

City of Birmingham  
Employees Retirement System  
Review of System Experience  
July 1, 2017 Through June 30, 2022





June 2, 2023

Retirement Board  
City of Birmingham Employees Retirement System  
Birmingham, Michigan

**Re: City of Birmingham Employees Retirement System Review of System Experience as of June 30, 2022  
Actuarial Disclosures**

Dear Board Members:

Presented in this report are the results of a review of Retirement System experience. The investigation was conducted for the purpose of updating the actuarial assumptions used in valuing the City of Birmingham Employees Retirement System actuarial liabilities, assets, and actuarially determined employer contribution amounts.

The investigation was based upon the data furnished for the annual actuarial valuations during the period **July 1, 2017 through June 30, 2022** and was carried out using generally accepted actuarial principles and techniques. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided.

We have shown the expected impact of the proposed changes on City contributions as of June 30, 2022. This information is shown in Section D of this report.

We believe that the actuarial assumptions recommended in this experience study report represent individually and in the aggregate reasonable estimates of future experience of the City of Birmingham Employees Retirement System.

This report should not be relied on for any purpose other than that described above. It was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. We certify that, to the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

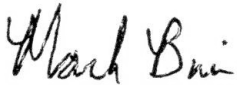
Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

Mark Buis and Richard C. Koch Jr. are Members of the American Academy of Actuaries (MAAA) and meet the qualification standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this experience study and report with the Board of Trustees and to answer any questions pertaining to the experience study.

Respectfully submitted,  
Gabriel, Roeder, Smith & Company



Mark Buis, FSA, EA, FCA, MAAA



Richard C. Koch Jr., FSA, EA, MAAA

MB/RCK:rmn



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# Introduction

Each year, as of June 30th, the actuarial liabilities of the City of Birmingham Employees Retirement System are valued. In order to perform the valuation, assumptions must be made regarding the future experience of the Plan with regard to the following risk areas:

- Rates of **termination** of active members;
- Rates of **disability** among active members;
- Rates of **retirement** among active members;
- Rates of **mortality** among active members, retirants and beneficiaries;
- Long-term rates of **investment return** to be generated by the assets of the Plan; and
- Patterns of **salary increases** to active members.

Assumptions should be carefully chosen and continually monitored. Continued use of outdated assumptions can lead to:

- Understated costs resulting in either an inability to pay benefits when due, or sharp increases in required contributions at some point in the future; and
- Overstated costs resulting in either benefit levels that are kept below the level that could be supported by the computed rate or an unnecessarily large burden on the current generation of members, employers, and taxpayers.

A single set of assumptions will not be suitable indefinitely. Things change, and our understanding of things also changes. In recognition of this, assumptions used to value the liabilities of the Retirement System should be reviewed and adjusted periodically to recognize changes in experience trends, a changing economic environment (or changing perceptions of the economic environment) and to maintain consistency within the universe of public employee retirement plans. The results of this analysis are shown in Section A of this report.

A common practice among public employee retirement plans is that the actuary recommends a set of demographic assumptions and suggests a range of reasonable alternate economic assumptions. Following discussion involving the actuary, the plan governing body, and other professionals, the plan governing body makes a final choice from the various alternatives.

The scope of this report is limited to assumptions used in the pension actuarial valuation. Analysis of assumptions specific to the retiree health valuation is beyond the scope of this report.

## **SECTION A**

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### **DEMOGRAPHIC ASSUMPTIONS**

# Retirement

**Discussion:** Rates of retirement are used to measure the probabilities of an eligible member retiring from City employment during the next year. During the study period, actual rates of retirement for the City of Birmingham Employees Retirement System have been higher than expected for the Police and Fire groups and lower than expected for the General group.

**Summary of Experience:** The experience during the study period is summarized below:

Number of Retirements Among Eligible System Members					
Police & Fire		General		Total	
Actual	Expected	Actual	Expected	Actual	Expected
11	5.6	21	23.7	32	29.3

**Proposal:** We recommend a slight change for the Police and Fire groups and for the General employees. The current and proposed retirement rates are shown on the following page. This change will put upward pressure on liabilities for Police and Fire and downward pressure on liabilities for the General group.

# Retirement Rates

## Current and Proposed Rates of Retirement

*The following rates of retirement* were used to measure the probability of eligible members retiring during the next year.

### Current Rates of Retirement

Retirement Ages	General	Teamsters	Retirement Ages	Police-Fire	Retirement Service	DROP Police-Fire
55		20%				
56		20%				
57	20%	20%	50-54	30%		
58	20%	20%	55-59	30%		
59	20%	20%				
60	20%	20%	60	30%		
61	20%	20%	61	30%		
62	25%	25%	62	30%		
63	20%	20%	63	30%		
64	15%	15%	64	30%		
65	40%	40%	65	100%	30	45%
66	25%	25%	66		31	25%
67	25%	25%	67		32	25%
68	25%	25%	68		33	25%
69	25%	25%	69		34	25%
70-74	25%	25%	70		35	100%
75	100%	100%				
Ref	1563	1565		1875		2308

### Proposed Rates of Retirement

Retirement Ages	General	Teamsters	Retirement Ages	Police-Fire	Retirement Service	DROP Police-Fire
55		15%				
56		15%				
57	15%	15%	50-54	35%		
58	15%	15%	55-59	35%		
59	15%	15%				
60	15%	15%	60	35%		
61	15%	15%	61	35%		
62	25%	25%	62	100%		
63	20%	20%	63			
64	15%	15%	64			
65	40%	40%	65		30	45%
66	25%	25%	66		31	25%
67	25%	25%	67		32	25%
68	25%	25%	68		33	25%
69	25%	25%	69		34	25%
70-74	25%	25%	70		35	100%
75	100%	100%				
Ref	3390	3389		3388		2308

An AFSCME, General, General Executive, Library, Police Support or Teamster member was assumed to be eligible for retirement after attaining age 57 (55 for Teamsters and General Executive) with 25 or more years of service (15 for General Executive) or age 60 with 10 or more years of service (or age 60 with 7 or more years of service for General and Library). A Police Patrol, Police Command, Police Official, or Fire member was assumed to be eligible for retirement after attaining age 50 (53 for Police Officials) with 25 or more years of service or age 55 with 10 or more years of service.





## Turnover

**Discussion:** During the study period, actual rates of termination for both the General group and the Police and Fire groups have been close to expected. The tables on the current page summarize recent experience and the current and proposed rates of termination.

**Summary of Experience:** The experience during the study period is summarized below:

<b>Number of General Employee Terminations from City Employment</b>					
<b>Vested</b>		<b>Non-Vested</b>		<b>Total</b>	
<b>Actual</b>	<b>Expected</b>	<b>Actual</b>	<b>Expected</b>	<b>Actual</b>	<b>Expected</b>
2	3.4	2	0.1	4	3.5

<b>Number of Police and Fire Terminations from City Employment</b>					
<b>Vested</b>		<b>Non-Vested</b>		<b>Total</b>	
<b>Actual</b>	<b>Expected</b>	<b>Actual</b>	<b>Expected</b>	<b>Actual</b>	<b>Expected</b>
0	0.6	0	0.3	0	0.9

**Proposal:** We recommend no change in the turnover rates. This will result in no impact on computed liabilities and contributions.

### Current and Proposed Rates of Turnover

<b>Sample Ages</b>	<b>Years of Service</b>	<b>% of Active Members Separating within Next Year</b>	
		<b>General</b>	<b>Police-Fire</b>
25	5 & Over	8.10%	2.70%
30		5.85%	1.65%
35		4.70%	1.05%
40		4.00%	0.60%
45		3.40%	0.36%
50		2.80%	0.33%
55		2.30%	0.30%
60		1.60%	0.30%
65		0.50%	0.30%
Ref			358 x 1

## Disability

**Discussion:** The actual number of disability retirements was close to expected during the study period. However, experience in this area is limited for a group of this size and a 5-year period is too short a period over which to develop a plan-specific table. In addition to the experience shown in the table below, there are 50 Police and Fire members in a defined contribution plan who are eligible for death and disability benefits through the defined benefit plan.

<b>Number of Disability Retirements from City Employment</b>					
<b>Police and Fire</b>		<b>General</b>		<b>Total</b>	
<b>Actual</b>	<b>Expected</b>	<b>Actual</b>	<b>Expected</b>	<b>Actual</b>	<b>Expected</b>
1	0.30	0	0.50	1	0.80

**Proposal:** We recommend no change in the disability rates. The Police-Fire rates shown below apply to the Police and Fire members in a defined contribution plan who are eligible for death and disability benefits through the defined benefit plan. This will result in no impact on computed liabilities and contributions.

The current and proposed rates are shown below:

<b>Sample Ages</b>	<b>% Becoming Disabled within Next Year</b>	
	<b>General</b>	<b>Police-Fire</b>
	20	0.04%
25	0.04%	0.08%
30	0.05%	0.08%
35	0.05%	0.08%
40	0.10%	0.20%
45	0.16%	0.27%
50	0.32%	0.49%
55	0.63%	0.89%
60	1.16%	1.41%
65	1.34%	1.66%
Ref	99	9

## Mortality

**Discussion:** The mortality assumption is used to measure the probabilities of members dying before retirement and the probability of each benefit payment being made after retirement. Mortality rates among retired public employees have been declining for years. Additionally, and perhaps consequently, the Actuarial Standards of Practice with regard to the mortality assumption has recently been revised. ASOP No. 35 Disclosure Section 4.1.1 now states: **“...The disclosure of the mortality assumption should contain sufficient detail to permit another qualified actuary to understand the provision made for future mortality improvement. If the actuary assumes zero mortality improvement after the measurement date, the actuary should state that no provision was made for future mortality improvement.”** The current mortality assumption is the RP-2014 Employee Generational Mortality Tables, with blue collar adjustments and extended via cubic spline. These tables are adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2017.

Newer tables (Pub-2010 mortality tables) have been developed since the last experience study by the Society of Actuaries that include mortality rates based on analysis of experience of public plan populations specifically for General and separately, Safety, employees.

During the study period, the COVID-19 pandemic influenced mortality experience. The impact of the COVID-19 pandemic varies considerably by occupation, income, geography, etc. We considered some recognition of the impact COVID on the mortality assumption; however, the impact would have been minimal at this time so no adjustment has been made. Actual experience will continue to be reflected in each future valuation as experience emerges.

# Mortality

**Proposal:** We recommend updating the mortality assumption to use the following; this change will increase measured liabilities:

## General

- **Healthy Pre-Retirement:** Pub-2010 General Employee Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
- **Healthy Post-Retirement:** Pub-2010 General Healthy Retiree Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
- **Disability Retirement:** Pub-2010 Non-Safety Disabled Retiree Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.

## Police and Fire

- **Healthy Pre-Retirement:** Pub-2010 Safety Employee Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
- **Healthy Post-Retirement:** Pub-2010 Safety Healthy Retiree Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
- **Disability Retirement:** Pub-2010 Safety Disabled Retiree Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.

# Mortality

## Summary of Life Expectancies under the Current Tables

Sample Attained Ages	Healthy Pre-Retirement		Healthy Post-Retirement		Disabled Retirement	
	Future Life		Future Life		Future Life	
	Expectancy (Years)*		Expectancy (Years)*		Expectancy (Years)*	
	Men	Women	Men	Women	Men	Women
55	30.01	35.16	28.80	31.64	21.58	25.31
60	25.16	30.17	24.23	26.92	18.50	21.72
65	20.66	25.30	19.94	22.41	15.59	18.27
70	16.55	20.58	15.98	18.13	12.81	14.89
75	12.80	16.05	12.37	14.16	10.17	11.71
80	9.42	11.78	9.19	10.62	7.77	8.94

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

## Summary of Life Expectancies under the Proposed Tables

### General

Sample Attained Ages	Healthy Pre-Retirement		Healthy Post-Retirement		Disabled Retirement	
	Future Life		Future Life		Future Life	
	Expectancy (Years)*		Expectancy (Years)*		Expectancy (Years)*	
	Men	Women	Men	Women	Men	Women
55	34.07	36.14	30.55	33.40	22.68	25.51
60	29.17	31.12	25.83	28.53	19.51	22.21
65	24.42	26.19	21.35	23.82	16.61	18.96
70	19.78	21.36	17.10	19.29	13.82	15.60
75	15.24	16.65	13.18	15.04	11.07	12.31
80	10.83	12.10	9.71	11.23	8.49	9.38

### Police and Fire

Sample Attained Ages	Healthy Pre-Retirement		Healthy Post-Retirement		Disabled Retirement	
	Future Life		Future Life		Future Life	
	Expectancy (Years)*		Expectancy (Years)*		Expectancy (Years)*	
	Men	Women	Men	Women	Men	Women
55	33.37	35.80	30.43	32.41	29.22	31.36
60	28.37	30.76	25.55	27.51	24.54	26.74
65	23.51	25.78	20.95	22.87	20.19	22.41
70	18.81	20.86	16.68	18.48	16.17	18.28
75	14.34	16.13	12.78	14.41	12.45	14.38
80	10.16	11.68	9.36	10.81	9.23	10.81

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

## Merit and Longevity Portion of Pay Increases

**Discussion:** Pay increases granted to individual active members consist in principle of two parts. The first part is an across-the-board economic type of increase related to inflation or cost-of-living changes. The second part, merit and/or longevity increases, relates to the performance of individual active members during a given year or scheduled step rates that are often experienced during the first few years of employment. Overall, merit and longevity pay increases were close to expected rates and the overall wage inflation was also close to expected during the experience period.

**Proposal:** We recommend no change in the base wage inflation rate of 3.25% (this is discussed further in Section B of this report) and no change in the merit and longevity portion. This will result in unchanged computed liabilities and contributions.

### Current and Proposed Rates

Sample Ages	% Increase in Salary at Sample Ages				
	Merit and Seniority		Base (Economic)	Increase Next Year	
	General	P-F		General	P-F
20	2.01%	1.58%	3.25%	5.26%	4.83%
25	1.64%	1.58%	3.25%	4.89%	4.83%
30	1.41%	1.37%	3.25%	4.66%	4.62%
35	1.25%	0.58%	3.25%	4.50%	3.83%
40	1.12%	0.11%	3.25%	4.37%	3.36%
45	0.88%	0.11%	3.25%	4.13%	3.36%
50	0.60%	0.11%	3.25%	3.85%	3.36%
55	0.35%	0.05%	3.25%	3.60%	3.30%
60	0.08%	0.00%	3.25%	3.33%	3.25%
61	0.03%	0.00%	3.25%	3.28%	3.25%
Ref	505	506			

## **SECTION B**

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### **ECONOMIC ASSUMPTIONS**

# Economic Assumptions

## Investment Return and Wage Inflation

Economic assumptions include **long-term rates of investment return** (investment expenses) and **wage inflation** (the across-the-board portion of salary increases). Unlike demographic activities, economic activities do not lend themselves to analysis solely on the basis of internal historical patterns because both salary increases and investment return are affected more by external forces; namely inflation (both wage and price), general productivity changes and the local economic environment which defy accurate long-term prediction. Estimates of economic activities are generally selected on the basis of the expectations in an inflation-free environment and then both long-term rates of investment return and wage inflation are increased by some provision for long-term inflation.

If inflation and/or productivity increases are lower than expected, it will probably result in both actual rates of salary increases and investment return below the assumed rates. Salaries increasing at rates less than expected produce lower liabilities. However, actual investment return below the assumed rate of investment return (whether due to manager performance, change in the mix of assets, or general market conditions) results in lower than expected asset amounts.

Sources considered in the analysis of the price inflation assumptions included:

- Congressional Budget Office's expectations;
- Expectations from the Federal Reserve Banks of Philadelphia, Cleveland, and St. Louis;
- Comparisons of Treasury yields and Treasury Inflation Protected Securities (TIPS);
- Social Security Trustees report; and
- Future expectations for various investment consultants that GRS monitors.

Sources considered in the analysis of the investment return assumptions included:

- Future expectations of various investment consultants that GRS monitors.

Sources considered in the wage inflation and merit and longevity pay increases included:

- Actual Retirement System experience over the last 5 years (i.e., merit and longevity pay increases); and
- Historical observations of inflation statistics (both price and wage) nationally.

Current economic assumptions for the System are as follows:

Price Inflation	2.50%
Wage Inflation	3.25%
Investment Return	6.75%

The remainder of this section addresses the economic assumptions other than pay increases due to merit and seniority. Pay increases due to merit and seniority are addressed on page 9.



## Economic Assumptions – ASOP No. 27

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standards of Practice (ASOP) No. 27. The standard requires that the selected economic assumptions be consistent with each other. That is, the selection of the investment return assumption should be consistent with the selection of the wage inflation and price inflation assumptions.

ASOP No. 27 defines a reasonable economic assumption as an assumption that has the following characteristics:

- (a) It is appropriate for the purpose of the measurement;
- (b) It reflects the actuary's professional judgment;
- (c) It takes into account historical and current economic data that is relevant as of the valuation date;
- (d) It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- (e) It has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed under Section 3.5.1, or when alternative assumptions are used for the assessment of risk.

ASOP No. 27 acknowledges that for any given economic assumption, there is a reasonable range of opinions on that assumption.

**Public Act 202.** Under Public Act 202 of the State of Michigan, Michigan municipalities are required to report liabilities under new uniform assumption guidelines. While the current guidelines are currently only for reporting purposes (and not funding), city governments will be encouraged to use these new assumptions for funding. The recommendations include the following (for fiscal year 2022 reporting):

- Investment return no higher than 6.85%;
- Assumed wage inflation no lower than 3.00%\*;
- Mortality assumption that uses a version of the Pub-2010 table with future mortality improvement projected generationally using Scale MP-2020\*; and
- Amortization period no longer than 17 years for Pension Plans and 27 years for Retiree Health Plans.

*\* Or based on an actuarial experience study conducted within the last five years.*

**Price inflation** underlies both the wage inflation and investment return assumptions. Since price inflation underlies the wage inflation assumption and the investment return assumption, we recommend that a specific price inflation assumption be adopted in conjunction with this Experience Study. For the actuarial valuation, a 2.50% price inflation assumption is currently used and is compatible with the wage inflation and investment return assumptions. The table on the following page shows forward-looking price inflation forecasts.

Forward-Looking Price Inflation Forecasts <sup>a</sup>	
<b>Congressional Budget Office<sup>b</sup></b>	
5-Year Annual Average	3.23%
10-Year Annual Average	2.81%
<b>Federal Reserve Bank of Philadelphia<sup>c</sup></b>	
5-Year Annual Average	3.75%
10-Year Annual Average	2.95%
<b>Federal Reserve Bank of Cleveland<sup>d</sup></b>	
10-Year Expectation	2.22%
20-Year Expectation	2.29%
30-Year Expectation	2.37%
<b>Federal Reserve Bank of St. Louis<sup>e</sup></b>	
10-Year Breakeven Inflation	2.26%
20-Year Breakeven Inflation	2.50%
30-Year Breakeven Inflation	2.26%
<b>U.S. Department of the Treasury<sup>f</sup></b>	
10-Year Breakeven Inflation	2.07%
20-Year Breakeven Inflation	2.40%
30-Year Breakeven Inflation	2.21%
50-Year Breakeven Inflation	2.34%
100-Year Breakeven Inflation	2.44%
<b>Social Security Trustees<sup>g</sup></b>	
Ultimate Intermediate Assumption	2.40%

<sup>a</sup>End of the Fourth Quarter, 2022. Version 2023-02-09 by Gabriel, Roeder, Smith & Company.

<sup>b</sup>*The Budget and Economic Outlook: 2022 to 2032*, Release Date: May 2022, Consumer Price Index (CPI-U), Percentage Change from Year to Year, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

<sup>c</sup>*Fourth Quarter 2022 Survey of Professional Forecasters*, Release Date: November 14, 2022, Headline CPI, Annualized Percentage Points, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

<sup>d</sup>Inflation Expectations, Model output date: December 1, 2022.

<sup>e</sup>The breakeven inflation rate represents a measure of expected inflation derived from X-Year Treasury Constant Maturity Securities and X-Year Treasury Inflation-Indexed Constant Maturity Securities. Observation date: December, 2022.

<sup>f</sup>The Treasury Breakeven Inflation (TBI) Curve, Monthly Average Rates, December, 2022.

<sup>g</sup>*The 2022 Annual Report of The Board of Trustees of The Federal Old-Age And Survivors Insurance and Federal Disability Insurance Trust Funds*, June 2, 2022, Long-range (75-year) assumptions, Intermediate, Consumer Price Index (CPI-W), for 2026 and later.

The previous table shows forward-looking price inflation forecasts at various time horizons. The Congressional Budget Office and Federal Reserve Bank of Philadelphia's 5-year annual average inflation assumptions are 3.23% and 3.75% respectively, while their 10-year annual average assumptions are 2.81% and 2.95% respectively. This suggests that price inflation is expected to decrease and stabilize in years 6 through 10.

For the firms included in the 2022 version of the GRS CMAM, the average price inflation assumption used in the forward-looking capital market expectations was 2.52% over the next 10 years (with a range of 2.26% to 2.90%) and 2.49% over the next 20 to 30 years.

While the very current CPI rates are well above 2.50% and future expectations for inflation have been rising, the current assumption is in line with inflation forecasters' and investment firms' forward-looking expectations. **Therefore, we recommend no change to the current price inflation assumption of 2.50%.**

## Summary of Findings - Economic Assumptions

Year	Annual Increase in		
	Prices (CPI-U)	Wages (NAE)	Difference
3-Year Avg	5.0 %	5.0 %	0.0 %
5-Year Avg	3.9 %	4.5 %	0.6 %
10-Year Avg	2.6 %	3.5 %	0.9 %
20-Year Avg	2.5 %	3.2 %	0.7 %
30-Year Avg	2.5 %	3.4 %	0.9 %
50-Year Avg	4.0 %	4.4 %	0.4 %

Payroll growth (wage inflation) represents the expected growth in total payroll for a stable population. Increases or decreases in covered population that lead to a change in total payroll are not reflected in this assumption which consists of two components: 1) a portion due to pure price inflation (i.e., increases due to changes in the CPI), and 2) increases in average salary levels in excess of pure price inflation (i.e., increases due to changes in productivity levels, supply and demand in the labor market and other macroeconomic factors).

The current payroll growth assumption is 3.25%, which is comprised of a 2.50% price inflation assumption, plus a real wage growth assumption of 0.75%. Average salaries in the City of Birmingham Employees Retirement System have risen at approximately 4.0% annually over the last 5 years and 3.1% over the last 20 years.

We are generally comfortable with the wage inflation assumption exceeding the price inflation assumption by 0.50% to 1.00%. Given our recommendation for a 2.50% price inflation assumption, and the fact that pay increases for the System have generally lagged behind our assumptions, we believe a reasonable range for this assumption is 3.00% to 3.50% per year. **These statistics lead us to believe that the current 3.25% payroll growth assumption is appropriate, and we recommend no change to the current assumption.**

## Summary of Findings - Economic Assumptions (Continued)

**Investment Return:** The investment return assumption is the actuarial assumption that has the largest impact on actuarial valuation results. As more of the actuarial accrued liabilities are related to non-active members, the nominal (as opposed to real) investment return assumption becomes a more prominent factor. Since one of Retirement System's fundamental financial objectives is the receipt of level contributions over time, the discount rate assumption is set equal to the investment return assumption (with perhaps an adjustment for conservatism).

Presented below is the approximate target asset allocation for the City of Birmingham Employees Retirement System:

Asset Class	Target Allocation
Domestic Equity	46%
International Equity	19%
Fixed Income	20%
Alternative Investments	15%
Cash	0%
Total	100%

Based upon the approximate target asset allocation, future expectations of various investment consultants were analyzed. The next few exhibits show the results of this analysis. Final expected nominal investment return results are based upon a 2.5% price inflation assumption. We used the actuarial assumption for price inflation rather than the consultant assumption, in order to be consistent with the calculation of liabilities. Investment results presented are net of expenses.

## Summary of Findings - Economic Assumptions (Continued)

### Investment Return Expectations of Various Investment Consultants

GRS 2023 CMAM								
Capital Market Assumption Set (CMA)	CMA Expected Nominal Return	CMA Inflation Assumption	Expected Real Return (2)-(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Administrative Expenses	Expected Nominal Return Net of Expenses (6)-(7)	Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	6.81%	2.50%	4.31%	2.50%	6.81%	0.10%	6.71%	12.65%
2	7.38%	2.90%	4.48%	2.50%	6.98%	0.10%	6.88%	13.90%
3	7.52%	2.51%	5.01%	2.50%	7.51%	0.10%	7.41%	13.57%
4	7.43%	2.31%	5.12%	2.50%	7.62%	0.10%	7.52%	14.04%
5	7.63%	2.50%	5.13%	2.50%	7.63%	0.10%	7.53%	13.79%
6	7.46%	2.26%	5.19%	2.50%	7.69%	0.10%	7.59%	12.62%
7	7.97%	2.41%	5.56%	2.50%	8.06%	0.10%	7.96%	13.54%
8	8.81%	2.90%	5.91%	2.50%	8.41%	0.10%	8.31%	13.71%
9	8.50%	2.62%	5.88%	2.50%	8.38%	0.10%	8.28%	12.88%
10	8.58%	2.54%	6.05%	2.50%	8.55%	0.10%	8.45%	13.24%
11	8.59%	2.28%	6.31%	2.50%	8.81%	0.10%	8.71%	13.12%
<b>Average</b>	<b>7.88%</b>	<b>2.52%</b>	<b>5.36%</b>	<b>2.50%</b>	<b>7.86%</b>	<b>0.10%</b>	<b>7.76%</b>	<b>13.37%</b>
					<b>Average from last 3 CMAMs</b>		<b>6.71%</b>	<b>13.27%</b>

<b>GRS 2023 CMAM</b>				
<b>Capital Market Assumption Set (CMA)</b>	<b>Distribution of 10-Year Average Geometric Net Nominal Return</b>			<b>Probability of exceeding 6.75%</b>
	<b>40th</b>	<b>50th</b>	<b>60th</b>	
(1)	(2)	(3)	(4)	(5)
1	4.97%	5.96%	6.97%	42.16%
2	4.89%	5.99%	7.09%	43.05%
3	5.49%	6.56%	7.64%	48.22%
4	5.51%	6.62%	7.74%	48.81%
5	5.57%	6.65%	7.75%	49.10%
6	5.87%	6.86%	7.87%	51.13%
7	6.06%	7.12%	8.20%	53.53%
8	6.38%	7.46%	8.55%	56.58%
9	6.50%	7.52%	8.55%	57.61%
10	6.60%	7.65%	8.70%	58.61%
11	6.89%	7.93%	8.97%	61.35%
<b>Average</b>	<b>5.88%</b>	<b>6.94%</b>	<b>8.00%</b>	<b>51.83%</b>
<b>Average from last 3 CMAMs over 10-year horizon</b>		<b>5.89%</b>		
<b>Current CMAM average over 20- to 30-year horizon</b>		<b>7.09%</b>		

The table below summarizes the average geometric and arithmetic returns based upon the System’s target funding policy for 2020, 2021 and 2022 CMAMs. Due to the volatility in forecasted returns, the table also provides a 3-year average of results.

<b>CMAM Scenarios</b>	<b>Average Returns</b>	
	<b>Geometric</b>	<b>Arithmetic</b>
2020 CMAM	5.49%	6.30%
2021 CMAM	5.24%	6.06%
2022 CMAM	6.94%	7.76%
3-Year Average	5.89%	6.71%

**Based upon the results of our analysis, and given the variation of future expectations, we recommend no change to the current investment return assumption to 6.75% at this time.**

Nothing in this report should be construed as GRS giving investment advice.

We have illustrated the approximate impact on contribution requirements based on the current 6.75% investment return assumption along with 6.50% on page 20.

## SECTION C

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### MISCELLANEOUS ASSUMPTIONS AND METHODS

# Miscellaneous Assumptions and Methods

## Option Factors

Option factors are calculated using the current interest assumption and the assumed rates of mortality. If a retiring member elects an optional form of benefit, the assumed benefit is multiplied by the appropriate option factor to produce the benefit actually payable. As a matter of common practice, option factors are usually revised to correspond to the new interest and mortality assumptions adopted with an experience study. When mortality experience is improved (i.e., members live longer), option factors will generally increase. When interest rates are reduced, option factors will generally decrease. Examples of option factors calculated using the present mortality assumptions and interest rates and the proposed mortality assumptions and interest rates are shown below. **We recommend all option factors for benefit calculations be updated for new mortality and interest rate assumptions effective January 1, 2024 to allow time for administrative changes.**

Retiring Participants' Ages		50% Joint & Survivor			100% Joint & Survivor		
Retiree	Beneficiary	Present	Proposed		Present	Proposed	
			6.75%	6.50%		6.75%	6.50%
50	45	0.95220	0.95898	0.95744	0.90876	0.92119	0.91836
55	50	0.94033	0.94842	0.94675	0.88738	0.90190	0.89888
60	55	0.92596	0.93514	0.93335	0.86213	0.87819	0.87503
65	60	0.90863	0.91850	0.91661	0.83257	0.84928	0.84606

## Actuarial Cost Method

The actuarial cost method is the allocation method the actuary uses to develop the contribution. The City of Birmingham Employees Retirement System currently uses the entry age normal cost method. This is the predominant funding method used by public pension systems and is considered a model practice. **We recommend no change to the actuarial cost method.**

## Annuity Withdrawal Option

If elected, a member's contribution account balance is paid in a lump sum at retirement. The regular retirement benefit is then reduced so that total benefits paid (lump sum plus monthly pension) are actuarially equivalent to the regular retirement benefit. The interest rate used to establish equivalency is based on the PBGC rates in effect at the time of retirement. Although this index is no longer published, it is proposed to use the PBGC replacement rate methodology published by the PBGC. These rates have averaged just over 1% for the last 5 years, but are currently at 2.0%. Since the interest rate used to value liabilities is greater than 2.0% (currently 6.75% assumed interest rate), members who elect this option receive a higher net benefit than if this offset was calculated using valuation assumptions. Service retirement liabilities for active members are currently increased by 6% to account for this subsidy. However, since the current interest rates are much lower now than they have been historically, **we recommend increasing the 6% adjustment to 8%.** Future studies should be conducted periodically to review the appropriateness of this assumption.



# Miscellaneous Assumptions and Methods (Concluded)

## Amortization Policy

The most recent actuarial valuations include a 16-year closed, level dollar amortization period. **We recommend continuing the current amortization policy until the amortization period reaches 15 years. Once at 15 years, we recommend incorporating layered amortization. Under a layered amortization approach, once the period reaches 15 years, the initial Unfunded Actuarial Accrued Liability (UAAL) would wind down until it is fully amortized. For each subsequent valuation, any new UAAL created by gains/losses, assumption changes and/or plan changes for that valuation will be amortized over a new, closed 15-year period. This change will have no impact on current employer contributions, but would aid in stabilizing future employer contributions. This is also considered a best practice under the Conference of Consulting Actuaries (CCA) Public Plans Community white paper on amortization methods.**

## Asset Valuation Method

The City of Birmingham Employees Retirement System currently uses a 4-year asset smoothing method with no corridor. The Funding Value of Assets recognizes assumed investment income fully each year. Differences between actual and assumed investment income are phased-in over closed 4-year periods. This is a very common method among public retirement systems. Most systems use an averaging period between 3 and 10 years with 5 being the most common. **Due to the high volatility we have seen in investment markets over the last 10 years, we recommend consideration be given to increasing the asset smoothing method from 4 years to 5 years. If adopted, this change would be recognized prospectively and have no immediate impact on employer contributions, but would aid in stabilizing future employer contributions.**

## **SECTION D**

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### **CONTRIBUTION RATES BASED ON PROPOSED CHANGES**

## Summary of Current and Proposed Assumptions

<b>Assumption Set</b>	<b>Economic Assumptions</b>			<b>Non-Economic Assumptions</b>
	<b>Net Rate of Investment Return</b>	<b>Rate of Inflation</b>		<b>Demographic</b>
		<b>Wage</b>	<b>Spread</b>	
A. Current	6.75%	3.25%	3.50%	Current
B. Proposed Demographic	6.75	3.25	3.50	Proposed
C. Alternate Economic	6.50	3.25	3.25	Proposed

## Effects of Recommended Changes in Actuarial Assumptions on Computed Employer Contribution Rates and Funded Status Results as of June 30, 2022

	<b>GENERAL</b>		
	A	B	C
	Baseline	New Decrements and Annuity Withdrawal Load	New Decrements and Annuity Withdrawal Load with 6.50% Interest
Actuarial Accrued Liability	\$ 51,539,597	\$ 53,354,661	\$ 54,649,911
Actuarial Value of Assets	43,031,333	43,031,333	43,031,333
Unfunded Accrued Liability	\$ 8,508,264	\$ 10,323,328	\$ 11,618,578
Funded Percent	83.5 %	80.7 %	78.7 %
Employer Normal Cost \$	\$ 241,987	\$ 256,086	\$ 276,088
Amortization Amount	857,187	1,040,051	1,152,421
Estimated Dollar Contribution	1,099,174	1,296,137	1,428,509

	<b>POLICE-FIRE</b>		
	A	B	C
	Baseline	New Decrements and Annuity Withdrawal Load	New Decrements and Annuity Withdrawal Load with 6.50% Interest
Actuarial Accrued Liability	\$ 71,462,970	\$ 73,177,740	\$ 75,124,953
Actuarial Value of Assets	59,831,741	59,831,741	59,831,741
Unfunded Accrued Liability	\$ 11,631,229	\$ 13,345,999	\$ 15,293,212
Funded Percent	83.7 %	81.8 %	79.6 %
Employer Normal Cost \$	\$ 557,720	\$ 610,176	\$ 650,670
Amortization Amount	1,171,819	1,344,578	1,516,900
Estimated Dollar Contribution	1,729,539	1,954,754	2,167,570

## **SECTION E**

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### **COMPLETE LISTING OF RECOMMENDED ASSUMPTIONS**

## Proposed Retirement Rates

*The following rates of retirement* were used to measure the probability of eligible members retiring during the next year.

Retirement Ages	General	Teamsters	Retirement Ages	Police-Fire	Retirement Service	DROP Police-Fire
55		15%				
56		15%				
57	15%	15%	50-54	35%		
58	15%	15%	55-59	35%		
59	15%	15%				
60	15%	15%	60	35%		
61	15%	15%	61	35%		
62	25%	25%	62	100%		
63	20%	20%	63			
64	15%	15%	64			
65	40%	40%	65		30	45%
66	25%	25%	66		31	25%
67	25%	25%	67		32	25%
68	25%	25%	68		33	25%
69	25%	25%	69		34	25%
70-74	25%	25%	70		35	100%
75	100%	100%				
Ref	3390	3389		3388		2308



## Proposed Disability Rates (Same as Current Rates)

Sample Ages	% of Active Members Becoming Disabled within Next Year	
	General	Police-Fire
20	0.04%	0.08%
21	0.04%	0.08%
22	0.04%	0.08%
23	0.04%	0.08%
24	0.04%	0.08%
25	0.04%	0.08%
26	0.04%	0.08%
27	0.04%	0.08%
28	0.04%	0.08%
29	0.04%	0.08%
30	0.05%	0.08%
31	0.05%	0.08%
32	0.05%	0.08%
33	0.05%	0.08%
34	0.05%	0.08%
35	0.05%	0.08%
36	0.06%	0.13%
37	0.06%	0.16%
38	0.07%	0.18%
39	0.08%	0.19%
40	0.10%	0.20%
41	0.11%	0.21%
42	0.13%	0.22%
43	0.14%	0.23%
44	0.15%	0.24%
45	0.16%	0.27%
46	0.18%	0.30%
47	0.20%	0.33%
48	0.24%	0.38%
49	0.28%	0.43%
50	0.32%	0.49%
51	0.37%	0.56%
52	0.42%	0.64%
53	0.49%	0.72%
54	0.56%	0.80%
55	0.63%	0.89%
56	0.71%	0.99%
57	0.79%	1.09%
58	0.91%	1.19%
59	1.03%	1.30%
60	1.16%	1.41%
61	1.24%	1.53%
62	1.33%	1.66%
63	1.33%	1.66%
64	1.34%	1.66%
65	1.34%	1.66%

Ref.                      99                      9

Disability decrements do not operate during retirement eligibility.





# Proposed Healthy Post-Retirement Mortality Rates

## General

Age	% Dying Next Year*	
	Male	Female
50	0.2803%	0.2033%
51	0.2998%	0.2154%
52	0.3228%	0.2306%
53	0.3486%	0.2473%
54	0.3793%	0.2650%
55	0.4130%	0.2844%
56	0.4506%	0.3050%
57	0.4918%	0.3271%
58	0.5361%	0.3492%
59	0.5843%	0.3737%
60	0.6338%	0.4000%
61	0.6852%	0.4296%
62	0.7396%	0.4621%
63	0.7950%	0.4994%
64	0.8550%	0.5393%
65	0.9214%	0.5853%
66	0.9958%	0.6364%
67	1.0807%	0.6946%
68	1.1769%	0.7626%
69	1.2876%	0.8418%
70	1.4139%	0.9334%
71	1.5569%	1.0403%
72	1.7216%	1.1643%
73	1.9096%	1.3076%
74	2.1272%	1.4724%
75	2.3763%	1.6613%
76	2.6624%	1.8755%
77	2.9905%	2.1202%
78	3.3664%	2.3994%
79	3.7956%	2.7168%
80	4.2861%	3.0803%
81	4.8462%	3.4970%
82	5.4841%	3.9744%
83	6.2006%	4.5189%
84	7.0044%	5.1435%
85	7.8995%	5.8562%

Age	% Dying Next Year*	
	Male	Female
86	8.8839%	6.6693%
87	9.9589%	7.5897%
88	11.1300%	8.6202%
89	12.3993%	9.7546%
90	13.7583%	10.9792%
91	15.1982%	12.2756%
92	16.7004%	13.6206%
93	18.2560%	15.0125%
94	19.8606%	16.4435%
95	21.4933%	17.9300%
96	23.2778%	19.5596%
97	25.1219%	21.2850%
98	27.0284%	23.1125%
99	28.9978%	25.0420%
100	31.0091%	27.0702%
101	33.0427%	29.1668%
102	35.0634%	31.2854%
103	37.0692%	33.4128%
104	39.0303%	35.5234%
105	40.9301%	37.6137%
106	42.7733%	39.6410%
107	44.5515%	41.6137%
108	46.2304%	43.5145%
109	47.8367%	45.3262%
110	49.1369%	47.0407%
111	49.2946%	48.6616%
112	49.4528%	49.5717%
113	49.6164%	49.7058%
114	49.7854%	49.8303%
115	49.9450%	49.9600%
116	49.9700%	49.9800%
117	49.9850%	49.9900%
118	50.0000%	50.0000%
119	50.0000%	50.0000%
120	100.0000%	100.0000%

Ref 100% x 2705 100% x 2706

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

# Proposed Healthy Post-Retirement Mortality Rates

## Police and Fire

Age	% Dying Next Year*	
	Male	Female
50	0.1806%	0.1365%
51	0.1971%	0.1544%
52	0.2155%	0.1744%
53	0.2371%	0.1976%
54	0.2630%	0.2251%
55	0.2932%	0.2566%
56	0.3280%	0.2918%
57	0.3681%	0.3302%
58	0.4144%	0.3721%
59	0.4660%	0.4165%
60	0.5235%	0.4646%
61	0.5867%	0.5132%
62	0.6545%	0.5639%
63	0.7269%	0.6173%
64	0.8049%	0.6741%
65	0.8891%	0.7352%
66	0.9799%	0.8006%
67	1.0797%	0.8747%
68	1.1894%	0.9593%
69	1.3130%	1.0553%
70	1.4528%	1.1670%
71	1.6126%	1.2945%
72	1.7940%	1.4417%
73	2.0020%	1.6107%
74	2.2414%	1.8039%
75	2.5142%	2.0248%
76	2.8269%	2.2744%
77	3.1836%	2.5563%
78	3.5911%	2.8752%
79	4.0550%	3.2318%
80	4.5815%	3.6322%
81	5.1790%	4.0815%
82	5.8539%	4.5823%
83	6.6084%	5.1406%
84	7.4554%	5.7637%
85	8.3997%	6.4574%

Age	% Dying Next Year*	
	Male	Female
86	9.4493%	7.2291%
87	10.6093%	8.0895%
88	11.8939%	9.0490%
89	13.3138%	10.1137%
90	14.8724%	11.2928%
91	16.4680%	12.5530%
92	18.0312%	13.8645%
93	19.5363%	15.2200%
94	20.9888%	16.6105%
95	22.3948%	18.0557%
96	23.9235%	19.6454%
97	25.5171%	21.3357%
98	27.2193%	23.1364%
99	29.0538%	25.0487%
100	31.0091%	27.0702%
101	33.0427%	29.1668%
102	35.0634%	31.2854%
103	37.0692%	33.4128%
104	39.0303%	35.5234%
105	40.9301%	37.6137%
106	42.7733%	39.6410%
107	44.5515%	41.6137%
108	46.2304%	43.5145%
109	47.8367%	45.3262%
110	49.1369%	47.0407%
111	49.2946%	48.6616%
112	49.4528%	49.5717%
113	49.6164%	49.7058%
114	49.7854%	49.8303%
115	49.9450%	49.9600%
116	49.9700%	49.9800%
117	49.9850%	49.9900%
118	50.0000%	50.0000%
119	50.0000%	50.0000%
120	100.0000%	100.0000%

Ref 100% x 2703 100% x 2704

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

# Proposed Disabled Post-Retirement Mortality Rates

## General

Age	% Dying Next Year*		Age	% Dying Next Year*	
	Male	Female		Male	Female
50	1.5097%	1.3584%	86	10.7900%	9.6265%
51	1.5990%	1.4188%	87	11.6958%	10.4661%
52	1.6961%	1.4878%	88	12.6728%	11.3189%
53	1.8003%	1.5659%	89	13.8964%	12.1809%
54	1.9109%	1.6485%	90	15.2409%	13.0610%
55	2.0256%	1.7324%	91	16.6184%	13.9821%
56	2.1420%	1.8128%	92	18.0001%	14.9559%
57	2.2560%	1.8856%	93	19.3819%	16.0049%
58	2.3685%	1.9478%	94	20.7743%	17.1374%
59	2.4758%	1.9981%	95	22.1778%	18.3805%
60	2.5794%	2.0377%	96	23.7437%	19.8257%
61	2.6786%	2.0654%	97	25.3955%	21.4436%
62	2.7767%	2.0876%	98	27.1551%	23.1881%
63	2.8755%	2.1077%	99	29.0339%	25.0631%
64	2.9742%	2.1278%	100	31.0091%	27.0702%
65	3.0719%	2.1539%	101	33.0427%	29.1668%
66	3.1701%	2.1891%	102	35.0634%	31.2854%
67	3.2705%	2.2393%	103	37.0692%	33.4128%
68	3.3747%	2.3075%	104	39.0303%	35.5234%
69	3.4883%	2.3977%	105	40.9301%	37.6137%
70	3.6143%	2.5130%	106	42.7733%	39.6410%
71	3.7601%	2.6545%	107	44.5515%	41.6137%
72	3.9279%	2.8249%	108	46.2304%	43.5145%
73	4.1251%	3.0257%	109	47.8367%	45.3262%
74	4.3543%	3.2604%	110	49.1369%	47.0407%
75	4.6192%	3.5317%	111	49.2946%	48.6616%
76	4.9222%	3.8398%	112	49.4528%	49.5717%
77	5.2683%	4.1886%	113	49.6164%	49.7058%
78	5.6599%	4.5813%	114	49.7854%	49.8303%
79	6.1026%	5.0196%	115	49.9450%	49.9600%
80	6.5970%	5.5069%	116	49.9700%	49.9800%
81	7.1503%	6.0484%	117	49.9850%	49.9900%
82	7.7613%	6.6458%	118	50.0000%	50.0000%
83	8.4292%	7.3019%	119	50.0000%	50.0000%
84	9.1580%	8.0206%	120	100.0000%	100.0000%
85	9.9444%	8.8065%			

Ref 100% x 2711 100% x 2712

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

# Proposed Disabled Post-Retirement Mortality Rates

## Police and Fire

Age	% Dying Next Year*	
	Male	Female
50	0.3320%	0.2785%
51	0.3484%	0.3050%
52	0.3685%	0.3365%
53	0.3936%	0.3724%
54	0.4238%	0.4131%
55	0.4599%	0.4585%
56	0.5031%	0.5077%
57	0.5551%	0.5596%
58	0.6155%	0.6153%
59	0.6832%	0.6712%
60	0.7574%	0.7282%
61	0.8386%	0.7848%
62	0.9232%	0.8407%
63	1.0119%	0.8970%
64	1.1025%	0.9535%
65	1.1969%	1.0130%
66	1.2947%	1.0759%
67	1.3987%	1.1462%
68	1.5092%	1.2243%
69	1.6302%	1.3123%
70	1.7669%	1.4137%
71	1.9226%	1.5286%
72	2.1059%	1.6588%
73	2.3231%	1.8064%
74	2.5814%	1.9714%
75	2.8834%	2.1554%
76	3.2305%	2.3615%
77	3.6231%	2.5930%
78	4.0557%	2.8752%
79	4.5237%	3.2318%
80	5.0259%	3.6322%
81	5.5722%	4.0815%
82	6.1737%	4.5823%
83	6.8424%	5.1406%
84	7.6009%	5.7637%
85	8.4714%	6.4574%

Age	% Dying Next Year*	
	Male	Female
86	9.4493%	7.2291%
87	10.6093%	8.0895%
88	11.8939%	9.0490%
89	13.3138%	10.1137%
90	14.8724%	11.2928%
91	16.4680%	12.5530%
92	18.0312%	13.8645%
93	19.5363%	15.2200%
94	20.9888%	16.6105%
95	22.3948%	18.0557%
96	23.9235%	19.6454%
97	25.5171%	21.3357%
98	27.2193%	23.1364%
99	29.0538%	25.0487%
100	31.0091%	27.0702%
101	33.0427%	29.1668%
102	35.0634%	31.2854%
103	37.0692%	33.4128%
104	39.0303%	35.5234%
105	40.9301%	37.6137%
106	42.7733%	39.6410%
107	44.5515%	41.6137%
108	46.2304%	43.5145%
109	47.8367%	45.3262%
110	49.1369%	47.0407%
111	49.2946%	48.6616%
112	49.4528%	49.5717%
113	49.6164%	49.7058%
114	49.7854%	49.8303%
115	49.9450%	49.9600%
116	49.9700%	49.9800%
117	49.9850%	49.9900%
118	50.0000%	50.0000%
119	50.0000%	50.0000%
120	100.0000%	100.0000%

Ref 100% x 2709 100% x 2710

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

# Proposed Pre-Retirement Mortality Rates

## General

Age	% Dying Next Year*		Age	% Dying Next Year*	
	Male	Female		Male	Female
20	0.0382%	0.0141%	45	0.1051%	0.0543%
21	0.0378%	0.0133%	46	0.1106%	0.0577%
22	0.0354%	0.0125%	47	0.1160%	0.0612%
23	0.0341%	0.0116%	48	0.1236%	0.0651%
24	0.0330%	0.0107%	49	0.1316%	0.0703%
25	0.0329%	0.0110%	50	0.1402%	0.0760%
26	0.0366%	0.0126%	51	0.1513%	0.0832%
27	0.0393%	0.0142%	52	0.1633%	0.0909%
28	0.0433%	0.0158%	53	0.1771%	0.1003%
29	0.0461%	0.0176%	54	0.1920%	0.1101%
30	0.0503%	0.0206%	55	0.2098%	0.1223%
31	0.0545%	0.0224%	56	0.2297%	0.1348%
32	0.0585%	0.0254%	57	0.2523%	0.1481%
33	0.0624%	0.0269%	58	0.2766%	0.1621%
34	0.0658%	0.0295%	59	0.3018%	0.1775%
35	0.0704%	0.0319%	60	0.3287%	0.1938%
36	0.0743%	0.0340%	61	0.3566%	0.2096%
37	0.0775%	0.0371%	62	0.3848%	0.2260%
38	0.0814%	0.0384%	63	0.4140%	0.2437%
39	0.0845%	0.0406%	64	0.4429%	0.2628%
40	0.0881%	0.0425%	65	0.4723%	0.2826%
41	0.0909%	0.0452%	66	0.5024%	0.3051%
42	0.0943%	0.0465%	67	0.5345%	0.3309%
43	0.0971%	0.0488%	68	0.5688%	0.3593%
44	0.1007%	0.0510%	69	0.6080%	0.3916%

Ref 100% x 2723 100% x 2724

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

# Proposed Pre-Retirement Mortality Rates

## Police and Fire

Age	% Dying Next Year*		Age	% Dying Next Year*	
	Male	Female		Male	Female
20	0.0423%	0.0174%	45	0.0880%	0.0650%
21	0.0430%	0.0188%	46	0.0909%	0.0671%
22	0.0429%	0.0193%	47	0.0950%	0.0705%
23	0.0429%	0.0209%	48	0.0993%	0.0734%
24	0.0429%	0.0226%	49	0.1059%	0.0776%
25	0.0429%	0.0245%	50	0.1129%	0.0834%
26	0.0464%	0.0264%	51	0.1205%	0.0897%
27	0.0494%	0.0283%	52	0.1306%	0.0966%
28	0.0525%	0.0317%	53	0.1415%	0.1041%
29	0.0556%	0.0338%	54	0.1532%	0.1130%
30	0.0573%	0.0372%	55	0.1677%	0.1223%
31	0.0602%	0.0391%	56	0.1849%	0.1327%
32	0.0629%	0.0423%	57	0.2028%	0.1440%
33	0.0653%	0.0452%	58	0.2243%	0.1538%
34	0.0673%	0.0478%	59	0.2478%	0.1649%
35	0.0704%	0.0500%	60	0.2721%	0.1750%
36	0.0728%	0.0517%	61	0.2985%	0.1838%
37	0.0731%	0.0543%	62	0.3267%	0.1934%
38	0.0757%	0.0550%	63	0.3552%	0.2018%
39	0.0776%	0.0566%	64	0.3835%	0.2100%
40	0.0788%	0.0578%	65	0.4138%	0.2177%
41	0.0794%	0.0587%	66	0.4617%	0.2445%
42	0.0821%	0.0606%	67	0.5131%	0.2742%
43	0.0831%	0.0613%	68	0.5717%	0.3099%
44	0.0851%	0.0631%	69	0.6363%	0.3509%

Ref 100% x 2721 100% x 2722

\* Based on attained ages in 2022. Future years will reflect improvements in life expectancy.

## Proposed Merit and Longevity Portion of Pay Increases with 3.25% Wage Inflation (Same as Current)

Sample Ages	Salary Increase Assumptions for an Individual Member				
	Merit and Seniority		Base (Economic)	Increase Next Year	
	General	P-F		General	P-F
20	2.01%	1.58%	3.25%	5.26%	4.83%
21	1.92	1.58	3.25	5.17	4.83
22	1.84	1.58	3.25	5.09	4.83
23	1.77	1.58	3.25	5.02	4.83
24	1.70	1.58	3.25	4.95	4.83
25	1.64	1.58	3.25	4.89	4.83
26	1.58	1.52	3.25	4.83	4.77
27	1.53	1.52	3.25	4.78	4.77
28	1.49	1.47	3.25	4.74	4.72
29	1.45	1.42	3.25	4.70	4.67
30	1.41	1.37	3.25	4.66	4.62
31	1.37	1.31	3.25	4.62	4.56
32	1.34	1.16	3.25	4.59	4.41
33	1.31	0.95	3.25	4.56	4.20
34	1.27	0.79	3.25	4.52	4.04
35	1.25	0.58	3.25	4.50	3.83
36	1.22	0.37	3.25	4.47	3.62
37	1.20	0.21	3.25	4.45	3.46
38	1.17	0.16	3.25	4.42	3.41
39	1.15	0.11	3.25	4.40	3.36
40	1.12	0.11	3.25	4.37	3.36
41	1.09	0.11	3.25	4.34	3.36
42	1.04	0.11	3.25	4.29	3.36
43	0.99	0.11	3.25	4.24	3.36
44	0.94	0.11	3.25	4.19	3.36
45	0.88	0.11	3.25	4.13	3.36
46	0.82	0.11	3.25	4.07	3.36
47	0.76	0.11	3.25	4.01	3.36
48	0.70	0.11	3.25	3.95	3.36
49	0.65	0.11	3.25	3.90	3.36
50	0.60	0.11	3.25	3.85	3.36
51	0.55	0.05	3.25	3.80	3.30
52	0.50	0.05	3.25	3.75	3.30
53	0.45	0.05	3.25	3.70	3.30
54	0.40	0.05	3.25	3.65	3.30
55	0.35	0.05	3.25	3.60	3.30
56	0.30	0.05	3.25	3.55	3.30
57	0.25	0.05	3.25	3.50	3.30
58	0.19	0.00	3.25	3.44	3.25
59	0.14	0.00	3.25	3.39	3.25
60	0.08	0.00	3.25	3.33	3.25
61	0.03	0.00	3.25	3.28	3.25
62	0.00	0.00	3.25	3.25	3.25
63	0.00	0.00	3.25	3.25	3.25
64	0.00	0.00	3.25	3.25	3.25
65	0.00	0.00	3.25	3.25	3.25
66	0.00	0.00	3.25	3.25	3.25
67	0.00	0.00	3.25	3.25	3.25
68	0.00	0.00	3.25	3.25	3.25
69	0.00	0.00	3.25	3.25	3.25
70	0.00	0.00	3.25	3.25	3.25
71	0.00	0.00	3.25	3.25	3.25
72	0.00	0.00	3.25	3.25	3.25
73	0.00	0.00	3.25	3.25	3.25
74	0.00	0.00	3.25	3.25	3.25

Ref. 505 506

