Firefighters' Pension Investment Fund

Actuarial Experience Study

Report Date: August 26, 2025

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

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Board of Trustees
Firefighters' Pension Investment Fund

Re: Firefighters' Pension Investment Fund Actuarial Experience Study

Dear Board of Trustees,

We are pleased to present to the Board of Trustees (Board) this report of the results of an actuarial experience study analyzing the assumptions used for actuarial valuation purposes for valuation reports produced on behalf of the Firefighters' Pension Investment Fund beginning with the fiscal year 2025 valuations. We have compiled plan experience from 2020 through 2023.

The report includes a review of demographic and economic experience, a comparison of this experience to current actuarial assumptions, and our recommendations for consideration regarding changes in assumptions or methods to be effective for actuarial valuations performed for fiscal year 2025. We believe implementing the recommended changes will assist in achieving the objective of developing costs that are stable, predictable, and represent our best estimate of anticipated experience.

It is important to remember that the ultimate cost of the retirement plan is independent of any actuarial assumptions or methods used throughout the valuation process. This cost will be the sum of the benefits paid from the fund and the administrative expenses incurred, less any net investment gains received. Future actuarial measurements may differ significantly from current measurements due to such factors as: plan experience differing from that anticipated by assumptions; changes in assumptions; increases or decreases expected as part of the natural operation of the methodology used; changes in plan provisions or applicable law

DATA AND ASSUMPTIONS

In preparing this report, we have relied on personnel and plan design supplied by the Fund. Assets were determined based on audited financial reports supplied by the Fund. While we cannot verify the accuracy of all this information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy of the information and believe that it has produced appropriate results. This information, along with any adjustments or modifications, is summarized in various sections of this report.

DISCLOSURES AND LIMITATIONS

Foster & Foster does not provide legal, investment or accounting advice. Thus, the information in this report is not intended to supersede or supplant the advice or the interpretations of the plan or its affiliated legal, investing or accounting partners.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as the following: plan experience differing from that anticipated by the economic

or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law. Due to the limited scope of this report, we did not provide an analysis of these potential differences.

In performing the analysis, we used third-party software to model (calculate) the underlying liabilities and costs. These results are reviewed in the aggregate and for individual sample lives. The output from the software is either used directly or input into internally developed models to generate the costs. All internally developed models are reviewed as part of the process. As a result of this review, we believe that the models have produced reasonable results. We do not believe there are any material inconsistencies among assumptions or unreasonable output produced due to the aggregation of assumptions.

ACTUARIAL CERTIFICATION

The experience study has been conducted in accordance with all applicable laws and regulations, as well as generally accepted actuarial principles and practices, including applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board; specifically No. 4 for Measuring Pension Obligations and Determining Pension Plan Costs or Contributions, No. 23 for Data Quality, No. 27 for Selection of Economic Assumptions for Measuring Pension Obligations, No. 35 for Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations, No. 44, Selection and Use of Asset Valuation Methods for Pension Valuations, and No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations.

The undersigned are familiar with the immediate and long-term aspects of pension valuations and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All of the sections of this report are considered an integral part of the actuarial opinions.

To our knowledge, no associate of Foster & Foster, Inc. working on this report has any direct financial interest or indirect material interest in the Firefighters' Pension Investment Fund, nor does anyone at Foster & Foster, Inc. act as a member of the Board of Trustees of the Firefighters' Pension Investment Fund. Thus, there is no relationship existing that might affect our capacity to prepare and certify this actuarial report.

Respectfully submitted,

Foster & Foster, Inc.

Jason L. Franken, FSA, EA, MAAA

Heidi E. Andorfer, FSA, EA, MAAA

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ACTUARIAL STANDARDS OF PRACTICE

The Actuarial Standards Board (ASB) is responsible for determining which actuarial activities are the best representations of generally accepted actuarial principles and is also responsible for issuing guidance in the form of Actuarial Standards of Practice (ASOPs) to help actuaries in various practice areas deliver results and recommendations that are consistent with those representations. Generally speaking, ASOPs identify what the actuary should consider, document, and disclose when performing actuarial assignments.

The experience study and related measurements of benefit obligations for the plan are subject to the "coordinated guidance" provided in various ASOPs, including but not limited to:

- ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*, which ties together the standards shown below, provides guidance on actuarial cost methods, and addresses overall considerations for measuring pension obligations and determining plan costs or contributions
- ASOP No. 23, *Data Quality*
- ASOP No. 25, *Credibility Procedures*
- ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*
- ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*
- ASOP No. 41, *Actuarial Communications*
- ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*
- ASOP No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions*
- ASOP No. 56, *Modeling*

This report refers to ASOPs by number (e.g. ASOP No. 4) throughout. It is important to keep in mind that this experience study report only reflects the guidance provided in the final releases of the above-mentioned ASOPs issued by the ASB on or before the date of this report. The results provided in this report reflect the requirements of, and are consistent with, the applicable above-mentioned Actuarial Standards of Practice. When applicable, details from the relevant ASOP will be provided in the report section associated with a particular analysis or topic.

RECOMMENDATIONS

Below is a summary of the recommended assumption changes resulting from the study. A detailed list of assumptions is at the end of the report.

Economic Assumptions

- Investment Return: We recommend no change to the 7.125% assumption. For plans with no invested assets, we recommend changing the assumption from 1.90% to 2.50%.
- Inflation: We recommend increasing the current 2.25% inflation assumption to 2.50%.
- Salary Increases: We recommend reducing the rates for service levels between 0 and 6 and increasing the rates for service levels greater than 6.
- Payroll Growth: We recommend no change to the 2.75% assumption.

Demographic Assumptions

- Retirement Rates: We recommend higher rates for Tier 1 members at most ages, and no changes for Tier 2 members.
- Withdrawal/Termination Rates: We recommend higher rates for ages 21 through 32 and lower rates for ages 33 through 43.
- Disability Incidence Rates: We recommend no changes to the disability rates.
- Mortality Rates: We recommend continuing use of the Pub-2010 Public Safety mortality tables, with the same adjustments for the credibility of the fund's actual experience.
- Other Demographic Assumptions: We analyzed the current assumptions for marital status, spousal age difference, the proportion of deaths that are duty-related, and administrative expenses. We only recommend changing the spousal age difference to 2 years.

REVIEW OF ECONOMIC ASSUMPTIONS

ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries in selecting (including giving advice on selecting) economic assumptions – primarily investment return, discount rate, post-retirement benefit increases, inflation, and compensation increases – for measuring obligations under defined benefit pension plans.

Throughout the remainder of this section, we have used the standards set forth in ASOP No. 27 as a guideline for reviewing and if applicable, selecting recommended changes to the following economic actuarial assumptions and methods:

- Investment Return
- Inflation
- Salary Increases
- Payroll Growth

Please keep in mind that ASOP No. 27 (and ASOP No. 35) recognizes a range of reasonable assumptions and states "the actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice."

INVESTMENT RETURN

The investment return assumption is critical in the actuarial valuation since it determines the portion of assets that will come from investment income rather than contributions from the plan sponsor and its participants. The investment return assumption should be determined based on the long-term rate of return (net of investment-related fees) the plan expects to earn over the life of the plan. The current assumed rate of investment return for most plans is 7.125% per year compounded annually, net of investment-related expenses. Plans with no invested assets currently use an investment return assumption of 1.90%. We believe that the decision to set the investment return assumption shall be made based upon input from your investment professionals, reflecting any significant changes to the asset allocation, and their judgment of capital market returns. Keep in mind, however, that this assumption should reflect the best estimate of investment returns expected to be realized over the next several decades.

ASOP No. 27 provides that in developing a reasonable assumption, the actuary may consider a broad range of data and other inputs, including the judgment of investment professionals. The data that may be considered includes: current yields to maturity of fixed income securities; forecasts of inflation, GDP growth, and total returns for each asset class; historical and current investment data (including real and nominal returns); the inflation and inflation risk components implicit in the yield of inflation-protected securities; dividend yields, earnings yields, and real estate capitalization rates; and historical plan performance.

For purposes of reviewing the investment return assumption, a building block approach is often used, whereby the actuary determines the weighted average expected real rate of return for the plan's target investment portfolio and then adjusts for inflation and expenses not reflected in the real rates of return. Foster & Foster is an actuarial firm, and we do not have the required expertise to produce our own capital market assumptions. For this reason, ASOP No. 27 addresses that the actuary will often collect capital market assumptions from external sources to determine the forward-looking expected geometric returns. The capital market assumptions can be broadly classified into the following categories: expected returns by asset class; standard deviation by asset class; and correlation coefficients between asset classes.

For this analysis, we relied on data collected as part of the "Survey of Capital Market Assumptions: 2024 Edition" released by Horizon Actuarial Services. This survey collects the capital market assumptions from 41 different investment firms, including Marquette Associates (Marquette), from across the country. The purpose of this survey is to provide a broad range of opinions on future expectations rather than relying on a single source. This survey has been conducted annually since 2012. Overall, expectations have increased over the last few years in most asset classes driven by an increase in interest rates.

As part of our analysis, we reviewed the proposed changes to the asset allocation, which has been adopted by the Board. These policies are outlined on the following page.

Asset Allocation	Long-Term Asset Allocation (%)
Equity	
US Equity	25
Developed Market Equity (non-US)	11
Emerging Market Equity	4
Private Equity	10
Credit	
Private Credit	7
Rate Sensitive	
Core Fixed Income	13.75
Core Plus Fixed Income	13.75
Short-Term Treasuries	0
Emerging Market Debt	3
Real Assets	
Real Estate	7.5
Infrastructure	5

Below is a table with the long-term asset allocation and the expected nominal rates of return by asset class based on the Horizon survey.

Asset Class	20-Year Expected Return	Long-Term Asset Allocation
Large Cap US Equity	6.96%	19.00%
Small/Mid Cap US Equity	7.50%	6.00%
Non-US Equity – Developed	7.52%	11.00%
Non-US Equity – Emerging	8.24%	4.00%
US Corp Bonds – Core	4.88%	13.75%
US Corp Bonds – Long Duration	5.16%	13.75%
US Treasuries (Cash Equivalents)	3.43%	0.00%
Non-US Debt – Emerging	6.28%	3.00%
Real Estate	6.17%	7.50%
Infrastructure	7.36%	5.00%
Private Equity	9.71%	10.00%
Private Debt	8.44%	7.00%

On the following page, we have calculated various expected returns based on the long-term investment policy, leveraging the data from the 2024 Horizon survey. We believe the 40th to 60th percentiles are a reasonable range for the assumption; however, we prefer the assumption to be within the 45th to 55th percentile range. The 50th percentile is the midpoint, with half of the results expected to exceed and half the results expected to fall short of that level.

	Geometric Return
40th Percentile	6.88%
45th Percentile	7.19%
50th Percentile	7.50%
55th Percentile	7.81%
60th Percentile	8.13%

The following table provides the probability of exceeding various assumptions.

Investment Return Assumption	Horizon Survey
6.25%	69%
6.50%	66%
6.75%	62%
7.00%	58%
7.25%	54%

Finally, we should consider the trend in the investment return assumptions of other similarly situated pension plans across the country. Each year, the National Association of State Retirement Administrators (NASRA) releases a survey of the investment return assumptions used by about 130 of the largest public pension systems in the country. The most recent full survey was as of April 2025. This information is summarized below. Figure 1, taken from NASRA's website, shows that an assumption of 7.00% is the most common range of assumptions among the respondents. Figure 2 shows how discount rates are trending down over the last 25 years, with the median assumption falling from 8.00% to 7.00% over that 25-year period.

Figure 1

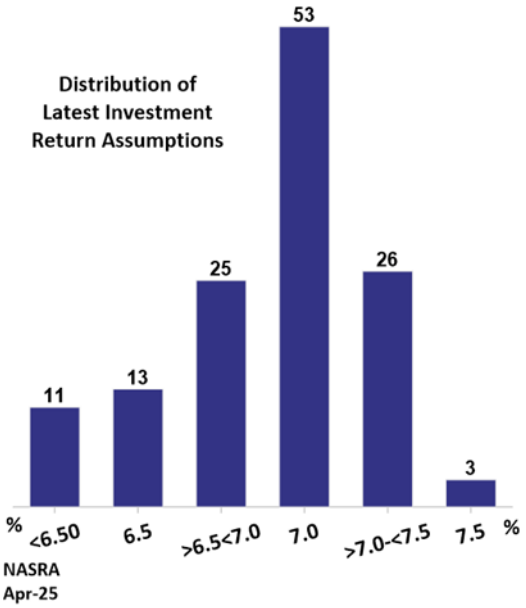
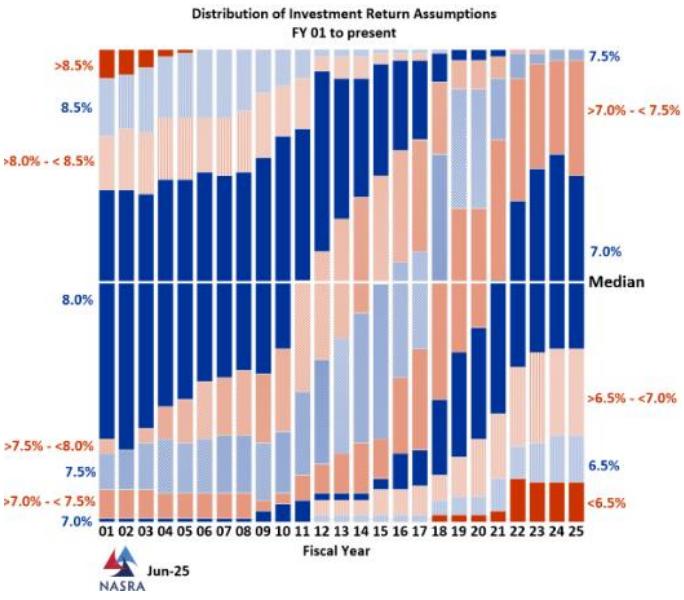


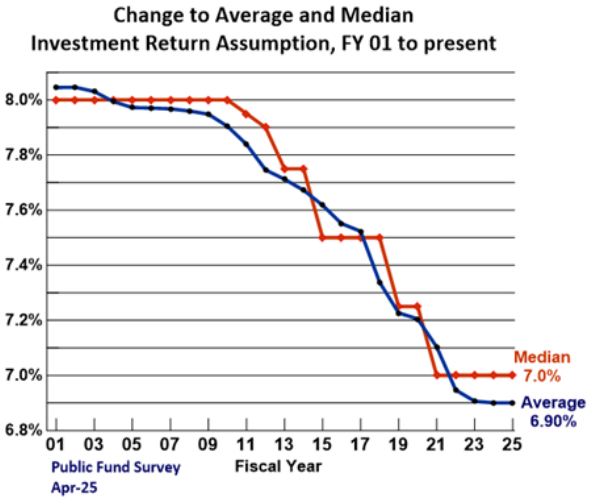
Figure 2



Over the last couple of years, there has been stabilization in the investment return assumption. This is consistent with the trend observed in the investment advisor expectations by asset class in the "Survey of Capital Market Assumptions: 2024 Edition" performed by Horizon Actuarial Services where they state the following:

"For illustration, this report also constructs an asset allocation for a hypothetical multiemployer pension plan and uses the results from the survey to develop a range of reasonably expected returns for the plan. The expected returns for this 2024 edition were 16 basis points lower over a 10-year horizon than they were last year, and 62 basis points lower than they were in 2019. Over a 20-year horizon, the expected returns are 16 basis points lower than last year, and the exact same as they were five years ago in the 2019 edition of the survey."

Figure 3



As part of this survey, the following Illinois public pension funds are included. Below is a summary of their recently published interest rate assumptions based on an updated NASRA survey:

- Illinois Municipal Retirement Fund 7.25%
- Illinois State Employees' Retirement System 6.75%
- Teachers' Retirement System of Illinois 7.00%
- State Universities Retirement System 6.50%

When setting any assumption, it is important to consider the concept of intergenerational equity. If you are too aggressive in your assumption setting, you are giving current taxpayers a break relative to their future counterparts. Similarly, if you are too conservative, you are asking current taxpayers to bear an unreasonable burden of the expense so that future taxpayers pay less. This is why it is so critical to set this assumption based on actual expectations, given the data available. You want the burden to be shared equally among current and future taxpayers, and the best way to do this is to set an assumption that is the best expectation of future experience.

RECOMMENDATION

When the 7.125% investment return assumption was established in 2021, it exceeded the 50th percentile expectation by 37.5 basis points. Current data, however, indicates the assumption is now 37.5 basis points below the 50th percentile, which implies support for a higher return assumption today.

Despite this, we recommend maintaining the 7.125% assumption. As a long-term assumption, it should not be adjusted based on short-term forecast fluctuations. We will continue to monitor this assumption and propose changes if it becomes necessary.

The Board recently made minor asset allocation adjustments to shift assets towards lower-risk classes. Based on current expectations, this new asset allocation supports the 7.125% assumption. The adoption of this change to the investment policy will enable the Board to maintain the current investment return assumption while simultaneously reducing the portfolio's investment risk.

For plans that currently hold no invested assets, we recommend increasing the assumption from 1.90% to 2.50%. This adjustment reflects the higher returns available from cash equivalent investments.

INFLATION

Inflation refers to general economic inflation, defined as price changes over the whole of the economy. The assumed inflation rate is the basis for the other economic assumptions, such as assumed investment returns, the discount rate, and salary increase assumptions.

In order to assess the reasonableness of the inflation assumption, we review historical inflation, applicable inflation forecasts to the extent available, inflation assumptions used by the system's investment consultant and other investment consultants, and assumptions currently used by similar plans.

Following ASOP No. 27, which provides guidance on the selection of economic assumptions, such as inflation, our determination of an appropriate inflation assumption includes a review of recent and long-term historical inflation, without giving undue weight to recent experience. We note that long-term historical experience, beyond 35 or so years, is less meaningful given that the Federal Reserve Board's monetary policy changed in the 1980's toward more vigilance in preventing high inflation.

HISTORICAL INFLATION

Over the last 20 years, inflation was low until a spike in 2021, which has slowly eased. The table below shows the average historical change in the annual CPI-U, over various periods. The average increase shown reflects the annual average rates for the year.

Periods Ending 2024	Average Annual Increase in CPI-U
Last 5 Years	4.2%
Last 10 Years	2.9%
Last 20 Years	2.6%
Last 30 Years	2.5%
Last 40 Years	2.8%

Source: Bureau of Labor Statistics, CPI-U, all items, not seasonally adjusted.

The current assumption of 2.25% appears to be low based on recent increases and the average increase over the last 20-30 years.

YIELDS ON GOVERNMENT SECURITIES OF VARIOUS MATURITIES

The spread between the nominal yield on treasury securities and the inflation indexed nominal yield on inflation protected treasury bills (TIPS) of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity. Current estimates reported at Bloomberg.com on May 16, 2025 are as follows.

Years to Maturity	Bond Nominal Yield	TIPS Nominal Yield	Breakeven Rate of Inflation
10 Years	4.48%	2.10%	2.38%
30 Years	4.95%	2.62%	2.33%

The current assumption is slightly low compared to the market data based on the 10-year and 30-year data point.

FORECASTS OF INFLATION

The Federal Reserve Bank of Philadelphia conducts a quarterly survey of the Society of Professional Forecasters and publishes a mid-term expectation. Their most recent forecast (first quarter of 2025) predicts average inflation over the next ten years (2025-2034) will be 2.30%. The Philadelphia Fed's Livingston Survey summarizes the forecasts of economists from industry, government, banking, and academia. The December 2024 report shows an average 10-year inflation expectation of 2.28%. The report does not provide a forecast beyond 10 years.

The Social Security Administration's 2024 Trustees Report includes the Office of the Chief Actuary's projection of ultimate long-term (75 year) average annual inflation. The intermediate cost assumption is 2.40%. The report provides a low-to-high range of 1.80% to 3.00%.

FORECASTS FROM INVESTMENT CONSULTING FIRMS

Horizon Actuarial Services, LLC, compiles and summarizes expected returns and volatility by asset class for 41 different investment advisors. The results of the survey are provided in a report titled "Survey of Capital Market Assumptions: 2024 Edition." The report defines the short-term horizon as 10 years and the long-term horizon as 20-years. All 41 advisors provided short-term assumptions, while only 26 provided both short-term and long-term assumptions. The average short-term (10-year) inflation assumption for all advisors is 2.42%, with a range of 2.0% to 3.0%. Of the 26 advisors providing both short-term and long-term assumptions, the short-term inflation assumption is 2.43% and the long-term inflation assumption is 2.44%, with a range from 2.2% to 2.8%.

RECOMMENDATION

Based on consideration of all of the data, we recommend increasing the long-term inflation assumption from 2.25% to 2.50%.

SALARY AND REAL WAGE GROWTH

The salary increase assumption is used to project a member's annual salary each year from the valuation date through the assumed retirement age. This assumption plays an important role in measuring individual pension costs and obligations. The sum of inflation and the real wage growth components comprise the recommended salary increase assumption. The real rate of wage increase includes increases due to promotion and longevity, often called merit increases, which are generally service related.

We previously addressed the inflation assumption, which we recommend increasing to 2.50%. We address the real wage growth assumption below.

EXPERIENCE AND RECOMMENDED ASSUMPTIONS

To assess the current assumed annual increases and provide a basis for updated assumptions, we reviewed the actual salary experience over the study period. Salary increases for those with less than 8 years of service were generally lower than expected, and higher than expected for those with at least 8 years of service. It is important to keep in mind that salary increase assumptions are used to project a member's salary from the valuation date until the assumed retirement age. For newly hired members, this projection could be for 40 or more years. Therefore, the recent past should not be considered in isolation. In addition to recent experience, we reviewed the experience from the three prior experience studies and long-term wage growth assumptions used by the Social Security Administration.

Actual Aggregate Salary Increase Experience			
	Actual Inflation	Real	Total
2004-2011	2.53%	3.44%	5.97%
2011-2016	1.32%	3.12%	4.43%
2017-2020	1.83%	2.77%	4.60%
2020-2023	5.59%	-0.18%	5.41%

Salary Increase Assumption – Current and Proposed			
	Assumed Inflation	Real	Total
Current Aggregate Assumed Annual Increase	2.25%	3.25%	5.50%
Proposed Aggregate Assumed Annual Increase	2.50%	2.92%	5.42%

SOCIAL SECURITY ADMINISTRATION

The Social Security Administration's (SSA) 2024 Trustees Report includes the Office of the Chief Actuary's projections of real wage inflation, which are used in their 75-year projections. These assumptions are based on data derived predominantly from the private sector and should therefore not be considered in isolation. However, this can provide a basis to help determine the reasonableness of the recommended long-term real increases shown above.

The annual increase in the National Average Wage Index under the intermediate cost assumption (best estimate) was 3.56%, with a range from 2.34% to 4.79%. After netting the SSA's inflation assumptions, the SSA's best estimate of the current long-term real wage inflation is 1.16%, with a range of 0.54% to 1.79% per year.

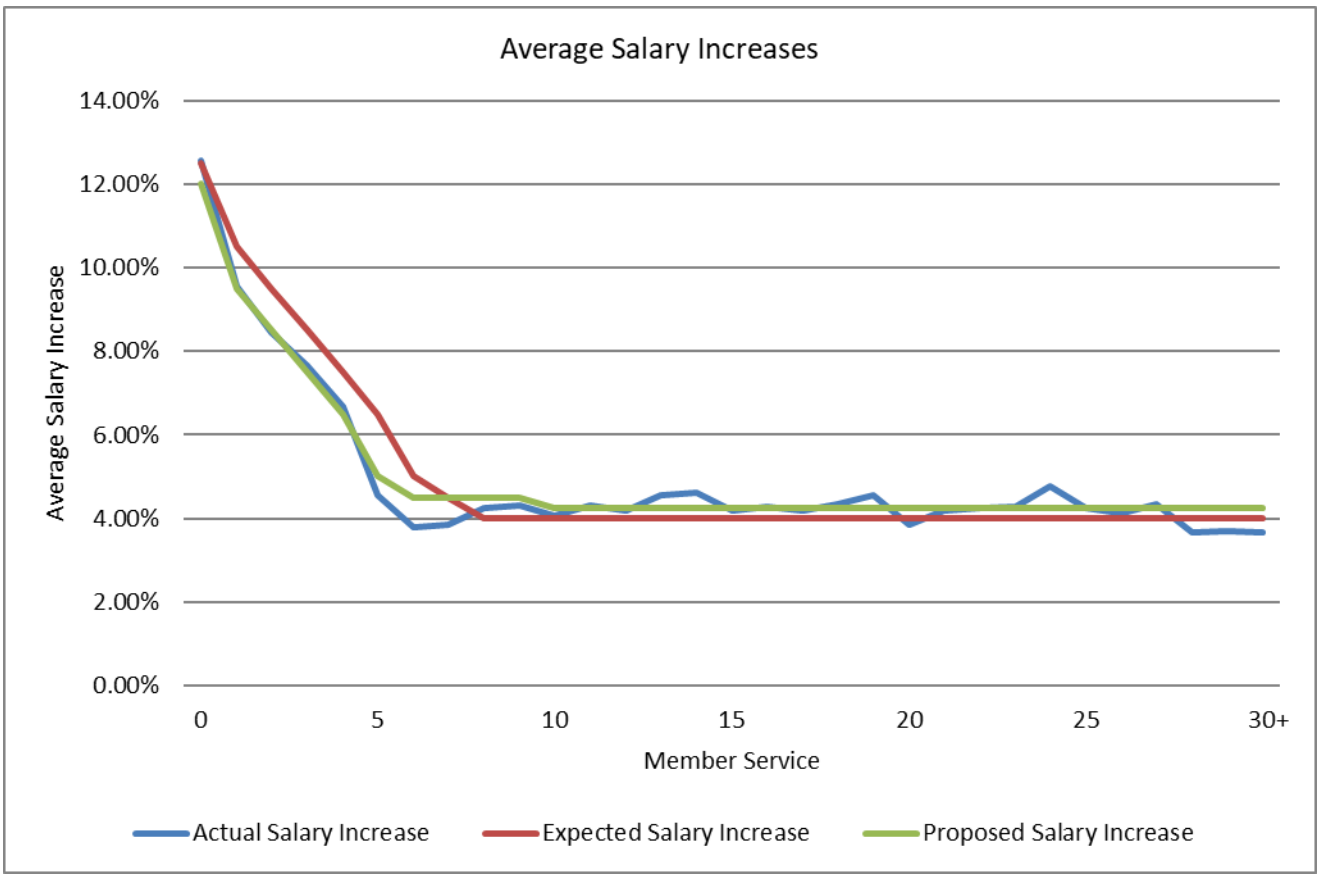
The proposed salary increase rates by duration of service are provided in the following table. Following the table is a graph which provides a visual representation of the actual and proposed salary increase rates compared to the current assumption.

Firefighters' Pension Investment Fund
2020 - 2023 Salary Increase Experience

Service	Eligible Members	Prior Year Salaries[1]	Actual Salaries[1]	Expected Salaries Current Assumption[1]	Actual Salary Increase	Expected Salary Increase	Proposed Salary Increase[2]
0	2,486	170,090	191,459	191,351	12.56%	12.50%	12.00%
1	1,307	99,549	109,057	110,002	9.55%	10.50%	9.50%
2	1,259	101,896	110,514	111,576	8.46%	9.50%	8.50%
3	1,163	99,282	106,875	107,721	7.65%	8.50%	7.50%
4	1,112	99,705	106,360	107,183	6.67%	7.50%	6.50%
5	1,018	94,608	98,924	100,758	4.56%	6.50%	5.00%
6	941	88,852	92,204	93,294	3.77%	5.00%	4.50%
7	894	85,216	88,483	89,050	3.83%	4.50%	4.50%
8	856	82,150	85,635	85,436	4.24%	4.00%	4.50%
9	821	79,024	82,436	82,185	4.32%	4.00%	4.50%
10	791	75,948	79,025	78,986	4.05%	4.00%	4.25%
11	903	87,696	91,464	91,203	4.30%	4.00%	4.25%
12	1,071	105,749	110,179	109,979	4.19%	4.00%	4.25%
13	1,206	120,849	126,366	125,683	4.57%	4.00%	4.25%
14	1,194	121,596	127,189	126,460	4.60%	4.00%	4.25%
15	1,062	109,691	114,271	114,078	4.18%	4.00%	4.25%
16	933	97,787	101,962	101,698	4.27%	4.00%	4.25%
17	842	89,432	93,183	93,009	4.19%	4.00%	4.25%
18	831	88,920	92,767	92,477	4.33%	4.00%	4.25%
19	917	99,761	104,304	103,751	4.55%	4.00%	4.25%
20	875	95,823	99,510	99,655	3.85%	4.00%	4.25%
21	783	87,351	91,014	90,845	4.19%	4.00%	4.25%
22	660	73,621	76,757	76,566	4.26%	4.00%	4.25%
23	565	64,857	67,623	67,451	4.26%	4.00%	4.25%
24	499	58,679	61,477	61,027	4.77%	4.00%	4.25%
25	383	45,111	47,033	46,915	4.26%	4.00%	4.25%
26	305	35,649	37,123	37,075	4.13%	4.00%	4.25%
27	251	29,514	30,790	30,695	4.32%	4.00%	4.25%
28	155	18,904	19,596	19,660	3.66%	4.00%	4.25%
29	84	10,591	10,981	11,015	3.68%	4.00%	4.25%
30+	212	27,174	28,168	28,261	3.66%	4.00%	4.25%
Total	**26,379**	**2,545,075**	**2,682,729**	**2,685,045**	**5.41%**	**5.50%**	**5.42%**

[1] All salary figures are shown as $1,000's.

[2] Inclusive of 2.50% inflation assumption.


Average Salary Increases
14.00%
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
Average Salary Increase
0
5
10
15
20
25
30+
Member Service
Actual Salary Increase
Expected Salary Increase
Proposed Salary Increase

PAYROLL GROWTH

The payroll growth assumption is used as part of the unfunded liability amortization calculation, allowing for the amortization rate to remain level as a percentage of payroll over time, assuming all assumptions are met. This is different from the salary increase assumption, since it is looking at the payroll for the entire membership, rather than any individual member. Total payroll growth includes an inflationary component and an additional increase for productivity gains.

CURRENT ASSUMPTION

Currently, the valuation assumes that payroll will increase 2.75% each year.

EXPERIENCE AND RECOMMENDATION

We reviewed the payroll increases for each plan over the study period (2020 - 2023). In addition, we considered the payroll increases from the prior two experience study periods (2012 – 2016 and 2017 - 2020). The results of this review are summarized below.

	Total Wage Inflation	Inflation	Productivity
2012-2016	2.48%	1.32%	1.16%
2017-2020	2.46%	1.83%	0.63%
2020-2023	4.22%	5.59%	-1.37%
Current Assumption	2.75%	2.25%	0.50%
Proposed Assumption	2.75%	2.50%	0.25%

We recommend the continued use of a 2.75% payroll growth assumption. The Board should consider modifying this assumption for each individual fund based on their specific experience. The experience can vary dramatically from one fund to another, so it is difficult to provide a one size fits all payroll growth assumption. While the payroll may grow at 3% or 4% each year in some places, it might remain flat in other locations. If a fund with little or no growth in payroll uses a 2.75% assumption, their contribution will continue to become a much larger percentage of the total future payroll and potentially make it difficult for the municipality to keep up with the growth in future contribution requirements.

An alternate approach would be to use the average growth in payroll over a specified period, for example over 10 years. This approach is used in some other states to help better align the assumption used by each fund with the reality of their situation. Under this approach, the funds with little or no payroll growth would use a smaller payroll growth assumption, resulting in an increase to their actuarial required contribution.

REVIEW OF DEMOGRAPHIC ASSUMPTIONS

ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries in selecting (including giving advice on selecting) demographic and other noneconomic assumptions for measuring obligations under defined benefit pension plans.

Over the following pages, the following demographic assumptions will be reviewed:

- Retirement Rates
- Withdrawal/Termination Rates
- Disability Incidence Rates
- Mortality Rates
- Other Demographic Assumptions

Generally, demographic assumptions are based on actual plan experience with additional considerations for current trends. ASOP No. 35 states "the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment." ASOP No. 35 also states that "a reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses…the actuary should not give undue weight to past experience when selecting demographic assumptions."

Demographic assumptions generally remain consistent over time, absent significant changes in plan provisions or economic conditions. Therefore, the best true indicator of future experience is often past experience. For each assumption, the study compares actual experience for that time period to assumptions used in the valuations.

Note that actuarial assumptions reflect average experience over long periods of time. A change in actuarial assumptions generally results when experience over a period of years indicates a consistent pattern. Proposed changes to the demographic assumptions are made to better reflect actual plan experience over the studied time period. The proposed changes also meet the objective of developing costs that are stable, predictable, and represent the best estimate of anticipated future experience.

RETIREMENT RATES

Retirement rates represent the probability that a member will retire at a given age and/or service level if they have attained the eligibility requirements. Higher rates of retirement at earlier ages generally result in higher costs to the plan but may be offset by the impacts of actuarially equivalent early retirement reductions.

The current retirement eligibility requirements are as follows.

Tier	Normal Retirement	Early Retirement
Tier 1	Age 50 and 20 years of Credited Service	Age 60 and 10 years of Credited Service
Tier 2	Age 55 and 10 years of Credited Service	Age 50 and 10 years of Credited Service

EXPERIENCE AND PROPOSED ASSUMPTIONS

The chart and graph on the following pages illustrate the actual retirement experience over the last three years. The rates illustrated are unisex and represent the probability of retirement, given the member had met the eligibility requirements. If the member did not meet the eligibility requirements at a given age, the member's exposure was excluded for that age. Because the Tier 2 experience for the study period includes only a handful of exposures (members eligible to retire), the experience was not split between Tiers.

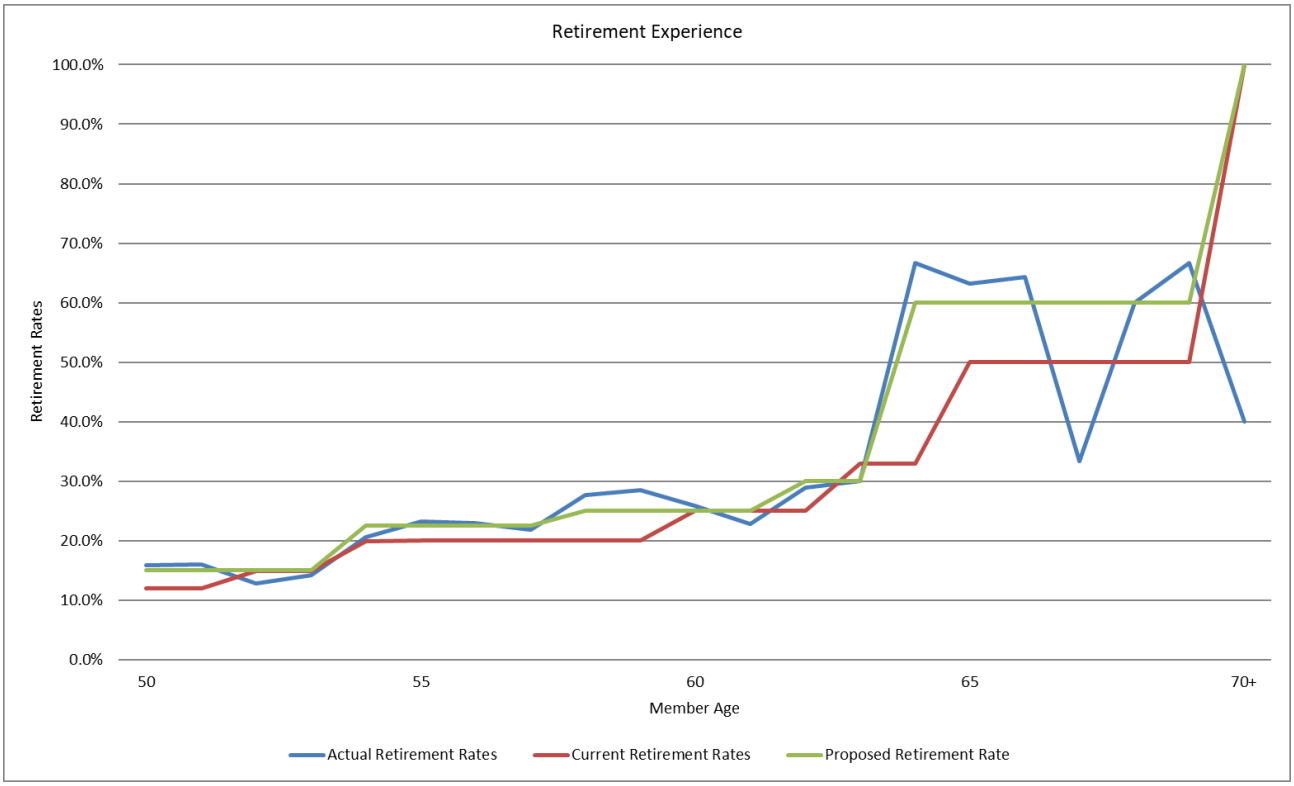
The current retirement rate assumption reflects age-related rates that vary by benefit Tier. Given the different benefit structures and retirement eligibilities, it is reasonable to assume that retirement patterns will vary between the two groups. Tier 2 members are assumed to retire at lower rates from age 50 to age 54 because benefits payable at those ages are reduced to reflect earlier payment.

In general, actual retirement rates were greater than expected for members of all ages. The proposed rates reflect slight increases.

Currently, there is proposed legislation that would eliminate the early retirement reduction for Tier 2 members that reach age 50 with 20 years of service. If this legislation passes, the Tier 1 retirement assumption will be used for Tier 2 members who are able to retire prior to age 55 without a reduction.

The actual, expected, and proposed retirement rates by age are displayed in the following table. Following the table is a graph which provides a visual representation of the actual and proposed retirement rates compared to the current assumptions.

Firefighters' Pension Investment Fund 2020 - 2023 Retirement Experience										
Age	Eligible Members	Actual Retirements	Expected Retirements Current Rates	Expected Retirements Proposed Rates	Actual Retirement Rates	Expected Current Rates Tier 1	Expected Current Rates Tier 2	Actual / Expected	Proposed Rates Tier 1	Proposed Rates Tier 2
50	871	139	104	130	16.0%	12%	3%	1.333	15.0%	3.0%
51	566	91	68	85	16.1%	12%	3%	1.343	15.0%	3.0%
52	524	67	78	78	12.8%	15%	3%	0.854	15.0%	3.0%
53	484	69	72	72	14.3%	15%	3%	0.952	15.0%	3.0%
54	426	88	85	96	20.7%	20%	3%	1.035	22.5%	3.0%
55	353	82	71	80	23.2%	20%	30%	1.160	22.5%	30.0%
56	296	68	59	67	23.0%	20%	20%	1.149	22.5%	22.5%
57	247	54	49	56	21.9%	20%	20%	1.093	22.5%	22.5%
58	235	65	47	59	27.7%	20%	20%	1.383	25.0%	25.0%
59	193	55	39	48	28.5%	20%	20%	1.425	25.0%	25.0%
60	151	39	38	38	25.8%	25%	25%	1.033	25.0%	25.0%
61	105	24	26	26	22.9%	25%	25%	0.914	25.0%	25.0%
62	76	22	19	23	28.9%	25%	25%	1.158	30.0%	30.0%
63	60	18	20	18	30.0%	33%	33%	0.909	30.0%	30.0%
64	30	20	10	18	66.7%	33%	33%	2.020	60.0%	60.0%
65	19	12	10	11	63.2%	50%	50%	1.263	60.0%	60.0%
66	14	9	7	8	64.3%	50%	50%	1.286	60.0%	60.0%
67	3	1	2	2	33.3%	50%	50%	0.667	60.0%	60.0%
68	5	3	3	3	60.0%	50%	50%	1.200	60.0%	60.0%
69	3	2	2	2	66.7%	50%	50%	1.333	60.0%	60.0%
70+	5	2	5	5	40.0%	100%	100%	0.400	100.0%	100.0%
Total	**4,666**	**930**	**813**	**924**	**19.9%**	**17.4%**	**10.7%**	**0.874**	**19.8%**	**11.5%**



TERMINATION RATES

The termination rate is the probability that a member will separate employment from a cause other than disability, death, or retirement.

Members who terminate before earning 10 years of service are eligible for a refund of member contributions. Members who terminate after earning 10 years are eligible to receive a deferred vested retirement benefit upon reaching the age-requirements for retirement.

CURRENT ASSUMPTION

The current termination assumption is an age-based table with rates starting at 10.00% and grading to 1.00% by age 44.

EXPERIENCE AND PROPOSED ASSUMPTIONS

All active members during the observation period were included in the exposures unless the member had met the retirement eligibility requirements. If a member was eligible for retirement at a given age, the member's exposure was excluded for that age.

Actual termination rates were higher than expected at younger ages. We recommend increasing the rates prior to age 33, decreasing the rates from 33 through 43, and make no change to the rates at age 44 and older.

The actual, expected, and proposed termination rates by age are provided on the following page. Following the table is a graph which provides a visual representation of the actual and proposed withdrawal rates compared to the current assumption.

Firefighters' Pension Investment Fund 2020 - 2023 Termination Experience							
Age	Exposures	Actual Terminations	Expected Terminations Current Rates	Actual Termination Rates	Expected Termination Rates	Actual / Expected	Proposed Termination Rates
20	0	0	0	0.00%	10.00%	0.000	12.50%
21	12	1	1	8.33%	10.00%	0.833	12.50%
22	84	13	8	15.48%	10.00%	1.548	12.50%
23	154	25	14	16.23%	9.00%	1.804	12.50%
24	240	39	20	16.25%	8.25%	1.970	12.50%
25	361	45	29	12.47%	8.00%	1.558	10.00%
26	491	48	38	9.78%	7.75%	1.261	9.00%
27	634	50	46	7.89%	7.25%	1.088	8.00%
28	730	55	46	7.53%	6.25%	1.205	7.00%
29	765	52	42	6.80%	5.50%	1.236	6.00%
30	806	39	32	4.84%	4.00%	1.210	5.00%
31	871	35	30	4.02%	3.50%	1.148	4.00%
32	953	37	29	3.88%	3.00%	1.294	3.00%
33	1,034	18	28	1.74%	2.75%	0.633	2.00%
34	1,065	25	27	2.35%	2.50%	0.939	2.00%
35	1,077	37	27	3.44%	2.50%	1.374	2.00%
36	1,073	16	24	1.49%	2.25%	0.663	1.50%
37	1,072	16	21	1.49%	2.00%	0.746	1.50%
38	1,044	11	16	1.05%	1.50%	0.702	1.00%
39	999	9	12	0.90%	1.25%	0.721	1.00%
40	985	9	12	0.91%	1.20%	0.761	1.00%
41	980	6	11	0.61%	1.15%	0.532	1.00%
42	960	6	11	0.63%	1.10%	0.568	1.00%
43	918	4	10	0.44%	1.05%	0.415	1.00%
44	888	6	9	0.68%	1.00%	0.676	1.00%
45	858	10	9	1.17%	1.00%	1.166	1.00%
46	851	13	9	1.53%	1.00%	1.528	1.00%
47	851	5	9	0.59%	1.00%	0.588	1.00%
48	876	15	9	1.71%	1.00%	1.712	1.00%
49	634	9	6	1.42%	1.00%	1.420	1.00%
50	319	6	3	1.88%	1.00%	1.881	1.00%
51	233	6	2	2.58%	1.00%	2.575	1.00%
52	160	4	2	2.50%	1.00%	2.500	1.00%
53	122	5	1	4.10%	1.00%	4.098	1.00%
54	83	4	1	4.82%	1.00%	4.819	1.00%
55	73	6	1	8.22%	1.00%	8.219	1.00%
56	50	2	1	4.00%	1.00%	4.000	1.00%
57	63	2	1	3.17%	1.00%	3.175	1.00%
58	51	2	1	3.92%	1.00%	3.922	1.00%
59	35	3	0	8.57%	1.00%	8.571	1.00%
60	11	2	0	18.18%	1.00%	18.182	1.00%
61	12	2	0	16.67%	1.00%	16.667	1.00%
62	10	2	0	20.00%	1.00%	20.000	1.00%
63	5	0	0	0.00%	1.00%	0.000	1.00%
64	6	3	0	50.00%	1.00%	50.000	1.00%
65+	1	1	0	100.00%	1.00%	100.000	1.00%
Total	**23,500**	**704**	**596**	**3.00%**	**2.54%**	**1.181**	**2.59%**


Withdrawal Experience
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Turnover Rates
20
25
30
35
40
45
50
55
60
65+
Member Age
Actual Turnover
Expected Turnover
Proposed Turnover

DISABILITY INCIDENCE RATES

The disability incidence assumption is the probability that a member will become disabled while actively participating in the plan. A review of past experience compared to the current assumption will provide the basis for examining the assumption.

The overall cost due to disability depends on the plan's disability provisions. For Article 4 members, the benefits for separating due to disability can be more valuable than retirement benefits. It is possible that an active member, who is already eligible to retire, becomes disabled and is entitled to receive a larger immediate benefit than if he or she had retired.

It is also important to note that the level of disability benefits received depends on whether the disability was service-related or non-service-related. To be eligible for non-service-related disability benefits, a member must have earned seven years of service, whereas members are eligible for service-related disability benefits immediately upon disability. Therefore, an additional assumption for the proportion of disablements that are service-related is necessary.

CURRENT ASSUMPTION

The current disability incidence assumption is a unisex age-related table. Currently, 80% of disabilities are assumed to be service-related.

EXPERIENCE AND PROPOSED ASSUMPTIONS

In total, over the studied period, there were slightly less disablements than assumed but the experience was very close to expected. For some ages, the actual rate was higher than expected and for other ages, the actual rate was lower. We propose no changes to the current assumption at this time.

We also reviewed the incidence of service-related disabilities versus non-service-related disabilities. Approximately 74% of the disabilities were service-related. We propose no change to the current 80% assumption. Over the long-term given the Tier 2 plan provisions, we would expect higher, not lower, service-related disabilities in the future.

The actual, expected, and proposed rates of disability are provided in the following table. Following the table is a graph which provides a visual representation of the actual and proposed disability rates compared to the current assumption.

Firefighters' Pension Investment Fund 2020 - 2023 Disability Experience							
Age	Exposures	Actual Disabilities	Expected Disabilities Current Rates	Actual Disability Rates	Expected Disability Rates	Actual / Expected	Proposed Disability Rates
20	0	0	0.0	0.000%	0.000%	0.000	0.000%
21	12	0	0.0	0.000%	0.010%	0.000	0.010%
22	84	0	0.0	0.000%	0.010%	0.000	0.010%
23	154	0	0.0	0.000%	0.012%	0.000	0.012%
24	240	0	0.0	0.000%	0.014%	0.000	0.014%
25	361	0	0.1	0.000%	0.016%	0.000	0.016%
26	491	0	0.1	0.000%	0.018%	0.000	0.018%
27	634	1	0.1	0.158%	0.020%	7.886	0.020%
28	730	0	0.3	0.000%	0.036%	0.000	0.036%
29	765	1	0.4	0.131%	0.052%	2.514	0.052%
30	806	0	0.6	0.000%	0.068%	0.000	0.068%
31	871	1	0.7	0.115%	0.084%	1.367	0.084%
32	953	1	1.0	0.105%	0.100%	1.049	0.100%
33	1,034	1	1.5	0.097%	0.140%	0.691	0.140%
34	1,065	3	1.9	0.282%	0.180%	1.565	0.180%
35	1,077	0	2.4	0.000%	0.220%	0.000	0.220%
36	1,073	1	2.8	0.093%	0.260%	0.358	0.260%
37	1,072	0	3.2	0.000%	0.300%	0.000	0.300%
38	1,044	7	3.6	0.670%	0.340%	1.972	0.340%
39	999	5	3.8	0.501%	0.380%	1.317	0.380%
40	985	5	4.1	0.508%	0.420%	1.209	0.420%
41	980	6	4.5	0.612%	0.460%	1.331	0.460%
42	960	4	4.8	0.417%	0.500%	0.833	0.500%
43	918	3	5.1	0.327%	0.550%	0.594	0.550%
44	888	5	5.3	0.563%	0.600%	0.938	0.600%
45	858	7	5.6	0.816%	0.650%	1.255	0.650%
46	851	6	6.0	0.705%	0.700%	1.007	0.700%
47	851	7	6.4	0.823%	0.750%	1.097	0.750%
48	876	5	7.0	0.571%	0.800%	0.713	0.800%
49	916	7	7.8	0.764%	0.850%	0.899	0.850%
50	908	10	8.2	1.101%	0.900%	1.224	0.900%
51	799	11	7.6	1.377%	0.950%	1.449	0.950%
52	684	3	6.8	0.439%	1.000%	0.439	1.000%
53	606	7	6.5	1.155%	1.080%	1.070	1.080%
54	509	5	5.9	0.982%	1.160%	0.847	1.160%
55	426	6	5.3	1.408%	1.240%	1.136	1.240%
56	346	4	4.6	1.156%	1.320%	0.876	1.320%
57	310	2	4.3	0.645%	1.400%	0.461	1.400%
58	286	4	4.2	1.399%	1.460%	0.958	1.460%
59	228	2	3.5	0.877%	1.520%	0.577	1.520%
60	162	0	2.6	0.000%	1.580%	0.000	1.580%
61	117	0	0.0	0.000%	0.000%	0.000	0.000%
62	86	1	0.0	1.163%	0.000%	0.000	0.000%
63	65	1	0.0	1.538%	0.000%	0.000	0.000%
64	36	0	0.0	0.000%	0.000%	0.000	0.000%
65+	50	2	0.0	4.000%	0.000%	0.000	0.000%
Total	**28,166**	**134**	**138.3**	**0.476%**	**0.491%**	**0.969**	**0.491%**


Disability Experience
2.000%
1.500%
1.000%
0.500%
0.000%
Disability Rates
21
26
31
36
41
46
51
56
61
Member Age
Actual Disability Rates
Expected/Proposed Disability Rates

MORTALITY RATES

A plan's normal cost and actuarial accrued liability depend in part on how long retirees will live. If retirees live longer than anticipated by the assumptions, benefits will be paid longer than expected and experience losses will develop. If retirees do not live as long as anticipated by the assumptions, experience gains will develop. Mortality rates represent the probability of death at a given age. The choice of mortality rates impacts active member and retiree costs and liabilities and has the greatest impact on the liabilities for retirees.

The actuarial profession has increasingly become more focused on the issue of future mortality improvement. Mortality rates have declined over time as advances in medical care have evolved. The extent of future mortality improvement will impact the magnitude of pension costs and liabilities for future benefit commitments. ASOP No. 35 discusses the importance of actuaries considering mortality improvements when measuring pension obligations. Specifically, an actuary should make and disclose a specific recommendation with respect to future mortality improvement after the measurement date. Mortality improvement can be accounted for with static or generational mortality tables. A static table includes a projection of the base mortality rates to a specific date or equivalently for a specific number of years. The same mortality rates at any given age apply to everyone. A generational table anticipates future improvements in mortality by using a different static mortality table for each year of birth, with the tables for later years of birth assuming lower mortality than the tables of earlier years of birth.

Our analysis employs a credibility procedure which uses a statistical approach to combine actual mortality experience with standard mortality tables to improve the estimate of future mortality.

CURRENT ASSUMPTION

Active Lives: Pub-2010 Public Safety Employee mortality table with generational mortality improvement using scale MP-2021.

Healthy Retiree Lives: Pub-2010 Public Safety Healthy Retiree mortality table with male rates increased by 8.1% and generational mortality improvement using scale MP-2021.

Disabled Lives: Pub-2010 Public Safety Disabled Retiree mortality table with male rates increased by 17.8% and generational mortality improvement using scale MP-2021.

Survivors:Pub-2010 Public Safety Survivor mortality table with female rates increased by 9.8% and generational mortality improvement using scale MP-2021.

STANDARD MORTALITY TABLES

In 2019, The Society of Actuaries (SOA) released its report of a comprehensive study of public sector mortality experience. Included in this report are gender-specific mortality tables for Public Safety employees, including separate tables for active members, retirees, disabled members and Contingent Survivor tables for beneficiaries. These tables are collectively named the Pub-2010 Mortality Tables and are currently being used, with adjustments noted above.

In preparing this study, we compared the Article 4 funds' actual plan experience to the current assumption and to the applicable Pub-2010 Mortality Tables.

For a plan to develop a mortality table based solely on its own experience, it must have hundreds of thousands of lives and thousands of deaths at each age and gender. However, many plans provide enough fully credible experience to develop a custom mortality table by multiplying the mortality rates in a published table by the ratio of actual to expected deaths. We employed this methodology by first identifying a standard table with mortality rates that are similar to those experienced by the actual plan membership. Since the rate at each age in the custom mortality table will be a multiple of the rate at that age from the standard table, close attention was given to the shape of the standard table in making the selection.

Once the appropriate standard table was selected, we determined the multiple using the limited fluctuation approach to credibility, as described in the Society of Actuaries Credibility Educational Resource for Pension Actuaries, issued in August 2017. Using this approach, 1082 deaths are needed to provide full credibility based on a 90% confidence level and a 5% margin of error. If the experience data is fully credible, then the rates from the standard table are multiplied by the ratio of the actual to expected deaths from the standard table. Where there are fewer than the 1,082 deaths needed for full credibility, the limited fluctuations approach allows some of the plan's actual experience to be used to adjust the standard table.

EXPERIENCE AND RECOMMENDED ASSUMPTIONS

Active Members

The low number of active public safety member deaths results in an insufficient number of deaths needed to provide fully credible experience on which to develop the appropriate mortality rates. With only 19 total active deaths over the studied period, we found that experience was only about 13.3% credible.

In selecting a standard table, we considered the Pub-2010 Public Safety Employee table for males and females. We found that this table provided a reasonable match to the experience pattern of current active members for both males and females. We recommend no change to the current assumption which is the Pub-2010 Public Safety Employee tables for males and females, with no adjustment.

Public Safety Retirees and Survivors

Using the credibility approach described above, we determined that the mortality experience was 63.2% credible for male retirees and 50.1% credible for female survivors. There was no credible experience for female retirees or male survivors.

We compared the experience to the Pub-2010 Public Safety Healthy Retiree and Pub-2010 Public Safety Survivor tables. These tables provided a reasonable fit to the actual experience. Given the partial credibility of the actual experience, an adjustment to these tables based on our findings is warranted. This analysis yielded adjustment factors of 1.159 for male retirees and 1.202 for female survivors, which are slightly higher than the current factors of 1.081 and 1.098.

However, a review of mortality rates by specific year revealed a notable increase in 2021, followed by a reduction in 2022 and 2023. We believe this pattern is at least partially attributable to the COVID-19 pandemic. Due to this potential anomaly, the recent data may not accurately represent future expectations. Therefore, we recommend no change to the current mortality assumption for male and female retirees and survivors.

Disability Retiree Mortality

Mortality rates among disability retirees are typically elevated compared to those of regular retirees. Our credibility analysis, based on 94 male deaths and zero female deaths, yielded a 29.5% credibility for male experience and 0% for female experience.

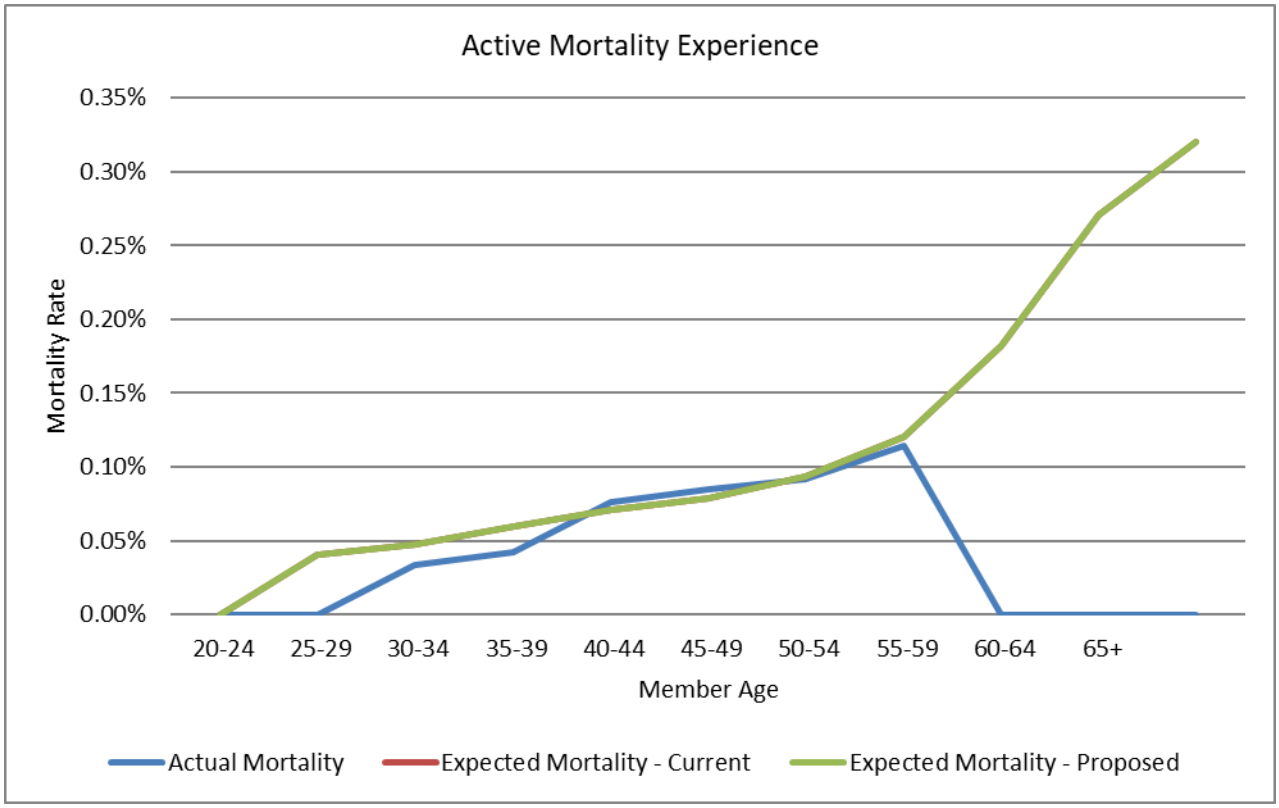
Although the actual mortality experience for disabled retirees was demonstrably heavier than that suggested by the standard Public table, and our limited fluctuation approach supported adjusting the Pub-2010 Disabled Retiree mortality table (specifically, a factor of 1.119 for male rates and no adjustment for female rates), a critical observation emerged. We identified a similar anomalous pattern in annual mortality rates, consistent with our findings for regular retirees and survivors. Consequently, we recommend no modification to the current assumption for male and female disability retirees

Future Mortality Improvement

Currently, the mortality tables reflect generational improvements using Scale MP-2021. We continued use of the generational improvements. Generally, the MP scales are updated each year to reflect actual mortality improvements. However, the Society of Actuaries has not issued a new scale since MP-2021 due to the effects of COVID-19. We recommend continuing the use of Scale MP-2021 until a new scale is released and an automatic adoption of new scales once they are released.

The actual, expected, and proposed mortality rates for active members, healthy retirees and survivors, and disabled members are provided on the following tables. Following the tables are graphs which provide a visual representation of the actual and proposed mortality rates compared to the current assumptions.

Firefighters' Pension Investment Fund 2020 - 2023 Mortality Experience Active Members						
Age	Exposures	Actual Deaths	Expected Deaths	Actual Mortality Rates	Expected Mortality Rates	Proposed Mortality Rates
<20	0	0	0	0.00%	0.00%	0.00%
20-24	490	0	0	0.00%	0.04%	0.04%
25-29	2,981	1	1	0.03%	0.05%	0.05%
30-34	4,729	2	3	0.04%	0.06%	0.06%
35-39	5,265	4	4	0.08%	0.07%	0.07%
40-44	4,731	4	4	0.08%	0.08%	0.08%
45-49	4,352	4	4	0.09%	0.09%	0.09%
50-54	3,506	4	4	0.11%	0.12%	0.12%
55-59	1,596	0	3	0.00%	0.18%	0.18%
60-64	466	0	1	0.00%	0.27%	0.27%
65+	50	0	0	0.00%	0.32%	0.32%
Total	**28,166**	**19**	**25**	**0.07%**	**0.09%**	**0.09%**



Firefighters' Pension Investment Fund 2020 - 2023 Mortality Experience Retirees and Survivors						
Age	Exposures	Actual Deaths	Expected Deaths	Actual Mortality Rates	Expected Mortality Rates	Proposed Mortality Rates
<50	1,143	0	0	0.00%	0.00%	0.00%
50-54	1,581	6	4	0.38%	0.24%	0.24%
55-59	3,405	10	13	0.29%	0.39%	0.39%
60-64	3,956	21	26	0.53%	0.67%	0.67%
65-69	4,028	45	43	1.12%	1.07%	1.07%
70-74	3,218	95	56	2.95%	1.73%	1.73%
75-79	2,768	109	83	3.94%	3.00%	3.00%
80-84	2,028	130	103	6.41%	5.09%	5.09%
85-89	1,186	152	104	12.82%	8.76%	8.76%
90-94	550	107	79	19.45%	14.30%	14.30%
95-99	108	25	24	23.15%	21.76%	21.76%
100+	15	5	5	33.33%	36.07%	36.07%
Total	**23,986**	**705**	**540**	**2.94%**	**2.25%**	**2.25%**

Firefighters' Pension Investment Fund 2020 - 2023 Mortality Experience Disabled Retirees						
Age	Exposures	Actual Deaths	Expected Deaths	Actual Mortality Rates	Expected Mortality Rates	Proposed Mortality Rates
<35	12	0	0	0.00%	0.17%	0.17%
35-39	48	0	0	0.00%	0.21%	0.21%
40-44	175	0	0	0.00%	0.23%	0.23%
45-49	315	1	1	0.32%	0.28%	0.28%
50-54	533	1	2	0.19%	0.38%	0.38%
55-59	607	5	3	0.82%	0.57%	0.57%
60-64	724	7	7	0.97%	0.93%	0.93%
65-69	687	15	10	2.18%	1.39%	1.39%
70-74	565	18	12	3.19%	2.13%	2.13%
75-79	389	22	15	5.66%	3.74%	3.74%
80-84	172	15	10	8.72%	6.01%	6.01%
85-89	59	9	6	15.25%	9.95%	9.95%
90-94	7	1	1	14.29%	17.57%	17.57%
95-99	2	0	1	0.00%	28.50%	28.50%
100+	1	0	0	0.00%	31.00%	31.00%
Total	**4,296**	**94**	**68**	**2.19%**	**1.58%**	**1.58%**

OTHER DEMOGRAPHIC ASSUMPTIONS

Dependent/minor children: The funds do provide temporary dependent/minor child benefits. However, because the benefits are immaterial, no assumptions are made regarding dependent minor children.

Spouse's age: Male spouses are assumed to be 3 years older. Correspondingly, female spouses are assumed to be three years younger. Based on available spousal data for current retirees, male spouses are about 2.7 years older than the female retiree, and female spouses are about 1.8 years younger than the male retiree. Less than 1% have same sex spouses. We recommend decreasing the spousal age difference to 2 years, with males being older than females.

Marital status: The current valuation assumes that 80% of active members are married. This statistic is used to determine the probability that spousal benefits will be payable in the event of an active member's death. Based on the spousal data for current retirees, 81% of male members are married and 50% of female retirees are married. Because the current retiree population has a limited number of female retirees, we recommend no change to the current 80% assumption for both males and females.

Duty-related deaths: Currently, 20% of active deaths are assumed to be in the line of duty. Given the small incidence of active deaths, we recommend no changes to this assumption.

Administrative expenses: The current assumption is a 2.0% load to the normal cost to account for administrative expenses. Based on Foster & Foster's experience with Article 4 funds, we recommend no change to this assumption.

RECOMMENDED ASSUMPTIONS

Interest Rate	7.125% per year compounded annually, net of investment related expenses.
Mortality Rate	***Actives:*** PubS-2010 Employee mortality, unadjusted, with generational improvements with the most recent projection scale (currently Scale MP-2021). 20% of active deaths are assumed to be in the line of duty. ***Inactives:*** PubS-2010 Healthy Retiree mortality, adjusted by a factor of 1.081 for male retirees and unadjusted for female retirees, with generational improvements with the most recent projection scale (currently Scale MP-2021). ***Beneficiaries:*** PubS-2010 Survivor mortality, unadjusted for male beneficiaries and adjusted by a factor of 1.098 for female beneficiaries, with generational improvements with the most recent projection scale (currently Scale MP-2021). ***Disableds:*** PubS-2010 Disabled mortality, adjusted by a factor of 1.178 for male disabled members and unadjusted for female disabled members, with generational improvements with the most recent projection scale (currently Scale MP-2021).
Retirement Age	See full tables at end of this section.
Disability Rate	See full tables at end of this section. 80% of the disabilities are assumed to be in the line of duty.
Termination Rate	See full tables at end of this section.

Salary Increases	See full tables at end of this section.
Inflation	2.50%.
Tier 2 Cost-of-Living Adjustment	1.25% per year after the later of attainment of age 60 or first anniversary of retirement. The increase is the lesser of 3.00% and one-half of the increase in CPI-U.
Marital Status	80% of Members are assumed to be married.
Spouse's Age	Males are assumed to be two years older than females.
Payroll Growth	2.75% per year.
Administrative Expenses	Administrative expenses will be estimated as 2% of the fund's total normal cost.

% Terminating During the Year	
Age	Rate
20	12.50%
21	12.50%
22	12.50%
23	12.50%
24	12.50%
25	10.00%
26	9.00%
27	8.00%
28	7.00%
29	6.00%
30	5.00%
31	4.00%
32	3.00%
33	2.00%
34	2.00%
35	2.00%
36	1.50%
37	1.50%
38	1.00%
39	1.00%
40	1.00%
41	1.00%
42	1.00%
43	1.00%
44	1.00%
45	1.00%
46	1.00%
47	1.00%
48	1.00%
49	1.00%
50	1.00%
51	1.00%
52	1.00%
53	1.00%
54	1.00%
55	1.00%
56	1.00%
57	1.00%
58	1.00%
59	1.00%
60	1.00%
61+	1.00%

% Becoming Disabled During the Year	
Age	Rate
20	0.010%
21	0.010%
22	0.010%
23	0.012%
24	0.014%
25	0.016%
26	0.018%
27	0.020%
28	0.036%
29	0.052%
30	0.068%
31	0.084%
32	0.100%
33	0.140%
34	0.180%
35	0.220%
36	0.260%
37	0.300%
38	0.340%
39	0.380%
40	0.420%
41	0.460%
42	0.500%
43	0.550%
44	0.600%
45	0.650%
46	0.700%
47	0.750%
48	0.800%
49	0.850%
50	0.900%
51	0.950%
52	1.000%
53	1.080%
54	1.160%
55	1.240%
56	1.320%
57	1.400%
58	1.460%
59	1.520%
60	1.580%
61+	0.000%

% Retiring During Year			
Tier 1		Tier 2	
Age	Rate	Age	Rate
50-53	15.0%	50-54	3.0%
54-57	22.5%	55	30.0%
58-61	25.0%	56-57	22.5%
62-63	30.0%	58-61	25.0%
64-69	60.0%	62-63	30.0%
70+	100.0%	64-69	60.0%
		70+	100.0%

Salary Scale	
Service	Rate
0	12.00%
1	9.50%
2	8.50%
3	7.50%
4	6.50%
5	5.00%
6	4.50%
7	4.50%
8	4.50%
9	4.50%
10+	4.25%