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Police and Fire Retirement System of Wichita, Kansas

Actuarial Valuation as of December 31, 2021

Produced by Cheiron

March 2022

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LETTER OF TRANSMITTAL

March 29, 2022

The Board of Trustees
Police and Fire Retirement System of Wichita, Kansas
City Hall, 12th Floor
455 N. Main Street
Wichita, KS 67202

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of the Police and Fire Retirement System of Wichita, Kansas (PFRS, System, or Plan) as of December 31, 2021. The valuation is organized as follows:

- In Section I **Board Summary,** we describe the purpose of an actuarial valuation and summarize the key results found in this valuation.
- The **Main Body** of the report presents details on the System's:
  - Section II - Identification and Assessment of Risk
  - Section III - Assets
  - Section IV - Liabilities
  - Section V - Contributions
  - Section VI - Accounting Statement Information
- In the **Appendices,** we conclude our report with detailed information describing the System's membership (Appendix A), actuarial assumptions and methods employed (Appendix B), a summary of pertinent plan provisions (Appendix C), and a glossary of terms (Appendix D).

The results of this report rely on future System experience conforming to the underlying assumptions. To the extent that actual System experience deviates from the underlying assumptions, the results will vary accordingly. The demographic actuarial assumptions were adopted by the Board, effective with the December 31, 2018 valuation, based on recommendations from the experience study performed for the period January 1, 2014 through December 31, 2016 prepared by the prior actuary. The economic actuarial assumptions were adopted by the Board, effective with the December 31, 2021 valuation, based on recommendations from the economic experience study presented to the Board on March 9, 2022. Cheiron has reviewed the actuarial assumptions. While we consider these assumptions reasonable, we have not yet performed our own demographic actuarial experience study.

The purpose of this report is to present the annual actuarial valuation of the Police and Fire Retirement System of Wichita, Kansas. This report is for the use of Board and its auditors in preparing financial reports in accordance with applicable law and accounting requirements. The report does not include calculations related to GASB Statements No. 67 and 68, which are provided in a separate report.

In preparing our report, we relied on information (some oral and some written) supplied by the Wichita Retirement Systems staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This actuarial report was prepared exclusively for the Police and Fire Retirement System of Wichita, Kansas for the purpose described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

Sincerely,
Cheiron

Janet Cranna, FSA, FCA, MAAA, EA
Principal Consulting Actuary

Jake Libauskas, FSA, FCA, MAAA, EA
Consulting Actuary

SECTION I – BOARD SUMMARY

The primary purpose of the actuarial valuation and this report is to measure, describe and identify as of the valuation date:

- The financial condition of the System,
- Past and expected trends in the financial progress of the System,
- The employer contribution rate for fiscal year 2023, and
- Information required for accounting statements.

In the balance of this Board Summary, we present (A) the basis upon which this year's valuation was completed, (B) the key findings of this valuation including a summary of all key financial results, (C) an examination of the historical trends, and (D) the projected financial outlook for the System.

A. Valuation Basis

The December 31, 2021 valuation results are based on the same actuarial assumptions and methods used in the December 31, 2020 valuation, except for the investment return assumption. The investment return assumption was lowered from 7.50% to 7.25%. The demographic assumptions were based on recommendations from the experience study covering the period January 1, 2014 through December 31, 2016 prepared by the prior actuary. The economic actuarial assumptions were adopted by the Board, effective with the December 31, 2021 valuation, based on recommendations from the economic experience study presented to the Board on March 9, 2022. Cheiron has reviewed the assumptions. While we consider these assumptions to be reasonable, we have not performed our own demographic actuarial experience study.

This report was prepared using census data and financial information as of December 31, 2021 provided by the Wichita Retirement Systems' staff and does not reflect any subsequent changes in the membership or assets.

Whereas there remains a lot of uncertainty, we continue to monitor developments regarding the COVID-19 pandemic and the impact it may have on the System. Actual experience, both demographic and economic, will be reflected in subsequent valuations as experience emerges.

B. Key Findings of this Valuation

The key results of the December 31, 2021 actuarial valuation are as follows:

- The actuarially determined employer contribution rate for the City as a percent of payroll increased from 20.9% as of December 31, 2020 to 21.9% as of December 31, 2021. Prior to the assumption change, the actuarially determined employer contribution rate was 18.5% of payroll as of December 31, 2021.

- The Unfunded Actuarial Liability increased from $47.6 million as of December 31, 2020 to $48.9 million as of December 31, 2021.

SECTION I – BOARD SUMMARY

- The System's funded ratio, the ratio of actuarial asset value over liabilities, increased from 94.1% as of December 31, 2020 to 94.4% as of December 31, 2021.
- There was a net actuarial experience gain during the year of $18.5 million.
  - During the year ended December 31, 2021, the System's assets had a 14.6% return on a market value basis, but due to smoothing of prior investment gains and losses, the return on the actuarial asset value was 10.8% (as compared to last year's 7.50% investment return assumption). This resulted in an actuarial gain on investments of $24.7 million.
  - On the liability side, the System experienced a total loss of $6.2 million, primarily due to salary increases greater than assumed. See Table IV-3 for more details.
- The investment return assumption was lowered from 7.50% to 7.25% which increased the Actuarial Liability by $23.7 million.

SECTION I – BOARD SUMMARY

Following is Table I-1 which summarizes all the key results of the valuation with respect to the System's membership, assets and liabilities, and contributions. The results are presented and compared for both the current and prior plan year.

Table I-1
Police and Fire Retirement System of Wichita, Kansas
Summary of Principal Results

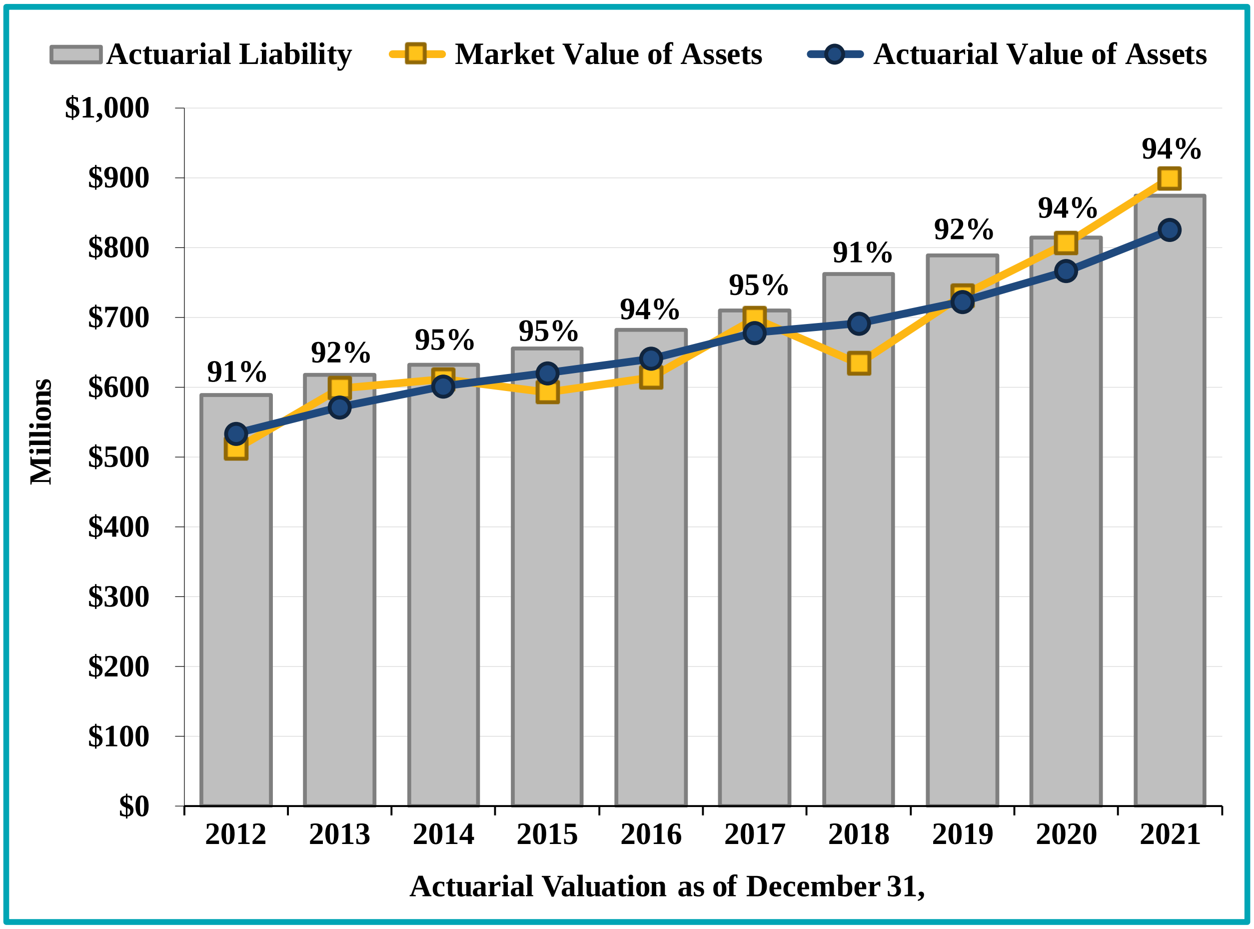
Valuation as of:	December 31, 2021	December 31, 2020	% change
Participant Counts			
Active Members			
Police	640	629	1.7%
Fire	480	487	(1.4%)
Total	1,120	1,116	0.4%
Retirees and Beneficiaries	1,075	1,060	1.4%
Inactive Vested Members	37	37	0.0%
Inactive Non-Vested Members	17	23	(26.1%)
Total Members	2,249	2,236	0.6%
Annual Projected Payroll	$81,257,427	$78,459,642	3.6%
Annual Retirement Allowances for Retired Members and Beneficiaries	41,220,576	39,429,415	4.5%
Assets and Liabilities			
Actuarial Liability (AL)	$873,565,283	$813,745,891	7.4%
Actuarial Value of Assets (AVA)	824,660,202	766,121,894	7.6%
Unfunded Actuarial Liability (UAL)	48,905,081	47,623,997	2.7%
Funded Ratio (AVA/AL)	94.4%	94.1%	
Market Value of Assets (MVA)	$898,696,279	$805,749,251	11.5%
Funded Ratio (MVA/AL)	102.9%	99.0%	
Contributions as a Percentage of Payroll	**Fiscal Year 2023**	**Fiscal Year 2022**	
Employer Normal Cost Rate	17.5%	16.4%	
UAL Amortization Rate	4.4%	4.5%	
Employer Contribution Rate	21.9%	20.9%	

C. Historical Trends

Despite the fact that for most retirement systems the greatest attention is given to the current valuation results and in particular the size of the current Unfunded Actuarial Liability and the employer's contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension system. It is more important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future.

Assets and Liabilities

The chart below shows the last ten years of the Actuarial Liabilities, shown as bars, and assets, shown as lines. The Market Value of Assets (MVA) is shown as the gold line and the smoothed Actuarial Value of Assets (AVA) is shown as the blue line. Above the bars is the funded ratio, which is the ratio of the Actuarial Value of Assets to the Actuarial Liability.



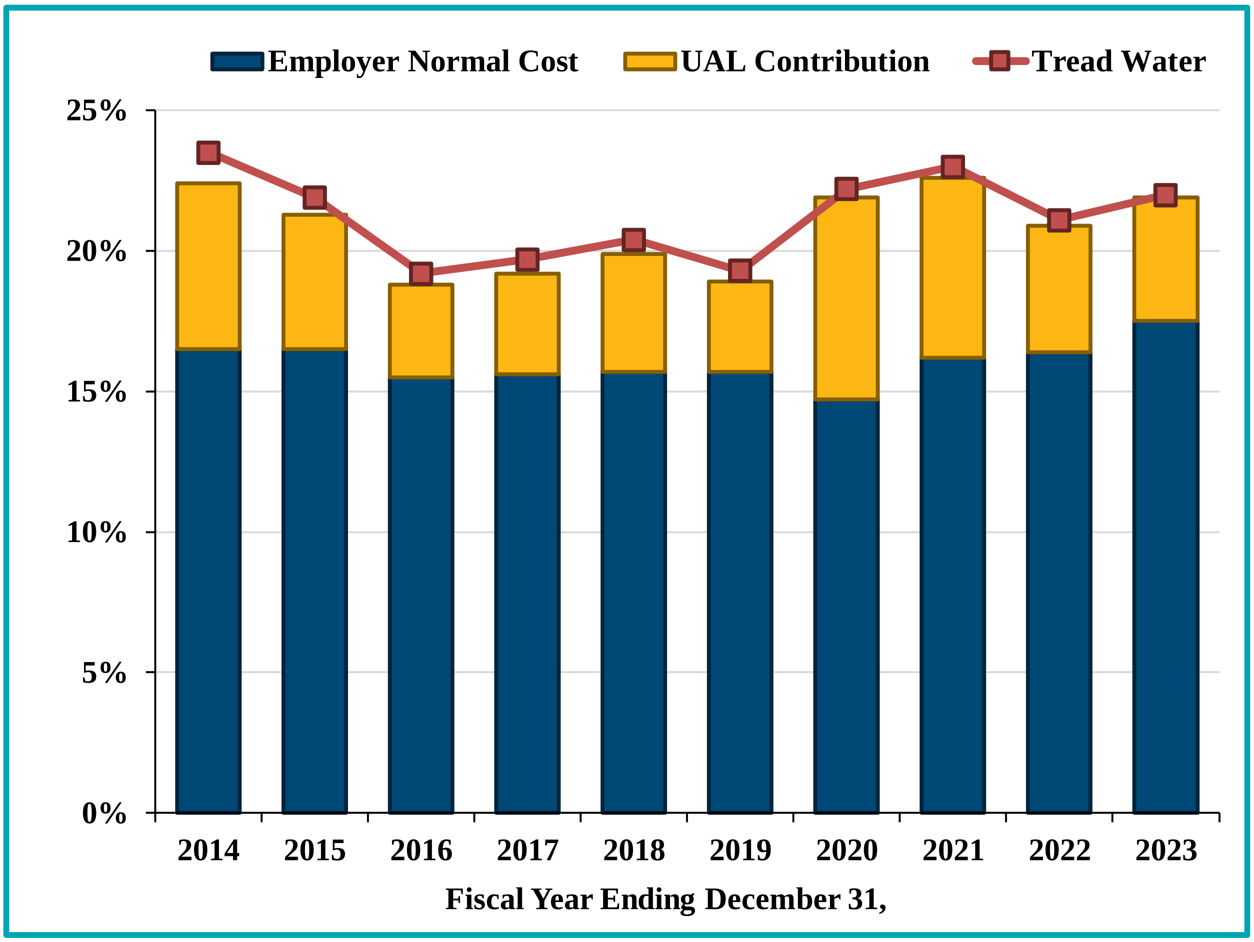
As shown in the prior chart, there was an increase in the MVA from $806 million to $899 million, due to a 14.6% return during the past year, which is greater than last year's investment return assumption of 7.50%. The effect of the asset smoothing method, which is

SECTION I – BOARD SUMMARY

shown as the AVA, has tracked a smoother path through the volatility of the market over recent years. The AVA return for 2021 was 10.8%. This chart also shows that the funded ratio has been stable during this period, fluctuating between 91% and 95% for the past ten years.

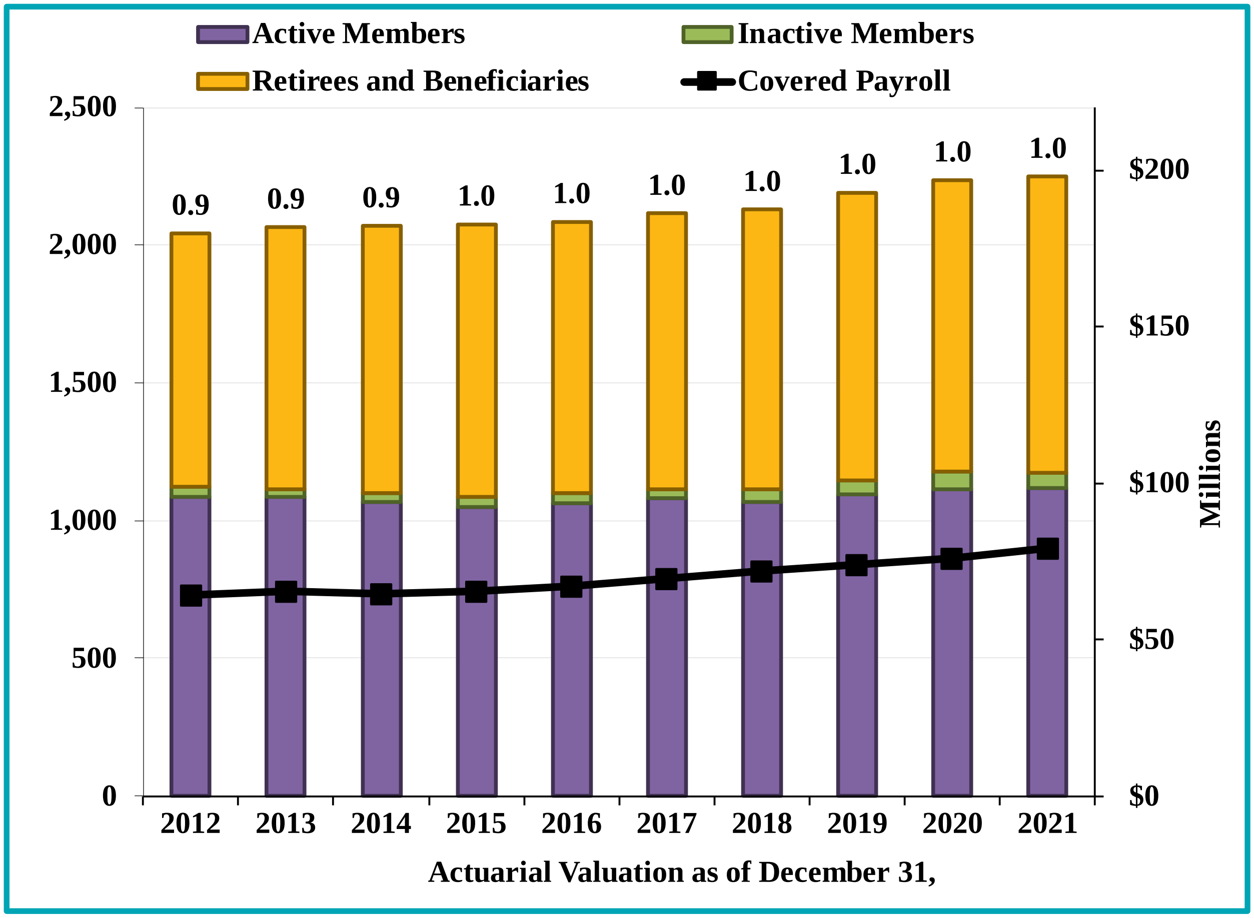
Contribution Rates

The bars in the chart below show the employer contribution rates for the last ten years. The blue bar is the employer normal cost rate and the gold bar is the Unfunded Actuarial Liability (UAL) contribution rate. The red line shows the tread water contribution rate, which is the employer normal cost plus interest on the UAL as a percentage of projected payroll. The tread water line shows the minimum contribution rate needed to avoid an increase in the UAL. The employer contribution rates have been slightly less than the tread water contribution rates for the last ten years. The employer contribution rate increased from 20.9% of payroll for 2022 to 21.9% of payroll for 2023 primarily due to the reduction in the investment return assumption which was partially offset by the actual investment return being greater than assumed during 2021.



Membership Trends

The chart below shows the membership counts and covered payroll of the System for the last ten valuations. The numbers which appear above each bar represent the ratio of the number of inactive members to active members at each valuation date and provides a measure of the maturity of the System. This ratio is referred to as the support ratio. The support ratio has generally been stable over this period. In 2012, each active supported 0.9 inactive members and in 2021 each active supports 1.0 inactive members. As the System matures and the support ratio increases, the System will likely experience more volatility in contribution rates when actuarial gains and losses are recognized.



SECTION I – BOARD SUMMARY

D. Future Expected Financial Trends

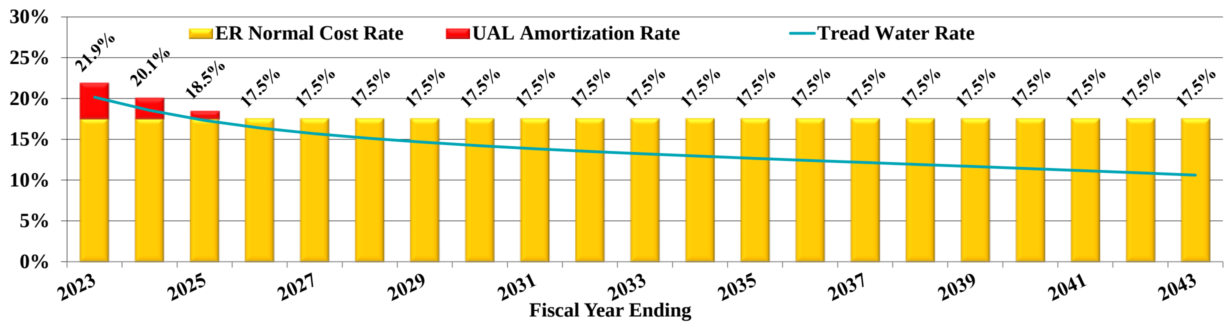
The analysis of projected financial trends is perhaps the most important component of this valuation. In this section, we present the implications of the December 31, 2021 valuation results in terms of (1) the projected employer contributions, and (2) projected System's funded status (ratio of assets over liabilities). We assume future investment returns of 7.25% each year. The projections assume there will be no future gains or losses on the liability and that covered payroll increases at 3.25% per year.

1. Contribution Rate Projections

The chart shows the projected employer normal cost rate (gold bars), UAL amortization rate (red bars), and tread water rate (blue line). The projected actuarially determined employer contribution rates (gold bars plus red bars) are shown above the bars for each year.

Baseline returns of 7.25%

The chart below shows that the employer contribution rate is projected to decrease over the 20-year period from 21.9% for 2023 to 17.5% for 2026 and thereafter. These projections assume that the System earns the assumed investment rate of return of 7.25% on market value each year. The employer contribution rates are projected to decrease over the next few years as deferred investment gains are recognized in the Actuarial Value of Assets. Once the System reaches 100% funded, the employer contribution rate is equal to the employer normal cost rate.



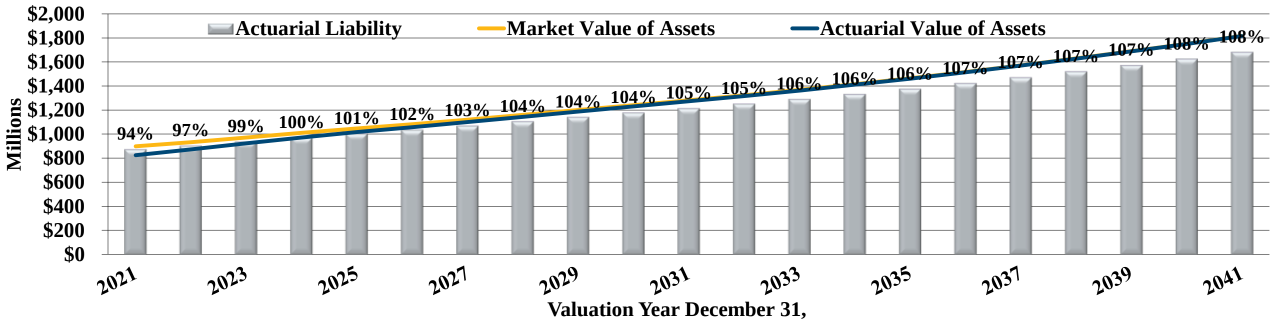
SECTION I – BOARD SUMMARY

2. Asset and Liability Projections

This next projection chart compares the Market Value of Assets (gold line) and the actuarial or smoothed value of assets (blue line) to the System's Actuarial Liabilities (gray bars). In addition, above the bars, we show the System's funded ratio (ratio of Actuarial Value of Assets to Actuarial Liabilities). The projections assume that the employer contribution rates, as shown in the previous charts, are made each year. The years shown in the chart signify the valuation date as of December 31st.

Baseline returns of 7.25%

Assuming that the System earns the assumed investment rate of 7.25%, the funded ratio will increase from 94% to 108% during the 20-year projection period. The UAL is projected to decrease as deferred investment gains are recognized in the Actuarial Value of Assets and the System is projected to reach 100% funded in 2024.



SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but actual future experience will undoubtedly be different and may be significantly different. This section of the report is intended to identify the primary risks to the System, provide some background information about those risks, and provide an assessment of those risks. Some of the charts within this section compare measures calculated for the Police and Fire Retirement System of Wichita, Kansas to plans within the Public Plans Database. Information regarding this data can be found at https://publicplansdata.org/.

Identification of Risks

The fundamental risk to a pension plan is that the contributions needed to pay the benefits become unaffordable. While we believe it is unlikely that the System by itself would become unaffordable, the contributions needed to support the System may differ significantly from expectations. While there are a number of factors that could lead to contribution amounts deviating from expectations, we believe the primary sources are:

- Investment risk,
- Interest rate risk,
- Longevity and other demographic risks, and
- Assumption change risk.

Other risks that we have not identified may also turn out to be important.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

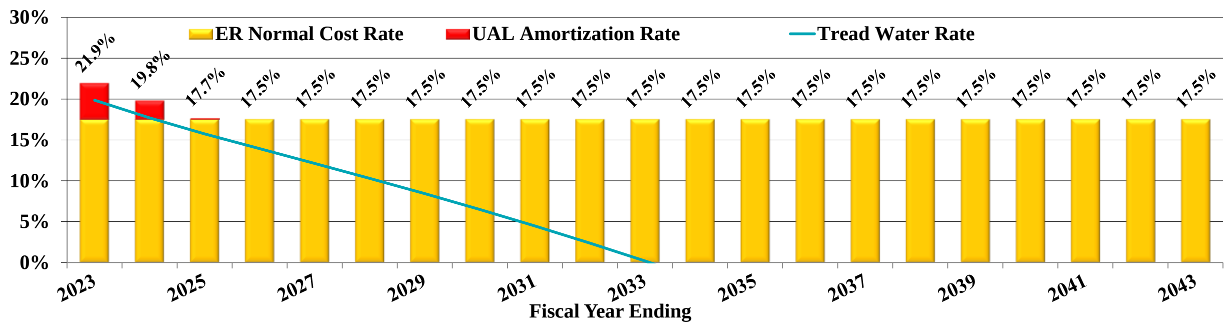
Investment risk is the potential for investment returns to be different than expected. Lower investment returns than anticipated will increase the UAL necessitating higher contributions in the future unless there are other gains that offset these investment losses. The potential volatility of future investment returns is determined by the System's asset allocation, and the affordability of the investment risk is determined by the amount of assets invested relative to the size of the plan sponsor or other contribution base.

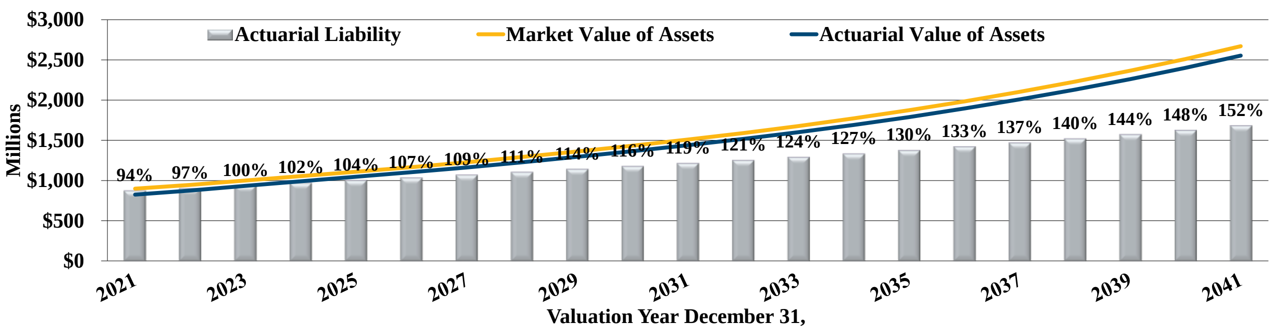
For stress testing purposes, we include two scenarios to illustrate the impact actual investment returns may have on future funded status and contribution amounts compared to the baseline scenario presented at the end of Section I of this report. The two scenarios are (1) optimistic returns of 8.75% each year and (2) pessimistic returns of 5.75% each year.

As with the baseline, we present the implications of the December 31, 2021 valuation results in terms of the projected employer contributions, and projected System's funded status (ratio of assets over liabilities).

1. <u>Optimistic returns of 8.75%</u>

If the System earns 1.50% greater than the assumed rate in each year of the projection, the employer contribution rate will steadily decrease to the employer normal cost rate of 17.5% by 2026. The funded ratio is projected to increase to 100% by 2024 and 152% by the end of the 20-year projection period.

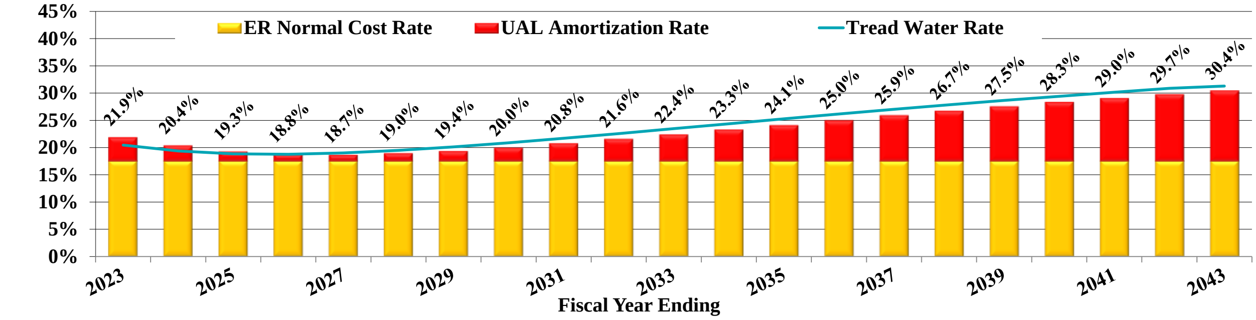


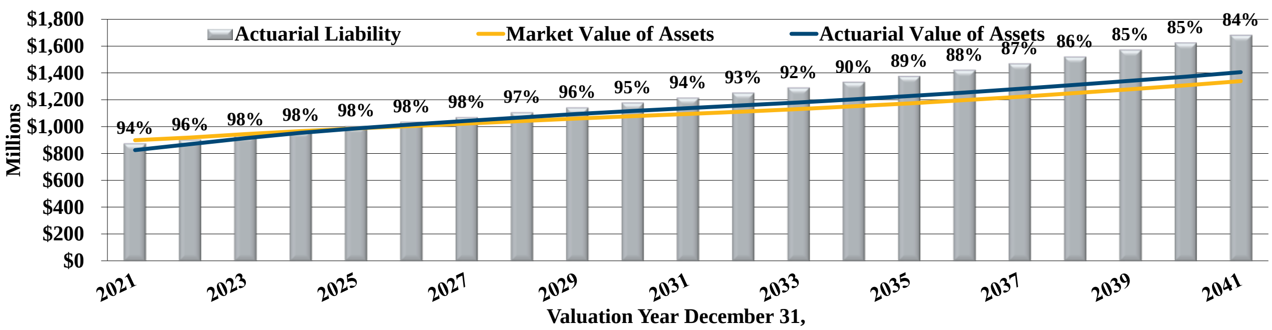


SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

2. Pessimistic returns of 5.75%

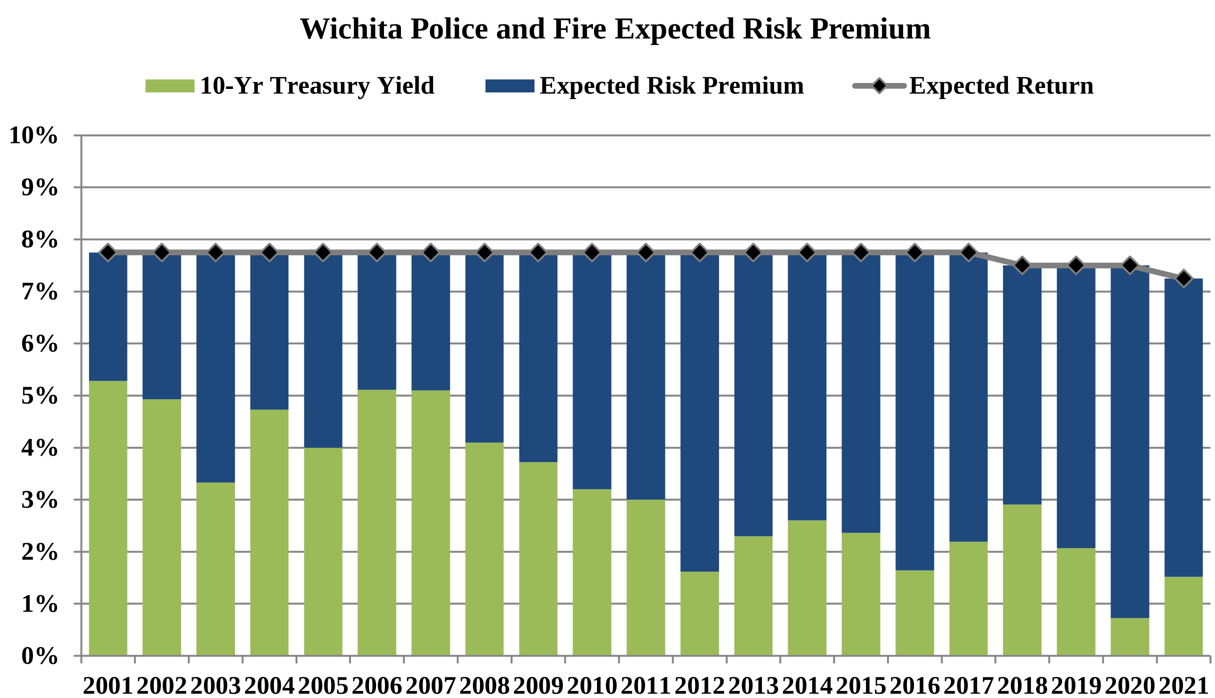
If the System earns 1.50% less than the assumed rate in each year of the projection, the employer contribution rate will decrease for a few years before steadily increasing to 30.4% by the end of the 20-year projection period. The funded ratio will increase for a few years before decreasing to 84% by the end of the 20-year projection period due to the investment losses and employer contribution rates being less than tread water rates.





SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Interest rate risk is the potential for interest rates to be different than expected. For public plans, short-term fluctuations in interest rates have little or no effect as the Plan’s liability is usually measured based on the expected return on assets. Longer term trends in interest rates, however, can have a powerful effect. The chart below shows the yield on a 10-year Treasury security compared to the System’s assumed rate of return. The difference is a simple measure of the amount of investment risk taken. As interest rates have declined, plans faced a choice: maintain the same level of risk and reduce the expected rate of return, maintain the same expected rate of return and take on more investment risk, or some combination of the two strategies. As shown below, even though PFRS has decreased the discount rate during the period, the amount of risk has increased as interest rates have dropped more than the discount rate.

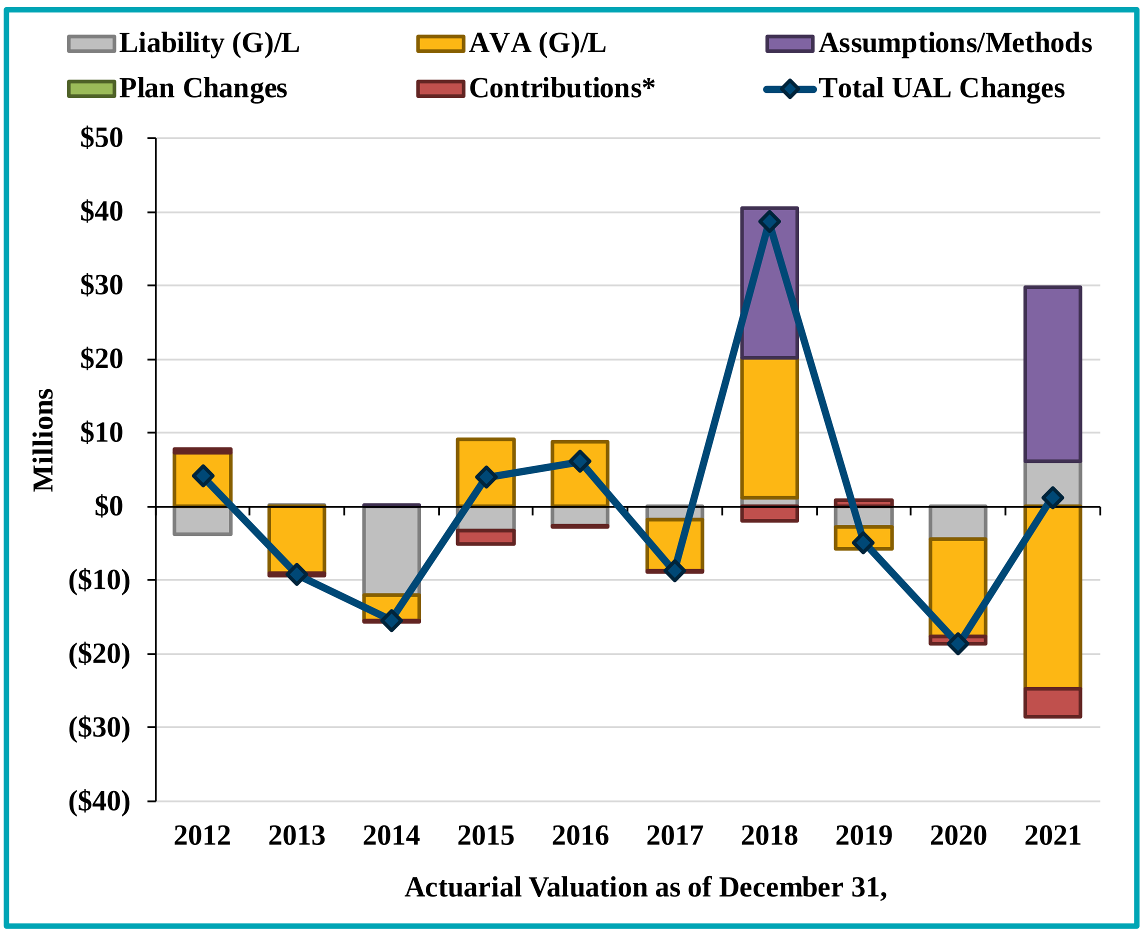


SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Longevity and other demographic risks are the potential for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time and are often dwarfed by other changes, particularly those due to investment returns. The System has experienced liability gains in seven of the last ten years with losses occurring in 2013, 2018, and 2021.

Assumption change risk is the potential for the environment to change such that future valuation assumptions are different than the current assumptions. Increases in UAL from assumption changes were related to experience studies in which demographic and economic assumptions were adjusted. Assumption change risk is an extension of the other risks identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment when the current assumption is no longer reasonable.

The chart below shows the components of changes in the UAL over the last ten years, which demonstrates how many of the risks mentioned above impact the financial status of the System. While a lot of attention is given to the demographic assumptions, the primary risk for the health of the System is the return on investments earned each year.



* UAL change due to contributions (greater)/less than normal cost-plus interest on the UAL.

Table II-1 summarizes the changes in the UAL over the last ten years.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Table II-1
Changes in Unfunded Actuarial Liability
(Dollar amounts in millions)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Discount Rate	**7.75%**	**7.75%**	**7.75%**	**7.75%**	**7.75%**	**7.75%**	**7.50%**	**7.50%**	**7.50%**	**7.25%**	
Source											
AVA (G)/L	$ 7.3	$ (9.1)	$ (3.4)	$ 9.1	$ 8.8	$ (6.8)	$ 19.0	$ (3.0)	$ (13.2)	$ (24.7)	$ (16.0)
Liability (G)/L	(3.7)	0.1	(12.0)	(3.3)	(2.6)	(1.8)	1.2	(2.8)	(4.4)	6.2	(23.2)
Assumptions/Methods	0.0	0.0	0.2	0.0	0.0	0.0	20.4	0.0	0.0	23.7	44.3
Plan/Policy Changes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contributions*	0.6	(0.2)	(0.3)	(1.9)	(0.0)	(0.1)	(1.9)	0.9	(1.0)	(3.9)	(7.8)
Net UAL Change	**$ 4.2**	**$ (9.2)**	**$ (15.5)**	**$ 3.9**	**$ 6.1**	**$ (8.7)**	**$ 38.7**	**$ (4.9)**	**$ (18.6)**	**$ 1.3**	**$ (2.6)**

** UAL change due to contributions (greater)/less than normal cost plus interest on the UAL*

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Plan Maturity Measures

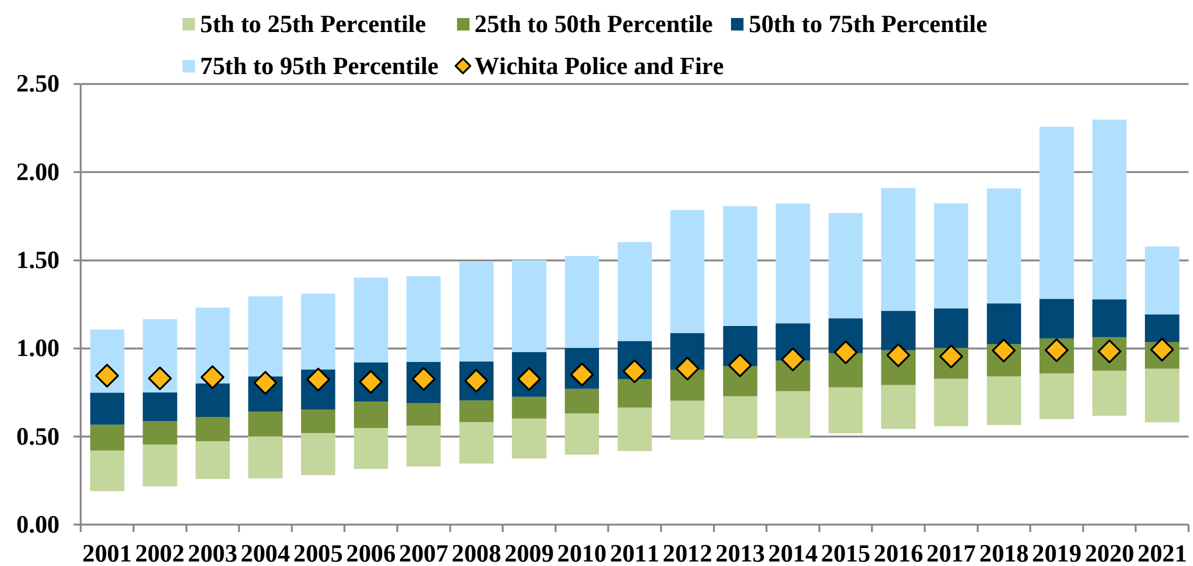
The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. It is important to understand the maturity of this System compared to other plans and how the maturity has changed over time.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic – the larger the Plan is compared to the contribution or revenue base that supports it, the more sensitive the Plan will be to risk. The measures below have been selected as the most important in understanding the primary risks identified for this System.

Inactives per Active (Support Ratio)

One simple measure of plan maturity is the ratio of the number of inactive members (those receiving benefits or entitled to a deferred benefit) to the number of active members. This ratio is referred to as the support ratio. The revenue base supporting the Plan is usually proportional to the number of active members, so a relatively high support ratio indicates a larger plan relative to its revenue base.

Support Ratio



Survey Data from Public Plans Data as of 2/14/2022

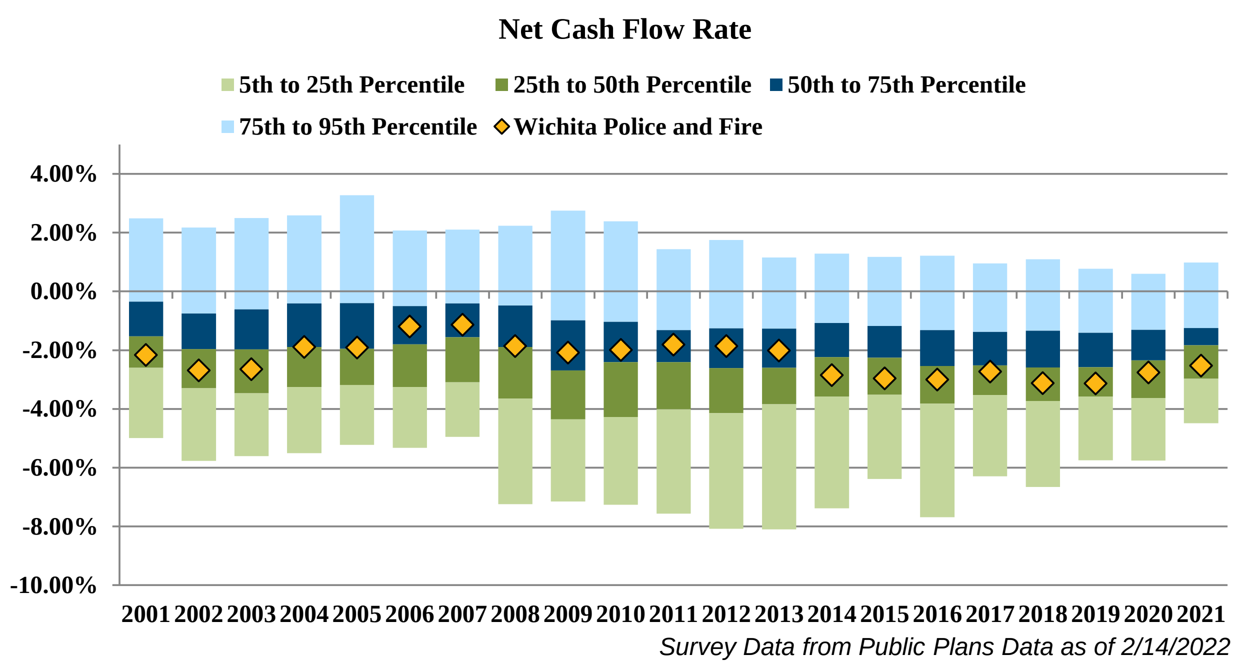
The chart above shows the distribution from the 5th to 95th percentile of support ratios for the Plans in the Public Plans Database. The gold diamond shows how the Police and Fire Retirement System of Wichita, Kansas compares to the other plans, which has trended down relative to other plans and is currently below the median.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

The System's support ratio has recently been in the 25th to 50th percentile of the Public Plans Database meaning that the System is less mature than the average plan in the Database. The System's support ratio has remained fairly level and increased only slightly over the period compared to a steady increase for most plans in the Database. The System's support ratio was initially in the 75th to 95th percentile, but has decreased over the period relative to other plans and has been in the 25th to 50th percentile for the past few years.

Net Cash Flow

The net cash flow of the Plan as a percentage of the end of year assets indicates the sensitivity of the Plan to short-term investment returns. Net cash flow is equal to contributions less benefit payments. Mature plans can have large amounts of benefit payments compared to contributions, particularly if they are well funded, which is the case for this System. Investment losses in the short-term are compounded by the net withdrawal from the Plan leaving a smaller asset base to try to recover from the investment losses. Large negative cash flows can also create liquidity issues.



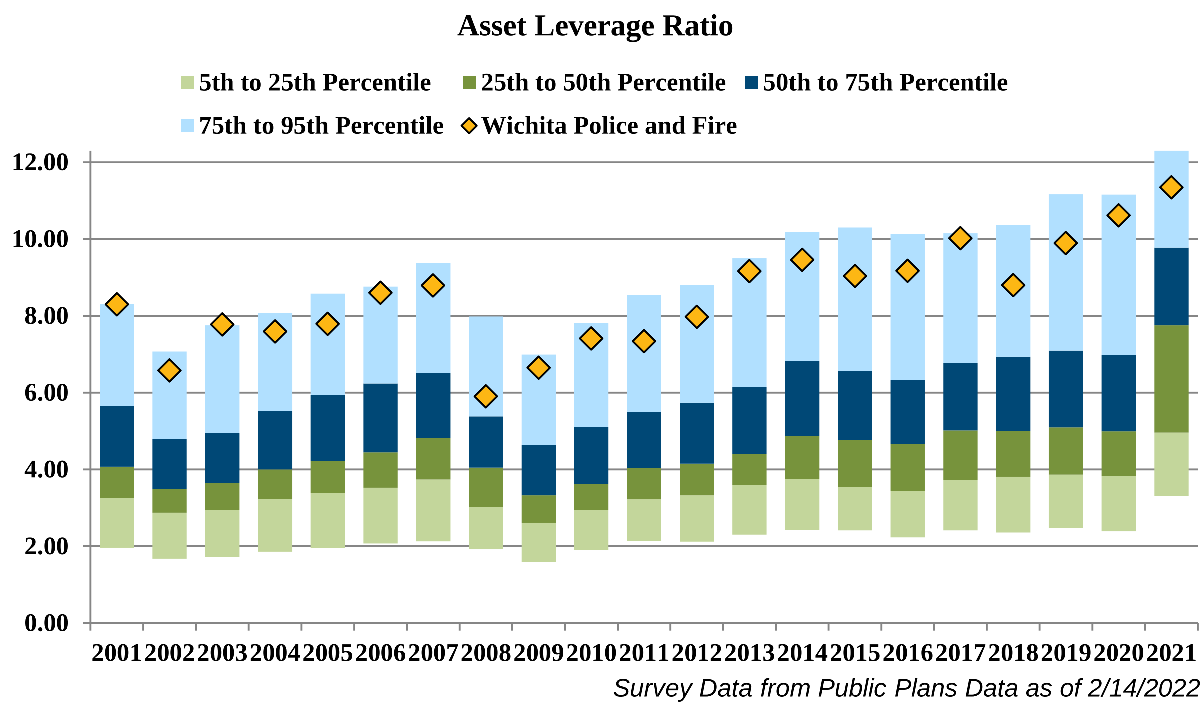
The chart above shows the distribution from the 5th to 95th percentile of net cash flow for the Plans in the Public Plans Database. The gold diamond show how the System compares. From 2006 to 2013, the System's net cash flow was in the 50th to 75th percentile. Since 2014, the System has been in the 25th to 50th percentile compared to other plans. Based on this measure, the System has become more mature over time, but this is partially because the contributions are lower than other plans in the Database that are less well funded.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Leverage Ratios

Leverage or volatility ratios measure the size of the Plan compared to its revenue base more directly. An asset leverage ratio of 5.0, for example, means that if the System experiences a 10% loss on assets compared to the expected return, the loss would be equivalent to 50% of payroll.

The same investment loss for a system with an asset leverage ratio of 10.0 would be equivalent to 100% of payroll. As the System becomes better funded, the asset leverage ratio will increase, and if it was 100% funded, the asset leverage ratio would equal the liability leverage ratio.

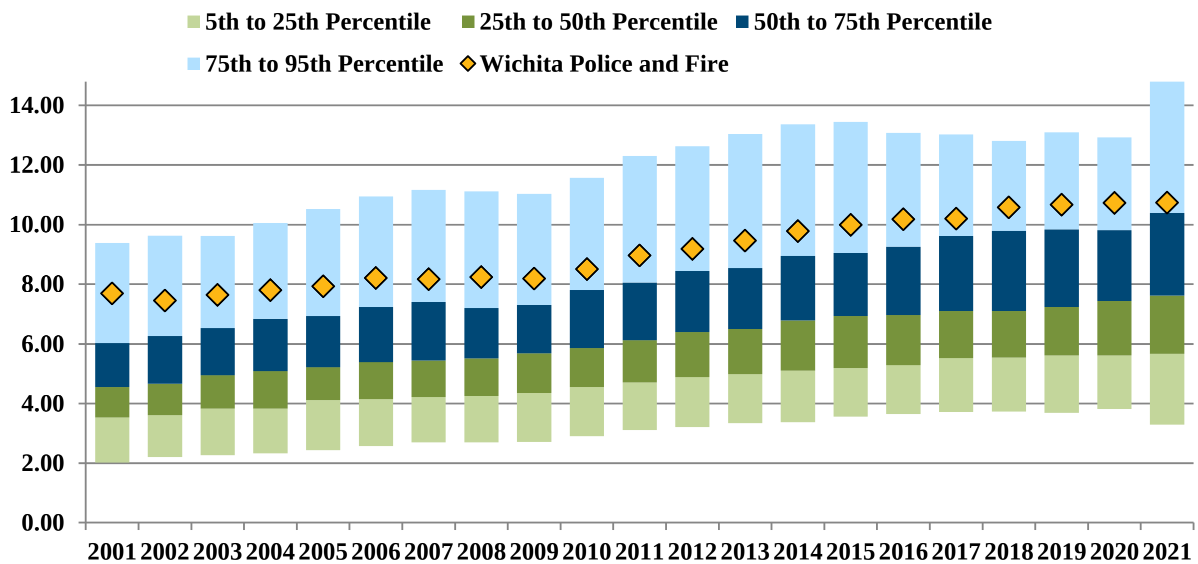


The chart above shows the distribution from the 5th to 95th percentile of asset leverage ratios for the Plans in the Public Plans Database. The gold diamond shows how the System compares. The System's asset leverage ratio has historically been in the 75th to 95th percentile compared to other plans. Based on this measure, the System is among the most mature plans in the Database partially because it is better funded than most plans in the Database.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Similar to the asset leverage ratio, a liability leverage ratio of 5.0 means that if the System experiences a 10% loss on liabilities, the liability loss would be equivalent to 50% of payroll.

Liability Leverage Ratio



Survey Data from Public Plans Data as of 2/14/2022

The chart above shows the distribution from the 5th to 95th percentile of liability leverage ratios for the plans in the Public Plans Database. The gold diamond shows how the System compares.

The System's liability leverage ratio has historically been in the 75th to 95th percentile compared to other plans, meaning that the System is more sensitive to risk compared to the average plan in the Database. As the System matures and more of the liability is due to inactive members, this ratio will continue to increase. The ratio has increased from about 7.7 in 2001 to a ratio of about 10.7 in 2021.

SECTION III – ASSETS

Pension plan assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, employer contributions, and the ultimate security of members' benefits.

In this section, we present detailed information on the System assets including:

- Disclosure of the System assets as of December 31, 2020 and December 31, 2021;
- Statement of the changes in market values during the year;
- Development of the Actuarial Value of Assets;
- An assessment of investment performance; and
- A projection of the System's expected cash flows for the next ten years.

Disclosure

There are two types of asset values disclosed in this valuation, the Market Value of Assets and the Actuarial Value of Assets. The market value represents a "snap-shot" or "cash-out" value which provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not as suitable for long-range planning as are the Actuarial Value of Assets which reflect smoothing of annual investment returns.

Table III-1 below discloses and compares the Market Value of Assets as of December 31, 2020 and December 31, 2021.

Table III-1
Statement of Assets at Market Value as of December 31,

Assets	2021	2020	% change
Cash	$ 105,124	$ 102,193	2.9%
Receivables	8,956,816	4,881,940	83.5%
U.S. Government Securities	21,387,277	20,238,463	5.7%
Fixed Income	157,074,817	140,419,837	11.9%
Domestic Equity	378,078,923	332,443,202	13.7%
International Equity	240,530,717	224,374,223	7.2%
Real Estate	57,918,520	48,020,231	20.6%
Timber	40,048,439	42,384,472	(5.5%)
Derivatives	136,393	236,637	(42.4%)
Accounts Payable	(1,601,607)	(1,579,377)	1.4%
Investment Purchases Pending	(3,939,140)	(5,772,570)	(31.8%)
Market Value of Assets	**$ 898,696,279**	**$ 805,749,251**	**11.5%**

SECTION III – ASSETS

Changes in Market Value

Table III-2 below shows the components of change between the Market Value of Assets as of December 31, 2020 and December 31, 2021.

Table III-2
Changes in Market Values

Market Value of Assets as of December 31, 2020	$ 805,749,251
Additions	
Employee Contributions	$ 6,682,182
Employer Contributions	17,889,908
Interest and Dividends	38,088,612
Net Investment Return	78,176,755
Total Additions	140,837,457
Deductions	
Benefit Payments	$ 46,710,855
Administrative Expenses	556,934
Refunds	622,640
Total Deductions	47,890,429
Market Value of Assets as of December 31, 2021	**$ 898,696,279**

SECTION III – ASSETS

Actuarial Value of Assets

The Actuarial Value of Assets (AVA) represents a "smoothed" value developed by the actuary to reduce, or eliminate, erratic results which could develop from short-term fluctuations in the Market Value of Assets (MVA). For this System, the Actuarial Value of Assets is calculated as the expected Actuarial Value of Assets plus 25% of the difference between the expected Actuarial Value of Assets and the actual Market Value of Assets. The expected Actuarial Value of Assets is calculated based on the prior year's Actuarial Value of Assets, plus net cash flows, plus an expected return of 7.50% for the year ended December 31, 2021. If the resulting Actuarial Value of Assets is less than 80% or more than 120% of the market value, an adjustment is made to the actuarial value to bring the value within this corridor. Table III-3 illustrates the calculation of the Actuarial Value of Assets for the December 31, 2021 valuation.

Table III-3
Development of Actuarial Value of Assets

Actuarial Value of Assets as of December 31, 2020	$ 766,121,894
Employee Contributions	$ 6,682,182
Employer Contributions	17,889,908
Benefit Payments and Refunds	(47,333,495)
Net Cash Flow	$ (22,761,405)
Expected Return at 7.50%	$ 56,621,020
Expected Value as of December 31, 2021	$ 799,981,509
Market Value of Assets as of December 31, 2021	898,696,279
Difference Between Expected AVA and Actual Market Value of Assets	$ 98,714,770
Initial Actuarial Value of Assets	$ 824,660,202
Corridor for Actuarial Value of Assets	
80% of Market Value of Assets	$ 718,957,023
120% of Market Value of Assets	1,078,435,535
Actuarial Value of Assets as of December 31, 2021	$ 824,660,202
Actuarial Value of Assets Divided by Market Value of Assets	91.8%
Market Value of Assets Less Actuarial Value of Assets	$ 74,036,077

SECTION III – ASSETS

Investment Performance

The Market Value of Assets (MVA) returned 14.6% during plan year ending December 31, 2021, which is more than the assumed 7.50% return for the year. A return of 10.8% was experienced on the Actuarial Value of Assets (AVA), resulting in an actuarial gain for the year. Below, we show additional historical returns.

Table III-4
Historical Returns

Fiscal Year	MVA	AVA
2012	13.3%	6.3%
2013	19.6%	9.5%
2014	5.1%	8.4%
2015	-0.1%	6.2%
2016	6.7%	6.3%
2017	17.0%	8.8%
2018	-6.5%	4.9%
2019	19.2%	7.9%
2020	13.5%	9.4%
2021	14.6%	10.8%

Projection of System's Future Cash Flows

Table III-5
Projection of System's Expected Cash Flows

Year Beginning January 1,	Benefit Payments	Employer and Employee Contributions	Net Cash Flow
2022	$53,629,962	$22,670,822	($30,959,140)
2023	50,956,186	24,246,607	(26,709,579)
2024	54,175,137	23,475,372	(30,699,765)
2025	57,850,165	22,807,277	(35,042,888)
2026	62,043,224	22,625,042	(39,418,182)
2027	62,955,099	23,360,356	(39,594,743)
2028	64,413,467	24,119,567	(40,293,900)
2029	66,837,653	24,903,453	(41,934,200)
2030	70,983,277	25,712,815	(45,270,462)
2031	73,739,391	26,548,482	(47,190,909)

Expected contributions assume contribution rates as shown in the graph on page 7 and that payroll will increase at the actuarially assumed rate of 3.25% per year. Expected benefit payments are projected for the closed group valued at December 31, 2021. Projecting any farther than ten years using a closed group would not yield reliable predictions due to the omission of new hires.

SECTION IV – LIABILITIES

In this section, we present detailed information on the System liabilities including:

- **Disclosure** of the System liabilities as of December 31, 2020 and December 31, 2021, and
- Statement of **changes** in the Unfunded Actuarial Liability during the year.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of All Future Benefits:** Used for measuring all future System obligations, represents the amount of money needed today to fully fund all benefits of the System both earned as of the valuation date and those expected to be earned in the future by current plan members, under the current plan provisions.

- **Actuarial Liability:** Calculated as of the valuation date as the Present Value of Benefits allocated to service prior to that date. The Actuarial Liability is determined using the Entry Age Normal method.

These liabilities are for funding purposes and are not appropriate for measuring the cost of settling plan liabilities by purchasing annuities or paying lump-sums.

Table IV-1, which follows, discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of plan assets yields, for each respective type, a **net surplus** or an **Unfunded Liability**.

Table IV-1
Liabilities/Net (Surplus)/Unfunded

	December 31, 2021	December 31, 2020
Present Value of Future Benefits		
Active Member Benefits	$ 557,524,894	$ 512,353,364
Retiree, Disabled and Beneficiaries Benefits	486,357,528	454,479,799
Inactive Member Benefits	12,832,670	12,274,327
Present Value of Future Benefits (PVB)	**$ 1,056,715,092**	**$ 979,107,490**
Actuarial Liability		
Active Member Benefits	$ 374,375,085	$ 346,991,765
Retiree, Disabled and Beneficiaries Benefits	486,357,528	454,479,799
Inactive Member Benefits	12,832,670	12,274,327
Actuarial Liability (AL)	**$ 873,565,283**	**$ 813,745,891**
Actuarial Value of Assets (AVA)	$ 824,660,202	$ 766,121,894
Net (Surplus)/Unfunded (AL-AVA)	**$ 48,905,081**	**$ 47,623,997**

Changes in Unfunded Actuarial Liability

Each of the liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- System amendments changing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Members retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

The Unfunded Actuarial Liability will change because of all of the above, and also due to changes in plan assets resulting from:

- Employer contributions more or less than tread water (normal cost-plus interest on the UAL)
- Investment earnings different than expected
- A change in the method used to measure plan assets

In each valuation, we report on those elements of change which are of particular significance, potentially affecting the long-term financial outlook of the System. Below, we present the reconciliation of the Unfunded Actuarial Liability since the last valuation.

In the table that follows, we show the components of change in the Actuarial Liability between December 31, 2020 and December 31, 2021.

SECTION IV – LIABILITIES

Table IV-2
Development of Experience (Gain)/Loss

	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability
Value as of December 31, 2020	$ 813,745,891	$ 766,121,894	$ 47,623,997
Changes for the year:			
Normal Cost	$ 16,786,611	$ 0	$ 16,786,611
Contributions	0	24,572,090	(24,572,090)
Benefit Payments	(47,333,495)	(47,333,495)	0
Expected Interest	60,547,020	56,621,020	3,926,000
Change in Methods/Assumptions	23,661,770	0	23,661,770
Change in Benefits	0	0	0
Expected Value as of December 31, 2021	$ 867,407,797	$ 799,981,509	$ 67,426,288
Actual Value as of December 31, 2021	$ 873,565,283	$ 824,660,202	$ 48,905,081
Actuarial (Gain)/Loss	$ 6,157,486	$ (24,678,693)	$ (18,521,207)

In addition, we breakdown the change in Actuarial Liability further by showing the liability (gain)/loss by source, as shown in Table IV-3 below.

Table IV-3
Liability (Gain)/Loss by Source as of December 31, 2021

Service and Salary Increases	$ 3,679,891
Retirements	2,232,771
Terminations	(576,208)
Disabilities	(1,367,413)
Pre-Retirement Mortality	(990,118)
Post-Retirement Mortality	488,337
New Hires	640,786
Other Demographic Changes	2,049,440
Total Liability (Gain)/Loss	**$ 6,157,486**

SECTION IV – LIABILITIES

Table IV-4
Present Value of Future Benefits (PVFB)
As of December 31, 2021

	Plan A	Plan B	Plan C	Total
Active Members				
Retirement Benefits	$ 984,933	$ 0	$ 473,254,695	$ 474,239,628
Disability Benefits	0	0	60,267,513	60,267,513
Pre-Retirement Death Benefits	0	0	5,887,790	5,887,790
Termination Benefits	0	0	17,129,963	17,129,963
Total	$ 984,933	$ 0	$ 556,539,961	$ 557,524,894
Inactive Vested Members	$ 0	$ 0	$ 12,423,959	$ 12,423,959
Inactive Non-Vested Members	$ 0	$ 0	$ 408,711	$ 408,711
In Pay Members				
Retirees	$ 113,586,377	$ 10,175,500	$ 262,303,266	$ 386,065,143
Disabled Members	11,538,304	450,883	47,205,457	59,194,644
Beneficiaries	20,182,754	7,752,872	13,162,115	41,097,741
Total	$ 145,307,435	$ 18,379,255	$ 322,670,838	$ 486,357,528
Grand Total	$ 146,292,368	$ 18,379,255	$ 892,043,469	$ 1,056,715,092

SECTION IV – LIABILITIES

Table IV-5
Actuarial Liability
As of December 31, 2021

	Plan A	Plan B	Plan C	Total
Active Members				
Present Value of Future Benefits	$ 984,933	$ 0	$ 556,539,961	$ 557,524,894
Present Value of Future Normal Cost	0	0	(183,149,809)	(183,149,809)
Actuarial Liability	$ 984,933	$ 0	$ 373,390,152	$ 374,375,085
Inactive Vested Members	$ 0	$ 0	$ 12,423,959	$ 12,423,959
Inactive Non-Vested Members	$ 0	$ 0	$ 408,711	$ 408,711
In Pay Members				
Retirees	$ 113,586,377	$ 10,175,500	$ 262,303,266	$ 386,065,143
Disabled Members	11,538,304	450,883	47,205,457	59,194,644
Beneficiaries	20,182,754	7,752,872	13,162,115	41,097,741
Total	$ 145,307,435	$ 18,379,255	$ 322,670,838	$ 486,357,528
Grand Total	$ 146,292,368	$ 18,379,255	$ 708,893,660	$ 873,565,283

SECTION V – CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the System. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this System, the funding method employed as of the December 31, 2021 valuation is the **Entry Age Normal (EAN)** actuarial cost method. Under this funding method, a normal cost rate is determined as a level percentage of pay for each active member. The normal cost rate multiplied by payroll equals the total normal cost for each active member. The total anticipated member contributions for the year are then subtracted from the sum of the total normal cost to arrive at the employer normal cost. The normal cost contributions (employer and active member) will pay for projected benefits at retirement for each active member. The EAN Actuarial Liability is the difference between the System's total Present Value of Future Benefits and the present value of future normal costs. The difference between the EAN Actuarial Liability and the Actuarial Value of Assets is the Unfunded Actuarial Liability (UAL).

The UAL is amortized over an open (rolling) 20-year period as a level percentage of payroll. Due to the nature of a rolling amortization method, the process of fully amortizing the UAL is slow and heavily contingent on investment returns.

Table V-1 below presents and compares the employer contribution rates for the System for this valuation and the prior one.

Table V-1
Employer Contribution Rate

	Fiscal Year Ending 2023	Fiscal Year Ending 2022
Total Normal Cost Rate	24.5%	23.4%
Member Contribution Rate	-7.0%	-7.0%
Employer Normal Cost Rate	17.5%	16.4%
UAL Amortization Rate	4.4%	4.5%
Employer Contribution Rate	21.9%	20.9%

SECTION V – CONTRIBUTIONS

The UAL is amortized over an open (rolling) 20-year period as a level percentage of payroll. Table V-2 shows the calculation of the UAL amortization rates for this valuation and the prior one.

Table V-2
UAL Contribution Rate

Valuation Date: Contribution Rate For Fiscal Year Ending:	December 31, 2021 2023	December 31, 2020 2022
Actuarial Liability (AL)	$ 873,565,283	$ 813,745,891
Actuarial Value of Assets (AVA)	824,660,202	766,121,894
Unfunded Actuarial Liability (UAL)	$ 48,905,081	$ 47,623,997
UAL Amortization Payment at Mid-Year	3,547,809	3,525,657
Total Projected Payroll	81,257,427	78,459,642
UAL Amortization Rate	4.4%	4.5%

Table V-3 shows the calculation of the total normal cost rates for this valuation and the prior one.

Table V-3
Normal Cost Rate

Valuation Date: Contribution Rate For Fiscal Year Ending:	December 31, 2021 2023		December 31, 2020 2022	
	Amount	% of Pay	Amount	% of Pay
Normal Cost				
Retirement Benefits	$ 12,246,582	16.4%	$ 11,192,589	15.6%
Disability Benefits	3,964,417	5.3%	3,677,990	5.1%
Pre-Retirement Death Benefits	413,350	0.6%	390,504	0.6%
Termination Benefits	1,631,591	2.2%	1,525,528	2.1%
Total Normal Cost[1]	18,255,940	24.5%	16,786,611	23.4%
Expected Payroll for Current Actives[1]	74,426,928		71,720,585	

[1] As of the beginning of the year

SECTION VI – ACCOUNTING STATEMENT INFORMATION

GFOA Recommended Information

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in a public retirement system's Annual Comprehensive Financial Report in order to receive recognition for excellence in financial reporting. The GFOA checklist uses the term Actuarial Accrued Liability, which is the same as the Actuarial Liability used elsewhere in this report.

- Table VI-1: Analysis of Financial Experience
- Table VI-2: Schedule of Funded Liabilities by Type (Solvency Test)
- Table VI-3: Schedule of Funding Progress
- Table VI-4: Schedule Retirees and Beneficiaries Added to and Removed from Rolls

Table VI-1
Analysis of Financial Experience
Change in Unfunded Actuarial Accrued Liability[1]

Valuation Date December 31,	Actuarial Value Of Assets Investment (Gain)/Loss	Actuarial Accrued Liability (Gain)/Loss	Assumption & Method Changes	Plan Changes	Contributions[2]	Change in Unfunded Actuarial Accrued Liability
2012	$ 7,300,000	$ (3,700,000)	$ 0	$ 0	$ 600,000	$ 4,151,087
2013	(9,100,000)	100,000	0	0	(200,000)	(9,206,403)
2014	(3,400,000)	(12,000,000)	200,000	0	(300,000)	(15,442,099)
2015	9,088,530	(3,259,180)	0	0	(1,886,754)	3,942,596
2016	8,820,491	(2,638,130)	0	0	(33,480)	6,148,881
2017	(6,822,540)	(1,817,276)	0	0	(95,087)	(8,734,903)
2018	18,971,614	1,227,668	20,399,180	0	(1,883,424)	38,715,038
2019	(2,959,223)	(2,810,020)	0	0	902,650	(4,866,593)
2020	(13,209,119)	(4,416,865)	0	0	(999,293)	(18,625,277)
2021	(24,678,693)	6,157,486	23,661,770	0	(3,859,479)	1,281,084

[1] Prior to 2015, the details were reported rounded to the nearest $100,000, so the components do not sum to the total change in the UAL.

[2] Change due to contributions (greater)/less than normal cost plus interest on the Unfunded Actuarial Accrued Liability.

SECTION VI – ACCOUNTING STATEMENT INFORMATION

Table VI-2
Schedule of Funded Liabilities by Type (Solvency Test)

Valuation Date December 31,	Active Member Contributions (1)	Inactive Members, Retirees, and Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Reported Actuarial Value of Assets	Portion of Actuarial Liabilities Covered by Reported Assets (1)	(2)	(3)
2012	$ 70,527,705	$ 305,985,839	$ 212,559,831	$ 533,380,618	100.0%	100.0%	73.8%
2013	74,238,693	325,096,785	218,412,805	571,261,929	100.0%	100.0%	78.7%
2014	74,684,418	348,915,979	208,304,004	600,860,146	100.0%	100.0%	85.1%
2015	77,222,492	364,943,124	212,970,051	620,148,816	100.0%	100.0%	83.6%
2016	81,765,281	377,864,418	222,014,789	640,508,756	100.0%	100.0%	81.5%
2017	85,753,036	393,307,456	230,956,665	677,616,328	100.0%	100.0%	86.0%
2018	88,116,395	425,093,252	248,875,679	690,969,459	100.0%	100.0%	71.4%
2019	91,219,009	446,538,086	250,689,554	722,197,375	100.0%	100.0%	73.6%
2020	93,912,548	466,754,126	253,079,217	766,121,894	100.0%	100.0%	81.2%
2021	96,912,524	499,190,198	277,462,561	824,660,202	100.0%	100.0%	82.4%

SECTION VI – ACCOUNTING STATEMENT INFORMATION

Table VI-3
Schedule of Funding Progress

Valuation Date December 31,	Actuarial Value of Assets (a)	Actuarial Liability (b)	Unfunded Actuarial Liability (b) - (a)	Ratio Ratio (a) / (b)	Covered Payroll (c)	UAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
2012	$ 533,380,618	$ 589,073,375	$ 55,692,757	90.5%	$ 64,150,064	86.8%
2013	571,261,929	617,748,283	46,486,354	92.5%	65,305,763	71.2%
2014	600,860,146	631,904,401	31,044,255	95.1%	64,572,237	48.1%
2015	620,148,816	655,135,667	34,986,851	94.7%	65,560,465	53.4%
2016	640,508,756	681,644,488	41,135,732	94.0%	66,946,250	61.4%
2017	677,616,328	710,017,157	32,400,829	95.4%	69,634,297	46.5%
2018	690,969,459	762,085,326	71,115,867	90.7%	72,017,196	98.7%
2019	722,197,375	788,446,649	66,249,274	91.6%	73,891,085	89.7%
2020	766,121,894	813,745,891	47,623,997	94.1%	75,880,105	62.8%
2021	824,660,202	873,565,283	48,905,081	94.4%	79,158,885	61.8%

SECTION VI – ACCOUNTING STATEMENT INFORMATION

Table VI-4
Schedule Retirees and Beneficiaries Added to and Removed From Rolls

Valuation Date December 31,	Added to Rolls Number	Added to Rolls Annual Allowance	Removed from Rolls Number	Removed from Rolls Annual Allowance	Rolls at End of Year Number	Rolls at End of Year Annual Allowance	Average Annual Allowance	% Increase in Average Annual Allowance
2012	33	$ 1,201,800	23	$ 435,120	921	$ 25,226,219	$ 27,390	3.8%
2013	48	1,938,485	17	380,985	952	27,143,376	28,512	4.1%
2014	63	2,400,693	42	850,741	971	29,165,652	30,037	5.3%
2015	44	1,652,860	26	494,625	989	30,774,324	31,117	3.6%
2016	31	1,286,489	33	629,314	987	31,914,576	32,335	3.9%
2017	41	1,757,606	28	694,600	1,000	33,526,716	33,527	3.7%
2018	43	1,888,265	28	544,427	1,015	35,386,980	34,864	4.0%
2019	56	2,090,904	27	604,235	1,044	37,445,846	35,868	2.9%
2020	57	2,473,237	41	1,024,790	1,060	39,429,415	37,198	3.7%
2021	58	2,415,326	43	1,126,089	1,075	41,220,576	38,345	3.1%

APPENDIX A – MEMBERSHIP INFORMATION

Table A-1 Total
Table of Plan Coverage

	December 31, 2021	December 31, 2020	% change
Active Members			
Number	1,120	1,116	0.4%
Average Age	40.5	40.7	-0.4%
Average Service	13.8	13.8	0.3%
Total Payroll	$77,470,947	$74,803,405	3.6%
Average Payroll	69,170	67,028	3.2%
Inactive Vested Members	37	37	0.0%
Inactive Non-Vested Members	17	23	-26.1%
Pensioners:			
Number in Pay Status			
Retirees	767	760	0.9%
Disabled Retirees	106	109	-2.8%
Total	873	869	0.5%
Average Age	67.5	67.5	0.0%
Average Monthly Benefit	$3,493	$3,382	3.3%
Beneficiaries:			
Number in Pay Status[1]	202	191	5.8%
Average Age	71.1	70.1	1.5%
Average Monthly Benefit	$1,910	$1,818	5.1%

[1] Includes 18 QDROs in 2020 and 19 QDROs in 2021

APPENDIX A – MEMBERSHIP INFORMATION

Table A-1a Police
Table of Plan Coverage

	December 31, 2021	December 31, 2020	% change
Active Members			
Number	640	629	1.7%
Average Age	40.6	40.9	-0.9%
Average Service	13.8	14.0	-1.1%
Total Payroll	$46,623,322	$44,464,502	4.9%
Average Payroll	72,849	70,691	3.1%
Inactive Vested Members	27	28	-3.6%
Inactive Non-Vested Members	14	21	-33.3%
Pensioners:			
Number in Pay Status			
Retirees	403	396	1.8%
Disabled Retirees	58	57	1.8%
Total	461	453	1.8%
Average Age	66.0	66.1	-0.1%
Average Monthly Benefit	$3,633	$3,504	3.7%
Beneficiaries:			
Number in Pay Status[1]	100	100	0.0%
Average Age	71.1	69.6	2.3%
Average Monthly Benefit	$1,844	$1,758	4.9%

[1] Includes 9 QDROs in 2020 and 2021

APPENDIX A – MEMBERSHIP INFORMATION

Table A-1b Fire
Table of Plan Coverage

	December 31, 2021	December 31, 2020	% change
Active Members			
Number	480	487	-1.4%
Average Age	40.4	40.4	0.0%
Average Service	13.9	13.6	2.1%
Total Payroll	$30,847,625	$30,338,904	1.7%
Average Payroll	64,266	62,298	3.2%
Inactive Vested Members	10	9	11.1%
Inactive Non-Vested Members	3	2	50.0%
Pensioners:			
Number in Pay Status			
Retirees	364	364	0.0%
Disabled Retirees	48	52	-7.7%
Total	412	416	-1.0%
Average Age	69.1	69.0	0.2%
Average Monthly Benefit	$3,336	$3,249	2.7%
Beneficiaries:			
Number in Pay Status[1]	102	91	12.1%
Average Age	71.2	70.7	0.7%
Average Monthly Benefit	$1,974	$1,884	4.8%

[1] Includes 9 QDROs in 2020 and 10 QDROs in 2021

APPENDIX A – MEMBERSHIP INFORMATION

Table A-2
Member Status Reconciliation

Status:	Active			Inactive Vested		Inactive Non-Vested		Disabled						Retired						Beneficiary						Total
Job Classification:	Police	Fire		Police	Fire	Police	Fire	Police			Fire			Police			Fire			Police			Fire			
Plan:	C	A	C	C	C	C	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
December 31, 2020	**629**	**1**	**486**	**28**	**9**	**21**	**2**	**8**	**2**	**47**	**25**	**2**	**25**	**171**	**28**	**197**	**144**	**51**	**169**	**41**	**32**	**27**	**37**	**32**	**22**	**2,236**
New hires	58	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76
Re-hires	0	0	1	0	0	0	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terminated Vested	(2)	0	(2)	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terminated Non-Vested	(12)	0	(3)	0	0	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refunded	(14)	0	(6)	0	0	(18)	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	(39)
Retired	(17)	0	(14)	(3)	(1)	(1)	0	0	0	0	0	0	0	0	0	21	0	0	15	0	0	0	0	0	0	0
Disabled	(1)	0	(1)	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Deceased (with beneficiary)	(1)	0	0	0	0	0	0	0	0	0	(3)	0	(1)	(4)	(1)	0	(3)	(2)	(1)	4	1	2	6	3	4	4
Deceased (without beneficiary)	0	0	0	0	0	0	0	0	0	0	(1)	0	0	(3)	(6)	0	(6)	(3)	0	(1)	(1)	0	(1)	(1)	0	(23)
Transfer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benefits expired	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	(2)	0	0	0	(2)
Status correction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	(1)	(2)	0	0	0	(3)
Net Change	11	0	(7)	(1)	1	(7)	1	0	0	1	(4)	0	0	(7)	(7)	21	(9)	(5)	14	3	(1)	(2)	5	2	4	13
December 31, 2021	**640**	**1**	**479**	**27**	**10**	**14**	**3**	**8**	**2**	**48**	**21**	**2**	**25**	**164**	**21**	**218**	**135**	**46**	**183**	**44**	**31**	**25**	**42**	**34**	**26**	**2,249**

APPENDIX A – MEMBERSHIP INFORMATION

Table A-3

Average Monthly Benefits for New Retirees[1]

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Average Monthly Pension										
0 - 5 Years of Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,710	$ -	$ -
5 - 10 Years of Service	-	3,460	3,379	-	-	-	-	-	3,371	-
10 - 15 Years of Service	1,481	2,296	-	-	2,744	2,688	-	1,867	2,254	2,344
15 - 20 Years of Service	3,850	3,825	4,196	4,549	2,533	1,895	4,203	1,993	3,930	3,929
20 - 25 Years of Service	3,579	3,635	3,230	3,861	3,144	3,108	3,004	2,971	3,037	3,691
25 - 30 Years of Service	4,212	4,551	4,233	4,073	4,320	4,509	4,074	4,212	4,138	-
30+ Years of Service	4,678	4,739	4,866	4,359	6,304	4,658	4,589	4,870	4,790	-
Average for All Years of Service	**$ 3,942**	**$ 4,173**	**$ 3,913**	**$ 4,116**	**$ 3,972**	**$ 4,235**	**$ 3,979**	**$ 3,984**	**$ 3,697**	**$ 3,281**
Average Final Average Salary										
0 - 5 Years of Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,890	$ -	$ -
5 - 10 Years of Service	-	4,441	4,341	-	-	-	-	-	4,262	-
10 - 15 Years of Service	4,616	4,209	-	-	5,122	5,014	-	5,150	4,065	3,838
15 - 20 Years of Service	5,238	5,661	5,464	5,429	4,726	3,590	5,280	4,842	4,961	5,120
20 - 25 Years of Service	6,062	5,840	5,931	6,062	5,596	5,586	5,490	5,132	4,936	5,652
25 - 30 Years of Service	6,204	6,667	6,119	6,196	6,349	6,887	5,963	5,698	5,696	-
30+ Years of Service	6,238	6,360	6,488	5,711	7,929	5,917	5,824	6,192	6,387	-
Average for All Years of Service	**$ 6,085**	**$ 6,068**	**$ 6,026**	**$ 5,983**	**$ 6,082**	**$ 6,055**	**$ 5,756**	**$ 5,671**	**$ 5,337**	**$ 4,959**
Number of Members Retiring										
0 - 5 Years of Service	-	-	-	-	-	-	-	1	-	-
5 - 10 Years of Service	-	3	1	-	-	-	-	-	1	-
10 - 15 Years of Service	1	3	-	-	1	1	-	1	3	2
15 - 20 Years of Service	1	3	2	1	5	1	1	1	1	1
20 - 25 Years of Service	15	5	15	10	7	2	8	13	10	3
25 - 30 Years of Service	16	17	11	13	14	7	9	11	20	-
30+ Years of Service	5	9	7	11	4	10	11	17	2	-
Total for All Years of Service	**38**	**40**	**36**	**35**	**31**	**21**	**29**	**44**	**37**	**6**

[1] Includes new disabilities.

APPENDIX A – MEMBERSHIP INFORMATION

Table A-4
Retired Members by Type and Benefit Amount
(as of December 31, 2021)

Amount of Monthly Benefit	Non-Service Disability	QDRO[1]	Recalc. Service Disability	Service	Service Disability	Survivor	Total
$ 0-500	0	2	0	5	0	0	7
500-1000	2	9	0	4	2	23	40
1000-1500	3	6	0	37	0	31	77
1500-2000	0	1	1	63	0	42	107
2000-2500	0	1	2	115	0	47	165
2500-3000	0	0	2	96	1	22	121
3000-3500	0	0	4	92	6	10	112
3500-4000	0	0	13	96	10	3	122
4000-4500	0	0	21	85	12	2	120
4500-5000	0	0	11	81	7	1	100
>5000	0	0	7	93	2	2	104
Total	**5**	**19**	**61**	**767**	**40**	**183**	**1,075**

[1] Qualified Domestic Relations Order

Table A-5
Schedule of Active Member Valuation Data

Valuation Date	Number of Members: Plan A	Plan B	Plan C	Total	Annual Covered Payroll (in Thousands)	Average Annual Pay	% Increase In Average Annual Pay
12/31/2012	11	0	1,073	1,084	$ 64,150	$ 59,179	2.6%
12/31/2013	9	0	1,076	1,085	65,306	60,190	1.7%
12/31/2014	8	0	1,060	1,068	64,572	60,461	0.5%
12/31/2015	5	0	1,045	1,050	65,560	62,439	3.3%
12/31/2016	4	0	1,059	1,063	66,946	62,979	0.9%
12/31/2017	2	0	1,080	1,082	69,634	64,357	2.2%
12/31/2018	2	0	1,065	1,067	72,017	67,495	4.9%
12/31/2019	1	0	1,093	1,094	73,891	67,542	0.1%
12/31/2020	1	0	1,115	1,116	75,880	67,993	0.7%
12/31/2021	1	0	1,119	1,120	79,159	70,678	3.9%

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Investment Rate of Return

7.25% per year, compounded annually, net of investment and administrative expenses. This assumption is composed of a 2.75% long-term price inflation and a 4.50% real rate of return over price inflation.

2. Payroll Growth

3.25% per year

3. Salary Increase

Salary increase varies by service as follows:

Years of Service	Inflation	Productivity	Merit and Longevity	Total Increase
Under 15	2.75%	0.50%	2.50%	5.75%
15 - 17	2.75	0.50	1.00	4.25
18+	2.75	0.50	0.75	4.00

4. Mortality Rates

Healthy Retirees and Beneficiaries:
RP-2000 Healthy Annuitant Mortality Tables with generational projection using Scale AA

Disabled Retirees:
RP-2000 Disabled Mortality Tables with generational projection using Scale AA

Active Members:
RP-2000 Employee Mortality Tables with generational projection using Scale AA

All active member deaths are assumed to be service related.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

5. Termination Rates before Retirement

Termination rates vary by job classification and years of service as follows:

Years of Service	Police	Fire
0-5	5.50%	2.00%
6	4.50	2.00
7 - 8	3.00	2.00
9 - 13	3.00	1.50
14 - 16	2.00	1.50
17 - 22	2.00	0.00
23+	0.00	0.00

No termination is assumed after attainment of retirement eligibility. A percentage of vested members terminating employment are assumed to forfeit their deferred retirement benefit in lieu of a refund of their accumulated contributions with interest. The table below shows the percent of vested members assumed to forfeit their deferred annuity.

Years of Service	Percent Forfeiting
10 - 14	65%
15 - 19	10
20+	0

6. Retirement Rates and Deferred Retirement Option Plan (DROP) Elections

Retirement rates vary by age, years of service, job classification, and Plan as follows:

Plan C					
Less than 30 Years of Service			30 or More Years of Service		
Age	Police	Fire	Years of Service	Police	Fire
50 - 58	10%	10%	30	0%	0%
59	10	15	31	0	0
60+	100	100	32	25	15
			33	50	20
			34	75	50
			35+	100	100

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Plans A & B		
Years of Service	Police	Fire
28 or less	5%	5%
29	5	5
30	10	5
31	10	5
32	30	25
33	50	25
34	50	25
35+	100	100

In addition, we assume members who retire under service retirement provisions elect a BackDROP of up to 60 months, if eligible.

Inactive vested members with less than 20 years of service are assumed to retire at age 55. Inactive vested members with 20 or more years of service are assumed to retire at age 50.

7. Disability Rates

Disability rates vary by age and job classification. Sample rates are shown below.

Age	Police	Fire
20	0.09%	0.07%
25	0.15	0.12
30	0.30	0.24
35	0.49	0.39
40	0.69	0.54
45	0.88	0.70
50	1.08	0.85
55	1.28	0.91

75% of active member disablements are assumed to be service related.

Rate of recovery from disability is assumed to be zero.

8. BackDROP Election

100% of eligible members are assumed to elect the BackDROP option upon retirement, and for the maximum DROP period possible.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

9. Unknown Data for Members

Same as those exhibited by members with similar known characteristics.

10. Rehires

No explicit assumption or load.

11. Sick Leave Load

The calculated normal retirement benefits are increased by 2.50% to account for the inclusion of unused sick leave in the calculation of service.

12. Percent Married

80% of non-retired members are assumed to be married for purposes of death benefits.

13. Age of Spouse

Females (or males) are three years younger (or older) than their spouses.

14. Vested Deferred Pensions

Benefit amount is assumed to increase during the deferral period at 3.50% per year, compounded annually.

15. Increase in Section 415 and Section 401(a)(17) limits

2.75% per year.

16. Decrement Timing

Decrements are assumed to occur mid-year.

17. Disclosures regarding Models Used

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) for the intended purpose of calculating liabilities and projected benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We are not aware of any material inconsistencies, unreasonable output resulting from the aggregation of assumptions, material limitations or known weaknesses that would affect this report.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Projections in this report were developed using P-scan, our proprietary tool for the intended purpose of developing projections. The projections shown in this report cover multiple individual scenarios and the variables are not necessarily correlated. We are not aware of any material inconsistencies, unreasonable output resulting from aggregation of assumptions, material limitations or known weaknesses that would affect the projections shown in this report.

18. Rationale for actuarial assumptions

The demographic actuarial assumptions were adopted by the Board of Trustees based upon recommendations made in an actuarial experience study covering the period January 1, 2014 through December 31, 2016, prepared by the prior actuary. The economic actuarial assumptions were adopted by the Board, effective with the December 31, 2021 valuation, based on recommendations from the economic experience study presented to the Board on March 9, 2022. Cheiron has reviewed the assumptions. While we consider these assumptions to be reasonable, we have not performed our own demographic actuarial experience study.

19. Changes in actuarial assumptions since last valuation

The investment rate assumption was changed from 7.50% to 7.25%.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

B. Projection Assumptions

1. New Entrants

Active population is assumed to remain level.

2. Administrative Expenses

Assumed to be paid through future investment returns

C. Actuarial Methods

1. Actuarial Value of Assets

The expected Actuarial Value of Assets plus 25% of the difference between the expected Actuarial Value of Assets and the actual Market Value of Assets. The expected Actuarial Value of Assets is calculated based on the prior year's Actuarial Value of Assets, plus net cash flows, plus the expected investment return. If the resulting Actuarial Value of Assets is less than 80% or more than 120% of the market value, an adjustment is made to the actuarial value to bring the value within this corridor.

2. Actuarial Cost Method

The cost method for valuation of liabilities used for this valuation is the Entry Age Normal (EAN) method. Under this funding method, a normal cost rate is determined as a level percentage of pay for each active member. The normal cost rate multiplied by payroll equals the total normal cost for each active member. The total anticipated member contributions for the year are then subtracted from the sum of the total normal cost to arrive at the employer normal cost. The EAN Actuarial Liability is the difference between the System's total Present Value of Future Benefits and the present value of future normal costs. The Unfunded Actuarial Liability is the difference between the Actuarial Liability and the Actuarial Value of Assets.

3. Amortization Method

The Unfunded Actuarial Liability is amortized over an open (rolling) 20-year period as a level percentage of payroll. If the Unfunded Actuarial Liability is negative, the Unfunded Actuarial Liability is not amortized and the actuarially determined employer contribution rate is equal to the employer normal cost rate.

4. Changes in Actuarial Methods since last valuation

None.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

1. Plan Year

January 1 through December 31.

2. Plans

Plan A is applicable to members who entered the System between January 1, 1965 and December 31, 1978, and members who entered prior to January 1, 1965 and elected Plan A coverage.

Plan B is applicable to members who entered the System prior to January 1, 1965 and elected Plan B coverage.

Plan C is applicable to members entering the System after December 31, 1978.

3. Final Average Salary

Average salary for the three consecutive years of service out of the last ten years of service which produce the highest average.

4. Service Retirement

Eligibility: For Plan A and B members, 20 years of service

For Plan C members, the earlier of:
- Age 55 with 10 years of service
- Age 50 with 20 years of service
- 30 years of service

Amount: 2.50% of Final Average Salary times years of service.

Maximum amount is 75% of Final Average Salary.

5. Deferred Retirement

Eligibility: Ten years of service. 20 years of service required for survivor benefits. Member may also elect a refund of accumulated contributions with interest in lieu of a deferred retirement benefit.

Amount: The Accrued Benefit at termination is based on the service retirement formula. The Accrued Benefit is adjusted during the deferral period based on changes in the National Average Earnings, up to 5.5% annual adjustments. Payments commence at age 55, or age 50 for Plan C members with 20 or more years of service.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

6. Service-Connected Disability

Eligibility:	No age or service requirement. Requires permanent inability to perform the duties of position.
Amount:	75% of final rate of salary if accident, 50% if disease. Pension plus earnings from gainful employment cannot exceed current salary for rank held at time of disability. Pension recomputed at age 55 using service retirement formula, updated final average salary and service credit for period of disability.

7. Non-Service Disability

Eligibility:	Seven years of service and under age 55. Requires permanent inability to perform duties of current position.
Amount:	30% of Final Average Salary plus 1% of Final Average Salary times years of service in excess of seven years. Maximum benefit is 50% of Final Average Salary. Pension plus earnings from gainful employment cannot exceed current salary for rank held at time of disability.

8. BackDROP (Deferred Retirement Option Plan)

Eligibility:	Member must be eligible to retire under service retirement provisions at the effective date of the BackDROP.
Amount:	Under the BackDROP, the member may elect a benefit based on a retirement date up to 60 months prior to the current date. The monthly benefit is computed based on years of service and Final Average Salary as of the selected prior date. The DROP account payable to the retiring member is the computed benefit multiplied by the number of months of BackDROP plus applicable Post-Retirement Adjustments and 5% annual interest, compounded monthly from the selected prior date. The monthly benefit paid to the member includes Post-Retirement Adjustments as if the member had retired on the selected prior date.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

9. Spouse Pre-Retirement Service-Connected Death Benefits

Eligibility: Death resulting directly from service-connected causes.

Amount: For surviving spouses, 50% of final salary plus 10% of final salary for each child under age 18 to a maximum of 75% of final salary.

For minor children without a surviving spouse, 20% of final salary for each child under age 18 to a maximum of 60% of final salary.

10. Spouse Pre-Retirement Non-Service-Connected Death Benefits

Eligibility: For Plan A and C members, three years of service

For Plan B members, 20 years of service

Amount: For Plan A and C members:

For surviving spouses, 35% of Final Average Salary plus 1% of Final Average Salary for each year of service in excess of three to a maximum of 50% of Final Average Salary. Benefit terminates upon remarriage prior to age 40 for pensions effective prior to January 1, 2000.

For minor children with a surviving spouse, 10% of Final Average Salary for each child under age 18. Maximum benefit, including surviving spouse benefit, is 66 2/3% of Final Average Salary.

For minor children without a surviving spouse, 15% of Final Average Salary for each child under age 18 to a maximum of 50% of Final Average Salary.

For Plan B members:

For surviving spouses, 50% of final salary.

For minor children without a surviving spouse, children share equally a benefit of 50% of final salary.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

11. Post-Retirement Death Benefits

Eligibility: 20 years of service. For retirements prior to January 1, 2000, surviving spouse must have been married to retired employee at retirement. For retirements on or after January 1, 2000, surviving spouse must have been married to retired employee for at least one year at time of death.

Minor children must be under the age of 18.

Amount: For Plan A and C members:

For surviving spouses, 35% of Final Average Salary plus 1% of Final Average Salary for each year of service in excess of three to a maximum of 50% of Final Average Salary. Benefit terminates upon remarriage prior to age 40 for those retiring prior to January 1, 2000.

For minor children with a surviving spouse, 10% of the member's Final Average Salary for each child under age 18. Maximum benefit, including surviving spouse benefit, is 66 2/3% of Final Average Salary.

For minor children without a surviving spouse, 15% of member's Final Average Salary for each child under age 18. Maximum benefit is 50% of Final Average Salary.

For Plan B members:

For surviving spouses, 50% of final salary.

For minor children without a surviving spouse, children share equally a benefit of 50% of final salary.

12. Post-Retirement Funeral Benefits

Eligibility: For Plan A and C members, must have retired after November 21, 1973.

All Plan B members are eligible.

Amount: For Plan A and C members, $750

For Plan B members who retired after November 21, 1973, $750

For Plan B members who retired on or before November 21, 1973, $100.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

13. Non-Vested Termination Benefits

Eligibility:	Termination of employment without eligibility for any other benefit.
Amount:	Refund of member's contributions with interest at 5% per year compounded monthly.

14. Post-Retirement Adjustments (PRA)

Eligibility: s	Completion of 36 months of retirement.
Amount:	2% of the original base benefit (simple COLA).

15. Member Contributions

Plan A:	8% of salary.
Plan B:	6% of salary.
Plan C:	7% of salary.

16. City Contributions

Actuarially determined amounts sufficient to satisfy K.S.A 1977 Suppl. 12-5002.

17. Unused Sick Leave

Each bi-weekly service credit of accumulated unused sick leave is converted to a service credit for the purpose of computing annual benefit amounts.

18. Section 415 limit

$230,000, effective January 1, 2021.

19. Section 401(a)(17) limit

$290,000, effective January 1, 2021.

20. Changes Since Last Valuation

None.

APPENDIX D – GLOSSARY OF TERMS

1. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disability, and retirement; changes in compensation; inflation; rates of investment earnings, and asset appreciation or depreciation; and other relevant items.

2. Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a normal cost and an Actuarial Liability.

3. Actuarial Gain/(Loss)

A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial cost method.

4. Actuarial Liability

The portion of the Actuarial Present Value of projected benefits which will not be paid by future normal costs. It represents the value of the past normal costs with interest to the valuation date.

5. Actuarial Present Value (Present Value)

The value as of a given date of a future amount or series of payments. The Actuarial Present Value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made. As a simple example: assume you owe $100 to a friend one year from now. Also, assume there is a 1% probability of your friend dying over the next year, in which case you will not be obligated to pay him. If the assumed investment return is 10%, the Actuarial Present Value is:

Amount		Probability of Payment		1/(1+Investment Return)		
$100	x	(1 - .01)	x	1/(1+.1)	=	$90

6. Actuarial Valuation

The determination, as of a specified date, of the normal cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

APPENDIX D – GLOSSARY OF TERMS

7. Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan as used by the actuary for the purpose of an actuarial valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values. This way long-term costs are not distorted by short-term fluctuations in the market.

8. Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of actuarial assumptions.

9. Amortization Payment

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

10. Entry Age Normal Actuarial Cost Method

A method under which the Actuarial Present Value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages.

11. Funded Ratio

The ratio of the Actuarial Value of Assets to the Actuarial Liabilities.

12. Investment Return Assumption

The assumed interest rate used for projecting dollar related values in the future.

13. Mortality Table

A set of percentages which estimate the probability of death at a particular point in time. Typically, the rates are annual and based on age and sex.

14. Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses, which is allocated to a valuation year by the actuarial cost method.

APPENDIX D – GLOSSARY OF TERMS

15. Projected Benefits

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of actuarial assumptions, taking into account such items as the effect of advancement in age and increases in future compensation and service credits.

16. Unfunded Actuarial Liability

The excess of the Actuarial Liability over the Actuarial Value of Assets.

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