.00	10.00	4.00	5.00
52	8.00	1.00	2.00	12.00	4.00	5.00
53	10.00	1.00	2.00	20.00	5.00	5.00
54	20.00	6.00	5.00	30.00	12.00	15.00
55	20.00	14.00	10.00	35.00	20.00	20.00
56	20.00	15.00	12.00	30.00	20.00	20.00
57	20.00	16.00	15.00	30.00	20.00	20.00
58	20.00	20.00	18.00	30.00	20.00	20.00
59	20.00	22.00	20.00	30.00	20.00	20.00
60	25.00	25.00	25.00	30.00	25.00	25.00
61	25.00	27.00	27.00	30.00	25.00	25.00
62	25.00	33.00	30.00	30.00	25.00	25.00
63	25.00	35.00	35.00	30.00	25.00	25.00
64	30.00	40.00	40.00	40.00	35.00	35.00
65	50.00	50.00	50.00	50.00	50.00	50.00
66	50.00	50.00	50.00	50.00	50.00	50.00
67	50.00	50.00	50.00	50.00	50.00	50.00
68	50.00	50.00	50.00	50.00	50.00	50.00
69	50.00	50.00	50.00	50.00	50.00	50.00
70 & Over	100.00	100.00	100.00	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 and will have DROP payments suspended for an average of 4.5 months due to the minimum hours per month needed for participation if they enter DROP on or after February 1, 2019. 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.